

Spec. No. VOLUME 1
Women's Health Clinic
Proj. No. 593-2202



Specifications

For: Construction Documents SPECIFICATIONS
VA MEDICAL CENTER -
Women's Health Clinic
Volume 1(Division 01 - Division 13)

At: VA Medical Center
VA Southern Nevada Healthcare System

Issue August 10, 2012

Open Bids

Amendment

No.	Date
A	9/7/12
B	1/25/13

Property of Department of Veterans Affairs

WITHIN 10 DAYS AFTER DATE OF OPENING BIDS, RETURN
THIS SPECIFICATION TOGETHER WITH DRAWINGS, POSTAGE
PREPAID TO:

DEPARTMENT OF VETERANS AFFAIRS
 WOMEN'S HEALTH CLINIC
 VA Medical Center
 SPECIFICATIONS

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PROJECT SUMMARY

Project Description

- A. General: The existing VA Medical Center is a mixed use complex approximately 780,000 s.f. with multiple stories ranging from six to three stories tall and including a basement. The Medical Center building houses a hospital, several clinic and supporting offices; it is expected to be fully operating in the summer of 2012. The existing facility is located in North Las Vegas, Nevada, on Pecos Road and the 215 Beltway.

- B. General Scope: The "Work" is approximately 10,000 s.f. that will consists of 12 exam rooms each with individual toilets, 11 supporting offices, 1 large conference room, and a reception space with a waiting area. The new construction is located in the ambulatory wing on the southwest corner of the third level. Along with the new architectural work, the existing mechanical, electrical, plumbing and special systems shall be upgraded to support the associated infrastructure required for the new Women's Health Clinic. The scope of the renovation includes:
 - 1. Demolition of existing partitions, doors, ceilings and all associated systems in the spaces affected by the new "Work"
 - 2. A new layout design that will include exam rooms, toilets, offices and waiting space.
 - 3. Upgrades of finishes to the existing Break Room.
 - 4. Reconfigure new HVAC layout system per new clinic layout.
 - 5. Upgraded fire alarm and fire sprinkler systems per new clinic layout.
 - 6. Upgraded electrical systems per new equipment requirements.
 - 7. Upgraded telecommunication systems throughout the new space.
 - 8. New and upgraded plumbing system per new clinic layout.
 - 9. Replacing the glazing and spandrel lites at the west elevation.
 - 10. Architectural finish upgrades

- C. Intent: The intent is to select a qualified bidder to:
 - 1. Provide and install all new construction and equipment for the new Women's Health Clinic at the existing VA Medical Center.

Objective: To renovate and upgrade the existing facilities and building systems in the existing VA Medical Center to support the new clinic's requirements and longevity of operations. By the time the "Work" will commence, the building will be occupied and operating throughout the "Project" duration. The VA Medical Center will be operating and open to the public during construction.

General Code Requirement

- A. All work is to be in compliance with current codes and regulations, including but not limited to:
 - 1. 2009 International Building Code and associated Fire and Mechanical Codes
 - 2. National Standard Plumbing Code, 2003
 - 3. National Electrical Code, 2010
 - 4. ASHRAE 62.1, Indoor Air Quality
 - 5. VA Barrier Free Design Guide, November 2007
 - 6. Uniform Federal Accessibility Standards, Latest Edition

- B. In addition to the above, Fire Detection and Alarm System shall comply with the latest editions of the following:
 - 1. Life Safety Code, NFPA-101-2012
 - 2. National Fire Alarm Code, Latest Edition

3. VA Fire Protection Design Manual, Fifth Edition, April 2009
- C. The Project is to be constructed for complete accessibility according to the 2009 International Building Code, VA Barrier Free Design Guide and the Uniform Federal Accessibility Standards, Latest Edition

Existing Conditions and Facility Operations

- A. The VA Medical Center is expected to be an operating facility in the summer of 2012. The facility will remain in operations throughout the course of construction and close-out phase.
- B. The Contractor shall be responsible to coordinate all work with the VA Medical Center so as not to impact the on-going operations, including scheduling work during off-peak hours if required and necessary to minimize impact to Owner's operations.
 1. Utility shut downs, turn-overs and tie-ins are to be coordinated with Owner and scheduled to minimize impact to the Owner's operations.
 2. Materials and equipment movement through the facility must be scheduled and coordinated with Owner ahead of time to allow for appropriate security and access, particularly through the healthcare operations.
- C. Site constraints limit areas for construction staging, deliveries, Contractor and subcontractor offices and team parking. The Contractor is solely responsible for securing lease, access and other agreements necessary with adjacent property owners to provide secured areas for construction lay down, staging, deliveries, Contractor and subcontractor offices and parking. Actual location construction lay down, staging, deliveries, Contractors' offices and parking is to be identified to the Owner and subject to Owner's approval. No additional costs nor schedule extensions will be permitted arising from fees, fines (including parking tickets), delivery delays, staging, thefts, vandalism, etc.
- D. The Contractor team shall be responsible for verifying all existing conditions for the new "Work."

Contractor/Construction Requirements

- A. All construction work must be performed in manner that does not jeopardize, causes to be in violation, or affects the VA Medical Center business of operations.
- B. All members of the Construction Team must comply with the strict security requirements of the VA Medical Center.

Life Safety

Applicable Codes and Standards

VA Fire Protection Design Manual, Fifth Edition, April 2009

Life Safety Code, NFPA 101-2012

National Fire Codes, Latest Edition in effect at the Date of Award of the design contract.

International Building Code, 2009 Edition

National Standard Plumbing Code, 2003

National Electrical Code, 2010

ASHRAE 62.1, Indoor Air Quality

VA Barrier Free Design Guide, Nov 2007

Uniform Federal Accessibility Standards, Latest Edition

As stated in the VA Fire Protection Design Manual, "*the Public Buildings Amendment Act (PL 100-678) requires all federal agencies to follow the latest editions of nationally recognized fire and life safety codes. It also requires federal agencies to give local fire protection officials the opportunity to review and comment on projects for compliance with local regulations and compatibility with local fire fighting practices*".

In addition, the Manual establishes that "*Fire protection features not addressed by the NFC shall be designed to comply with the requirements of the latest edition of the International Building Code (IBC) or as otherwise addressed in this manual*".

Following this approach, the 2012 Life Safety Code will be used as the basis of design for the Women's Center. Fire Protection features not addressed in the National Fire Codes shall be designed to comply with the 2009 IBC or as otherwise addressed in the Design Guide.

Code references listed in the narrative are based on the 2012 Life Safety Code, unless noted otherwise. As an Ambulatory Health Care portion of the facility the applicable reference is Chapter 20, New Ambulatory Health Care occupancies. Many means of egress requirements are governed by Chapter 38, New Business Occupancies.

Use Group and Occupancy

The new Women's Center will occupy smoke compartment 3-2 on Level 3 of the existing VA Medical Center at the southwest corner of the floor. The new Women's Center will require a modification of the existing smoke compartment 3-2, which currently measures 11,820 square feet.

This project will constitute an alteration to that compartment. The modification will shift approximately 24 square feet from compartment 3-1 to compartment 3-2. It will remain classified as Ambulatory Health Care.

Construction Type and Height/Area

Building construction type is Type II (222), IBC Type IB. Per NFPA 101 there are no height or area limitations for this building (Table 18.1.6.1).

Fire department vehicle access is provided around the entire perimeter of the building.

Building Separation

As this is an interior renovation there are no building separation issues.

Interior Finish

Walls and ceilings in rooms housing four or fewer occupants may be Class A or B interior finish. Corridor wall finish not exceeding 48" in height and located in the lower half of the wall may be Class A or B. All other interior finish shall be Class A.

Class I or Class II floor finish shall be provided in exit enclosures and exit access corridors and spaces not separated from them by walls.

Fire Barriers and Smoke Barriers

The Medical Center is currently subdivided by fire barriers and smoke barriers. Two hour fire barriers are provided for separation of non-Health Care occupancies from the Health Care portions of the building. The renovation takes place within an Ambulatory Health Care portion of the building.

The area of renovation is located within smoke compartment 3-2, which has a floor area of 11,820 square feet. This compartment will be increased by approximately 24 SF as a result of the interior modifications.

Refer to FJ 103F for the proposed smoke compartment configurations. Travel distances to smoke barriers are all less than 200 feet.

HVAC systems will be zoned as much as possible to correspond with the smoke barriers. Where this is not possible, return air ducts will be provided with smoke detectors at the point the duct crosses a smoke barrier. Smoke dampers will not be provided in fully ducted systems in following NFPA 101 §20.3.7.6.

Incidental hazardous use areas will be separated in accordance with the requirements of 38.3.2.2 and to follow the standards established under the original building design. In summary the following rooms will be rated:

Laundry rooms > 100 square feet:	1 hour
Soiled Linen Rooms:	1 hour
Storage Rooms > 100 square feet:	1 hour
Trash Collection Rooms:	1 hour
Electrical Equipment Rooms:	1 hour
Mechanical Equipment Rooms:	1 hour

There are no modifications to existing stairs.

There are no special requirements for corridor enclosures in a fully sprinklered building per 38.3.6.1.

Means of Egress

Means of egress component limits (fully sprinklered building):

Occupancy	Travel Distance Limit, feet	Common Path Limit, feet	Dead-End Limit, feet
Health Care	200	100	30
Ambulatory Care	200	100	50
Business	300	100	50
Storage	400	100	100

All exits for the ED Expansion discharge directly to the building exterior.

Exit remoteness is good and exits from each fire area comply with §20.2.4.2 for number and type required.

Door swings are generally in the direction of egress travel, except for doors to individual rooms of low occupancy.

Corridor widths will be a minimum of 72 inches in the Women's Center, except where there is no patient access. Corridors in these areas are a minimum 44 inches.

Exit signs are shown on the Life Safety plans.

The following tables summarize the occupant loading and egress capacity by floor level. Refer to the FJ drawings for additional information.

COMPARTMENT 3-2 OCCUPANT LOADING

SMOKE COMPARTMENT	USE	AREA (SQFT)	OCCUPANT LOAD FACTOR (FT2/PERSON)	OCCUPANT LOAD (PERSONS)
3-2	Ambulatory Health Care	11,844	100	119

COMPARTMENT 3-2 EXIT CAPACITY

EXIT ELEMENT	STAIR CLEAR WIDTH (IN)	STAIR FACTOR (IN/OCC)	DOOR CLEAR WIDTH (IN)	HORIZONTAL FACTOR (IN/OCC)	CAPACITY (OCCUPANTS)
Stair 7	48	0.3	32	0.2	160
Stair 8	48	0.3	32	0.2	160
					320

Hazardous Materials

There are no designated areas for hazardous materials in the Medical center. The following table lists the allowable quantities of hazardous materials permitted to be stored in each control area per IBC Table 307.7(1). At the current time, the Medical Center building is classified as a single control area, therefore, these are the allowable limits of storage for the entire building plus the Women's Center.

Hazardous Material	Allowable Qty	Allowable Qty Safety Cans/ Cabinets	Allowable Qty Safety Cans + Sprinklers
Class II Combust. Liquid	120 gallons	240 gallons	480 gallons
Class IIIA Combust. Liquid	330 gallons	660 gallons	1320 gallons
Class IIIB Combust. Liquid	13,200 gallons	26,400 gallons	No Limit
Flammable Gas, Liquefied	30 gallons	60 gallons	120 gallons
Flammable Gas, Gaseous	1,000 cubic feet	2000 cubic feet	4000 cubic feet
Class IA Flammable Liquid	30 gallons	60 gallons	120 gallons
Class IB Flammable Liquid	60 gallons	120 gallons	240 gallons
Class IC Flammable Liquid	90 gallons	180 gallons	360 gallons
Combination IA+IB+IC	120 gallons	240 gallons	480 gallons
Class 1 Oxidizer	4,000 pounds	8,000 pounds	16,000 pounds
Class 2 Oxidizer	250 pounds	500 pounds	1,000 pounds

Fire Protection

Fire Protection Water Supply

System Overview: The fire water supply for the new Women's Center will be supplied from the existing VA Las Vegas Medical Center complex. The existing water supply is provided by an atmospheric storage tank located adjacent to the central plant with 204,000 gallons of water dedicated for fire protection use. The storage tank was provided under Phase 1 ECP. All pump and underground systems have been designed in accordance with NFPA-20, NFPA-24, and the VA Fire Protection Design Manual.

Pressure is boosted by redundant ITT-AC 1500 gpm at 115 psi fire pumps also located in the central plant. Redundant 8" feed mains, located on opposite sides of a 25 foot wide utility trench between the central plant and the Medical Center, supply the complex with fire protection water for fire sprinkler and standpipe systems. Fire hydrants are supplied by the municipal water supply system.

The main hospital and Women's Center are provided with a redundant water supply source from the municipal water distribution system servicing the area. Fire hydrants located throughout the site provide a secondary water source as required by the VA Design manual. Fire department trucks provide the additional pressure required through the existing fire department connections.

Fire Pump Design Criteria: Two (redundant) fire pumps rated 1500 gpm at 115psi, have been provided. The fire pumps are sized based on the two most demanding sprinkler systems in the hospital; the warehouse and a light hazard system located on the highest level of the hospital. The fire pump pressure has not been sized to provide NFPA-14 standpipe pressure requirements as this pressure will be supplemented by the fire department via fire department connections as required by the VA Fire Protection Design Manual. Each fire pump system is redundant and does not rely on components from the other pump system to operate. Soft start controllers with automatic transfer switches control each fire pump.

Fire pump curve data, based on the shop drawing submittal is as follows:

- 0 gpm at 130 psi
- 750 gpm at 125 psi
- 1,500 gpm at 115 psi
- 2,250 gpm at 90 psi

Fire Sprinkler and Standpipe Systems:

System Overview: The Women's Center will be fully sprinklered. Systems will be designed in accordance with NFPA 13-2009, and the fifth edition VA Fire Protection Design Manual. All systems will be wet-pipe.

Sprinkler Control Zones: All work occurs within the existing Compartment 3-2.

Design Basis

Women's Center Fire Sprinkler Systems: Sprinkler system design basis will be light hazard, with a design density of 0.10 gpm per square foot over the hydraulically most remote 1500 square feet.

Sprinklers

All sprinklers will be quick response except for areas identified by the VA Fire Protection Design Guide including switch-gear rooms and elevator pits will be standard response.

Generally all sprinklers will be quick response recessed pendants white in color in all finished areas. Unfinished areas will be provided with quick response brass upright or pendant sprinklers.

Fire Department Connections: The existing Medical Center fire department connections will be retained. These are interconnected so that any fire department connection supplies all of the standpipe risers and sprinkler systems within the Medical Complex including the new Women's Center.

Fire Alarm

Basic System Architecture:

The existing fire alarm devices in Zone 3-2 shall be modified to accommodate the new Women's Center layout.

The Women's Center will be served from existing FACP located in Facilities Systems closet 1A243. This node serves all signaling line circuits for the existing Women's Center.

The system shall have automatic voice evacuation and one-way manual voice notification features as in the Medical Center. The manual voice messages shall be capable of being delivered from the FACP located in the Fire Command Center. The Fire Command Center panel shall be expanded and reprogrammed as necessary to perform all required notification functions within the ED Expansion.

All alarms in the Women's Center shall report at the network computer in the Fire Command Center, by address.

VA Medical Center Women's Health Clinic

TDS Narrative

Spaces

This renovation will utilize the existing facilities and data technology rooms. Existing cabinet and rack space will accommodate the changes required for this project.

Systems

AV systems will have device locations detailed on the drawings, but no system specification or bid information will be included. The extent of this design will be for boxes and conduit only.

CCTV The new system installed is the GE VSC Platform utilizing IP protocol HS-264 cameras connected to a central security command center. We recommend extending this existing system with additional storage as required for any new cameras. No new monitors in the central command will be required. The new cameras will need to be of the same manufacturer or show complete interoperability with the existing system. The system shall be designed to view people in the public spaces. Additionally cameras will be located to view inside the medication room and the nursing stations.

Access Control is currently the GE Commander series utilizing Proximity cards. Panic alarms, break glass, motion detectors and all other ancillary alarm components are running across this platform. Access control card readers shall be located at all major equipment, medication, and utility and nourishment rooms. Panic buttons are located at the nursing stations.

MATV distribution is currently utilizing homerun Series 6 coaxial cable with a dedicated Fiber Backbone. This is non-proprietary and could be addressed via an open bid specification.

Nurse Call and Code Blue functionality is currently being provided utilizing the Hill-Rom Navicare solution. Staff Stations with code blue buttons shall be installed at all exam and treatment rooms Lavatory pull cords shall be installed near every patient toilet, Duty stations will be installed in areas where nursing staff may congregate specifically the clean utility, soiled utility, medication, nourishment, and equipment rooms. A master station will be located at the main nursing station.

Antenna system for Cellular reinforcement and 800 MHz public radio is a cable only solution and no hardware is currently being provided as part of our design. There is no requirement to sole source this product and an open specification should suffice for this product.

Voice/Data cabling and devices are current to the Cat 6 level. Any appropriate CAT 6 solution should suffice for the expansion, but the current solution provided by Panduit will carry a 25 year performance guarantee as long as Panduit product is utilized. If the expansion utilizes a different cable/device manufacturer, then care must be taken as to any demarcation location and responsibility.

A 2-tier (over/under) Cable Tray system for low voltage cabling will be designed. Voice and data will utilize the Bottom tray. The top tray shall be divided into 3 sections with section 1 being reserved for Access Control, Intercom, and Cameras – 2-way radio in center – End slot for facility fiber.

PA system is an IP based solution that will be extended into the new addition. This system will allow for flexible zoning, music and paging capabilities. It will extend from the existing system and we recommend that this system also apply for sole source procurement status. Speakers will be located every 14-16 feet down all staff access and public corridors.

SECTION 00 01 15
LIST OF DRAWING SHEETS

The drawings listed below accompanying this specification form as part of the contract.

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AE-1707	Interior Elevations
AE-1708	Interior Elevations
AE-1709	Interior Elevations
AE-1710	Interior Elevations
AE-1711	Interior Elevations
AE-1803	Floor Finish Plan Level 3 – Area F
AE-1813	Furniture Plan Level 3 – Area F
AE-1901	Plan Details
AE-1902	Plan Details
AE-1910	Misc. Details
AE-1911	Reflective Ceiling Details
AE-1912	Reflective Ceiling Details
AE-1913	Reflective Ceiling Details
AE-1931	Typical Backing Details

Fire Protection / Life Safety:

FJD-103	Life Safety Plan – Level 3 Segment F – Demolition
FJ-103F	Life Safety Plan – Level 3 Segment F – New Work
FPD-103F	Fire Protection Plan – Level 3 Segment – Demolition
FP-103F	Fire Protection Plan – Level 3 Segment – New Work
FAD-103F	Fire Alarm Plan – Level 3 Segment – Demolition
FA-103F	Fire Alarm Plan – Level 3 Segment – New Work

Mechanical:

M-001	Mechanical Sheet Index, General Notes, Symbol List and Abbreviation List
MHD-1003F	Demo Mechanical Plan – Level 3
MPD-1003F	Demo Mechanical Piping – Level 3
MH-1003F	Mechanical Plan – Level 3
MH-1004F	Mechanical Plan - Roof
MP-1003	Mechanical Piping Plan – Level 3
MH-3003F	Mechanical Zoning Plan – Level 3
M-501	Mechanical – Details
M-601	Mechanical Schedules
M-602	Mechanical Schedules
M-901	Mechanical – Control Diagrams

Plumbing:

P-001	Plumbing - Sheet Index, Notes, Legend and Abbreviations
PLD-1003F	Demo Waste and Storm Plan – Level 3
PPD-1000F	Demo Domestic Water Plan – Basement Level
PPD-1002F	Demo Domestic Water Plan – Level 2
PPD-1003F	Demo Domestic Water Plan – Level 3
PL-1003F	Waste and Storm Plan – Level 3
PL-1000F	Domestic Water Plan – Basement Level
PL-1001F	Domestic Water Plan – Level 1
PP-1002F	Domestic Water Plan - Level 2
PP-1003F	Domestic Water Plan - Level 3
P-401	Plumbing - Details
P-402	Plumbing - Details
P-501	Plumbing Schedule
P-601	Domestic Water Flow Diagram
P-602	Medical Gas Flow Diagram

Electrical:

E-001	Electrical - Sheet Index, Symbol List and Specifications
ED-1003F	Partial Demo Power Plan Level 3 – Area F

ED-1103F	Partial Demo Lighting Plan Level 3 – Area F
EP-1003F	Partial Power Plan Level 3 – Area F
EL-1103F	Partial Lighting Plan Level 3 – Area F
E-601	Panel Schedule

Special Systems / Telecommunications:

T0.00	Technology Symbols and Legend
T1.01	Women's Center Technology Floor Plan
T4.01	Security Details
T6.01	Security Schedules

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DIVISION 01

TO BE PROVIDED BY THE VA

SECTION 02 41 00
DEMOLITION

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies demolition and removal of buildings, portions of buildings, utilities, other structures and debris from trash dumps shown.

1.2 RELATED WORK:

- A. Safety Requirements: GENERAL CONDITIONS Article, ACCIDENT PREVENTION.
- B. Disconnecting utility services prior to demolition: Section 01 00 00, GENERAL REQUIREMENTS.
- C. Reserved items that are to remain the property of the Government: Section 01 00 00, GENERAL REQUIREMENTS.
- D. Environmental Protection: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- E. Construction Waste Management: Section 017419 CONSTRUCTION WASTE MANAGEMENT.
- F. Infectious Control: Section 01 00 00, GENERAL REQUIREMENTS, Article 1.7, INFECTION PREVENTION MEASURES.
- G. GENERAL COMMISSIONING REQUIREMENTS: Section 01 91 00.

1.3 PROTECTION:

- A. Perform demolition in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities; and to provide free passage to and from such adjacent areas of structures. Comply with requirements of GENERAL CONDITIONS Article, ACCIDENT PREVENTION.
- B. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel during demolition and removal operations. Comply with requirements of Section 01 00 00, GENERAL REQUIREMENTS, Article PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES AND IMPROVEMENTS.
- C. Maintain fences, barricades, lights, and other similar items around exposed excavations until such excavations have been completely filled.

- D. Provide enclosed dust chutes with control gates from each floor to carry debris to truck beds and govern flow of material into truck. Provide overhead bridges of tight board or prefabricated metal construction at dust chutes to protect persons and property from falling debris.
- E. Prevent spread of flying particles and dust. Sprinkle rubbish and debris with water to keep dust to a minimum. Do not use water if it results in hazardous or objectionable condition such as, but not limited to; ice, flooding, or pollution. Vacuum and dust the work area daily.
- F. In addition to previously listed fire and safety rules to be observed in performance of work, include following:
1. No wall or part of wall shall be permitted to fall outwardly from structures.
 2. Wherever a cutting torch or other equipment that might cause a fire is used, provide and maintain fire extinguishers nearby ready for immediate use. Instruct all possible users in use of fire extinguishers.
 3. Keep hydrants clear and accessible at all times. Prohibit debris from accumulating within a radius of 4500 mm (15 feet) of fire hydrants.
- G. Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The contractor shall take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the Medical Center; any damaged items shall be repaired or replaced as approved by the Resident Engineer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition or removal works. Repairs, reinforcement, or structural replacement must have Resident Engineer's approval.
- H. The work shall comply with the requirements of Section 01 57 19,
TEMPORARY ENVIRONMENTAL CONTROLS.

- I. The work shall comply with the requirements of Section 01 00 00, GENERAL REQUIREMENTS, Article 1.8 INFECTION PREVENTION MEASURES.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 DEMOLITION:

- A. Completely demolish and remove buildings and structures, including all appurtenances related or connected thereto, as noted below:
1. As required for installation of new utility service lines.
 2. To full depth within an area defined by hypothetical lines located 1500 mm (5 feet) outside building lines of new structures.
- B. Debris, including brick, concrete, stone, metals and similar materials shall become property of Contractor and shall be disposed of by him daily, off the Medical Center to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Resident Engineer. Break up concrete slabs below grade that do not require removal from present location into pieces not exceeding 600 mm (24 inches) square to permit drainage. Contractor shall dispose debris in compliance with applicable federal, state or local permits, rules and/or regulations.
- C. In removing buildings and structures of more than two stories, demolish work story by story starting at highest level and progressing down to third floor level. Demolition of first and second stories may proceed simultaneously.
- D. Remove and legally dispose of all materials, other than earth to remain as part of project work, from any trash dumps shown. Materials removed shall become property of contractor and shall be disposed of in compliance with applicable federal, state or local permits, rules and/or regulations. All materials in the indicated trash dump areas, including above surrounding grade and extending to a depth of 1500mm (5feet) below surrounding grade, shall be included as part of the lump sum compensation for the work of this section. Materials that are located beneath the surface of the surrounding ground more than 1500 mm (5 feet), or materials that are discovered to be hazardous, shall be handled as unforeseen. The removal of hazardous material shall be referred to Hazardous Materials specifications.
- E. Remove existing utilities as indicated or uncovered by work and terminate in a manner conforming to the nationally recognized code

covering the specific utility and approved by the Resident Engineer. When Utility lines are encountered that are not indicated on the drawings, the Resident Engineer shall be notified prior to further work in that area.

3.2 CLEAN-UP:

On completion of work of this section and after removal of all debris, leave site in clean condition satisfactory to Resident Engineer. Clean-up shall include off the Medical Center disposal of all items and materials not required to remain property of the Government as well as all debris and rubbish resulting from demolition operations.

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**SECTION 05 40 00
COLD-FORMED METAL FRAMING**

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies materials and services required for installation of cold-formed steel, including tracks and required accessories as shown and specified. This Section includes the following:

1.2 RELATED WORK:

- A. Structural steel framing: Section 05 12 00, STRUCTURAL STEEL FRAMING.
- B. Non-load-bearing metal stud framing assemblies: Section 09 22 16, NON-STRUCTURAL METAL FRAMING.
- C. Gypsum board assemblies: Section 09 29 00, GYPSUM BOARD.

1.3 DESIGN REQUIREMENTS:

- A. Design steel in accordance with American Iron and Steel Institute Publication "Specification for the Design of Cold-Formed Steel Structural Members", except as otherwise shown or specified.
- B. Structural Performance: Engineer, fabricate and erect cold-formed metal framing with the minimum physical and structural properties indicated.
- C. Structural Performance: Engineer, fabricate, and erect cold-formed metal framing to withstand design loads within limits and under conditions required.
1. Design Gravity, Wind, and Seismic Loads: As indicated.
 2. Design Blast Loads: Per specification 013600.
 3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change (range) of 67 degrees C (120 degrees F).
 4. Design framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings.

5. Engineering Responsibility: Engage a fabricator who assumes undivided responsibility for engineering cold-formed metal framing by employing a qualified professional engineer to prepare design calculations, shop drawings, and other structural data.

1.4 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Shop and erection drawings showing steel unit layout, connections to supporting members, and information necessary to complete installation as shown and specified.
- C. Manufacturer's Literature and Data: Showing steel component sections and specifying structural characteristics.
- D. For cold-formed metal framing indicated to comply with certain design loadings, include structural analysis data sealed and signed by the qualified registered Nevada professional engineer who was responsible for its preparation.

1.5 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Iron and Steel Institute (AISI):
Specification and Commentary for the Design of Cold-Formed Steel Structural Members (1996)
- C. American Society of Testing and Materials (ASTM):
A36/A36M-08.....Standard Specifications for Carbon Structural Steel
A123/A123M-09.....Standard Specifications for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
A153/A153M-09.....Standard Specifications for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
A307-10.....Standard Specifications for Carbon Steel Bolts and Studs

A653/A653M-10.....Standard Specifications for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

E488-96(R2003).....Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements

E1190-95(R2007).....Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members

D. American Welding Society (AWS):

D1.3/D1.3M-08.....Structural Welding Code-Sheet Steel

E. Military Specifications (Mil. Spec.):

MIL-P-21035B.....Paint, High Zinc Dust Content, Galvanizing Repair

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Sheet Steel for studs and accessories 16 gage and heavier: ASTM A653, structural steel, zinc coated G60, with a yield of 340 MPa (50 ksi) minimum.

B. Sheet Steel for studs and accessories 18 gage and lighter: ASTM A653, structural steel, zinc coated G60, with a yield of 230 MPa (33 ksi) minimum.

C. Galvanizing Repair Paint: MIL-P-21035B.

2.2 WALL FRAMING:

A. Steel Studs: Manufacturer's standard C-shaped steel studs of web depth indicated, with lipped flanges, and complying with the following:

1. Design Uncoated-Steel Thickness:

0.0566 inch Minimum.

2. Flange Width:

(1-5/8 inches) min

3. Web: Punched

B. Steel Track: Manufacturer's standard U-shaped steel track, unpunched, of web depths indicated, with straight flanges, and complying with the following:

1. Design Uncoated-Steel Thickness: Matching steel studs.
2. Flange Width: Manufacturer's standard deep flange where indicated, standard flange elsewhere.

2.3 FRAMING ACCESSORIES:

A. Fabricate steel framing accessories of the same material and finish used for framing members, with a minimum yield strength of 230 MPa (33 ksi).

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Gusset plates.
5. Deflection track and vertical slide clips.
6. Stud kickers and girts.
7. Reinforcement plates.

2.4 ANCHORS, CLIPS, AND FASTENERS:

A. Steel Shapes and Clips: ASTM A36, zinc coated by the hot-dip process according to ASTM A123.

B. Cast-in-Place Anchor Bolts and Studs: ASTM A307, Grade A, zinc coated by the hot-dip process according to ASTM A153.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times the design load, as determined by testing per ASTM E488 conducted by a qualified independent testing agency. Anchors to have ICC certification for seismic loads in cracked concrete.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials,

with capability to sustain, without failure, a load equal to 10 times the design load, as determined by testing per ASTM E1190 conducted by a qualified independent testing agency.

- E. Mechanical Fasteners: Corrosion-resistant coated, self-drilling, self-threading steel drill screws. Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.5 REQUIREMENTS:

- A. Welding in accordance with AWS D1.3
- B. Furnish members and accessories by one manufacturer only.

PART 3 - EXECUTION

3.1 FABRICATION:

- A. Framing components may be preassembled into panels. Panels shall be square with components attached.
- B. Cut framing components squarely or as required for attachment. Cut framing members by sawing or shearing; do not torch cut.
- C. Hold members in place until fastened.
- D. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
 - 1. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - 2. Locate mechanical fasteners and install according to cold-formed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
- E. Where required, provide specified insulation in double header members and double jamb studs which will not be accessible after erection.

3.2 ERECTION:

- A. Handle and lift prefabricated panels in a manner as to not distort any member.
- B. Securely anchor tracks to supports as shown.

- C. At butt joints, securely anchor two pieces of track to same supporting member or butt-weld or splice together.
- D. Plumb, align, and securely attach studs to flanges or webs of both upper and lower tracks.
- E. All axially loaded members shall be aligned vertically to allow for full transfer of the loads down to the foundation. Vertical alignment shall be maintained at floor/wall intersections.
- F. Install jack studs above and below openings and as required to furnish support. Securely attach jack studs to supporting members.
- G. Install headers in all openings that are larger than the stud spacing in that wall.
- H. Attach bridging for studs in a manner to prevent stud rotation. Space bridging rows as shown.
- I. Studs in one piece for their entire length, splices will not be permitted.
- J. Provide a load distribution member at top track where joist is not located directly over bearing stud.
- K. Provide joist bridging and web stiffeners at reaction points where shown.
- L. Provide end blocking where joist ends are not restrained from rotation.
- M. Provide an additional joist under parallel partitions, unless otherwise shown, when partition length exceeds one-half joist span and when floor and roof openings interrupt one or more spanning members.
- N. Provide temporary bracing and leave in place until framing is permanently stabilized.
- O. Do not bridge building expansion joints with cold-formed metal framing. Independently frame both sides of joints.
- P. Fasten reinforcement plate over web penetrations that exceed size of manufacturer's standard punched openings.

3.3 TOLERANCES:

- A. Vertical alignment (plumbness) of studs shall be within 1/960th of the span.
- B. Horizontal alignment (levelness) of walls shall be within 1/960th of their respective lengths.
- C. Spacing of studs shall not be more than 3 mm (1/8 inch) +/- from the designed spacing providing that the cumulative error does not exceed the requirements of the finishing materials.
- D. Prefabricated panels shall be not more than 3 mm (1/8 inch) +/- out of square within the length of that panel.

3.4 FIELD REPAIR:

- A. Touch-up damaged galvanizing with galvanizing repair paint.

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SECTION 054300

SLOTTED CHANNEL FRAMING

PART I - GENERAL

1.1 DESCRIPTION

- A. This work consists of all labor, materials, and equipment necessary for furnishing and installing slotted channel framing and accessories in conformance with the details as shown and locations indicated or required. Follow manufacturer's details and requirements. Coordinate with finishes and other trades.

1.2 SUMMARY

- A. Framing shall be a strut type metal framing system.
- B. Metal Framing System shall be used:
1. To support mechanical and electrical equipment and devices.
 2. For structural and other support applications as applicable.
- C. Metal Framing System and components must be supplied from a single approved Manufacturer.
- D. Metal Framing System will include components and accessories to incorporate a suspended acoustical ceiling type grid.

1.3 QUALITY ASSURANCE

- A. Manufacturer's qualifications:
1. The manufacturer shall have at least 10 year's experience in manufacturing strut type metal framing systems.
 2. The manufacturer must certify in writing all components supplied have been produced in accordance with an established quality assurance program.
- B. Work shall meet the requirements of the following standards:
1. Federal, State and Local codes.
 2. American Iron and Steel Institute (AISI) Specification for the Design of Cold-Formed Steel Structural Members, Latest Edition.
 3. American Society for Testing And Materials (ASTM).
 4. Metal Framing Manufacturer's Association (MFMA).

1.4 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):

ASTM A123/A123M-02	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153/A153M-05	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
A575-96(2002)	Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades
A1008/A1008M	Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
A924/924M.....	Standard Specification for Steel Sheet Metallic Coated by the Hot Dip Process
A1011/A1011M	Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
A653/A653M	Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
E4	Practices for Force Verification of Testing Machines

1.5 RELATED WORK

- A. Coordination with other metal elements and accessory structures: Section 05500, METAL FABRICATIONS.
- B. Ceilings, Ceiling Tiles: Section 09510, Acoustical Ceiling Tiles.
- C. Ceilings, Gypsum Wallboard: Section 09260, Gypsum Board System.
- D. Equipment: Coordinate with various items of Medical Equipment. Medical Equipment may be provided by others. Complete coordination will be required for support and provision of utilities.

1.6 SUBMITTALS

- A. Submit structural calculations for approval by the project engineer. Calculations may include, but are not limited to:
 - 1. Description of design criteria.

- 2. Stress and deflection analysis.
- 3. Selection of framing members, fittings, and accessories.
- B. Shop/assembly drawings necessary to install the Strut System in compliance with the Contract Drawings.
- C. Pertinent manufacturers published data.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. All material is to be delivered to the work site in original factory packaging to avoid damage to the finish.
- B. Upon delivery to the work site, all components shall be protected from the elements by a shelter or other covering.

1.8 WARRANTY

- A. Manufacturer shall warrant for 1 year from the shipment date that products will be free from defects in material or manufacture. In the event of any such defect in violation of the warranty, Manufacturer shall have the option to repair or replace any such defective product.
- B. Installer shall warrant for 1 year from the date of completion of work that the work will be free of defects in installation. In the event of any such defect in violation of the warranty, Installer shall have the option to repair or replace any such defective product.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Strut System and components shall be furnished by a manufacturer that meets all performance requirements in this specification in addition to requirements of various equipment manufacturers.

2.2 MATERIALS

- A. All channel members shall be fabricated from structural grade steel conforming to the following ASTM specifications: A 1011 GR 33.
- B. All fittings shall be fabricated from steel conforming to the following ASTM specification, A 575, and the physical requirements of A1011 GR 33.

2.3 FINISHES

- A. HOT-DIPPED GALVANIZED per ASTM A123 or A153
 - 1. Zinc coated after all manufacturing operations are complete.
 - 2. Zinc coating thickness shall be G65 (2.6 mils = 1.50 oz./ sq. ft. surface area).
 - 3. Coating shall conform to ASTM A 123 or A 153.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. The installer shall inspect the work area prior to installation. If work area conditions are unsatisfactory, installation shall not proceed until satisfactory corrections are completed.

3.2 COORDINATION

- A. The installer shall fully coordinate all requirements for equipment supported or suspended by the metal framing system, the installation of

the ceiling tiles and the availability of appropriate utility connections for any ceiling mounted equipment. The installer shall also coordinate ceiling utilities/penetrations including but not limited to lighting, HVAC registers, grilles, sprinkler heads and piping, fire alarm detection and signaling devices, casework and cabinets and clearances for movable equipment.

3.2 INSTALLATION

- A. Installation shall be accomplished by a contractor with a minimum of 5 years experience installing strut type metal framing systems.
- B. Set metal framing system components into final position true to line, level and plumb, in accordance with approved shop drawings.
- C. Anchor material firmly in place, and tighten all connections to their recommended torques. Follow manufacturer's requirements for support of their equipment.

3.3 REPAIR OF GALVANIZED SURFACES

- A. Use galvanizing repair compound, cold galvanizing paint, stick form, or other method, where galvanized surfaces need field or shop repair.

3.4 CLEANUP

- A. Upon completion of this section of work, remove all protective wraps and debris. Repair any damage due to installation of this section of work.

3.5 PROTECTION

- A. During installation, it shall be the responsibility of the installer to protect this work and adjacent materials and finishes from damage.
- B. Upon completion of this scope of work and after review, inspection and acceptance by the General Contractor, it shall become the responsibility of the General Contractor to protect this work from damage during the remainder of construction on the project and until substantial completion.

End of Section

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This section specifies items and assemblies fabricated from structural steel shapes and other materials as shown and specified.
- B. Items specified.
 - 1. Support for Wall and Ceiling Mounted Items: (12, 14A, 14C)
 - 2. Frames: (24E)

1.2 RELATED WORK

- A. Colors, finishes, and textures: Section 09 05 00, SCHEDULE FOR FINISHES.
- B. Prime and finish painting: Section 09 91 00, PAINTING.
- C. Stainless steel corner guards: Section 10 26 00, WALL AND DOOR PROTECTION.
- D. Seismic support, fastening and installation: Section No. 13 05 41 Seismic Restraint for Non-Structural Components.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:

Grating, each type	
Trap door	
Ceiling hatch	

- C. Shop Drawings:
 - 1. Each item specified, showing complete detail, location in the project, material and size of components, method of joining various components and assemblies, finish, and location, size and type of anchors.
 - 2. Mark items requiring field assembly for erection identification and furnish erection drawings and instructions.
 - 3. Provide templates and rough-in measurements as required.
- D. Manufacturer's Certificates:
 - 1. Anodized finish as specified.
 - 2. Live load designs as specified.
- E. Design Calculations stamped and signed by a registered Nevada Engineer for specified live loads including dead loads.

- F. Furnish setting drawings and instructions for installation of anchors to be preset into concrete and masonry work, and for the positioning of items having anchors to be built into concrete or masonry construction.

1.4 QUALITY ASSURANCE

- A. Each manufactured product shall meet, as a minimum, the requirements specified, and shall be a standard commercial product of a manufacturer regularly presently manufacturing items of type specified.
- B. Each product type shall be the same and be made by the same manufacturer.
- C. Assembled product to the greatest extent possible before delivery to the site.
- D. Include additional features, which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product.
- E. Prior to installation, submit details for typical support seismic bracing, and any special details for locations where typical details do not apply.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Mechanical Engineers (ASME):
- B18.6.1-81(R1997).....Wood Screws
 - B18.2.2-87(R2005).....Square and Hex Nuts
- C. American Society for Testing and Materials (ASTM):
- A36/A36M-08.....Structural Steel
 - A47-99(R2009).....Malleable Iron Castings
 - A48-03(2008).....Gray Iron Castings
 - A53-10.....Pipe, Steel, Black and Hot-Dipped, Zinc-Coated
Welded and Seamless
 - A123-09.....Zinc (Hot-Dip Galvanized) Coatings on Iron and
Steel Products
 - A167-99(R2009).....Stainless and Heat-Resisting Chromium-Nickel
Steel Plate, Sheet and Strip
 - A269-10.....Seamless and Welded Austenitic Stainless Steel
Tubing for General Service
 - A307-10.....Carbon Steel Bolts and Studs, 60,000 PSI Tensile
Strength
 - A312/A312M-11.....Seamless, Welded, and Heavily Cold Worked
Austenitic Stainless Steel Pipes

- A391/A391M-07.....Grade 80 Alloy Steel Chain
- A653/A653M-10.....Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
- A786/A786M-05(2009).....Rolled Steel Floor Plate
- B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
- B456-11.....Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
- B632-08.....Aluminum-Alloy Rolled Tread Plate
- C1107-11.....Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- F436-11.....Hardened Steel Washers
- F468-10.....Nonferrous Bolts, Hex Cap Screws, and Studs for General Use
- F593-02(2008).....Stainless Steel Bolts, Hex Cap Screws, and Studs
- F1667-11.....Driven Fasteners: Nails, Spikes and Staples
- D. American Welding Society (AWS):
- D1.1-04.....Structural Welding Code Steel
- D1.2-03.....Structural Welding Code Aluminum
- D1.3-98.....Structural Welding Code Sheet Steel
- E. National Association of Architectural Metal Manufacturers (NAAMM)
- AMP521-01.....Pipe Railing Manual
- AMP 500-505-1988.....Metal Finishes Manual
- MBG 531-00.....Metal Bar Grating Manual
- MBG 532-00.....Heavy Duty Metal Bar Grating Manual
- F. Structural Steel Painting Council (SSPC):
- SP 1-05.....No. 1, Solvent Cleaning
- SP 2-05.....No. 2, Hand Tool Cleaning
- SP 3-05.....No. 3, Power Tool Cleaning
- G. Federal Specifications (Fed. Spec):
- RR-T-650E.....Treads, Metallic and Nonmetallic, Nonkid

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Structural Steel: ASTM A36.
- B. Stainless Steel: ASTM A167, Type 302 or 304.
- C. Aluminum, Extruded: ASTM B221, Alloy 6063-T5 unless otherwise specified. For structural shapes use alloy 6061-T6 and alloy 6061-T4511.
- D. Steel Pipe: ASTM A53.
1. Galvanized for exterior locations.
 2. Type S, Grade A unless specified otherwise.

3. NPS (inside diameter) as shown.
- E. Cast-Iron: ASTM A48, Class 30, commercial pattern.
- F. Malleable Iron Castings: A47.
- G. Primer Paint: As specified in Section 09 91 00, PAINTING.
- H. Stainless Steel Tubing: ASTM A269, type 302 or 304.
- I. Modular Channel Units:
 1. Factory fabricated, channel shaped, cold formed sheet steel shapes, complete with fittings bolts and nuts required for assembly.
 2. Form channel with in turned pyramid shaped clamping ridges on each side.
 3. Provide case hardened steel nuts with serrated grooves in the top edges designed to be inserted in the channel at any point and be given a quarter turn so as to engage the channel clamping ridges. Provide each nut with a spring designed to hold the nut in place.
 4. Factory finish channels and parts with oven baked primer when exposed to view. Channels fabricated of ASTM A525, G90 galvanized steel may have primer omitted in concealed locations. Finish screws and nuts with zinc coating.
 5. Fabricate snap-in closure plates to fit and close exposed channel openings of not more than 0.3 mm (0.0125 inch) thick stainless steel.
- J. Grout: ASTM C1107, pourable type.

2.2 HARDWARE

- A. Rough Hardware:
 1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electro-galvanizing process. Galvanized G-90 where specified.
 2. Use G90 galvanized coating on ferrous metal for exterior work unless non-ferrous metal or stainless is used.
- B. Fasteners:
 1. Bolts with Nuts:
 - a. ASME B18.2.2.
 - b. ASTM A307 for 415 MPa (60,000 psi) tensile strength bolts.
 - c. ASTM F468 for nonferrous bolts.
 - d. ASTM F593 for stainless steel.
 2. Screws: ASME B18.6.1.
 3. Washers: ASTM F436, type to suit material and anchorage.
 4. Nails: ASTM F1667, Type I, style 6 or 14 for finish work.

2.3 FABRICATION GENERAL

- A. Material

1. Use material as specified. Use material of commercial quality and suitable for intended purpose for material that is not named or its standard of quality not specified.
2. Use material free of defects which could affect the appearance or service ability of the finished product.

B. Size:

1. Size and thickness of members as shown.
2. When size and thickness is not specified or shown for an individual part, use size and thickness not less than that used for the same component on similar standard commercial items or in accordance with established shop methods.

C. Connections

1. Except as otherwise specified, connections may be made by welding, riveting or bolting.
2. Field riveting will not be approved.
3. Design size, number and placement of fasteners, to develop a joint strength of not less than the design value.
4. Holes, for rivets and bolts: Accurately punched or drilled and burrs removed.
5. Size and shape welds to develop the full design strength of the parts connected by welds and to transmit imposed stresses without permanent deformation or failure when subject to service loadings.
6. Use Rivets and bolts of material selected to prevent corrosion (electrolysis) at bimetallic contacts. Plated or coated material will not be approved.
7. Use stainless steel connectors for removable members machine screws or bolts.

D. Fasteners and Anchors

1. Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.
2. Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.
3. Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.
4. Fasteners for securing metal fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for

welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.

5. Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self drilling and tapping screws or bolts.

E. Workmanship

1. General:

- a. Fabricate items to design shown.
- b. Furnish members in longest lengths commercially available within the limits shown and specified.
- c. Fabricate straight, true, free from warp and twist, and where applicable square and in same plane.
- d. Provide holes, sinkages and reinforcement shown and required for fasteners and anchorage items.
- e. Provide openings, cut-outs, and tapped holes for attachment and clearances required for work of other trades.
- f. Prepare members for the installation and fitting of hardware.
- g. Cut openings in gratings and floor plates for the passage of ducts, sumps, pipes, conduits and similar items. Provide reinforcement to support cut edges.
- h. Fabricate surfaces and edges free from sharp edges, burrs and projections which may cause injury.

2. Welding:

- a. Weld in accordance with AWS.
- b. Welds shall show good fusion, be free from cracks and porosity and accomplish secure and rigid joints in proper alignment.
- c. Where exposed in the finished work, continuous weld for the full length of the members joined and have depressed areas filled and protruding welds finished smooth and flush with adjacent surfaces.
- d. Finish welded joints to match finish of adjacent surface.

3. Joining:

- a. Miter or butt members at corners.
- b. Where frames members are butted at corners, cut leg of frame member perpendicular to surface, as required for clearance.

4. Anchors:

- a. Where metal fabrications are shown to be preset in concrete, weld 32 x 3 mm (1-1/4 by 1/8 inch) steel strap anchors, 150 mm (6 inches) long with 25 mm (one inch) hooked end, to back of member at 600 mm (2 feet) on center, unless otherwise shown.

- b. Where metal fabrications are shown to be built into masonry use 32 x 3 mm (1-1/4 by 1/8 inch) steel strap anchors, 250 mm (10 inches) long with 50 mm (2 inch) hooked end, welded to back of member at 600 mm (2 feet) on center, unless otherwise shown.
5. Cutting and Fitting:
- a. Accurately cut, machine and fit joints, corners, copes, and miters.
 - b. Fit removable members to be easily removed.
 - c. Design and construct field connections in the most practical place for appearance and ease of installation.
 - d. Fit pieces together as required.
 - e. Fabricate connections for ease of assembly and disassembly without use of special tools.
 - f. Joints firm when assembled.
 - g. Conceal joining, fitting and welding on exposed work as far as practical.
 - h. Do not show rivets and screws prominently on the exposed face.
 - i. The fit of components and the alignment of holes shall eliminate the need to modify component or to use exceptional force in the assembly of item and eliminate the need to use other than common tools.
- F. Finish:
1. Finish exposed surfaces in accordance with NAAMM Metal Finishes Manual.
 2. Aluminum: NAAMM AMP 501.
 - a. Mill finish, AA-M10, as fabricated, use unless specified otherwise.
 3. Steel and Iron: NAAMM AMP 504.
 - a. Zinc coated (Galvanized): ASTM A123, G90 unless noted otherwise.
 - b. Surfaces exposed in the finished work:
 - 1) Finish smooth rough surfaces and remove projections.
 - 2) Fill holes, dents and similar voids and depressions with epoxy type patching compound.
 - c. Shop Prime Painting:
 - 1) Surfaces of Ferrous metal:
 - a) Items not specified to have other coatings.
 - b) Galvanized surfaces specified to have prime paint.
 - c) Remove all loose mill scale, rust, and paint, by hand or power tool cleaning as defined in SSPC-SP2 and SP3.

d) Clean of oil, grease, soil and other detrimental matter by use of solvents or cleaning compounds as defined in SSPC-SP1.

e) After cleaning and finishing apply one coat of primer as specified in Section 09 91 00, PAINTING.

2) Non ferrous metals: Comply with MAAMM-500 series.

4. Stainless Steel: NAAMM AMP-504 Finish No. 4.

G. Protection:

1. Insulate aluminum surfaces that will come in contact with concrete, masonry, plaster, or metals other than stainless steel, zinc or white bronze by giving a coat of heavy-bodied alkali resisting bituminous paint or other approved paint in shop.
2. Spot prime all abraded and damaged areas of zinc coating which expose the bare metal, using zinc rich paint on hot-dip zinc coat items and zinc dust primer on all other zinc coated items.

2.4 SUPPORTS

A. General:

1. Fabricate ASTM A36 structural steel shapes as shown.
2. Use clip angles or make provisions for welding hangers and braces to overhead construction.
3. Field connections may be welded or bolted.

B. For Wall Mounted Items:

1. For typical items supported by metal stud partitions see drawing for backing requirements.
2. Structural steel tube or channel for grab bar at water closets floor to structure above with clip angles or end plates formed for anchors.
3. Use steel angles for thru wall counters. Drill angle for fasteners at ends and not over 100 mm (4 inches) on center between ends.

C. For Trapeze Bars:

1. Construct assembly above ceilings as shown and design to support not less than a 340 kg (750 pound) working load at any point.
2. Fabricate trapeze supports as shown, with all exposed members, including screws, nuts, bolts and washers, fabricated of stainless steel.
3. Fabricate concealed components of structural steel shapes unless shown otherwise.
4. Stainless steel ceiling plate drilled for eye bolt.
5. Continuously weld connections where welds shown.
6. Use modular channel where shown with manufacturers bolts and fittings.

- a. Weld ends of steel angle braces to steel plates and secure to modular channel units as shown. Drill plates for anchor bolts.
- b. Fabricate eye bolt, special clamp bolt, and plate closure full length of modular channel at ceiling line and secure to modular channel unit with manufacturers standard fittings.

D. For Cubical Curtain Track:

1. Fabricate assembly of steel angle as shown.
2. Drill angle bent ends for anchor screws to acoustical suspension system and angle for hanger wires.
3. Provide pipe sleeve welded to angle.

2.5 FRAMES

A. Channel Door Frames:

1. Fabricate of structural steel channels of size shown.
2. Miter and weld frames at corners.
3. Where anchored to masonry or embedded in concrete, weld to back of frame at each jamb, 5 mm (3/16 inch) thick by 44 mm (1-3/4 inch) wide steel strap anchors with ends turned 50 mm (2 inches), and of sufficient length to extend at least 300 mm (12 inches) into wall. Space anchors 600 mm (24 inches) above bottom of frame and 600 mm (24 inches) o.c. to top of jamb. Weld clip angles to bottom of jambs and provide holes for expansion bolts.
4. Where anchored to concrete or masonry in prepared openings, drill holes at jambs for anchoring with expansion bolts. Weld clip angles to bottom of frame and provide holes for expansion bolt anchors as shown. Drill holes starting 600 mm (24 inches) above bottom of frame and 600 mm (24 inches) o.c. to top of jamb and at top of jamb. Provide pipe spacers at holes welded to channel.
5. Where closure plates are shown, continuously weld them to the channel flanges.
6. Weld continuous 19 x 19 x 3 mm (3/4 x 3/4 x 1/8 inch) thick steel angles to the interior side of each channel leg at the head and jambs to form a caulking groove.
7. Prepare frame for installation of hardware specified in Section 08 71 00, DOOR HARDWARE.
 - a. Cut a slot in the lock jamb to receive the lock bolt.
 - b. Where shown use continuous solid steel bar stops at perimeter of frame, weld or secure with countersunk machine screws at not more than 450 mm (18 inches) on center.

B. Frames for Breech Opening:

1. Fabricate from steel channels, or combination of steel plates and angles to size and contour shown.
2. Weld strap anchors on back of frame at not over 600 mm (2 feet) on centers for concrete or masonry openings.

2.6 GUARDS

A. Wall Corner Guards:

1. Fabricate from steel angles and furnish with anchors as shown.
2. Continuously weld anchor to angle.

B. Guard Angles for Overhead Doors:

1. Cut away top portion of outstanding leg of angle and extend remaining portion of angle up wall.
2. Weld filler piece across head of opening to jamb angles.
3. Make provisions for fasteners and anchorage.

C. Wheel Guards:

1. Construct wheel guards of not less than 16 mm (5/8 inch) thick cast iron.
2. Provide corner type, with flanges for bolting to walls.

2.7 PLATE DOOR SILL

A. Fabricate of checkered plate as detailed.

1. Aluminum Plate: ASTM B632, 3 mm (0.125 inch) thick.
2. Steel Plate: ASTM A786, 3 mm (0.125 inch thick), galvanized G90.

B. Fabricate for anchorage with flat head countersunk bolts at each end and not over 300 mm (12 inches), o. c.

2.8 TRAP DOOR AND FRAMES WITH CEILING HATCH

A. Design to support a live load as specified.

B. Frames:

1. Fabricate steel angle frame to set in concrete slabs and design to set flush with finished concrete slab or curb. If not shown use 63 x 63 x 6 mm (2-1/2 x 2-1/2 x 1/4 inch) angles.
2. Miter steel angles at corners and weld together.
3. Weld steel bar stops to vertical leg of frame, to support doors flush with the top of the frame.
4. Weld steel strap anchors on each side not over 600 mm (24 inches) on center to the backs of the frames. If not shown use 6 x 50 x 200 mm (1/4 x 2 x 8 inch) long straps with 50 mm (2 inch bent) ends.
5. Form frames from steel angles with welded corners for reinforcing and bracing of well lining and support of ceiling hatch.

C. Covers:

1. Use 6 mm (1/4 inch) thick steel floor plate.

2. Where double leaf covers are shown, reinforce at meeting edges.
 3. Use wrought steel hinges with fixed brass pins.
 - a. Weld to cover.
 - b. Secure to frame with machine screws.
 4. Where ladders occur, install hinges on the side opposite the ladder.
 5. Provide two bar type drop handles, flush with cover when closed for each leaf.
- E. Ceiling Hatch:
1. Construct hatch with "T" or angle frame designed to support edge of ceiling and hatch, weld to well lining.
 2. Form hatch panels of 3 mm (1/8 inch) steel, 5 mm (3/16 inch) aluminum or 1 mm (0.0359 inch) thick steel of pan type construction with 25 mm (one inch) of mineral fiber insulation between.
 3. Use counter balance device, hinges, latch, hangers and other accessories required for installation and operation of hatch with not over 90 N (20 pounds) of force.
 4. Fabricate panels flush and reinforced to remain flat.
 5. Locate hatch panel flush with frame.
- F. Finish with baked on prime coat.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set work accurately, in alignment and where shown, plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Set frames of gratings, covers, corner guards, trap doors and similar items flush with finish floor or wall surface and, where applicable, flush with side of opening.
- C. Field weld in accordance with AWS.
 1. Design and finish as specified for shop welding.
 2. Use continuous weld unless specified otherwise.
- D. Install anchoring devices and fasteners as shown and as necessary for securing metal fabrications to building construction as specified. Power actuated drive pins may be used except for removable items and where members would be deformed or substrate damaged by their use.
- E. Spot prime all abraded and damaged areas of zinc coating as specified and all abraded and damaged areas of shop prime coat with same kind of paint used for shop priming.
- F. Isolate aluminum from dissimilar metals and from contact with concrete and masonry materials as required to prevent electrolysis and corrosion.

G. Secure escutcheon plate with set screw.

3.2 INSTALLATION OF SUPPORTS

A. Anchorage to structure.

1. Secure angles or channels and clips to overhead structural steel by continuous welding unless bolting is shown.
2. Secure supports to concrete inserts by bolting or continuous welding as shown.
3. Secure supports to mid height of concrete beams when inserts do not exist with expansion bolts and to slabs, with expansion bolts. unless shown otherwise.
4. Secure steel plate or hat channels to studs as detailed.

B. Supports for Wall Mounted items:

1. Locate center of support at anchorage point of supported item.
2. Locate support at top and bottom of wall hung cabinets.
3. Locate support at top of floor cabinets and shelving installed against walls.
4. Locate supports where required for items shown.

C. Support at Ceiling for X-ray Tube Stand and Radiographic Equipment:

1. Bolt modular steel channel frames to hangers as shown, anchored to structure above.
2. Fasten frames with modular channel manufacturers fittings, bolts, and nuts. Space modular channel supports and hangers as shown and as required to suit equipment furnished.
3. Install closure plates in channels at ceiling where channel opening is visible. Coordinate and cut plates to fit tight against equipment anchors after equipment anchors are installed.

D. Ceiling Support for Operating Light:

1. Anchor support to structure above as shown.
2. Set leveling plate as shown level with ceiling.
3. Secure operating light to leveling plate in accordance with light manufacturer's requirements.

E. Supports for intravenous (IV) Track and Cubicle Curtain Track:

1. Install assembly where shown after ceiling suspension grid is installed.
2. Drill angle for bolt and weld nut to angle prior to installation of tile.

F. Support for cantilever grab bars:

1. Locate channels or tube in partition for support as shown, and extend full height from floor to underside of structural slab above.

2. Anchor at top and bottom with angle clips bolted to channels or tube with two, 9 mm (3/8 inch) diameter bolts.
 3. Anchor to floors and overhead construction with two 9 mm (3/8 inch) diameter bolts.
 4. Fasten clips to concrete with expansion bolts, and to steel with machine bolts or welds.
- G. Supports for Trapeze Bars:
1. Secure plates to overhead construction with fasteners as shown.
 2. Secure angle brace assembly to overhead construction with fasteners as shown and bolt plate to braces.
 3. Fit modular channel unit flush with finish ceiling, and secure to plate with modular channel unit manufacturer's standard fittings through steel shims or spreaders as shown.
 - a. Install closure plates in channel between eye bolts.
 - b. Install eyebolts in channel.
- H. Support for Communion Rail Posts:
1. Anchor steel plate supports for posts as shown.
 2. Use four bolts per plate, locate two at top and two at bottom.
 3. Use lag bolts.

3.3 DOOR FRAMES

- A. Secure clip angles at bottom of frames to concrete slab with expansion bolts as shown.
- B. Level and plumb frame; brace in position required.
- C. At masonry, set frames in walls so anchors are built-in as the work progresses unless shown otherwise.
- D. Set frames in formwork for frames cast into concrete.
- E. Where frames are set in prepared openings, bolt to wall with spacers and expansion bolts.

3.4 OTHER FRAMES

- A. Set frame flush with surface unless shown otherwise.
- B. Anchor frames at ends and not over 450 mm (18 inches) on centers unless shown otherwise.
- C. Set in formwork before concrete is placed.

3.5 PLATE DOOR SILL

- A. Install after roofing base flashing and counter flashing work is completed.
- B. Set in sealant and bolt to curb.

3.6 SCREENED ACCESS DOOR

- A. Set frame in opening so that clearance at jambs is equal and secure with expansion bolts.

- B. Use shims at bolts to prevent deformation of frame members in prepared openings.
- C. Set frame in mortar bed and build in anchors as the masonry work progresses.
- D. Grout jambs solid with mortar.
- E. Secure insect screen to inside of door with stainless steel fasteners on doors in exterior walls.

3.7 STEEL COMPONENTS FOR MILLWORK ITEMS

Coordinate and deliver to Millwork fabricator for assembly where millwork items are secured to metal fabrications.

3.8 CLEAN AND ADJUSTING

- A. Adjust movable parts including hardware to operate as designed without binding or deformation of the members centered in the opening or frame and, where applicable, contact surfaces fit tight and even without forcing or warping the components.
- B. Clean after installation exposed prefinished and plated items and items fabricated from stainless steel, aluminum and copper alloys, as recommended by the metal manufacture and protected from damage until completion of the project.

- - - E N D - - -

**SECTION 06 10 00
ROUGH CARPENTRY**

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. Section specifies wood blocking, framing, sheathing, furring, nailers, sub-flooring, rough hardware, and light wood construction.

1.2 RELATED WORK:

- A. Milled woodwork: Section 06 20 00, FINISH CARPENTRY.
- B. Gypsum sheathing: Section 09 29 00, GYPSUM BOARD.
- C. Cement board sheathing: Section 06 16 63, CEMENTITIOUS SHEATHING.

1.3 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings showing framing connection details, fasteners, connections and dimensions.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Protect lumber and other products from dampness both during and after delivery at site.
- B. Pile lumber in stacks in such manner as to provide air circulation around surfaces of each piece.
- C. Stack plywood and other board products so as to prevent warping.
- D. Locate stacks on well drained areas, supported at least 150 mm (6 inches) above grade and cover with well ventilated sheds having firmly constructed over hanging roof with sufficient end wall to protect lumber from driving rain.

1.5 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in the text by basic designation only.
- B. American Forest and Paper Association (AFPA):

National Design Specification for Wood Construction

NDS-05.....Conventional Wood Frame Construction

- C. American Institute of Timber Construction (AITC):

A190.1-07.....Structural Glued Laminated Timber

D. American Society of Mechanical Engineers (ASME):

B18.2.1-96(R2005).....Square and Hex Bolts and Screws

B18.2.2-87.....Square and Hex Nuts

B18.6.1-97.....Wood Screws

B18.6.4-98(R2005).....Thread Forming and Thread Cutting Tapping Screws
and Metallic Drive Screws

E. American Plywood Association (APA):

E30-07.....Engineered Wood Construction Guide

F. American Society for Testing And Materials (ASTM):

A47-99(R2009).....Ferritic Malleable Iron Castings

A48-03(R2008).....Gray Iron Castings

A653/A653M-10.....Steel Sheet Zinc-Coated (Galvanized) or Zinc-
Iron Alloy Coated (Galvannealed) by the Hot Dip
Process

C954-10.....Steel Drill Screws for the Application of Gypsum
Board or Metal Plaster Bases to Steel Studs from
0.033 inch (2.24 mm) to 0.112-inch (2.84 mm) in
thickness

C1002-07.....Steel Self-Piercing Tapping Screws for the
Application of Gypsum Panel Products or Metal
Plaster Bases to Wood Studs or Metal Studs

D143-09.....Small Clear Specimens of Timber, Method of
Testing

D1760-01.....Pressure Treatment of Timber Products

D2559-10a.....Adhesives for Structural Laminated Wood Products
for Use Under Exterior (Wet Use) Exposure
Conditions

D3498-11.....Adhesives for Field-Gluing Plywood to Lumber
Framing for Floor Systems

F844-07a.....Washers, Steel, Plan (Flat) Unhardened for
General Use

F1667-11.....Nails, Spikes, and Staples

G. Federal Specifications (Fed. Spec.):

MM-L-736C.....Lumber; Hardwood

H. Commercial Item Description (CID):

A-A-55615.....Shield, Expansion (Wood Screw and Lag Bolt Self
Threading Anchors)

I. Military Specification (Mil. Spec.):

MIL-L-19140E.....Lumber and Plywood, Fire-Retardant Treated

J. Truss Plate Institute (TPI):

TPI-85.....Metal Plate Connected Wood Trusses

K. U.S. Department of Commerce Product Standard (PS)

PS 1-95.....Construction and Industrial Plywood

PS 20-05.....American Softwood Lumber Standard

PART 2 - PRODUCTS

2.1 LUMBER:

A. Unless otherwise specified, each piece of lumber bear grade mark, stamp, or other identifying marks indicating grades of material, and rules or standards under which produced.

1. Identifying marks in accordance with rule or standard under which material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification.
2. Inspection agency for lumber approved by the Board of Review, American Lumber Standards Committee, to grade species used.

B. Lumber Other Than Structural:

1. Unless otherwise specified, species graded under the grading rules of an inspection agency approved by Board of Review, American Lumber Standards Committee.
2. Framing lumber: Minimum extreme fiber stress in bending of 1100.
3. Furring, blocking, nailers and similar items 100 mm (4 inches) and narrower Standard Grade; and, members 150 mm (6 inches) and wider, Number 2 Grade.

C. Sizes:

1. Conforming to Prod. Std., PS20.
2. Size references are nominal sizes, unless otherwise specified, actual sizes within manufacturing tolerances allowed by standard under which produced.

D. Moisture Content:

1. At time of delivery and maintained at the site.
2. Boards and lumber 50 mm (2 inches) and less in thickness: 19 percent or less.
3. Lumber over 50 mm (2 inches) thick: 25 percent or less.

E. Fire Retardant Treatment:

1. Mil Spec. MIL-L-19140 with piece of treated material bearing identification of testing agency and showing performance rating.
2. Treatment and performance inspection, by an independent and qualified testing agency that establishes performance ratings.

F. Preservative Treatment:

1. Do not treat Heart Redwood and Western Red Cedar.
2. Treat wood members and plywood exposed to weather or in contact with plaster, masonry or concrete, including framing of open roofed structures; sills, sole plates, furring, and sleepers that are less than 600 mm (24 inches) from ground; nailers, edge strips, blocking, crickets, curbs, cant, vent strips and other members used in connection with roofing and flashing materials.
3. Treat other members specified as preservative treated (PT).
4. Preservative treat by the pressure method complying with ASTM D1760, except any process involving the use of Chromated Copper arsenate (CCA) for pressure treating wood is not permitted.

2.2 PLYWOOD

- A. Comply with Prod. Std., PS 1.
- B. Bear the mark of a recognized association or independent inspection agency that maintains continuing control over quality of plywood which identifies compliance by veneer grade, group number, span rating where applicable, and glue type.

C. Sheathing:

1. APA rated Exposure 1 or Exterior; panel grade CD or better.
2. Wall sheathing:
 - a. Minimum 9 mm (11/32 inch) thick with supports 400 mm (16 inches) on center and 12 mm (15/32 inch) thick with supports 600 mm (24 inches) on center unless specified otherwise.
 - b. Minimum 1200 mm (48 inches) wide at corners without corner bracing of framing.

2.3 ROUGH HARDWARE AND ADHESIVES:

A. Anchor Bolts:

1. ASME B18.2.1 and ANSI B18.2.2 galvanized, 13 mm (1/2 inch) unless shown otherwise.
2. Extend at least 200 mm (8 inches) into masonry or concrete with ends bent 50 mm (2 inches).

B. Miscellaneous Bolts: Expansion Bolts: C1D, A-A-55615; lag bolt, long enough to extend at least 65 mm (2-1/2 inches) into masonry or concrete. Use 13 mm (1/2 inch) bolt unless shown otherwise.

C. Washers

1. ASTM F844.
2. Use zinc or cadmium coated steel or cast iron for washers exposed to weather.

D. Screws:

1. Wood to Wood: ANSI B18.6.1 or ASTM C1002.
2. Wood to Steel: ASTM C954, or ASTM C1002.

E. Nails:

1. Size and type best suited for purpose unless noted otherwise. Use aluminum-alloy nails, plated nails, or zinc-coated nails, for nailing wood work exposed to weather and on roof blocking.
2. ASTM F1667:
 - a. Common: Type I, Style 10.
 - b. Concrete: Type I, Style 11.
 - c. Barbed: Type I, Style 26.

- d. Underlayment: Type I, Style 25.e. Masonry: Type I, Style 27.
- f. Use special nails designed for use with ties, strap anchors, framing connectors, joists hangers, and similar items. Nails not less than 32 mm (1-1/4 inches) long, 8d and deformed or annular ring shank.

F. Adhesives:

- 1. For field-gluing plywood to lumber framing floor or roof systems: ASTM D3498.
- 2. For structural laminated Wood: ASTM D2559.

PART 3 - EXECUTION

3.1 INSTALLATION OF FRAMING AND MISCELLANEOUS WOOD MEMBERS:

A. Conform to applicable requirements of the following:

- 1. AFPA National Design Specification for Wood Construction for timber connectors.
- 2. ASTM F 499 for wood underlayment.

B. Fasteners:

1. Nails.

- a. Nail in accordance with the Recommended Nailing Schedule as specified in AFPA Manual for House Framing where detailed nailing requirements are not specified in nailing schedule. Select nail size and nail spacing sufficient to develop adequate strength for the connection without splitting the members.
- b. Use special nails with framing connectors.
- c. For sheathing and subflooring, select length of nails sufficient to extend 25 mm (1 inch) into supports.
- d. Use eight penny or larger nails for nailing through 25 mm (1 inch) thick lumber and for toe nailing 50 mm (2 inch) thick lumber.
- e. Use 16 penny or larger nails for nailing through 50 mm (2 inch) thick lumber.
- f. Select the size and number of nails in accordance with the Nailing Schedule except for special nails with framing anchors.
- g. Nailing Schedule; Using Common Nails:

- 1) Subflooring or Sheathing:

- a) 150 mm (6 inch) wide or less to each joist face nail two-8d.
- b) Subflooring, more than 150 mm (6 inches) wide, to each stud or joint, face nail three-8d.
- c) Plywood or structural use panel to each stud or joist face nail 8d, at supported edges 150 mm (6 inches) on center and at intermediate supports 250 mm (10 inches) on center. When gluing plywood to joint framing increase nail spacing to 300 mm (12 inches) at supported edges and 500 mm (20 inches) o.c. at intermediate supports.

2. Bolts:

- a. Fit bolt heads and nuts bearing on wood with washers.
- b. Countersink bolt heads flush with the surface of nailers.
- c. Embed in concrete and solid masonry or use expansion bolts. Special bolts or screws designed for anchor to solid masonry or concrete in drilled holes may be used.
- d. Use toggle bolts to hollow masonry or sheet metal.
- e. Use bolts to steel over 2.84 mm (0.112 inch, 11 gage) in thickness. Secure wood nailers to vertical structural steel members with bolts, placed one at ends of nailer and 600 mm (24 inch) intervals between end bolts. Use clips to beam flanges.

3. Drill Screws to steel less than 2.84 mm (0.112 inch) thick.

- a. ASTM C1002 for steel less than 0.84 mm (0.033 inch) thick.
- b. ASTM C 954 for steel over 0.84 mm (0.033 inch) thick.

4. Power actuated drive pins may be used where practical to anchor to solid masonry, concrete, or steel.

5. Do not anchor to wood plugs or nailing blocks in masonry or concrete. Use metal plugs, inserts or similar fastening.

6. Screws to Join Wood:

- a. Where shown or option to nails.
- b. ASTM C1002, sized to provide not less than 25 mm (1 inch) penetration into anchorage member.
- c. Spaced same as nails.

7. Installation of Timber Connectors:

- a. Conform to applicable requirements of the NFPA National Design Specification for Wood Construction.
 - b. Fit wood to connectors and drill holes for fasteners so wood is not split.
- C. Set blocking level in full bed of mortar on masonry or concrete walls.
1. Space anchor bolts 1200 mm (4 feet) on centers between ends and within 150 mm (6 inches) of end. Stagger bolts from side to side on plates over 175 mm (7 inches) in width.
 2. Use shims of slate, tile or similar approved material to level wood members resting on concrete or masonry. Do not use wood shims or wedges.
 3. Closely fit, and set to required lines.
- D. Cut notch, or bore in accordance with NFPA Manual for House-Framing for passage of ducts wires, bolts, pipes, conduits and to accommodate other work. Repair or replace miscut, misfit or damaged work.
- E. Blocking Nailers, and Furring:
1. Install furring, blocking, nailers, and grounds where shown.
 2. Use longest lengths practicable.
 3. Use fire retardant treated wood blocking where shown at openings and where shown or specified.
 4. Layers of Blocking or Plates:
 - a. Stagger end joints between upper and lower pieces.
 - b. Nail at ends and not over 600 mm (24 inches) between ends.
 - c. Stagger nails from side to side of wood member over 125 mm (5 inches) in width.
- F. Sheathing:
1. Use plywood or structural-use panels for sheathing.
 2. Lay panels with joints staggered, with edge and ends 3 mm (1/8 inch) apart and nailed over bearings as specified.
 3. Set nails not less than 9 mm (3/8 inch) from edges.
 4. Install 50 mm by 100 mm (2 inch by 4 inch) blocking spiked between joists, rafters and studs to support edge or end joints of panels.

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**SECTION 06 16 63
CEMENTITIOUS SHEATHING**

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This section specifies cement board sheathing applied to frame wall construction, ready to receive subsequent finishes.

1.2 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
1. Cement board panels, 200 mm by 200 mm (8 inches by 8 inches), minimum size.
 2. Fasteners, each type used.
 3. Reinforcing tape for joints 300 mm (12 inches) long.
 4. Water barrier backing, 300 mm (12 inches) square.
- C. Product Data:
1. Cement board sheathing.
 2. Reinforcing tape.
 3. Fasteners.

1.3 DELIVERY AND STORAGE

- A. Deliver materials in containers with labels legible and intact.
- B. Store materials so as to prevent damage or contamination.

1.4 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. American National Standards Institute (ANSI):
- A108.11-99(R2010).....Interior Installation of Cementitious Backer Units
- A118.9-99(R2010).....Cementitious Backer Units
- C. American Society for Testing and Materials (ASTM):

C954-10.....Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

D226-09.....Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

D4586-07.....Asphalt Roof Cement, Asbestos-Free

D. Federal Specifications (FS):

UU-B-790.....Building Paper, Vegetable Fiber INT AMD 1 (Kraft, Waterproofed, Water Repellant and Fire Resistant)

PART 2 - PRODUCTS

2.1 CEMENT BOARD SHEATHING

A. Conform to ANSI A118.9, except physical property requirements defined in Table 1 changed to not less than the minimum values stated below.

B. Property Minimum Average Value

1. Water Absorption by Weight, ASTM D1037	20 percent maximum
2. Flame Spread	5
3. Smoke Density	0
4. Thickness	13 mm (1/2 inch)
5. Minimum Width	800 mm (32 inches)

2.2 ACCESSORY MATERIALS

A. Steel Drill Screws: ASTM C954. Modified for flat head. Bugle head not acceptable.

B. Organic Felt: ASTM D226, Type II, 13.6 kg (30 lb).

C. Roof Cement: ASTM D4586

D. Joint Reinforcing Tape:

1. Minimum 100 mm (4-inches) wide open mesh alkali resistant.

2. Glass fiber mesh polymer coated as recommended by Cement Board manufacturer.

- E. Water Barrier: FS UU-B-790. Type I (Barrier paper), Grade D (Water-vapor permeable). Other products meeting or exceeding the Federal specification for a water barrier with water vapor permeability are acceptable.

PART 3 - EXECUTION

3.1 ENVIRONMENTAL REQUIREMENTS

- A. Do not install units when temperature is below 4.5 degrees Celsius (40 degrees F).
- B. Do not install joint reinforcing tape when temperature is below 10 degrees Celsius (50 degrees F).

3.2 INSTALLATION

- A. Remove wrapping and separate to allow air circulation for not less than seven days before installation.
- B. Installing Water Barrier over Framing Members:
1. Apply roof cement or tape to framing members sufficient to adhere and support water barrier.
 2. Use either organic felt or water barrier.
 3. Apply barrier shingle fashion with horizontal joints lapped not less than 50 mm (2 inches). Lap end joints over framing, not less than 100 mm (4 inches) cemented together with roof cement, stagger end joints.
 4. Do not leave over 300 mm (12-inch) wide strip exposed when work is stopped.
 5. Coordinate with installation of flashing to lap water barrier over flashing. Install weeps every 600 mm (24 inches) or as detailed, directly above flashing. Provide for clear exit of water to exterior.
 6. Repair torn or cut barrier with barrier patch spanning framing space cemented to surface along top and side edges.
- C. Installing Cement Board Units:
1. Apply cement board sheathing immediately over water barrier in accordance with ANSI A108.11, with rounded edges and rough side to exterior, except as specified otherwise.
 2. Secure units to framing members with screws spaced not more than 200 mm (8 inches) on center and not closer than 13 mm (1/2-inch) from the edge of the unit.

3. Install screws so that the screw heads do not penetrate the surface of unit.
 4. Install 13 mm (1/2-inch) wide horizontal control joints at floors and vertical control joints not over 4.87 m (16 feet) on center unless shown otherwise, maintain alignment.
 5. Stop units at edges of building expansion joints.
 6. Minimum bearing over framing members: 19 mm (3/4-inch.)
- D. Joint and Surface Treatment: Apply joint reinforcing tape over joints, exposed edges, and corners using adhesive recommended by manufacturer.
- E. Leave surface flush and ready to receive subsequent finishes.

3.3 PROTECTION AND REPAIR

- A. Protect board with temporary coverings against moisture until subsequent finish is applied.
- B. Patch and repair damaged surface prior to application of subsequent finish.
1. Fill cracks.
 2. Replace loose, spalling or missing joint finish.
 3. Replace broken or damaged boards.

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**SECTION 06 20 00
FINISH CARPENTRY****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. This section specifies exterior and interior millwork.
- B. Items specified.
 - 1. Counter Shelf
 - 2. Interview Booth
 - 3. Counter or Work Tops
 - 4. Wall Paneling
 - 5. Pegboard (Perforated Hardboard)

1.2 RELATED WORK

- A. Framing, furring and blocking: Section 06 10 00, ROUGH CARPENTRY.
- B. Wood doors: Section 08 14 00, WOOD DOORS.
- C. Color and texture of finish: Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Electrical light fixtures and duplex outlets: Division 26, ELECTRICAL.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings:
 - 1. Millwork items - Half full size scale for sections and details 1:50 (1/4-inch) for elevations and plans.
 - 2. Show construction and installation.
- C. Samples:
 - Plastic laminate finished plywood or particleboard, 150 mm by 300 mm (six by twelve inches).
- D. Certificates:
 - 1. Indicating preservative treatment and/or fire retardant treatment of materials meet the requirements specified.
 - 2. Indicating moisture content of materials meet the requirements specified.
- E. List of acceptable sealers for fire retardant and preservative treated materials.
- F. Manufacturer's literature and data:
 - 1. Finish hardware
 - 2. Sinks with fittings
 - 3. Electrical components

1.4 DELIVERY, STORAGE AND HANDLING

- A. Protect lumber and millwork from dampness, maintaining moisture content specified both during and after delivery at site.
- B. Store finishing lumber and millwork in weathertight well ventilated structures or in space in existing buildings designated by Resident Engineer. Store at a minimum temperature of 21⁰C (70⁰F) for not less than 10 days before installation.
- C. Pile lumber in stacks in such manner as to provide air circulation around surfaces of each piece.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Testing and Materials (ASTM):
 - A36/A36M-08.....Structural Steel
 - A53-07.....Pipe, Steel, Black and Hot-Dipped Zinc Coated,
Welded and Seamless
 - A167-99 (R2009).....Stainless and Heat-Resisting Chromium-Nickel
Steel Plate, Sheet, and Strip
 - B26/B26M-09.....Aluminum-Alloy Sand Castings
 - B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods,
Wire, Profiles, and Tubes
 - E84-09.....Surface Burning Characteristics of Building
Materials
- C. American Hardboard Association (AHA):
 - A135.4-04.....Basic Hardboard
- D. Builders Hardware Manufacturers Association (BHMA):
 - A156.9-03.....Cabinet Hardware
 - A156.11-04.....Cabinet Locks
 - A156.16-02.....Auxiliary Hardware
- E. Hardwood Plywood and Veneer Association (HPVA):
 - HP1-09.....Hardwood and Decorative Plywood
- F. National Particleboard Association (NPA):
 - A208.1-99.....Wood Particleboard
- G. American Wood-Preservers' Association (AWPA):
 - AWPA C1-03.....All Timber Products - Preservative Treatment by
Pressure Processes
- H. Architectural Woodwork Institute (AWI):

AWI-99.....Architectural Woodwork Quality Standards and
Quality Certification Program

I. National Electrical Manufacturers Association (NEMA):

LD 3-05.....High-Pressure Decorative Laminates

J. U.S. Department of Commerce, Product Standard (PS):

PS20-05.....American Softwood Lumber Standard

K. Military Specification (Mil. Spec):

MIL-L-19140E.....Lumber and Plywood, Fire-Retardant Treated

L. Federal Specifications (Fed. Spec.):

A-A-1922A.....Shield Expansion

A-A-1936.....Contact Adhesive

FF-N-836D.....Nut, Square, Hexagon Cap, Slotted, Castle

FF-S-111D(1).....Screw, Wood

MM-L-736(C).....Lumber, Hardwood

PART 2 - PRODUCTS

2.1 LUMBER

A. Grading and Marking:

1. Lumber shall bear the grade mark, stamp, or other identifying marks indicating grades of material.
2. Such identifying marks on a material shall be in accordance with the rule or standard under which the material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification.
3. The inspection agency for lumber shall be approved by the Board of Review, American Lumber Standards Committee, to grade species used.

B. Sizes:

1. Lumber Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which product is produced.
2. Millwork, standing and running trim, and rails: Actual size as shown or specified.

C. Hardwood: MM-L-736, species as specified for each item.

D. Softwood: PS-20, exposed to view appearance grades:

1. Use C select or D select, vertical grain for transparent finish including stain transparent finish.
2. Use Prime for painted or opaque finish.

E. Use edge grain Wood members exposed to weather.

2.2 PLYWOOD

A. Softwood Plywood:

1. Prod. Std.
2. Grading and Marking:
 - a. Each sheet of plywood shall bear the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood.
 - b. The mark shall identify the plywood by species group or identification index, and shall show glue type, grade, and compliance with PS1.
3. Plywood, 13 mm (1/2 inch) and thicker; not less than five ply construction, except 32 mm (1-1/4 inch) thick plywood not less than seven ply.
4. Plastic Laminate Plywood Cores:
 - a. Exterior Type, and species group.
 - b. Veneer Grade: A-C.
5. Shelving Plywood:
 - a. Interior Type, any species group.
 - b. Veneer Grade: A-B or B-C.
6. Other: As specified for item.

B. Hardwood Plywood:

1. HPVA: HP.1
2. Species of face veneer shall be as shown or as specified in connection with each particular item.
3. Inside of Building:
 - a. Use Type II (interior) A grade veneer for transparent finish.
 - b. Use Type II (interior) Sound Grade veneer for paint finish.
4. On Outside of Building:
 - a. Use Type I, (exterior) A Grade veneer for natural or stained and varnish finish.
 - b. Use Type I, (exterior) Sound Grade veneer for paint finish.
5. Use plain sliced red oak unless specified otherwise.
6. Fire Retardant Treated (FRT) plywood, rated for use in locations either indicated on required.
7. Preservative (Pressure) Treated Plywood for use in wet, damp or exterior conditions. Rot, termite and insect resistant plywood. Acceptable materials include only those treated for dimensional stability and increased strength.
8. Combination Pressure Treated/Fire Retardant Treated plywood.

9. Use Marine Board for countertops with sinks.

2.3 PARTICLEBOARD

- A. NPA A208.1
- B. Plastic Laminate Particleboard Cores:
 - 1. Use Type 1, Grade 1-M-3, or Type 2, Grade 2-M-2, unless otherwise specified.
- C. General Use: Type 1, Grade 1-M-3 or Type 2, Grade 2-M-2.

2.4 PLASTIC LAMINATE

- A. NEMA LD-3.
- B. Exposed decorative surfaces including countertops, both sides of cabinet doors, and for items having plastic laminate finish. General Purpose, Type HGL.
- C. Cabinet Interiors including Shelving: Both of following options to comply with NEMA, CLS as a minimum.
 - 1. Plastic laminate clad plywood or particle board.
 - 2. Resin impregnated decorative paper thermally fused to particle board.
- D. Backing sheet on bottom of plastic laminate covered wood tops: Backer, Type HGP.
- E. Post Forming Fabrication, Decorative Surfaces: Post forming, Type HGP.

2.5 BUILDING BOARD (HARDBOARD)

- A. ANSI/AHA A135.4, 6 mm (1/4 inch) thick unless specified otherwise.
- B. Perforated hardboard (Pegboard): Type 1, Tempered perforated 6 mm (1/4 inch) diameter holes, on 25 mm (1 inch) centers each way, smooth surface one side.
- C. Wall paneling at gas chain rack: Type 1, tempered, Fire Retardant treated, smooth surface on side.

2.6 ADHESIVE

- A. For Plastic Laminate: Fed. Spec. A-A-1936.
- B. For Interior Millwork: Unextended urea resin, unextended melamine resin, phenol resin, or resorcinol resin.
- C. For Exterior Millwork: Unextended melamine resin, phenol resin, or resorcinol resin.

2.7 STAINLESS STEEL

ASTM A167, Type 302 or 304.

2.8 ALUMINUM CAST

ASTM B26

2.9 ALUMINUM EXTRUDED

ASTM B221

2.10 HARDWARE

A. Rough Hardware:

1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electric-galvanizing process. Galvanized where specified.
2. Use galvanized coating on ferrous metal for exterior work unless non-ferrous metals or stainless is used.
3. Fasteners:
 - a. Bolts with Nuts: FF-N-836.
 - b. Expansion Bolts: A-A-1922A.
 - c. Screws: Fed. Spec. FF-S-111.

B. Finish Hardware

1. Cabinet Hardware: ANSI A156.9.
 - a. Door/Drawer Pulls: B02011. Door in seismic zones: B03182.
 - b. Drawer Slides: B05051 for drawers over 150 mm (6 inches) deep, B05052 for drawers 75 mm to 150 mm 3 to 6 inches) deep, and B05053 for drawers less than 75 mm (3 inches) deep.
 - c. Sliding Door Tracks: B07063.
 - d. Adjustable Shelf Standards: B4061 with shelf rest B04083.
 - e. Concealed Hinges: B1601, minimum 110 degree opening.
 - f. Butt Hinges: B01361, for flush doors, B01381 for inset lipped doors, and B01521 for overlay doors.
 - g. Cabinet Door Catch: B0371 or B03172.
 - h. Vertical Slotted Shelf Standard: B04103 with shelf brackets B04113, sized for shelf depth.
2. Cabinet Locks: ANSI A156.11.
 - a. Drawers and Hinged Door: E07262.
 - b. Sliding Door: E07162.
3. Auxiliary Hardware: ANSI A156.16.
 - a. Shelf Bracket: B04041, japanned or enameled finish.
 - b. Combination Garment rod and Shelf Support: B04051 japanned or enamel finish.
 - c. Closet Bar: L03131 chrome finish of required length.
 - d. Handrail Brackets: L03081 or L03101.
 - 1) Cast Aluminum, satin polished finish.
 - 2) Cast Malleable Iron, japanned or enamel finish.
4. Pipe Bench Supports:
 - a. Pipe: ASTM A53.

5. Fabricated Wall Bench Supports:
 - a. Steel Angles: ASTM A36 steel with chrome finish, or ASTM A167, stainless steel with countersunk wood screws, holes at 64 mm (2-1/2 inches) on center on horizontal member.
 - b. Use 38 mm by 38 mm by 5 mm (1-1/2 by 1-1/2 by 3/16 inch) angle thick drilled for screw and bolt holes unless shown otherwise. Drill 6 mm (1/4 inch) holes for anchors on vertical member, not more than 200 mm (8 inches) on center between ends or corners.
 - c. Stainless steel bars brackets: ASTM A167, fabricated to shapes shown, Number 4 finish. Use 50 mm by 5 mm (2 inch by 3/16 inch) bars unless shown otherwise. Drill for anchors and screws. Drill countersunk wood screw holes at 64 mm (2-1/2 inches) on center on horizontal members and not less than two 13 mm (1/4 inch) hole for anchors on vertical member.
6. Thru-Wall Counter Brackets:
 - a. Steel angles drilled for fasteners on 100 mm (4 inches) centers.
 - b. Baked enamel prime coat finish.
7. Edge Strips Moldings:
 - a. Driven type "T" shape with serrated retaining stem; vinyl plastic to match plastic laminate color, stainless steel, or 3 mm (1/8 inch) thick extruded aluminum.
 - b. Stainless steel or extruded aluminum channels.
 - c. Stainless steel, number 4 finish; aluminum, mechanical applied medium satin finish, clear anodized 0.1 mm (0.4 mils) thick.
8. Rubber or Vinyl molding
 - a. Rubber or vinyl standard stock and in longest lengths practicable.
 - b. Design for closures at joints with walls and adhesive anchorage.
 - c. Adhesive as recommended by molding manufacturer.
9. Primers: Manufacturer's standard primer for steel providing baked enamel finish.

2.11 MOISTURE CONTENT

- A. Moisture content of lumber and millwork at time of delivery to site.
 1. Interior finish lumber, trim, and millwork 32 mm (1-1/4 inches) or less in nominal thickness: 12 percent on 85 percent of the pieces and 15 percent on the remainder.
 2. Exterior treated or untreated finish lumber and trim 100 mm (4 inches) or less in nominal thickness: 15 percent.
 3. Moisture content of other materials shall be in accordance with the standards under which the products are produced.

2.12 FIRE RETARDANT TREATMENT

- A. Where wood members and plywood are specified to be fire retardant treated, the treatment shall be in accordance with Mil. Spec. MIL-L19140.
- B. Treatment and performance inspection shall be by an independent and qualified testing agency that establishes performance ratings.
- C. Each piece of treated material shall bear identification of the testing agency and shall indicate performance in accordance with such rating of flame spread and smoke developed.
- D. Treat wood for maximum flame spread of 25 and smoke developed of 25.
- E. Fire Resistant Softwood Plywood:
 - 1. Use Grade A, Exterior, plywood for treatment.
 - 2. Meet the following requirements when tested in accordance with ASTM E84.
 - a. Flame spread: 0 to 25.
 - b. Smoke developed: 100 maximum
- F. Fire Resistant Hardwood Plywood:
 - 1. Core: Fire retardant treated softwood plywood.
 - 2. Hardwood face and back veneers untreated,
 - 3. Factory seal panel edges, to prevent loss of fire retardant salts.
- G. Locations for use of Fire Retardant Treatment: The following list is NOT intended to be comprehensive. The list contains but is not limited to:
 - 1. Any wood products within rates partitions.
 - 2. Any wood products forming part of a rated assembly.
 - 3. Any wood products enclosed within a gypsum wallboard partition.
 - 4. Any wood products required to be treated by NFPA requirements.
 - 5. Any wood products required to be treated per VA requirements.

2.13 PRESERVATIVE TREATMENT

- A. Wood members and plywood exposed to weather or in contact with plaster, masonry or concrete, including wood members used for rough framing of millwork items except heart-wood Redwood and Western Red Cedar shall be preservative treated in accordance with AWPA Standards.
- B. Use Grade A, exterior plywood for treatment.

2.14 ACOUSTICAL PANEL

- A. Performance criteria:
 - 1. NRC 19 mm (3/4 inch) adhesive mounting direct to substrate.
 - 2. Composite flame spread: ASTM E84, 25 or less.
 - 3. Smoke developed: ASTM E84, 140 or less.
- B. Glass fiber panel covered with fabric.

1. Glass fiber panel one inch thick minimum, self supporting of density required for minimum NRC.
2. Fabric covering treated to resist stains and soil, bonded directly to the glass fiber panel face, flat bonded directly to the glass fiber panel face, flat wrinkle-free surface.

C. Adhesive: As recommended by panel manufacturers.

2.15 FABRICATION

A. General:

1. Except as otherwise specified, use AWI Custom Grade for architectural woodwork and interior millwork.
2. Finish woodwork shall be free from pitch pockets.
3. Except where special profiles are shown, trim shall be standard stock molding and members of the same species.
4. Plywood shall be not less than 13 mm (1/2 inch), unless otherwise shown or specified.
5. Edges of members in contact with concrete or masonry shall have a square corner caulking rebate.
6. Fabricate members less than 4 m (14 feet) in length from one piece of lumber, back channeled and molded as shown.
7. Interior trim and items of millwork to be painted may be fabricated from jointed, built-up, or laminated members, unless otherwise shown on drawings or specified.
8. Plastic Laminate Work:
 - a. Factory glued to either a plywood or a particle board core, thickness as shown or specified.
 - b. Cover exposed edges with plastic laminate, except where aluminum, stainless steel, or plastic molded edge strips are shown or specified. Use plastic molded edge strips on 19 mm (3/4-inch) molded thick or thinner core material.
 - c. Provide plastic backing sheet on underside of countertops, vanity tops, thru-wall counter and sills including back splashes and end splashes of countertops.
 - d. Use backing sheet on concealed large panel surface when decorative face does not occur.

B. Mounting Strips, Shelves and Rods:

1. Cut mounting strips from 25 mm by 100 mm (1 by 4 inches) softwood stock, with exposed edge slightly rounded.
2. Cut wood shelf from softwood 1 inch stock, of width shown, exposed edge slightly rounded. Option: Use 19 mm (3/4 inch) thick plywood

with 19 mm (3/4 inch) softwood edge nosing on exposed edge, slightly rounded.

3. Plastic laminate covered, 19 mm (3/4 inch) thick plywood or particle board core with edges and ends having plastic molded edge strips. Size, finish and number as shown.
4. Rod or Closet Bar: L03131. Combination Garment and Shelf Support, intermediate support for closet bar: B04051 for rods over 1800 mm (6 feet) long.

C. Pegboard:

1. Perforated hardboard sheet size as shown.
2. Spacing strip: 13 mm by 13 mm (1/2 by 1/2 inch); glued to hardboard sheet.
 - a. Locate at perimeter of sheet edge.
 - b. Locate material intermediate spacing strips at 800 mm (32 inches) o.c.
3. Use 19 mm (3/4 inch) one quarter round edge trim to cover exposed edge and finish flush with hardboard surface. Glue to spacing strip and hard board.

D. Interview Booth:

1. Fabricate to AWI premium grade construction.
2. Use softwood for framing, space members not over 600 mm (24 inches) on center. Use softwood for counter concealed members and mounting strip for writing surface.
3. Use red oak for exposed hardwood trim.
4. Use red oak veneer plywood for exposed wood finish.
5. Acoustical panel glued to plywood substrate.
6. Use decorative plastic laminate writing surface pattern on counter.
7. Secure writing surfaces to divided panels with screws and to center support with mounting strips screwed to panel and top at underside.

E. Thru-Wall Counter or Pass Thru Counter.

1. Fabricate counter as shown. Return hardwood edge to metal frame at ends. Fabricate to join other counters where shown.
2. Cut to fit metal frame profile.
3. Fabricate to receive sliding pass window track when shown.
4. Use angle and fabricated shelf bracket supports.

F. Counter or Work Tops:

1. Fabrication with plastic laminate over 32 mm (1-1/4 inch) thick core unless shown otherwise.

- a. Use decorative laminate for exposed edges of tops 38 mm (1-1/2 inches) wide and on back splash and end splash. Use plastic or metal edges for top edges less than 38 mm (1-1/2 inches) wide.
 - b. Assemble back splash and end splash to counter top.
 - c. Use one piece counters for straight runs.
 - d. Miter corners for field joints with overlapping blocking on underside of joint.
2. Fabricate wood counter for work benches as shown.
 3. Grommets to be cut in counter tops and plum cabinets at owners direction after installation.

PART 3 - EXECUTION

3.1 ENVIRONMENTAL REQUIREMENTS

- A. Maintain work areas and storage areas to a minimum temperature of 21⁰C (70⁰F) for not less than 10 days before and during installation of interior millwork.
- B. Do not install finish lumber or millwork in any room or space where wet process systems such as concrete, masonry, or plaster work is not complete and dry.

3.2 INSTALLATION

- A. General:
 1. Millwork receiving transparent finish shall be primed and back-painted on concealed surfaces. Set no millwork until primed and back-painted.
 2. Secure trim with fine finishing nails, screws, or glue as required.
 3. Set nails for putty stopping. Use washers under bolt heads where no other bearing plate occurs.
 4. Seal cut edges of preservative and fire retardant treated wood materials with a certified acceptable sealer.
 5. Caulk or seal between edges of all casework, work counters, furniture, equipment, feature strips, and any hard surface they abut. This includes any items permanently affixed or attached with seismic connections.
 6. Coordinate with plumbing and electrical work for installation of fixtures and service connections in millwork items.
 7. Plumb and level items unless shown otherwise.
 8. Nail finish at each blocking, lookout, or other nailer and intermediate points; toggle or expansion bolt in place where nails are not suitable.

9. Exterior Work: Joints shall be close fitted, metered, tongue and grooved, rebated, or lapped to exclude water and made up in thick white lead paste in oil.

B. Pegboard or Perforated Hardboard:

1. Install board with chromium plated steel round-head toggle bolts or other fasteners capable of supporting board when loaded at 122 kg/m² (25 psf) of board.
2. Install board with spacers to allow hooks and accessories to be inserted and removed.
3. Install 6 mm (1/4 inch) round trim at perimeter to finish flush with face of board and close space between wall and hardboard.

C. Shelves:

1. Install mounting strip at back wall and end wall for shelves in closets where shown secured with toggle bolts at each end and not over 600 mm (24 inch) centers between ends.
 - a. Nail Shelf to mounting strip at ends and to back wall strip at not over 900 mm (36 inches) on center.
 - b. Install metal bracket, ANSI A156.16, B04041, not over 1200 mm (4 feet) centers when shelves exceed 1800 mm (6 feet) in length.
 - c. Install metal bracket, ANSI A156.16, B04051, not over 1200 mm (4 feet) on centers where shelf length exceeds 1800 mm (6 feet) in length with metal rods, clothes hanger bars ANSI A156.16, L03131, of required length, full length of shelf.
2. Install vertical slotted shelf standards, ANSI A156.9, B04103 to studs with toggle bolts through each fastener opening. Double slotted shelf standards may be used where adjacent shelves terminate.
 - a. Install brackets ANSI A156.9, B04113, providing supports for shelf not over 900 mm (36 inches) on center and within 13 mm (1/2 inch) of shelf end unless shown otherwise.
 - b. Install shelves on brackets so front edge is restrained by bracket.

D. Interview Booths:

1. Anchor divider panel floor plates to floor with expansion bolts at ends and not over 900 mm (36 inch) centers.
2. Install both writing surface on mounting strips secured to divider panels and center support with screws if not shop assembled. Field assemble in accordance with shop drawings.

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SECTION 07 08 00
FACILITY EXTERIOR CLOSURE COMMISSIONING

DELETE SECTION -
ADDENDUM B - JANUARY 25, 3013

**SECTION 07 21 13
THERMAL INSULATION**

PART 1 - GENERAL**1.1 DESCRIPTION:**

- A. This section specifies thermal and acoustical insulation for buildings.
- B. Acoustical insulation is identified by thickness and words "Acoustical Insulation".

1.2 RELATED WORK

- A. Safing insulation: Section 07 84 00, FIRESTOPPING.

1.3 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES .
- B. Manufacturer's Literature and Data:
 - 1. Insulation, each type used
 - 2. Adhesive, each type used.
 - 3. Tape
- C. Certificates: Stating the type, thickness and "R" value (thermal resistance) of the insulation to be installed.

1.4 STORAGE AND HANDLING:

- A. Store insulation materials in weathertight enclosure.
- B. Protect insulation from damage from handling, weather and construction operations before, during, and after installation.

1.5 APPLICABLE PUBLICATIONS:

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
 - C270-10.....Mortar for Unit Masonry
 - C516-08.....Vermiculite Loose Fill Thermal Insulation
 - C549-06.....Perlite Loose Fill Insulation
 - C552-07.....Cellular Glass Thermal Insulation.
 - C553-11.....Mineral Fiber Blanket Thermal Insulation for
Commercial and Industrial Applications
 - C578-10a.....Rigid, Cellular Polystyrene Thermal Insulation
 - C591-11.....Unfaced Preformed Rigid Cellular
Polyisocyanurate Thermal Insulation

C612-10.....Mineral Fiber Block and Board Thermal
Insulation

C665-06.....Mineral Fiber Blanket Thermal Insulation for
Light Frame Construction and Manufactured
Housing

C728-05(R2010).....Perlite Thermal Insulation Board

C954-10.....Steel Drill Screws for the Application of
Gypsum Panel Products or Metal Plaster Base to
Steel Studs From 0.033 (0.84 mm) inch to 0.112
inch (2.84 mm) in thickness

C1002-07.....Steel Self-Piercing Tapping Screws for the
Application of Gypsum Panel Products or Metal
Plaster Bases to Wood Studs or Steel Studs

D312-00(R2006).....Asphalt Used in Roofing

E84-11a.....Surface Burning Characteristics of Building
Materials

F1667-11.....Driven Fasteners: Nails, Spikes and Staples.

PART 2 - PRODUCTS

2.1 INSULATION - GENERAL:

- A. Where thermal resistance ("R" value) is specified or shown for insulation, the thickness shown on the drawings is nominal. Use only insulation with actual thickness that is not less than that required to provide the thermal resistance specified.
- B. Where "R" value is not specified for insulation, use the thickness shown on the drawings.
- C. Where more than one type of insulation is specified, the type of insulation for each use is optional, except use only one type of insulation in any particular area.
- D. Insulation Products shall comply with following minimum content standards for recovered materials:

Material Type	Percent by Weight
Perlite composite board	23 percent post consumer recovered paper
Polyisocyanurate/polyurethane	
Rigid foam	9 percent recovered material
Foam-in-place	5 percent recovered material
Glass fiber reinforced	6 percent recovered material
Phenolic rigid foam	5 percent recovered material
Rock/mineral wool material	75 percent recovered material

The minimum-content standards are based on the weight (not the volume) of the material in the insulating core only.

2.2 EXTERIOR FRAMING OR FURRING INSULATION:

- A. Batt or Blanket: Optional.
- B. Mineral Fiber: ASTM C665, Type II, Class C, Category I where framing is faced with gypsum board.
- C. Mineral Fiber: ASTM C665, Type III, Class A where framing is not faced with gypsum board.

2.3 ACOUSTICAL INSULATION:

- A. Mineral Fiber boards: ASTM C553, Type II, flexible, or Type III, semirigid (4.5 pound nominal density).
- B. Mineral Fiber Batt or Blankets: ASTM C665. Maximum flame spread of 25 and smoke development of 450 when tested in accordance with ASTM E84.
- C. Thickness as shown; of widths and lengths to fit tight against framing.

2.4 RIGID INSULATION:

- A. On the inside face of spandrel beams, floors, bottom of slabs, and where shown.
- B. Mineral Fiber Board: ASTM C612, Type IB or 2.
- C. Perlite Board: ASTM C728.
- D. Cellular Glass Block: ASTM C552, Type I.

2.5 FASTENERS:

- A. Staples or Nails: ASTM F1667, zinc-coated, size and type best suited for purpose.
- B. Screws: ASTM C954 or C1002, size and length best suited for purpose with washer not less than 50 mm (two inches) in diameter.
- C. Impaling Pins: Steel pins with head not less than 50 mm (two inches) in diameter with adhesive for anchorage to substrate. Provide impaling

pins of length to extend beyond insulation and retain cap washer when washer is placed on the pin.

2.6 ADHESIVE:

- A. As recommended by the manufacturer of the insulation.
- B. Asphalt: ASTM D312, Type III or IV.
- C. Mortar: ASTM C270, Type 0.

2.7 TAPE:

- A. Pressure sensitive adhesive on one face.
- B. Perm rating of not more than 0.50.
- C. Seal all joints in curtain wall insulation or exterior wall insulation with vapor retarder tape. Apply vapor retarder tape at intersection of insulation with framing, adjacent pieces and similar intersections to insure a vapor tight seal. Repair all tears in insulation foil facing with vapor retarder tape.

PART 3 - EXECUTION**3.1 INSTALLATION - GENERAL**

- A. Install insulation with the vapor barrier facing the heated side, unless specified otherwise.
- B. Install rigid insulating units with joints close and flush, in regular courses and with cross joints broken.
- C. Install batt or blanket insulation with tight joints and filling framing void completely. Seal cuts, tears, and unlapped joints with tape.
- D. Fit insulation tight against adjoining construction and penetrations, unless specified otherwise.

3.2 PERIMETER INSULATION:

- A. Vertical insulation:
 - 1. Fill joints of insulation with same material used for bonding.
 - 2. Bond polystyrene board to surfaces with adhesive or Portland cement mortar mixed and applied in accordance with recommendations of insulation manufacturer.
 - 3. Bond cellular glass insulation to surfaces with hot asphalt or adhesive cement.
- B. Horizontal insulation under concrete floor slab:
 - 1. Lay insulation boards and blocks horizontally on level, compacted and drained fill.
 - 2. Extend insulation from foundation walls towards center of building not less than 600 mm (24 inches) or as shown.

3.3 EXTERIOR FRAMING OR FURRING BLANKET INSULATION:

- A. Pack insulation around door frames and windows and in building expansion joints, door soffits and other voids. Pack behind outlets around pipes, ducts, and services encased in walls. Open voids are not permitted. Hold insulation in place with pressure sensitive tape.
- B. Lap vapor retarder flanges together over face of framing for continuous surface. Seal all penetrations through the insulation.
- C. Fasten blanket insulation between metal studs or framing and exterior wall furring by continuous pressure sensitive tape along flanged edges.
- D. Fasten blanket insulation between wood studs or framing with nails or staples through flanged edges on face of stud. Space fastenings should not be more than 150 mm (six inches) apart.
- E. Ceiling Insulation and Soffit Insulation:
 - 1. Fasten blanket insulation between wood framing or joist with nails or staples through flanged edges of insulation.
 - 2. At metal framing or ceilings suspension systems, install blanket insulation above suspended ceilings or metal framing at right angles to the main runners or framing. Tape insulation tightly together so no gaps occur and metal framing members are covered by insulation.
 - 3. In areas where suspended ceilings adjoin areas without suspended ceilings, install either blanket, batt, or mineral fiberboard extending from the suspended ceiling to underside of deck or slab above. Secure in place to prevent collapse or separation of hung blanket, batt, or board insulation and maintain in vertical position. Secure blanket or batt with continuous cleats to structure above.

3.4 ACOUSTICAL INSULATION:

- A. Fasten blanket insulation between metal studs and wall furring with continuous pressure sensitive tape along edges or adhesive.
- B. Pack insulation around door frames and windows and in cracks, expansion joints, control joints, door soffits and other voids. Pack behind outlets, around pipes, ducts, and services encased in wall or partition. Hold insulation in place with pressure sensitive tape or adhesive.
- C. Do not compress insulation below required thickness except where embedded items prevent required thickness.
- D. Where acoustical insulation is installed above suspended ceilings install blanket at right angles to the main runners or framing. Extend

insulation over wall insulation systems not extending to structure above.

- E. Where semi-rigid insulation is used which is not full thickness of cavity, adhere to one side of cavity maintaining continuity of insulation and covering penetrations or embedment in insulation.
- F. Where sound deadening board is shown, secure with adhesive to masonry or concrete walls and with screws to metal or wood framing. Secure sufficiently in place until subsequent cover is installed. Seal all cracks with caulking.

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SECTION 07 51 00
BUILT-UP BITUMINOUS ROOFING

PART 1 GENERAL**1.1 DESCRIPTION**

This section includes bituminous built-up roofing, aggregate surfacing, with base flashing for new construction, repairs and alterations to existing construction.

1.2 RELATED WORK

- A. Wood cants, blocking, and wood edge strips: Section 06 10 00, ROUGH CARPENTRY.
- B. Wood sheathing: Section 06 10 00, ROUGH CARPENTRY.
- C. Metal base flashing, pipe flashing, counter flashing, coping, splash pan, reglet, insulated expansion joint cover, scupper: Section 07 60 00, FLASHING AND SHEET METAL.
- D. Extruded aluminum coping, and expansion joint cover: Section 07 71 00, ROOF SPECIALTIES and Section 07 72 00, ROOF ACCESSORIES.

1.3 APPLICABLE PUBLICATIONS

- A. Applicable publications listed below form a part of this Specification as referenced. Publications are referenced in the text by the number designation only.
- B. American Society for Testing and Materials (ASTM):
 - A167-99(R2009).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
 - B209-10.....Aluminum and Aluminum-Alloy Sheet and Plate
 - D41-11.....Asphalt Primer Used in Roofing, Dampproofing and Waterproofing
 - D43-00(R2006).....Coal Tar Primer Used in Roofing, Dampproofing and Waterproofing
 - D227-03.....Coal-Tar Saturated Organic Felt Used in Roofing and Waterproofing
 - D312-00(R2006).....Asphalt Used in Roofing
 - D448-08.....Sizes of Aggregate for Road and Bridge Construction
 - D450-07.....Coal-Tar Pitch Used in Roofing, Dampproofing and Waterproofing
 - D751-06.....Test Methods for Coated Fabrics
 - D1863-05.....Mineral Aggregate Used on Built-Up Roofs

- D2178-04.....Asphalt Glass Felt Used in Roofing and
Waterproofing
- D3884-09.....Abrasion Resistance of Textile Fabrics
(Rotary Platform Double-Head Method)
- D3909-97B(R2004)e1.....Asphalt Roll Roofing (Glass Felt) Surfaced
with Mineral Granules
- D4586-07.....Asphalt Roof Cement, Asbestos Free
- D4601-04.....Asphalt Coated Fiberglass Base Sheet Used
In Roofing
- D4897-01(R2009).....Asphalt Coated Glass Fiber Venting Base
Sheet Used in Roofing
- D6163-00(R2008).....Specification for Styrene Butadiene
Styrene (SBS) Modified Bituminous Sheet
Materials Using Glass Fiber Reinforcements
- F1667-11.....Driven Fasteners: Nails, Spikes, Staples
- C. FM Global (FMG):
- P7825C-05.....Approval Guide Building Materials
- 4450:.....Approved Standard for Class 1 Insulated
Steel Deck Roofs
- 4470:.....Approved Standard for Class 1 Roof
Coverings
- D. National Roofing Contractors Association (NRCA):
1. "Quality Control Guidelines for the Application of Built-up
Roofing."
 2. "The NRCA Roofing and Waterproofing Manual"

1.4 WARRANTY

- A. Roofing system is subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period is extended to five years.

1.5 QUALITY CONTROL

- A. Applicator Qualifications: Installer experienced in installation of systems similar in complexity to that required for this Project, including specific requirements indicated:
1. Work shall be performed by installer approved in writing by roofing material manufacturer.
 2. Work shall comply with printed instructions of the roofing materials manufacturer.
- B. Product/Material Qualifications:
1. Provide manufacturer's label on each container or certification with each load of bulk bitumen, indicating Flash Point (FP),

Finished Blowing Temperature (FBT), Softening Point (SP), Equiviscous Temperature (EVT).

2. Provide manufacturer's certification that field applied bituminous coatings and mastics, and field applied roof coatings comply with limits for Volatile Organic Compounds (VOC) per the National Volatile Organic Compound Emission Standards for Architectural Coatings pursuant to Section 183(e) of the Clean Air Act with limits as follows:
 - a. Bituminous Coatings and Mastics: 500 g/l (4.2#/gal.).
 - b. Roof Coatings: 250 g/l (2.1#/gal.).
3. Obtain products from single manufacturer or from sources recommended by manufacturer for use with roofing system.
- C. Comply with the recommendations of the NRCA "Roofing and Waterproofing Manual" applicable to built-up roofing for storage, handling and installation.
- D. FMG Listing: Provide roofing membrane, base flashing, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a roofing system and that are listed in FMG "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.
 1. Fire/Windstorm Classification: Class 1A-60 120.
 2. Hail Resistance: MH.

1.6 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data:
 1. Asphalt materials, each type.
 2. Roofing cement, each type.
 3. Fastening requirements.
- C. Certificates:
 1. Indicate materials and method of application of roofing system meet requirements of FMG.
 2. Statements of qualification for manufacturers and installers.
 3. Inspection Report: Copy of roofing system manufacturer's inspection report certifying completed roofing complies with manufacturer's warranty requirements.
- D. Warranty: As specified in Part 1 of this Section:
 1. Warranty sample form with specific language to address Contract provisions.

- E. Contract Close-out Submittals:
 - 1. Maintenance Manuals.
 - 2. Warranty signed by installer and manufacturer.

1.7 DELIVERY, STORAGE AND MARKING

- A. Deliver roofing materials to the site in original sealed packages or containers marked with the name and brand or trademark of the manufacturer or seller.
- B. Keep roofing materials dry and store in a dry, weather-tight facility or under canvas covers. Do not use polyethylene or plastic covers to protect materials. Store above ground or deck level on wood pallets. Cover ground under pallet stored materials with plastic.
 - 1. Store rolled materials (felts, base sheets, and paper) on end. Do not store hems on top of rolled materials.
 - 2. Aggregates shall be maintained surface dry as defined by ASTM D1863.
- C. Protect from damage due to handling, weather and construction operations before, during and after installation.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Environmental Controls: Refer to Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- C. Protection of interior spaces: Refer to Section 01 00 00, GENERAL REQUIREMENTS.

PART 2 - PRODUCTS

2.1 ROOFING SYSTEM

- A. Install built-up roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations of NRCA "Quality Control Guidelines for the Application of Built-up Roofing."
- B. Glass sheet, asphalt bitumen, mineral surfaced.
 - 1. Substrate:
 - a. Roof Insulation over Cast-In-Place Concrete.
 - b. Roof Insulation over Roof boards.
 - 2. Components: Quantity
 - a. Ventilating Base Sheet: 1 Ply

- b. Ply Sheet: 3 Plies
 - c. Mineral Surfaced Cap Sheet: 1 Ply
 - d. Asphalt Between Ventilating Base Sheet, and First Ply: 20-35 lbs/100 sq. ft.
 - e. Asphalt Between Each Ply 10-17.5 kg/10 sq. meters 20-35 lbs/100 sq. ft.
3. Provide asphalt quantities within the indicated ranges, unless recommended otherwise in the roofing materials manufacturer's printed data.

2.2 MATERIALS

- A. Primer: ASTM D41.
- B. Base Sheet: ASTM D4601, Type II, nonperforated, asphalt-impregnated and coated, glass-fiber sheet, dusted with fine mineral surfacing on both sides.
- C. Venting Base Sheet: ASTM D4897, Type II, venting, nonperforated, heavyweight, asphalt-impregnated and coated, glass-fiber base sheet with coarse granular surfacing or embossed venting channels on bottom surface.
- D. Asphalt: ASTM D312, Type III or IV for roof membrane. Use Type I for pour coat unless specified otherwise.
- E. Ply Sheet/Backer Sheet: ASTM D2178, Type VI, heavy-duty ply sheet.
- F. Cap Sheet: ASTM D3909, asphalt-impregnated and -coated, glass-fiber cap sheet, with white coarse mineral-granule top surfacing and white fine mineral surfacing on bottom surface. Product must comply with Specification Section 01 81 11 SUSTAINABLE DESIGN REQUIREMENTS, Solar Reflectance Index (SRI) of the material.
- G. Roof Cement: ASTM D4586, Type I.
- H. Flashing Sheet: ASTM D6163, Type I or II, glass-fiber-reinforced, SBS-modified asphalt sheet; granular surfaced; suitable for application method specified.

2.3 MISCELLANEOUS MATERIALS

- A. Roof Walkway:
 - 1. Prefabricated asphalt plank consisting of a homogeneous core of asphalt, plasticizer and inert fillers, bonded by heat and pressure between two saturated and coated sheets of felt:
 - a. Topside of plank surfaced with ceramic granules.

2.4 FASTENERS

- A. Nails and Staples: ASTM F1667.
- B. Nails for Securing built-up Flashing and Base Sheets to Wood Nailers and Deck:

1. Zinc coated steel roofing nails with minimum head diameter of 10 mm (3/8-inch) through metal discs at least 25 mm (one inch) across.
 2. One-piece nails with an integral flat cap at least 24 mm (15/16-inch) across.
- C. Fasteners for Securing Dry Felt Edge Strips to Wood Nailer and Decks:
1. Zinc coated steel roofing nails, 16-mm (5/8-inch) minimum head diameter.
 2. Staples, Flat top Crown, zinc coated may be used.
- D. Nails for Plywood:
1. Use annular thread type at least 19 mm (3/4-inch) penetration of plywood.
 2. 16 mm (5/8-inch) minimum head diameter.
 3. Nails with flat cap at least 24 mm (15/16-inch) across.

PART 3 - EXECUTION

3.1 GENERAL

- A. Do not apply if deck will be used for subsequent work platform, storage of materials, or staging or scaffolding will be erected thereon.
- B. Phased construction is not permitted. The complete installation of roofing system is required in the same day except for area where temporary protection is required when work is stopped. Complete installation includes pavers and ballast for ballasted systems.

3.2 EXAMINATION

- A. Verification of Conditions: Examine substrates, areas and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion:
 1. Do not proceed until unsatisfactory conditions, including moisture, have been corrected.
 2. Do not install roofing materials over wet insulation.
 3. Do not install roofing materials unless roof openings, wood nailers, edge venting, insulation board, flashing, curbs, and roof joints are constructed.
 4. Do not install roof materials unless deck and/or insulation provides designed drainage to working drains.
- B. Uninsulated Concrete Decks, except Insulating Concrete:
 1. Test deck for moisture prior to application of roofing materials.

2. Test by pouring one pint of hot bitumen at 204 degrees C (400 degrees F.) or EVT on deck at start of each day's Work and at start of each new roof area or plane. Do not proceed if test sample foams or can be easily (cleanly) stripped after cooling.

3.3 REPAIR AND ALTERATIONS TO EXISTING ROOF

- A. Areas to be altered or repaired, remove loose aggregate and aggregate not firmly embedded where new penetrations occur or repairs are required:
 1. Remove aggregate 900 mm (3 feet) beyond areas to be cut.
 - a. Clean, dry and store aggregate away from roof area until ready to reuse.
 - b. Remove unsuitable and excess aggregate not used from Project.
- B. Cut and remove existing roof membrane for new work to be installed. Clean cut edges and install a temporary seal to cut surfaces. Use roof cement and one layer of 7 Kg (15 pound) felt strip cut to extend 150 mm (6 inches) on each side of cut surface. Bed strip in roof cement and cover with roof cement to completely embed the felt.
- C. Bend up cap flashing or temporarily remove at built-up base flashing to be repaired. Brush and scrape away deteriorated and loose bitumen, felts or surface material of built-up base flashing.
- D. Repairs to existing membrane and base flashing:
 1. Remove temporary patches prior to starting new work.
 2. Blisters and fish mouths:
 - a. Cut blisters open and turn membrane back to fully adhered portion. Cut fish mouths so membrane can be turned back and subsequently laid flat.
 - b. Heat membrane to facilitate bending and to dry surface of exposed blister areas.
 - c. Mop turned back membrane in hot bitumen. Roll to insure full adhesion and embedment in substrate.
 - d. Cover cut areas with two plies of felt. Extend first ply 100 mm (4-inches) beyond cut area edge. Extend second 100 mm (4 inches) beyond first ply. Mop down in hot bitumen as specified for new work. Resurface to match existing.
 3. Exposed Felts:
 - a. Cut away exposed deteriorated edges of sheets.
 - b. Glaze coat felt edges.

- c. Resurface to match existing.
- 4. Built-up Base Flashing:
 - a. Restore felts and cap sheet removed, lapping 100 mm (4-inches) over existing.
 - b. Install new felts and cap sheet as specified for new work.
- 5. Horizontal Metal Flanges:
 - a. Remove loose, buckled or torn stripping.
 - b. Remove loose fasteners and install new fasteners.
 - c. Restrip flanges as specified for new work.
- 6. Resurfacing:
 - a. Over repaired membrane, embed aggregate as specified for new work.
 - b. Cover all membrane areas. Do not leave any exposed membrane surface.
- E. Match existing roofing materials and construction. Use bitumen compatible with existing for roof repair and alteration.
- F. Perform alterations, maintenance and repairs to roof membrane immediately after membrane has been cut or damaged, with permanent new work as specified in this specification. Repair items damaged in surface preparation and aggregate removal.

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**SECTION 07 60 00
FLASHING AND SHEET METAL**

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. Formed sheet metal work for wall and roof flashing, copings, roof edge metal, fasciae, and drainage specialties are specified in this section.

1.2 RELATED WORK

- A. Manufactured flashing, copings, roof edge metal, and fasciae: Section 07 71 00 ROOF SPECIALTIES.
- B. Membrane base flashings and stripping: Section 07 51 00, BUILT-UP BITUMINOUS ROOFING.
- C. Flashing components of factory finished roofing and wall systems: Division 07 roofing and wall system sections.
- D. Joint Sealants: Section 07 92 00, JOINT SEALANTS.
- E. Integral flashing components of manufactured roof specialties and accessories or equipment: Section 07 71 00, ROOF SPECIALTIES, Division 22, PLUMBING sections and Division 23 HVAC sections.
- F. Paint materials and application: Section 09 91 00, PAINTING.

1.3 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only. Editions of applicable publications current on date of issue of bidding documents apply unless otherwise indicated.

B. Aluminum Association (AA):

AA-C22A41.....Aluminum Chemically etched medium matte, with clear anodic coating, Class I Architectural, 0.7-mil thick

AA-C22A42.....Chemically etched medium matte, with integrally colored anodic coating, Class I Architectural, 0.7 mils thick

AA-C22A44.....Chemically etched medium matte with electrolytically deposited metallic compound, integrally colored coating Class I Architectural, 0.7-mil thick finish

C. American National Standards Institute/Single-Ply Roofing Institute

(ANSI/SPRI):

ANSI/SPRI ES-1-03.....Wind Design Standard for Edge Systems Used with
Low Slope Roofing Systems

D. American Architectural Manufacturers Association (AAMA):

AAMA 620.....Voluntary Specification for High Performance
Organic Coatings on Coil Coated Architectural
Aluminum

AAMA 621.....Voluntary Specification for High Performance
Organic Coatings on Coil Coated Architectural
Hot Dipped Galvanized (HDG) and Zinc-Aluminum
Coated Steel Substrates

E. ASTM International (ASTM):

A167-99(R2009).....Stainless and Heat-Resisting Chromium-Nickel
Steel Plate, Sheet, and Strip

A653/A653M-10.....Steel Sheet Zinc-Coated (Galvanized) or Zinc
Alloy Coated (Galvanized) by the Hot- Dip
Process

B32-08.....Solder Metal

B209-10.....Aluminum and Aluminum-Alloy Sheet and Plate

B370-11.....Copper Sheet and Strip for Building
Construction

D173-03.....Bitumen-Saturated Cotton Fabrics Used in
Roofing and Waterproofing

D412-06ae2.....Vulcanized Rubber and Thermoplastic Elastomers-
Tension

D1187-97(R2011)e1.....Asphalt Base Emulsions for Use as Protective
Coatings for Metal

D1784-11.....Rigid Poly (Vinyl Chloride) (PVC) Compounds and
Chlorinated Poly (Vinyl Chloride) (CPVC)
Compounds

D3656-07.....Insect Screening and Louver Cloth Woven from
Vinyl-Coated Glass Yarns

D4586-07.....Asphalt Roof Cement, Asbestos Free

F. Sheet Metal and Air Conditioning Contractors National Association
(SMACNA): Architectural Sheet Metal Manual.

G. National Association of Architectural Metal Manufacturers (NAAMM):
AMP 500-06.....Metal Finishes Manual

H. Federal Specification (Fed. Spec):

A-A-1925A.....Shield, Expansion; (Nail Anchors)

UU-B-790A.....Building Paper, Vegetable Fiber

I. International Code Commission (ICC): International Building Code,
Current Edition

1.4 PERFORMANCE REQUIREMENTS

A. Wind Uplift Forces: Resist the following forces per FM Approvals 1-49:

1. Wind Zone 1: 0.48 to 0.96 kPa (10 to 20 lbf/sq. ft.): 1.92-kPa (40-lbf/sq. ft.) perimeter uplift force, 2.87-kPa (60-lbf/sq. ft.) corner uplift force, and 0.96-kPa (20-lbf/sq. ft.) outward force.
2. Wind Zone 1: 1.00 to 1.44 kPa (21 to 30 lbf/sq. ft.): 2.87-kPa (60-lbf/sq. ft.) perimeter uplift force, 4.31-kPa (90-lbf/sq. ft.) corner uplift force, and 1.44-kPa (30-lbf/sq. ft.) outward force.
3. Wind Zone 2: 1.48 to 2.15 kPa (31 to 45 lbf/sq. ft.): 4.31-kPa (90-lbf/sq. ft.) perimeter uplift force, 5.74-kPa (120-lbf/sq. ft.) corner uplift force, and 2.15-kPa (45-lbf/sq. ft.) outward force.
4. Wind Zone 3: 2.20 to 4.98 kPa (46 to 104 lbf/sq. ft.): 9.96-kPa (208-lbf/sq. ft.) perimeter uplift force, 14.94-kPa (312-lbf/sq. ft.) corner uplift force, and 4.98-kPa (104-lbf/sq. ft.) outward force.

B. Wind Design Standard: Fabricate and install copings tested per ANSI/SPRI ES-1 to resist design pressure indicated on Drawings.

1.5 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

- B. Shop Drawings: For all specified items, including:
 - 1. Flashings
 - 2. Copings
 - 3. Fascia-cant
- C. Manufacturer's Literature and Data: For all specified items, including:
 - 1. Two-piece counterflashing
 - 2. Nonreinforced, elastomeric sheeting
 - 3. Fascia-cant
- D. Certificates: Indicating compliance with specified finishing requirements, from applicator and contractor.

PART 2 - PRODUCTS

2.1 FLASHING AND SHEET METAL MATERIALS

- A. Stainless Steel: ASTM A167, Type 302B, dead soft temper.
- B. Aluminum Sheet: ASTM B209, alloy 3003-H14, except alloy used for color anodized aluminum shall be as required to produce specified color. Alloy required to produce specified color shall have the same structural properties as alloy 3003-H14.
- C. Nonreinforced, Elastomeric Sheet: Elastomeric substances reduced to thermoplastic state and extruded into continuous homogenous sheet (0.056 inch) thick. Sheet shall have not less than 7 MPa (1,000 psi) tensile strength and not more than seven percent tension-set at 50 percent elongation when tested in accordance with ASTM D412. Sheet shall show no cracking or flaking when bent through 180 degrees over a 1 mm (1/32 inch) diameter mandrel and then bent at same point over same size mandrel in opposite direction through 360 degrees at temperature of -30°C (-20 °F).

2.2 FLASHING ACCESSORIES

- A. Solder: ASTM B32; flux type and alloy composition as required for use with metals to be soldered.
- B. Rosin Paper: Fed-Spec. UU-B-790, Type I, Grade D, Style 1b, Rosin-sized sheathing paper, weighing approximately 3 Kg/10 m² (6 lbs/100 sf).

C. Bituminous Paint: ASTM D1187, Type I.

D. Fasteners:

1. Use copper, copper alloy, bronze, brass, or stainless steel for copper and copper clad stainless steel, and stainless steel for stainless steel and aluminum alloy. Use galvanized steel or stainless steel for galvanized steel.

2. Nails:

a. Minimum diameter for copper nails: 3 mm (0.109 inch).

b. Minimum diameter for aluminum nails 3 mm (0.105 inch).

c. Minimum diameter for stainless steel nails: 2 mm (0.095 inch) and annular threaded.

d. Length to provide not less than 22 mm (7/8 inch) penetration into anchorage.

3. Rivets: Not less than 3 mm (1/8 inch) diameter.

4. Expansion Shields: Fed Spec A-A-1925A.

E. Sealant: As specified in Section 07 92 00, JOINT SEALANTS for exterior locations.

F. Roof Cement: ASTM D4586.

2.3 SHEET METAL THICKNESS

A. Except as otherwise shown or specified use thickness or weight of sheet metal as follows:

B. Concealed Locations (Built into Construction):

1. Copper: 30g (10 oz) minimum 0.33 mm (0.013 inch thick).

2. Stainless steel: 0.25 mm (0.010 inch) thick.

3. Copper clad stainless steel: 0.25 mm (0.010 inch) thick.

4. Galvanized steel: 0.5 mm (0.021 inch) thick.

C. Exposed Locations:

1. Copper: 0.4 Kg (16 oz).

2. Stainless steel: 0.4 mm (0.015 inch).

3. Copper clad stainless steel: 0.4 mm (0.015 inch).

D. Thickness of aluminum or galvanized steel is specified with each item.

2.4 FABRICATION, GENERAL

A. Jointing:

1. In general, copper, stainless steel and copper clad stainless steel joints, except expansion and contraction joints, shall be locked and soldered.
2. Jointing of copper over 0.5 Kg (20 oz) weight or stainless steel over 0.45 mm (0.018 inch) thick shall be done by lapping, riveting and soldering.
3. Joints shall conform to following requirements:
 - a. Flat-lock joints shall finish not less than 19 mm (3/4 inch) wide.
 - b. Lap joints subject to stress shall finish not less than 25 mm (one inch) wide and shall be soldered and riveted.
 - c. Unsoldered lap joints shall finish not less than 100 mm (4 inches) wide.
4. Flat and lap joints shall be made in direction of flow.
5. Edges of bituminous coated copper, copper covered paper, nonreinforced elastomeric sheeting and polyethylene coated copper shall be jointed by lapping not less than 100 mm (4 inches) in the direction of flow and cementing with asphalt roof cement or sealant as required by the manufacturer's printed instructions.
6. Soldering:
 - a. Pre tin both mating surfaces with solder for a width not less than 38 mm (1 1/2 inches) of uncoated copper, stainless steel, and copper clad stainless steel.
 - b. Wire brush to produce a bright surface before soldering lead coated copper.
 - c. Treat in accordance with metal producers recommendations other sheet metal required to be soldered.
 - d. Completely remove acid and flux after soldering is completed.

B. Cleats:

1. Fabricate cleats to secure flashings and sheet metal work over 300 mm (12 inches) wide and where specified.
2. Provide cleats for maximum spacing of 300 mm (12 inch) centers unless specified otherwise.
3. Form cleats of same metal and weights or thickness as the sheet metal being installed unless specified otherwise.
4. Fabricate cleats from 50 mm (2 inch) wide strip. Form end with not less than 19 mm (3/4 inch) wide loose lock to item for anchorage. Form other end of length to receive nails free of item to be anchored and end edge to be folded over and cover nail heads.

C. Edge Strips or Continuous Cleats:

1. Fabricate continuous edge strips where shown and specified to secure loose edges of the sheet metal work.
2. Except as otherwise specified, fabricate edge strips or minimum 0.6 mm (0.024 inch) thick stainless steel.
3. Use material compatible with sheet metal to be secured by the edge strip.
4. Fabricate in 3000 mm (10 feet) maximum lengths with not less than 19 mm (3/4 inch) loose lock into metal secured by edge strip.
5. Fabricate Strips for fascia anchorage to extend below the supporting wood construction to form a drip and to allow the flashing to be hooked over the lower edge at least 19 mm (3/4-inch).
6. Fabricate anchor edge maximum width of 75 mm (3 inches) or of sufficient width to provide adequate bearing area to insure a rigid installation using 0.8 mm (0.031 inch) thick stainless steel

D. Drips:

1. Form drips at lower edge of sheet metal counter-flashings (cap flashings), fascias, gravel stops, wall copings, by folding edge back 13 mm (1/2 inch) and bending out 45 degrees from vertical to carry water away from the wall.
2. Form drip to provide hook to engage cleat or edge strip for fastening for not less than 19 mm (3/4 inch) loose lock where shown.

E. Edges:

1. Edges of flashings concealed in masonry joints opposite drain side shall be turned up 6 mm (1/4 inch) to form dam, unless otherwise specified or shown otherwise.
2. Finish exposed edges of flashing with a 6 mm (1/4 inch) hem formed by folding edge of flashing back on itself when not hooked to edge strip or cleat. Use 6 mm (1/4 inch) minimum penetration beyond wall face with drip for through-wall flashing exposed edge.
3. All metal roof edges shall meet requirements of IBC, current edition.

F. Metal Options:

1. Where options are permitted for different metals use only one metal throughout.
2. Match existing metals.

2.5 FINISHES

- A. Use same finish on adjacent metal or components and exposed metal surfaces unless specified or shown otherwise.
- B. In accordance with NAAMM Metal Finishes Manual AMP 500, unless otherwise specified.
- C. Finish exposed metal surfaces as follows, unless specified otherwise:
 1. Stainless Steel: Finish No. 2B or 2D.
 2. Aluminum:
 - a. Clear Finish: AA-C22A41 medium matte, clear anodic coating, Class 1 Architectural, 18 mm (0.7 mils) thick.
 - c. Fluorocarbon Finish: AAMA 620, high performance organic coating.
 - d. Mill finish.
 3. Steel and Galvanized Steel:
 - a. Finish painted under Section 09 91 00, PAINTING unless specified as prefinished item.
 - b. Manufacturer's finish:

- 1) Fluorocarbon Finish: AAMA 621, high performance organic coating.

4. Colors

- a. Match wall color immediately below gravel stop or coping. Stainless Steel not exposed on exterior faces of building, visible from building windows or exterior courtyards within building are to be left without additional finishes.

2.6 BASE FLASHING

- A. Use metal base flashing at vertical surfaces intersecting built-up roofing without cant strips or where shown.
 1. Use either copper, or stainless steel, thickness specified unless specified otherwise.
 2. When flashing is over 250 mm (10 inches) in vertical height or horizontal width use either 0.5 Kg (20 oz) copper or 0.5 mm (0.018 inch) stainless steel.
 3. Use stainless steel at aluminum roof curbs where flashing contacts the aluminum.
 4. Use either copper or stainless steel at pipe flashings.
- B. Fabricate metal base flashing up vertical surfaces not less than 200 mm (8 inch) nor more than 400 mm (16 inch).
- C. Fabricate roof flange not less than 100 mm (4 inches) wide unless shown otherwise. When base flashing length exceeds 2400 mm (8 feet) form flange edge with 13 mm (1/2 inch) hem to receive cleats.
- D. Form base flashing bent from strip except pipe flashing. Fabricate ends for riveted soldered lap seam joints. Fabricate expansion joint ends as specified.
- E. Pipe Flashing:(Other than engine exhaust or flue stack)
 1. Fabricate roof flange not less than 100 mm (4 inches) beyond sleeve on all sides.
 2. Extend sleeve up and around pipe and flange out at bottom not less than 13 mm (1/2 inch) and solder to flange and sleeve seam to make watertight.

3. At low pipes 200 mm (8 inch) to 450 mm (18 inch) above roof:
 - a. Form top of sleeve to turn down into the pipe at least 25 mm (one inch).
 - b. Allow for loose fit around and into the pipe.
4. At high pipes and pipes with goosenecks or other obstructions which would prevent turning the flashing down into the pipe:
 - a. Extend sleeve up not less than 300 mm (12 inch) above roofing.
 - b. Allow for loose fit around pipe.

2.7 COUNTERFLASHING (CAP FLASHING OR HOODS)

- A. Stainless steel, unless specified otherwise.
- B. Fabricate to lap base flashing a minimum of 100 mm (4 inches) with drip:
 1. Form lock seams for outside corners. Allow for lap joints at ends and inside corners.
 2. In general, form flashing in lengths not less than 2400 mm (8 feet) and not more than 3000 mm (10 feet).
 3. Two-piece, lock in type flashing may be used in-lieu-of one piece counter-flashing.
 4. Manufactured assemblies may be used.
 5. Where counterflashing is installed at new work use an integral flange at the top designed to be extended into the masonry joint or reglet in concrete.
 6. Where counterflashing is installed at existing work use surface applied type, formed to provide a space for the application of sealant at the top edge.
- C. One-piece Counterflashing:
 1. Back edge turned up and fabricate to lock into reglet in concrete.
 2. Upper edge formed to extend full depth of masonry unit in mortar joint with back edge turned up 6 mm (1/4 inch).
- D. Two-Piece Counterflashing:

1. Receiver to extend into masonry wall depth of masonry unit with back edge turned up 6 mm (1/4 inch) and exposed edge designed to receive and lock counterflashing upper edge when inserted.
2. Counterflashing upper edge designed to snap lock into receiver.

E. Surface Mounted Counterflashing; one or two piece:

1. Use at existing or new surfaces where flashing can not be inserted in vertical surface.
2. One piece fabricate upper edge folded double for 65 mm (2 1/2 inches) with top 19 mm (3/4 inch) bent out to form "V" joint sealant pocket with vertical surface. Perforate flat double area against vertical surface with horizontally slotted fastener holes at 400 mm (16 inch) centers between end holes. Option: One piece surface mounted counter-flashing (cap flashing) may be used. Fabricate as detailed on Plate 51 of SMACNA Architectural Sheet Metal Manual.
3. Two pieces: Fabricate upper edge to lock into surface mounted receiver. Fabricate receiver joint sealant pocket on upper edge and lower edge to receive counterflashing, with slotted fastener holes at 400 mm (16 inch) centers between upper and lower edge.

F. Pipe Counterflashing:

1. Form flashing for water-tight umbrella with upper portion against pipe to receive a draw band and upper edge to form a "V" joint sealant receiver approximately 19 mm (3/4 inch) deep.
2. Fabricate 100 mm (4 inch) over lap at end.
3. Fabricate draw band of same metal as counter flashing. Use 0.6 Kg (24 oz) copper or 0.33 mm (0.013 inch) thick stainless steel or copper coated stainless steel.
4. Use stainless steel bolt on draw band tightening assembly.
5. Vent pipe counter flashing may be fabricated to omit draw band and turn down 25 mm (one inch) inside vent pipe.

- G. Where vented edge decks intersect vertical surfaces, form in one piece, shape to slope down to a point level with and in front of edge-set notched plank; then, down vertically, overlapping base flashing.

2.8 ENGINE EXHAUST PIPE OR FLUE OR STACK FLASHING

- A. Flashing at penetrations through roofing shall consist of a metal collar, sheet metal flashing sleeve and hood.
- B. Fabricate collar with roof flange of 1.2 mm (0.047 inch) minimum thick black iron or galvanized steel sheet.
 - 1. Fabricate inside diameter of collar 100 mm (4 inches) larger than the outside diameter of the item penetration the roofing.
 - 2. Extend collar height from structural roof deck to not less than 350 mm (14 inches) above roof surface.
 - 3. Fabricate collar roof flange not less than 100 mm (4 inches) wide.
 - 4. Option: Collar may be of steel tubing 3 mm (0.125 inch) minimum wall thickness, with not less than four, 50 mm x 100 mm x 3 mm (2 inch by 4 inch by 0.125 inch) thick tabs bottom edge evenly spaced around tube in lieu of continuous roof flange. Full butt weld joints of collar.
- C. Fabricate sleeve base flashing with roof flange of either copper, stainless steel, or copper clad stainless steel.
 - 1. Fabricate sleeve roof flange not less than 100 mm (4 inches) wide.
 - 2. Extend sleeve around collar up to top of collar.
 - 3. Flange bottom of sleeve out not less than 13 mm (1/24 inch) and soldered to 100 mm (4 inch) wide flange to make watertight.
 - 4. Fabricate interior diameter 50 mm (2 inch) greater than collar.
- D. Fabricate hood counter flashing from same material and thickness as sleeve.
 - 1. Fabricate the same as pipe counter flashing except allow not less than 100 mm (4 inch) lap below top of sleeve and to form vent space minimum of 100 mm (4 inch) wide.
 - 2. Hem bottom edge of hood 13 mm (1/2 inch).
 - 3. Provide a 50 mm (2 inch) deep drawband.
- E. Fabricate insect screen closure between sleeve and hood. Secure screen to sleeve with sheet metal screws.

2.9 GOOSENECK ROOF VENTILATORS

- A. Form of 1.3 mm (0.0508 inch) thick sheet aluminum, reinforce as necessary for rigidity, stiffness, and connection to curb, and to be watertight.
 - 1. Form lower-edge to sleeve to curb.
 - 2. Curb:
 - a. Form for 100 mm (4 inch) high sleeve to ventilator.
 - b. Form for concealed anchorage to structural curb and to bear on structural curb.
 - c. Form bottom edge of curb as counterflashing to lap base flashing.
- B. Provide open end with 1.6 mm (16 gage), stainless steel wire guard of 13 mm (1/2 inch) square mesh.
 - 1. Construct suitable aluminum angle frame to retain wire guard.
 - 2. Rivet angle frame to end of gooseneck.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Install flashing and sheet metal items as shown in Sheet Metal and Air Conditioning Contractors National Association, Inc., publication, ARCHITECTURAL SHEET METAL MANUAL, except as otherwise shown or specified.
 - 2. Apply Sealant as specified in Section 07 92 00, JOINT SEALANTS.
 - 3. Apply sheet metal and other flashing material to surfaces which are smooth, sound, clean, dry and free from defects that might affect the application.
 - 4. Remove projections which would puncture the materials and fill holes and depressions with material compatible with the substrate. Cover holes or cracks in wood wider than 6 mm (1/4 inch) with sheet metal compatible with the roofing and flashing material used.
 - 5. Confine direct nailing of sheet metal to strips 300 mm (12 inch) or less wide. Nail flashing along one edge only. Space nail not over 100 mm (4 inches) on center unless specified otherwise.

6. Install bolts, rivets, and screws where indicated, specified, or required in accordance with the SMACNA Sheet Metal Manual. Space rivets at 75 mm (3 inch) on centers in two rows in a staggered position. Use neoprene washers under fastener heads when fastener head is exposed.
7. Coordinate with roofing work for the installation of metal base flashings and other metal items having roof flanges for anchorage and watertight installation.
8. Nail continuous cleats on 75 mm (3 inch) on centers in two rows in a staggered position.
9. Nail individual cleats with two nails and bend end tab over nail heads. Lock other end of cleat into hemmed edge.
10. Install flashings in conjunction with other trades so that flashings are inserted in other materials and joined together to provide a water tight installation.
11. Where required to prevent galvanic action between dissimilar metal isolate the contact areas of dissimilar metal with sheet lead, waterproof building paper, or a coat of bituminous paint.
12. Isolate aluminum in contact with dissimilar metals others than stainless steel, white bronze or other metal compatible with aluminum by:
 - a. Paint dissimilar metal with a prime coat of zinc-chromate or other suitable primer, followed by two coats of aluminum paint.
 - b. Paint dissimilar metal with a coat of bituminous paint.
 - c. Apply an approved caulking material between aluminum and dissimilar metal.
13. Paint aluminum in contact with or built into mortar, concrete, plaster, or other masonry materials with a coat of bituminous paint.
14. Paint aluminum in contact with absorptive materials that may become repeatedly wet with two coats of bituminous paint or two coats of aluminum paint.

3.2 BASE FLASHING

- A. Install where roof membrane type base flashing is not used and where shown.
1. Install flashing at intersections of roofs with vertical surfaces or at penetrations through roofs, to provide watertight construction.
 2. Install metal flashings and accessories having flanges extending out on top of the built-up roofing before final bituminous coat and roof aggregate is applied.
 3. Set flanges in heavy trowel coat of roof cement and nail through flanges into wood nailers over bituminous roofing.
 4. Secure flange by nailing through roofing into wood blocking with nails spaced 75 mm (3 inch) on centers or, when flange over 100 mm (4 inch) wide terminate in a 13 mm (1/2 inch) folded edge anchored with cleats spaced 200 mm (8 inch) on center. Secure one end of cleat over nail heads. Lock other end into the seam.
- B. For long runs of base flashings install in lengths of not less than 2400 mm (8 feet) nor more than 3000 mm (ten feet). Install a 75 mm (3 inch) wide slip type, loose lock expansion joint filled with sealant in joints of base flashing sections over 2400 mm (8 feet) in length. Lock and solder corner joints at corners.
- C. Extend base flashing up under counter flashing of roof specialties and accessories or equipment not less than 75 mm (3 inch).

3.3 COUNTERFLASHING (CAP FLASHING OR HOODS)

- A. General:
1. Install counterflashing over and in conjunction with installation of base flashings, except as otherwise specified or shown.
 2. Install counterflashing to lap base flashings not less than 100 mm (4 inch).
 3. Install upper edge or top of counterflashing not less than 225 mm (9 inch) above top of the roofing.
 4. Lap joints not less than 100 mm (4 inch). Stagger joints with relation to metal base flashing joints.

5. Use surface applied counterflashing on existing surfaces and new work where not possible to integrate into item.
6. When fastening to concrete or masonry, use screws driven in expansion shields set in concrete or masonry. Use screws to wood and sheet metal. Set fasteners in mortar joints of masonry work.

B. One Piece Counterflashing:

1. Where flashing is installed at new masonry, coordinate to insure proper height, embed in mortar, and end lap.
2. Where flashing is installed in reglet in concrete insert upper edge into reglet. Hold flashing in place with lead wedges spaced not more than 200 mm (8 inch) apart. Fill joint with sealant.
3. Where flashing is surface mounted on flat surfaces.
 - a. When top edge is double folded anchor flat portion below sealant "V" joint with fasteners spaced not over 400 mm (16 inch) on center:
 - 1) Locate fasteners in masonry mortar joints.
 - 2) Use screws to sheet metal or wood.
 - b. Fill joint at top with sealant.
4. Where flashing or hood is mounted on pipe.
 - a. Secure with draw band tight against pipe.
 - b. Set hood and secure to pipe with a one by 25 mm x 3 mm (1 x 1/8 inch) bolt on stainless steel draw band type clamp, or a stainless worm gear type clamp.
 - c. Completely fill joint at top with sealant.

C. Two-Piece Counterflashing:

1. Where receiver is installed at new masonry coordinate to insure proper height, embed in mortar, and lap.
2. Surface applied type receiver:
 - a. Secure to face construction in accordance, with manufacturers instructions.
 - b. Completely fill space at the top edge of receiver with sealant.

3. Insert counter flashing in receiver in accordance with fabricator or manufacturer's instructions and to fit tight against base flashing.
- D. Where vented edge occur install so lower edge of counterflashing is against base flashing.
 - E. When counter flashing is a component of other flashing install as shown.

3.4 COPINGS

A. General:

1. Where shown turn down roof side of coping and extend down over base flashing as specified for counter-flashing. Secure counter-flashing to lock strip in coping at continuous cleat.
2. Install ends adjoining existing construction so as to form space for installation of sealants. Sealant is specified in Section 07 92 00, JOINT SEALANTS.

B. Aluminum Coping:

1. Install with 6 mm (1/4 inch) joint between ends of coping sections.
2. Install joint covers, centered at each joint, and securely lock in place.

C. Stainless Steel Copings:

1. Join ends of sheets by a 19 mm (3/4 inch) locked and soldered seam, except at intervals of 9600 mm (32 feet), provide a 38 mm (1 1/2 inch) loose locked expansion joint filled with sealant or mastic.
2. At straight runs between 7200 mm (24 feet) and 19200 mm (64 feet) locate expansion joint at center.
3. At straight runs that exceed 9600 mm (32 feet) and form the leg of a corner locate the expansion joint not more than 4800 mm (16 feet) from the corner.

3.5 ENGINE EXHAUST PIPE OR STACK FLASHING

- A. Set collar where shown and secure roof tabs or flange of collar to structural deck with 13 mm (1/2 inch) diameter bolts.
- B. Set flange of sleeve base flashing not less than 100 mm (4 inch) beyond collar on all sides as specified for base flashing.

- C. Install hood to above the top of the sleeve 50 mm (2 inch) and to extend from sleeve same distance as space between collar and sleeve beyond edge not sleeve:
1. Install insect screen to fit between bottom edge of hood and side of sleeve.
 2. Set collar of hood in high temperature sealant and secure with one by 3 mm (1/8 inch) bolt on stainless steel draw band type, or stainless steel worm gear type clamp. Install sealant at top of head.

3.6 GOOSENECK ROOF VENTILATORS

- A. Install on structural curb not less than 200 mm (8 inch) high above roof surface.
- B. Securely anchor ventilator curb to structural curb with fasteners spaced not over 300 mm (12 inch) on center.
- C. Anchor gooseneck to curb with screws having nonprene washers at 150 mm (6 inch) on center.

- - - E N D - - -

SECTION 07 71 00
ROOF SPECIALTIES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies equipment supports, gravity ventilators, and walkway pads..

1.2 RELATED WORK

- A. Sealant material and installation: Section 07 92 00, JOINT SEALANTS.
B. General insulation: Section 07 21 13, THERMAL INSULATION.

1.3 QUALITY CONTROL

- A. All roof accessories shall be the products of manufacturers regularly engaged in producing the kinds of products specified.
B. Each accessory type shall be the same and be made by the same manufacturer.
C. Each accessory shall be completely assembled to the greatest extent possible before delivery to the site.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
B. Samples: Representative sample panel of color anodized aluminum not less than 100 mm X 100 mm (four by four inches), except extrusions shall be a width not less than section to be used. Sample shall show coating with integral color and texture and shall include manufacturer's identifying label.
C. Shop Drawings: Each item specified showing design, details of construction, installation and fastenings.
D. Manufacturer's Literature and Data: Each item specified.
E. Certificates: Stating that aluminum has been given specified thickness of anodizing.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
B. Federal Specifications (Fed. Spec.):
RR-G-1602D.....Grating, Metal, Other Than Bar Type (Floor,
Except for Naval Vessels)
C. American Society for Testing and Material (ASTM):

- A653/A653M-10.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) By the Hot-Dip Process
- B209/209M-10.....Aluminum and Aluminum Alloy-Sheet and Plate
- B221/221M-08.....Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
- C612-10.....Mineral Fiber Block and Board Thermal Insulation
- D1187-97(2011)e1.....Asphalt-Base Emulsions for Use as Protective Coatings for Metal
- D. National Association of Architectural Metal Manufacturers (NAAMM):
AMP 500 Series.....Metal Finishes Manual
- E. American Architectural Manufacturers Association (AAMA):
605-98.....High Performance Organic Coatings on Architectural Extrusions and Panels.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum, Extruded: ASTM B221/B221M.
- B. Aluminum Sheet: ASTM B209/B209M.
- C. Galvanized Sheet Steel: ASTM A526/A526M; G-90 coating.
- D. Metal Grating for Roof Walkway: Fed. Spec. RR-G-1602.

2.2 EQUIPMENT SUPPORTS

- A. Fabricate equipment supports from 1.3 mm (0.0516 inch) thick galvanized steel.
- B. Form exterior curb with integral base, and deck closures for curbs installed on steel decking.
- C. Use galvanized steel liners for curbs having inside dimension over 305 mm (12 inches).
- D. Fabricate curb with a minimum height of 200 mm (8 inches) above roof surface.
- E. Attach preservative treated wood nailers to top of curb. Use 50 mm (2 inch) by 50 mm (2 inch) minimum nominal size on curb with openings and 50 mm (2 inch) thick, width of curb up to 300 mm (12 inches) on equipment support curbs.
- F. Make size of supports suit size of equipment furnished, with height as shown on drawings, but not less than 200 mm (8 inches) above roof surface.

2.3 LOW SILHOUETTE GRAVITY VENTILATORS

- A. Fabricate base of 1 mm (0.04 inch) thick aluminum, and vent of 0.8 mm (0.032 inch) thick aluminum. Height not to exceed 300 mm (12 inches) above top of roof curb. Design ventilators to withstand 137 Km (85

miles) per hour wind velocity. Provide ventilators with a removable 18 by 18 mesh aluminum wire cloth insect screen.

- B. Construct damper of the same material as the ventilator and design to completely close opening or remain wide open. Hold damper in closed position by a brass chain and catch. Extend chains 300 mm (12 inches) below and engage catch when damper is closed.

2.4 FINISH

- A. In accordance with NAAMM Amp 500 Series.
- B. Aluminum, Mill Finish: AA-MIX, as fabricated.
- C. Aluminum, Clear Finish: AA-C22A41 medium matte, clear anodic coating.
- D. Aluminum Colored Finish: AA-C22A42 (anodized or AA0C22A44 (electrolytically deposited metallic compound) medium matte, integrally colored coating. Dyes will not be accepted.

2.5 WALKWAY PADS

- A. Heavy duty, textured, flexible, polyester-reinforced thermoplastic membrane manufactured using an ultraviolet-resistant formulation.
- B. Use over Built-Up Roofing system as walkway material and as protection around rooftop units/equipment that require regular maintenance.
- C. Color - Safety Yellow.
- D. Size - 36' wide x 60" long, 0.150" (3.81mm) nominal thickness, packaged in a roll.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install roof specialties where shown.
- B. Secure with fasteners in accordance with manufacture's printed installation instructions and approved shop drawings unless shown otherwise.
- C. Comply with section 07 92 00, JOINT SEALANTS to install sealants where manufactures installation instructions require sealant.
- D. Coordinate with roofing work for installation of items in sequence to prevent water infiltration.
 - b. After completion of base flashing bend down cap flashing flange and secure to blocking with screws.
 - c. Install expansion joint cover with 6 mm (1/4 inch) wide space at end joints and tension bars at 600 mm (24 inches) on center.
 - d. Install cover plates with formed aluminum flashing concealed and centered on joint. Flashing to lap cover not less than 100 mm (4 inches).
- E. Equipment Supports: Do not anchor to insulating concrete or metal deck. Anchor only to building structure as per manufacturers recommendations.

- F. Walk Pads: install textured side up over roofing membrane with a 1-1/2 continuous weld around the sheet perimeter to ensure watertightness. Refer to manufacturer installation instructions for additional information.

3.2 PROTECTION OF ALUMINUM

- A. Provide protection for aluminum against galvanic action wherever dissimilar materials are in contact, by painting the contact surfaces of the dissimilar material with two coats of asphalt coating (complete coverage), or by separating the contact surfaces with a preformed neoprene tape having pressure sensitive adhesive coating on side.
- B. Paint aluminum in contact with wood, concrete and masonry, or other absorptive materials, that may become repeatedly wet, with two coats of asphalt coating.

3.3 PROTECTION

Protect roof accessories from damage during installation and after completion of the work from subsequent construction.

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SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL**1.1 DESCRIPTION**

- A. Closures of openings in walls, floors, and roof decks against penetration of flame, heat, and smoke or gases in fire resistant rated construction.
- B. Closure of openings in walls against penetration of gases or smoke in smoke partitions.

1.2 RELATED WORK

- A. Sealants and application: Section 07 92 00, JOINT SEALANTS.
- B. Fire and smoke damper assemblies in ductwork: Section 23 31 00, HVAC DUCTS AND CASINGS and Section 23 37 00, AIR OUTLETS AND INLETS.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturers literature, data, and installation instructions for types of firestopping and smoke stopping used.
- C. List of FM, UL, or WH classification number of systems installed.
- D. Certified laboratory test reports for ASTM E814 tests for systems not listed by FM, UL, or WH proposed for use.

1.4 DELIVERY AND STORAGE

- A. Deliver materials in their original unopened containers with manufacturer's name and product identification.
- B. Store in a location providing protection from damage and exposure to the elements.

1.5 WARRANTY

Firestopping work subject to the terms of the Article "Warranty of Construction", FAR clause 52.246-21, except extend the warranty period to five years.

1.6 QUALITY ASSURANCE

FM, UL, or WH or other approved laboratory tested products will be acceptable.

1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

- B. American Society for Testing and Materials (ASTM):
 - E84-11a.....Surface Burning Characteristics of Building Materials
 - E814-11a.....Fire Tests of Through-Penetration Fire Stops
- C. Factory Mutual Engineering and Research Corporation (FM):
 - Annual Issue Approval Guide Building Materials
- D. Underwriters Laboratories, Inc. (UL):
 - Annual Issue Building Materials Directory
 - Annual Issue Fire Resistance Directory
 - 1479-10.....Fire Tests of Through-Penetration Firestops
- E. Warnock Hersey (WH):
 - Annual Issue Certification Listings

PART 2 - PRODUCTS

2.1 FIRESTOP SYSTEMS

- A. Use either factory built (Firestop Devices) or field erected (through-Penetration Firestop Systems) to form a specific building system maintaining required integrity of the fire barrier and stop the passage of gases or smoke.
- B. Through-penetration firestop systems and firestop devices tested in accordance with ASTM E814 or UL 1479 using the "F" or "T" rating to maintain the same rating and integrity as the fire barrier being sealed. "T" ratings are not required for penetrations smaller than or equal to 100 mm (4 in) nominal pipe or 0.01 m² (16 sq. in.) in overall cross sectional area.
- C. Products requiring heat activation to seal an opening by its intumescence shall exhibit a demonstrated ability to function as designed to maintain the fire barrier.
- D. Firestop sealants used for firestopping or smoke sealing shall have following properties:
 1. Contain no flammable or toxic solvents.
 2. Have no dangerous or flammable out gassing during the drying or curing of products.
 3. Water-resistant after drying or curing and unaffected by high humidity, condensation or transient water exposure.
 4. When used in exposed areas, shall be capable of being sanded and finished with similar surface treatments as used on the surrounding wall or floor surface.

- E. Firestopping system or devices used for penetrations by glass pipe, plastic pipe or conduits, unenclosed cables, or other non-metallic materials shall have following properties:
1. Classified for use with the particular type of penetrating material used.
 2. Penetrations containing loose electrical cables, computer data cables, and communications cables protected using firestopping systems that allow unrestricted cable changes without damage to the seal.
 3. Intumescent products which would expand to seal the opening and act as fire, smoke, toxic fumes, and, water sealant.
 4. Provide firestopping pillows for cable trays.
 5. If a firestopping system is used due to flexibility requirements in a smoke rated wall assembly, it should be consistent and should be a different color from firestopping systems in smoke and fire barriers to maintain a distinction.
- F. Maximum flame spread of 25 and smoke development of 50 when tested in accordance with ASTM E84.
- G. FM, UL, or WH rated or tested by an approved laboratory in accordance with ASTM E814.
- H. Materials to be asbestos free.

2.2 SMOKE STOPPING IN SMOKE PARTITIONS

- A. Use silicone sealant in smoke partitions as specified in Section 07 92 00, JOINT SEALANTS.
- B. Use mineral fiber filler and bond breaker behind sealant.
- C. Sealants shall have a maximum flame spread of 25 and smoke developed of 50 when tested in accordance with E84.
- D. When used in exposed areas capable of being sanded and finished with similar surface treatments as used on the surrounding wall or floor surface.

PART 3 - EXECUTION

3.1 EXAMINATION

Submit product data and installation instructions, as required by article, submittals, after an on site examination of areas to receive firestopping.

3.2 PREPARATION

- A. Remove dirt, grease, oil, loose materials, or other substances that prevent adherence and bonding or application of the firestopping or smoke stopping materials.
- B. Remove insulation on insulated pipe for a distance of 150 mm (six inches) on either side of the fire rated assembly prior to applying the firestopping materials unless the firestopping materials are tested and approved for use on insulated pipes.

3.3 INSTALLATION

- A. Do not begin work until the specified material data and installation instructions of the proposed firestopping systems have been submitted and approved.
- B. Install firestopping systems with smoke stopping in accordance with FM, UL, WH, or other approved system details and installation instructions.
- C. Install smoke stopping seals in smoke partitions.

3.4 CLEAN-UP AND ACCEPTANCE OF WORK

- A. As work on each floor is completed, remove materials, litter, and debris.
- B. Do not move materials and equipment to the next-scheduled work area until completed work is inspected and accepted by the Resident Engineer.
- C. Clean up spills of liquid type materials.

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SECTION 07 92 00
JOINT SEALANTS

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. Section covers all sealant and caulking materials and their application, wherever required for complete installation of building materials or systems.

1.2 RELATED WORK:

- A. Firestopping penetrations: Section 07 84 00, FIRESTOPPING.
B. Glazing: Section 08 80 00, GLAZING.
C. Sound rated gypsum partitions/sound sealants: Section 09 29 00, GYPSUM BOARD.
D. Mechanical Work: Section 21 05 11, COMMON WORK RESULTS FOR FIRE SUPPRESSION Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

1.3 QUALITY CONTROL:

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Product Testing: Obtain test results from a qualified testing agency based on testing current sealant formulations within a 12-month period.
1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021.
 2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C920, and where applicable, to other standard test methods.
 3. Test elastomeric joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion-in peel, and indentation hardness.
 4. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

- D. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates in accordance with sealant manufacturer's recommendations:
1. Locate test joints where indicated or, if not indicated, as directed by Contracting Officer.
 2. Conduct field tests for each application indicated below:
 - a. Each type of elastomeric sealant and joint substrate indicated.
 - b. Each type of non-elastomeric sealant and joint substrate indicated.
 3. Notify Resident Engineer seven days in advance of dates and times when test joints will be erected.
 4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
- E. VOC: Acrylic latex and Silicon sealants shall have less than 50g/l VOC content.

1.4 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's installation instructions for each product used.
- C. Cured samples of exposed sealants for each color where required to match adjacent material.
- D. Manufacturer's Literature and Data:
 1. Caulking compound
 2. Primers
 3. Sealing compound, each type, including compatibility when different sealants are in contact with each other.

1.5 PROJECT CONDITIONS:

- A. Environmental Limitations:
 1. Do not proceed with installation of joint sealants under following conditions:
 - a. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 °C (40 °F).
 - b. When joint substrates are wet.
- B. Joint-Width Conditions:

1. Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

C. Joint-Substrate Conditions:

1. Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.6 DELIVERY, HANDLING, AND STORAGE:

- A. Deliver materials in manufacturers' original unopened containers, with brand names, date of manufacture, shelf life, and material designation clearly marked thereon.
- B. Carefully handle and store to prevent inclusion of foreign materials.
- C. Do not subject to sustained temperatures exceeding 32° C (90° F) or less than 5° C (40° F).

1.7 DEFINITIONS:

- A. Definitions of terms in accordance with ASTM C717 and as specified.
- B. Back-up Rod: A type of sealant backing.
- C. Bond Breakers: A type of sealant backing.
- D. Filler: A sealant backing used behind a back-up rod.

1.8 WARRANTY:

- A. Warranty exterior sealing against leaks, adhesion, and cohesive failure, and subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period shall be extended to two years.
- B. General Warranty: Special warranty specified in this Article shall not deprive Government of other rights Government may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

1.9 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
 - C509-06.....Elastomeric Cellular Preformed Gasket and Sealing Material.
 - C612-10.....Mineral Fiber Block and Board Thermal Insulation.

- C717-11a.....Standard Terminology of Building Seals and Sealants.
- C834-10.....Latex Sealants.
- C919-08.....Use of Sealants in Acoustical Applications.
- C920-11.....Elastomeric Joint Sealants.
- C1021-08.....Laboratories Engaged in Testing of Building Sealants.
- C1193-11.....Standard Guide for Use of Joint Sealants.
- C1330-02 (R2007).....Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
- D1056-07.....Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.
- E84-11a.....Surface Burning Characteristics of Building Materials.
- C. Sealant, Waterproofing and Restoration Institute (SWRI).
The Professionals' Guide

PART 2 - PRODUCTS

2.1 SEALANTS:

- A. S-1:
1. ASTM C920, polyurethane or polysulfide.
 2. Type M.
 3. Class 25.
 4. Grade NS.
 5. Shore A hardness of 20-40
- B. S-2:
1. ASTM C920, polyurethane or polysulfide.
 2. Type M.
 3. Class 25.
 4. Grade P.
 5. Shore A hardness of 25-40.
- C. S-3:
1. ASTM C920, polyurethane or polysulfide.
 2. Type S.
 3. Class 25, joint movement range of plus or minus 50 percent.
 4. Grade NS.
 5. Shore A hardness of 15-25.
 6. Minimum elongation of 700 percent.

D. S-4:

1. ASTM C920 polyurethane or polysulfide.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-40.

E. S-5:

1. ASTM C920, polyurethane or polysulfide.
2. Type S.
3. Class 25.
4. Grade P.
5. Shore hardness of 15-45.

F. S-6:

1. ASTM C920, silicone, neutral cure.
2. Type S.
3. Class: Joint movement range of plus 100 percent to minus 50 percent.
4. Grade NS.
5. Shore A hardness of 15-20.
6. Minimum elongation of 1200 percent.

G. S-7:

1. ASTM C920, silicone, neutral cure.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-30.
6. Structural glazing application.

H. S-8:

1. ASTM C920, silicone, acetoxo cure.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-30.
6. Structural glazing application.

I. S-9:

1. ASTM C920 silicone.
2. Type S.
3. Class 25.

4. Grade NS.
5. Shore A hardness of 25-30.
6. Non-yellowing, mildew resistant.

J. S-10:

1. ASTM C920, coal tar extended fuel resistance polyurethane.
2. Type M/S.
3. Class 25.
4. Grade P/NS.
5. Shore A hardness of 15-20.

K. S-11:

1. ASTM C920 polyurethane.
2. Type M/S.
3. Class 25.
4. Grade P/NS.
5. Shore A hardness of 35 to 50.

L. S-12:

1. ASTM C920, polyurethane.
2. Type M/S.
3. Class 25, joint movement range of plus or minus 50 percent.
4. Grade P/NS.
5. Shore A hardness of 25 to 50.

2.2 CAULKING COMPOUND:

- A. C-1: ASTM C834, acrylic latex.
- B. C-2: One component acoustical caulking, non drying, non hardening, synthetic rubber.

2.3 COLOR:

- A. Sealants used with unpainted concrete shall match color of adjacent concrete.
- B. Caulking shall be light gray or white, unless specified otherwise.
- C. All caulking and sealant colors to be approved by architect. Changes may be made within the full and complete range of the manufacturer's colors.

2.4 JOINT SEALANT BACKING:

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

- B. Cylindrical Sealant Backings: ASTM C1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 - 1. Type C: Closed-cell material with a surface skin.
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 32° C (minus 26° F). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 FILLER:

- A. Mineral fiber board: ASTM C612, Class 1.
- B. Thickness same as joint width.
- C. Depth to fill void completely behind back-up rod.

2.6 PRIMER:

- A. As recommended by manufacturer of caulking or sealant material.
- B. Stain free type.

2.7 CLEANERS-NON POUROUS SURFACES:

Chemical cleaners acceptable to manufacturer of sealants and sealant backing material, free of oily residues and other substances capable of staining or harming joint substrates and adjacent non-porous surfaces and formulated to promote adhesion of sealant and substrates.

PART 3 - EXECUTION**3.1 INSPECTION:**

- A. Inspect substrate surface for bond breaker contamination and unsound materials at adherent faces of sealant.
- B. Coordinate for repair and resolution of unsound substrate materials.
- C. Inspect for uniform joint widths and that dimensions are within tolerance established by sealant manufacturer.

3.2 PREPARATIONS:

- A. Prepare joints in accordance with manufacturer's instructions and SWRI.

- B. Clean surfaces of joint to receive caulking or sealants leaving joint dry to the touch, free from frost, moisture, grease, oil, wax, lacquer paint, or other foreign matter that would tend to destroy or impair adhesion.
 - 1. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants.
 - 2. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- C. Do not cut or damage joint edges.
- D. Apply masking tape to face of surfaces adjacent to joints before applying primers, caulking, or sealing compounds.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. Apply primer to sides of joints wherever required by compound manufacturer's printed instructions.
 - 1. Apply primer prior to installation of back-up rod or bond breaker tape.
 - 2. Use brush or other approved means that will reach all parts of joints.
- F. Take all necessary steps to prevent three sided adhesion of sealants.

3.3 BACKING INSTALLATION:

- A. Install back-up material, to form joints enclosed on three sides as required for specified depth of sealant.
- B. Where deep joints occur, install filler to fill space behind the back-up rod and position the rod at proper depth.
- C. Cut fillers installed by others to proper depth for installation of back-up rod and sealants.
- D. Install back-up rod, without puncturing the material, to a uniform depth, within plus or minus 3 mm (1/8 inch) for sealant depths specified.
- E. Where space for back-up rod does not exist, install bond breaker tape strip at bottom (or back) of joint so sealant bonds only to two opposing surfaces.
- F. Take all necessary steps to prevent three sided adhesion of sealants.

3.4 SEALANT DEPTHS AND GEOMETRY:

- A. At widths up to 6 mm (1/4 inch), sealant depth equal to width.
- B. At widths over 6 mm (1/4 inch), sealant depth 1/2 of width up to 13 mm (1/2 inch) maximum depth at center of joint with sealant thickness at center of joint approximately 1/2 of depth at adhesion surface.

3.5 INSTALLATION:

- A. General:
 - 1. Apply sealants and caulking only when ambient temperature is between 5° C and 38° C (40° and 100° F).
 - 2. Do not use polysulfide base sealants where sealant may be exposed to fumes from bituminous materials, or where water vapor in continuous contact with cementitious materials may be present.
 - 3. Do not use sealant type listed by manufacture as not suitable for use in locations specified.
 - 4. Apply caulking and sealing compound in accordance with manufacturer's printed instructions.
 - 5. Avoid dropping or smearing compound on adjacent surfaces.
 - 6. Fill joints solidly with compound and finish compound smooth.
 - 7. Tool joints to concave surface unless shown or specified otherwise.
 - 8. Finish paving or floor joints flush unless joint is otherwise detailed.
 - 9. Apply compounds with nozzle size to fit joint width.

10. Test sealants for compatibility with each other and substrate. Use only compatible sealant.
 11. Caulk or seal between all dissimilar hard surfaces unless item is the type that requires frequent access. There should be no visible gaps between finish materials. All interior caulk or sealant that abuts a painted surface must be paintable. This includes, but is not limited to, edges of exposed frames, casework, millwork equipment, work surfaces, and any exposed hard surfaces permanently affixed or attached with seismic connections. Also see individual specification sections.
- B. For application of sealants, follow requirements of ASTM C1193 unless specified otherwise.
- C. Where gypsum board partitions are of sound rated, fire rated, or smoke barrier construction, follow requirements of ASTM C919 only to seal all cut-outs and intersections with the adjoining construction unless specified otherwise.
1. Apply a 6 mm (1/4 inch) minimum bead of sealant each side of runners (tracks), including those used at partition intersections with dissimilar wall construction.
 2. Coordinate with application of gypsum board to install sealant immediately prior to application of gypsum board.
 3. Partition intersections: Seal edges of face layer of gypsum board abutting intersecting partitions, before taping and finishing or application of veneer plaster-joint reinforcing.
 4. Openings: Apply a 6 mm (1/4 inch) bead of sealant around all cut-outs to seal openings of electrical boxes, ducts, pipes and similar penetrations. To seal electrical boxes, seal sides and backs.
 5. Control Joints: Before control joints are installed, apply sealant in back of control joint to reduce flanking path for sound through control joint.

3.6 FIELD QUALITY CONTROL:

- A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as recommended by sealant manufacturer:
1. Extent of Testing: Test completed elastomeric sealant joints as follows:
 - a. Perform 10 tests for first 300 m (1000 feet) of joint length for each type of elastomeric sealant and joint substrate.

- b. Perform one test for each 300 m (1000 feet) of joint length thereafter or one test per each floor per elevation.
- B. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.
- C. Inspect tested joints and report on following:
 - 1. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
 - 2. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 - 3. Whether sealants filled joint cavities and are free from voids.
 - 4. Whether sealant dimensions and configurations comply with specified requirements.
- D. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
- E. Repair sealants pulled from test area by applying new sealants following same procedures used to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.
- F. Evaluation of Field-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements, will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.7 CLEANING:

- A. Fresh compound accidentally smeared on adjoining surfaces: Scrape off immediately and rub clean with a solvent as recommended by the caulking or sealant manufacturer.
- B. After filling and finishing joints, remove masking tape.
- C. Leave adjacent surfaces in a clean and unstained condition.

3.8 LOCATIONS:

- A. Exterior Building Joints, Horizontal and Vertical:

1. Metal to Metal: Type S-1, S-2
 2. Metal to Masonry or Stone: Type S-1
 3. Masonry to Masonry or Stone: Type S-1
 4. Stone to Stone: Type S-1
 5. Cast Stone to Cast Stone: Type S-1
 6. Threshold Setting Bed: Type S-1, S-3, S-4
 7. Masonry Expansion and Control Joints: Type S-6
 8. Wood to Masonry: Type S-1
- B. Metal Reglets and Flashings:
1. Flashings to Wall: Type S-6
 2. Metal to Metal: Type S-6
- C. Sanitary Joints:
1. Walls to Plumbing Fixtures: Type S-9
 2. Counter Tops to Walls: Type S-9
 3. Pipe Penetrations: Type S-9
- D. Horizontal Traffic Joints:
1. Concrete Paving, Unit Pavers: Type S-11 or S-12
 2. Garage/Parking Decks: Type S-10
- E. High Temperature Joints over 204 degrees C (400 degrees F):
1. Exhaust Pipes, Flues, Breech Stacks: Type S-7 or S-8
- F. Interior Caulking:
1. Typical Narrow Joint 6 mm, (1/4 inch) or less at Walls and Adjacent Components, including, but not limited to, FEC's, FHC's, Equipment and Mirrors: Types C-1, C-2.
 2. Perimeter of Doors, Windows, Access Panels which Adjoin Concrete or Masonry or Gypsum Wallboard Surfaces: Types C-1, C-2.
 3. Joints at Masonry Walls and Columns, Piers, Concrete Walls, Concrete curbs or Exterior Walls: Types C-1, C-2.
 4. Perimeter of exterior Windows (on the interior side) and Gypsum Wallboard Walls: Types C-1, C-2.
 5. Exposed Isolation Joints at Top of Full Height Walls: Types C-1, C-2.
 6. Exposed Acoustical Joint at Sound Rated Partitions Type C-2.
 7. Concealed Acoustic Sealant Type S-4, C-1, C-2.
 8. Between Door frame and Door Protection at top only: Types C-1, C-2.
 9. Between Door frame and flooring material: Types C-1, C-2.

10. Perimeter of ceramic wall and floor tile to adjacent dissimilar materials, such as door frames, gypsum wallboard, casework, mirrors and toilet accessories: Types C-1, C-2.
11. Bottom of gypsum wallboard walls to concrete floors: Type determined by wall type, refer to drawings.
12. At inside corners of wall base: Types C-1, C-2. Match wall color.
13. Caulk or seal between edges of all casework, work counters, furniture, equipment, feature strips, expansion joint covers, and any hard surface they abut. This includes any items permanently affixed or attached with seismic connections.

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SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This section specifies steel doors, steel frames and related components.
- B. Terms relating to steel doors and frames as defined in ANSI A123.1 and as specified.

1.2 RELATED WORK

- A. Frames fabricated of structural steel: Section 05 50 00, METAL FABRICATIONS.
- B. Door Hardware: Section 08 71 00, DOOR HARDWARE.
- C. Glazing and ballistic rated glazing: Section 08 80 00, GLAZING.
- D. Section 01 36 00 Blast-Resistant Design

1.3 TESTING

- A. An independent testing laboratory shall perform testing.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturers Literature and Data:
 - 1. Fire rated doors and frames, showing conformance with NFPA 80 and Underwriters Laboratory, Inc., or Intertek Testing Services or Factory Mutual fire rating requirements and temperature rise rating for stairwell doors. Submit proof of temperature rating.
 - 2. Sound rated doors, including test report from Testing Laboratory.

1.5 SHIPMENT

- A. Prior to shipment label each door and frame to show location, size, door swing and other pertinent information.
- B. Fasten temporary steel spreaders across the bottom of each door frame.

1.6 STORAGE AND HANDLING

- A. Store doors and frames at the site under cover.
- B. Protect from rust and damage during storage and erection until completion.

1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

- B. Federal Specifications (Fed. Spec.):
L-S-125B.....Screening, Insect, Nonmetallic
- C. Door and Hardware Institute (DHI):
A115 Series.....Steel Door and Frame Preparation for Hardware,
Series A115.1 through A115.17 (Dates Vary)
- D. Steel Door Institute (SDI):
113-01.....Thermal Transmittance of Steel Door and Frame
Assemblies
128-1997.....Acoustical Performance for Steel Door and Frame
Assemblies
A250.8-03.....Standard Steel Doors and Frames
- E. American Society for Testing and Materials (ASTM):
A167-99(R2009).....Stainless and Heat-Resisting Chromium-Nickel
Steel Plate, Sheet, and Strip
A568/568-M-11a.....Steel, Sheet, Carbon, and High-Strength, Low-
alloy, Hot-Rolled and Cold-Rolled
A1008/A1008M-11.....Steel, sheet, Cold-Rolled, Carbon, Structural,
High Strength Low Alloy and High Strength Low
Alloy with Improved Formability
B209/209M-10.....Aluminum and Aluminum-Alloy Sheet and Plate
B221/221M-10.....Aluminum and Aluminum-Alloy Extruded Bars,
Rods, Wire, Profiles and Tubes
D1621-10.....Compressive Properties of Rigid Cellular
Plastics
D3656-07.....Insect Screening and Louver Cloth Woven from
Vinyl Coated Glass Yarns
E90-09.....Laboratory Measurement of Airborne Sound
Transmission Loss of Building Partitions
- F. The National Association Architectural Metal Manufacturers (NAAMM):
Metal Finishes Manual (1988 Edition)
- G. National Fire Protection Association (NFPA):
80-09.....Fire Doors and Fire Windows
- H. Underwriters Laboratories, Inc. (UL):
Fire Resistance Directory
- I. Intertek Testing Services (ITS):
Certifications Listings...Latest Edition
- J. Factory Mutual System (FM):
Approval Guide

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. Stainless Steel: ASTM A167, Type 302 or 304; finish, NAAMM Number 4.
- B. Sheet Steel: ASTM A1008, cold-rolled for panels (face sheets) of doors.
- C. Anchors, Fastenings and Accessories: Fastenings anchors, clips connecting members and sleeves from zinc coated steel.
- D. Aluminum Sheet: ASTM B209/209M.
- E. Aluminum, Extruded: ASTM B221/221M.
- F. Prime Paint: Paint that meets or exceeds the requirements of A250.8.

2.2 FABRICATION GENERAL

- A. GENERAL:
 - 1. Follow SDI A250.8 for fabrication of standard steel doors, except as specified otherwise. Doors to receive hardware specified in Section 08 71 00, DOOR HARDWARE. Tolerances as per SDI A250.8. Thickness, 44 mm (1-3/4 inches), unless otherwise shown.
 - 2. Close top edge of exterior doors flush and seal to prevent water intrusion.
 - 3. When vertical steel stiffeners are used for core construction, fill spaces between stiffeners with mineral fiber insulation.
- B. Standard Duty Doors: SDI A250.8, Level 1, Model 2 of size and design shown. Used for interior locations only. Do not use for stairwell doors and security doors.
- C. Heavy Duty Doors: SDI A250.8, Level 2, Model 2 of size and design shown. Core construction types a, d, or f, for interior doors, and, types b, c, e, or f, for exterior doors
- D. Smoke Doors:
 - 1. Close top and vertical edges flush.
 - 2. Provide seamless vertical edges.
 - 3. Apply Steel astragal to the meeting style at the active leaf of pair of doors or double egress doors.
 - 4. Provide clearance at head, jamb and sill as specified in NFPA 80.
- E. Fire Rated Doors (Labeled):
 - 1. Conform to NFPA 80 when tested by Underwriters Laboratories, Inc., Inchcape Testing Services, or Factory Mutual for the class of door or door opening shown.
 - 2. Fire rated labels of metal, with raised or incised markings of approving laboratory shall be permanently attached to doors.

3. Close top and vertical edges of doors flush. Vertical edges shall be seamless. Apply steel astragal to the meeting stile of the active leaf of pairs of fire rated doors, except where vertical rod exit devices are specified for both leaves swinging in the same direction.
4. Construct fire rated doors in stairwell enclosures for maximum transmitted temperature rise of 230 °C (450 °F) above ambient temperature at end of 30 minutes of fire exposure when tested in accordance with ASTM E152.

2.3 METAL FRAMES

A. General:

1. SDI A250.8, 1.3 mm (0.053 inch) thick sheet steel, types and styles as shown or scheduled.
2. Frames for exterior doors: Fabricate from 1.7 mm (0.067 inch) thick galvanized steel conforming to ASTM A525.
3. Frames for labeled fire rated doors and windows.
 - a. Comply with NFPA 80. Test by Underwriters Laboratories, Inc., Inchcape Testing Services, or Factory Mutual.
 - b. Fire rated labels of approving laboratory permanently attached to frames as evidence of conformance with these requirements. Provide labels of metal or engraved stamp, with raised or incised markings.
4. Frames for doors specified to have automatic door operators; Security doors (Type 36); service window: minimum 1.7 mm (0.067 inch) thick.
5. Knocked-down frames are not acceptable.

B. Reinforcement and Covers:

1. SDI A250.8 for, minimum thickness of steel reinforcement welded to back of frames.
2. Provide mortar guards securely fastened to back of hardware reinforcements except on lead-lined frames.

C. Terminated Stops: SDI A250.8.

D. Glazed Openings :

- a. Integral stop on exterior, corridor, or secure side of door.
- b. Design rabbet width and depth to receive glazing material or panel shown or specified.

E. Two piece frames:

- a. One piece unequal leg finished rough buck sub-frames as shown, drilled for anchor bolts.
 - b. Unequal leg finished frames formed to fit subframes and secured to subframe legs with countersunk, flat head screws, spaced 300 mm (12 inches) on center at head and jambs on each side.
 - c. Preassemble at factory for alignment.
 - d. All exposed joints in finish frame to be filled with approved metal filler and ground smooth prior to painting.
 - e. Caulk between frame and wall or partition at junction with hard flooring.
- F. Frame Anchors:
1. Floor anchors:
 - a. Where floor fills occur, provide extension type floor anchors to compensate for depth of fill.
 - b. At bottom of jamb use 1.3 mm (0.053 inch) thick steel clip angles welded to jamb and drilled to receive two 6 mm (1/4 inch) floor bolts. Use 50 mm x 50 mm (2 inch by 2 inch) 9 mm by (3/8 inch) clip angle for lead lined frames, drilled for 9 mm (3/8 inch) floor bolts.
 - c. Where mullions occur, provide 2.3 mm (0.093 inch) thick steel channel anchors, drilled for two 6 mm (1/4 inch) floor bolts and frame anchor screws.
 - d. Where sill sections occur, provide continuous 1 mm (0.042 inch) thick steel rough bucks drilled for 6 mm (1/4 inch) floor bolts and frame anchor screws. Space floor bolts at 50 mm (24 inches) on center.
 2. Jamb anchors:
 - a. Locate anchors on jambs near top and bottom of each frame, and at intermediate points not over 600 mm (24 inches) apart, except for fire rated frames space anchors as required by labeling authority.
 - b. Form jamb anchors of not less than 1 mm (0.042 inch) thick steel unless otherwise specified.
 - c. Anchors set in masonry: Use adjustable anchors designed for friction fit against the frame and for extension into the masonry not less than 250 mm (10 inches). Use one of following type:
 - 1) Wire loop type of 5 mm (3/16 inch) diameter wire.

- 2) T-shape or strap and stirrup type of corrugated or perforated sheet steel.
- d. Anchors for stud partitions: Either weld to frame or use lock-in snap-in type. Provide tabs for securing anchor to the sides of the studs.
- e. Anchors for frames set in prepared openings:
 - 1) Steel pipe spacers with 6 mm (1/4 inch) inside diameter welded to plate reinforcing at jamb stops or hat shaped formed strap spacers, 50 mm (2 inches) wide, welded to jamb near stop.
 - 2) Drill jamb stop and strap spacers for 6 mm (1/4 inch) flat head bolts to pass thru frame and spacers.
 - 3) Two piece frames: Sub-frame or rough buck drilled for 6 mm (1/4 inch) bolts.
- f. Anchors for observation windows and other continuous frames set in stud partitions.
 - 1) In addition to jamb anchors, weld clip anchors to sills and heads of continuous frames over 1200 mm (4 feet) long.
 - 2) Anchors spaced 600 mm (24 inches) on centers maximum.
- g. Modify frame anchors to fit special frame and wall construction and provide special anchors where shown or required.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Plumb, align and brace frames securely until permanent anchors are set.
 1. Use triangular bracing near each corner on both sides of frames with temporary wood spreaders at midpoint.
 2. Use wood spreaders at bottom of frame if the shipping spreader is removed.
 3. Protect frame from accidental abuse.
 4. Where construction will permit concealment, leave the shipping spreaders in place after installation, otherwise remove the spreaders after the frames are set and anchored.
 5. Remove wood spreaders and braces only after the walls are built and jamb anchors are secured.
- B. Floor Anchors:
 1. Anchor the bottom of door frames to floor with two 6 mm (1/4 inch) diameter expansion bolts. Use 9 mm (3/8 inch) bolts on lead lined frames.

2. Power actuated drive pins may be used to secure frame anchors to concrete floors.

C. Jamb Anchors:

1. Anchors in masonry walls: Embed anchors in mortar. Fill space between frame and masonry wall with grout or mortar as walls are built.
2. Coat frame back with a bituminous coating prior to lining of grout filling in masonry walls.
3. Secure anchors to sides of studs with two fasteners through anchor tabs. Use steel drill screws to steel studs.
4. Frames set in prepared openings of masonry or concrete: Expansion bolt to wall with 6 mm (1/4 inch) expansion bolts through spacers. Where sub-frames or rough bucks are used, 6 mm (1/4 inch) expansion bolts on 600 mm (24 inch) centers or power activated drive pins 600 mm (24 inches) on centers. Secure two piece frames to sub-frame or rough buck with machine screws on both faces.

- D. Install anchors for labeled fire rated doors to provide rating as required.

- E. Frames for Sound Rated Doors: Coordinate to line frames for sound rated doors with insulation.

- F. Overhead Bracing (Lead Lined Frames): Where jamb extensions extend to structure above, anchor clip angles with not less than two, 9 mm (3/8 inch) expansion bolts or power actuated drive pins to concrete slab. Weld to steel overhead members.

- G. Caulk or seal between edges of frames and any hard surfaces that they abut.

3.2 INSTALLATION OF DOORS AND APPLICATION OF HARDWARE

- A. Install doors and hardware as specified in Section 08 11 13, HOLLOW METAL DOORS AND FRAMES, Section 08 14 00, WOOD DOORS and Section 08 71 00, DOOR HARDWARE.

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**SECTION 08 14 00
INTERIOR WOOD DOORS**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies interior flush doors with prefinished, prefit option.
- B. Section includes fire rated doors, sound retardant doors, and smoke.

1.2 RELATED WORK

- A. Metal door frames: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES.
- B. Door hardware including hardware location (height): Section 08 71 00, DOOR HARDWARE.
- C. Installation of doors and hardware: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES, Section 08 14 00, WOOD DOORS, or Section 08 71 00, DOOR HARDWARE.
- D. Glazing and ballistic rated glazing: Section 08 80 00, GLAZING.
- E. Finish: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Samples:
 - 1. Corner section of flush veneered door 300 mm (12 inches) square, showing details of construction, labeled to show grade and type number and conformance to specified standard.
 - 2. Veneer sample 200 mm (8 inch) by 275 mm (11 inch) by 6 mm (1/4 inch) showing specified wood species sanded to receive a transparent finish. Factory finish veneer sample where the prefinished option is accepted.
- C. Shop Drawings:
 - 1. Show every door in project and schedule location in building.
 - 2. Indicate type, grade, finish and size; include detail of , glazing , sound gasketing , and pertinent details.
 - 3. Provide information concerning specific requirements not included in the manufacturer's literature and data submittal.
- D. Manufacturer's Literature and Data:
 - 1. Sound rated doors, STC rating per ASTM E90 from test laboratory.
 - 2. Labeled fire rated doors showing conformance with NFPA 80.
- E. Laboratory Test Reports:

1. Screw holding capacity test report in accordance with WDMA T.M.10.
2. Split resistance test report in accordance with WDMA T.M.5.
3. Cycle/Slam test report in accordance with WDMA T.M.7.
4. Hinge-Loading test report in accordance with WDMA T.M.8.

1.4 WARRANTY

- A. Doors are subject to terms of Article titled "Warranty of Construction", FAR clause 52.246-21, except that warranty shall be as follows:
1. For interior doors, manufacturer's warranty for lifetime of original installation.
 2. Specified STC RATING for sound retardant rated door assembly in place.

1.5 DELIVERY AND STORAGE

- A. Factory seal doors and accessories in minimum of 6 mill polyethylene bags or cardboard packages which shall remain unbroken during delivery and storage.
- B. Store in accordance with WDMA I.S.1-A, J-1 Job Site Information.
- C. Label package for door opening where used.

1.6 APPLICABLE PUBLICATIONS

Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

- B. Window and Door Manufacturers Association (WDMA):
- IS-1A-04.....Architectural Wood Flush Doors
- I.S.4-07A.....Water-Repellent Preservative Non-Pressure
Treatment for Millwork
- I.S.6A-01.....Architectural Wood Stile and Rail Doors
- T.M.5-90.....Split Resistance Test Method
- T.M.6-08.....Adhesive (Glue Bond) Durability Test Method
- T.M.7-08.....Cycle-Slam Test Method
- T.M.8-08.....Hinge Loading Test Method
- T.M.10-08.....Screwholding Test Method
- C. National Fire Protection Association (NFPA):
- 80-07.....Protection of Buildings from Exterior Fire
- 252-08.....Fire Tests of Door Assemblies
- D. ASTM International (ASTM):
- E90-09.....Laboratory Measurements of Airborne Sound
Transmission Loss

PART 2 - PRODUCTS**2.1 FLUSH DOORS**

A. General:

1. Meet requirements of WDMA I.S.1-A, Extra Heavy Duty.
2. Adhesive: Type II
3. Thickness: 45 mm (1-3/4 inches) unless otherwise shown or specified.
4. Give exposed wood parts of exterior doors a water-repellent preservative treatment in accordance with WDMA I.S.4.

B. Face Veneer:

1. In accordance with WDMA I.S.1-A.
2. One species throughout the project unless scheduled or otherwise shown.
3. For transparent finishes: Match finish from existing hospital.
 - a. A grade face veneer standard optional.
 - b. AA grade face veneer
 - c. Match face veneers for doors for uniform effect of color and grain at joints.
 - d. Door edges shall be same species as door face veneer except maple may be used for stile face veneer on birch doors.
 - e. On doors required to have transparent finish on one side and paint finish on other side; use veneers as required for transparent finish on both sides.
 - f. In existing buildings, where doors are required to have transparent finish, use wood species and grade of face veneers to match adjacent existing doors.
4. For painted finishes: Custom Grade, mill option close grained hardwood, premium or medium density overlay. Do not use Lauan.
5. Factory sand doors for finishing.

C. Wood for stops, louvers, muntins and moldings of flush doors required to have transparent finish:

1. Solid Wood of same species as face veneer, except maple may be used on birch doors.
2. Glazing:
 - a. On non-labeled doors use applied wood stops nailed tight on room side and attached on opposite side with flathead, countersunk wood screws, spaced approximately 125 mm (5 inches) on centers.

- b. Use stainless steel or dull chrome plated brass screws for exterior doors.
- D. Fire rated wood doors:
- 1. Fire Performance Rating:
 - a. "B" label, 1-1/2 hours.
 - b. "C" label, 3/4 hour.
 - 2. Labels:
 - a. Doors shall conform to the requirements of ASTM E2074, or NFPA 252, and, carry an identifying label from a qualified testing and inspection agency for class of door or opening shown designating fire performance rating.
 - b. Metal labels with raised or incised markings.
 - 3. Additional Hardware Reinforcement:
 - a. Provide fire rated doors with hardware reinforcement blocking.
 - b. Size of lock blocks as required to secure hardware specified.
 - c. Top, bottom and intermediate rail blocks shall measure not less than 125 mm (five inches) minimum by full core width.
 - d. Reinforcement blocking in compliance with manufacturer's labeling requirements.
 - e. Mineral material similar to core is not acceptable.
 - 4. Other Core Components: Manufacturer's standard as allowed by the labeling requirements.
 - 5. Provide steel frame approved for use in labeled doors for vision panels.
 - 6. Provide steel astragal on pair of doors.
- E. Smoke Barrier Doors:
- 1. For glazed openings use steel frames approved for use in labeled doors.
 - 2. Provide a steel astragal on one leaf of pairs of doors, including double egress doors.
- F. Sound Rated Doors:
- 1. Fabricated as specified for flush wood doors with additional construction requirements to meet specified sound transmission class (STC).
 - 2. STC Rating of the door assembly in place when tested in accordance with ASTM E90 by an independent nationally recognized acoustical testing laboratory not less than 36.

3. If STC rating is not required, doors shall be of structural composite core to meet STC 40 design.
4. Accessories:
 - a. Frame Gaskets: Continuous closed cell sponge neoprene with stop adjusters.
 - b. Automatic Door Bottom Seal:
 - 1) Steel spring operated, closed cell sponge neoprene metal mounted removable in extruded aluminum housing with a medium matte 0.1 mm (4.0 mil) thick clear Anodized finish.
 - 2) Concealed or Surface Mounted.

G. Dutch Doors:

1. Consist of two sections, each fabricated as specified for flush doors.
2. Construct shelf as detailed, from clear hardwood stock, or laminated plastic door shelf, same species as face veneer of door.
3. Place shelf on top of lower section of door and support as shown with a pair of wood or wrought steel brackets.
4. Prime steel brackets for finish painting.

2.2 PREFINISH, PREFIT OPTION

- A. Flush doors may be factory machined to receive hardware, bevels, undercuts, cutouts, accessories and fitting for frame.
- B. Factory fitting to conform to specification for shop and field fitting, including factory application of sealer to edge and routings.
- C. Flush doors to receive transparent finish (in addition to being prefit) shall be factory finished as follows:
 1. WDMA I.S.1-A Section F-3 specification for System TR-4, Conversion Varnish or System TR-5, Catalyzed Vinyl.
 2. Use stain when required to produce the finish specified in Section 09 06 00 SCHEDULE FOR FINISHES.

2.3 IDENTIFICATION MARK:

- A. On top edge of door.
- B. Either a stamp, brand or other indelible mark, giving manufacturer's name, door's trade name, construction of door, code date of manufacture and quality.
- C. Accompanied by either of the following additional requirements:
 1. An identification mark or a separate certification including name of inspection organization.
 2. Identification of standards for door, including glue type.

3. Identification of veneer and quality certification.
4. Identification of preservative treatment for stile and rail doors.

2.4 SEALING:

- A. Give top and bottom edge of doors two coats of catalyzed polyurethane or water resistant sealer before sealing in shipping containers.

PART 3 - EXECUTION

3.1 DOOR PREPARATION

- A. Field, shop or factory preparation: Do not violate the qualified testing and inspection agency label requirements for fire rated doors.
- B. Clearances between Doors and Frames and Floors:
 1. Maximum 3 mm (1/8 inch) clearance at the jambs, heads, and meeting stiles, and a 19 mm (3/4 inch) clearance at bottom, except as otherwise specified.
 2. Maximum clearance at bottom of sound rated doors, light-proofed doors, doors to operating rooms, and doors designated to be fitted with mechanical seal: 10 mm (3/8 inch).
- C. Provide cutouts for special details required and specified.
- D. Rout doors for hardware using templates and location heights specified in Section, 08 71 00 DOOR HARDWARE.
- E. Fit doors to frame, bevel lock edge of doors 3 mm (1/8 inch) for each 50 mm (two inches) of door.
- F. Immediately after fitting and cutting of doors for hardware, seal cut edges of doors with two coats of water resistant sealer.
- G. Finish surfaces, including both faces, top and bottom and edges of the doors smooth to touch.
- H. Apply a steel astragal on the opposite side of active door on pairs of fire rated doors.
- I. Apply a steel astragal to meeting style of active leaf of pair of doors or double egress smoke doors.

3.2 INSTALLATION OF DOORS APPLICATION OF HARDWARE

- A. Install doors and hardware as specified in Section, INSTALLATION OF DOORS AND HARDWARE.

3.3 DOOR PROTECTION

- A. As door installation is completed, place polyethylene bag or cardboard shipping container over door and tape in place.
- B. Provide protective covering over knobs and handles in addition to covering door.

C. Maintain covering in good condition until removal is approved by
Resident Engineer.

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required templates to door and frame manufacturers to enable proper and accurate sizing and locations of hardware.

- C. Samples: Provide physical samples as required by Section 01 33 23.
- D. Provide Owner Manual, instruction sheets and installation.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Integrated Door Assembly systems shall be delivered to the general contractor at the job site complete with necessary screws, miscellaneous parts, instructions, and installation templates. Each package shall be legibly and properly labeled to correspond to the approved door schedule.
- B. Deliver Integrated Door Assembly system to project site. Contractor will jointly check in hardware with representatives of the supplier to verify shipment is correct.
- C. Furnish door assemblies with flush operating hardware flush with door skin, using protective wrappings and protective spacers between projecting hardware. Maintain and protect door assemblies using cardboard spacers and protective edge guards along the door edges, to reduce exposure to marring or damage during storage.
- D. Store door assemblies in a dry and secure area. Storage area shall be void of any excess humidity that can cause damage to the product.

1.7 INSTRUCTIONS

- A. Manufacturers' Catalog Number References: Where manufacturers' products are specified herein, products of other manufacturers which are considered equivalent to those specified may be used. Manufacturers whose products are specified are identified by abbreviations as follows:

Adams-Rite	Adams Rite Mfg. Co.	Pomona, CA
G.E. Security	GE Security, Inc.	Bradentown, FL
Pemko	Pemko Manufacturing Co.	Ventura, CA

1.8 APPLICABLE PUBLICATIONS

- A. The following references established standards for architectural hardware as specified in this section.
- B. American National Standards Institute (ANSI)
 - ICC/ANSI A117.1-2003.....Accessible and Usable Buildings and Facilities
 - ANSI/BHMA A156.1-2006.....Butts and Hinges
 - ANSI/BHMA A156.3-2008.....Exit Devices

ANSI/BHMA A156.4-2008.....Door Controls - Closers

ANSI/BHMA A156.5-2001.....Auxiliary Locks and Associated Products

ANSI/BHMA A156.6-2005.....Architectural Door Trim

ANSI/BHMA A156.7-2009.....Template Hinge Dimensions

ANSI/BHMA A156.8-2005.....Door Controls - Overhead Holders

ANSI/BHMA A156.10-2005.....Power Operated Pedestrian Doors

ANSI/BHMA A156.13-2002.....Mortise Locks and Latches

ANSI/BHMA A156.15-2006.....Closer Holder Release Devices

ANSI/BHMA A156.16-2008.....Auxiliary Hardware

ANSI/BHMA A156.18-2006.....Materials and Finishes

ANSI/BHMA A156.19-2007.....Power Assist and Low Energy Power
Operated Doors

ANSI/BHMA A156.21-2009.....Thresholds

ANSI/BHMA A156.22-2005.....Door Gasketing Systems

ANSI/BHMA A156.23-2004.....Electromagnetic Locks

ANSI/BHMA A156.24-2003.....Delayed Egress Locking Systems

ANSI/BHMA A156.25-2007.....Electrified Locking Devices

ANSI/BHMA A156.26-2006.....Continuous Hinges

ANSI/BHMA A156.28-2007.....Master Keying Systems

ANSI/BHMA A156.29-2007.....Exit Locks and Alarms

ANSI/BHMA A156.30-2003.....High Security Cylinders

ANSI/BHMA A156.31-2007.....Electric Strikes and Frame Mounted
Actuators

ANSI/BHMA A156.32-2008.....Integrated Door Opening Assemblies

ANSI/SDI A250.4-2001.....Test Procedure and Acceptance Criteria
for Physical Evidence for Steel Doors,
Frames, Frame Anchors and Reinforcings

ANSI/SDI A250.8-2003.....Recommended Specifications for Standard
Steel Doors and Frames

ANSI/SDI A250.11-2001.....Recommended Erection Instructions for
Steel Frames

UL10C-2009.....Positive Pressure Fire Tests of Door
Assemblies

C. American Society for Testing and Materials (ASTM)

1. ASTM E2074 (2000): Standard Test Method for Fire Tests of Door
Assemblies

2. ASTM E2180 (2007): Standard Test Method for Determining the Activity

- of Incorporated Antimicrobial Agent(s) In Polymeric or Hydrophobic Materials
3. ASTM F476 (2002): Standard Test Method for Security of Swinging Door Assemblies
- D. Door and Hardware Institute (DHI)
1. Recommended Locations for Builder's Hardware for Standard Doors and Frames (2004)
 2. Recommended Locations for Builder's Hardware for Custom Steel Doors and Frames (1996)
- E. Metal Door and Frame Associations
1. Hollow Metal Manufacturing Association (HMMA)
 - a. National Association of Architectural Metal Manufacturers (NAAMM)
 2. Steel Door Institute (SDI)
- F. Approved Testing Laboratories
1. Underwriter's Laboratories, Inc. (UL)
 - a. UL305 (2007): Panic Hardware
 - b. UL1784 (2004): Air Leakage Tests of Door Assemblies
 2. ITS / Intertek Testing Services / Warnock Hersey Inc.
- G. National Fire Protection Association (NFPA)
1. NFPA 70-2008: National Electrical Code
 2. NFPA 80-2010: Standard for Fire Doors and Other Opening Protectives
 3. NFPA 101-2009: Life Safety Code
 4. NFPA 105-2010: Standard for Installation of Smoke Door Assemblies and Other Opening Protectives
 5. NFPA 252-2008: Standard Methods of Fire Tests of Door Assemblies
- H. Building Codes [Applicable Building Code]
1. 2009 International Building Code
 2. All hardware shall comply with UFAS, (Uniform Federal Accessible Standards - 1998) unless specified otherwise

PART 2 - PRODUCTS

2.1 MATERIAL REQUIREMENTS

- A. Integrated Door Assembly requirements:
1. Integrated Door Opening Assemblies shall be 1-3/4" thick, with no seams or spot welds on door face and be of manufacturer's standard construction: Door face skins to be minimum 16 -gauge cold rolled steel. Door core construction to be Steel Stiffened. All doors shall

- be constructed with a U-Shaped, 16 gauge steel reinforcement channel, top and bottom, for the installation of door hardware accessories. All doors shall be supplied with an 18 gauge top cap.
2. Integrated Door Opening Assemblies shall provide a label for life safety or fire labels as required in door schedule.
 3. Integral vision lite preparation, or field installed lite kit, as required.
- B. Door Frame requirements:
1. Door Frames shall be 16 gauge ASTM A366, cold roll steel and shall comply to ANSI/SDI A250.8 Level A - Grade III and / or HMMA/NAAMM - 850-99.
 2. Door frames shall be furnished with mitered corners, continuously welded, ground smooth on frame face.
 3. Prepare frames with proper 14 gauge reinforcements for applied hardware. Provide 12 gauge reinforcements for continuous hinges.
 4. Provide suitable adjustable type anchors, minimum 4 per jamb.
- C. Integrated Hardware Requirements:
1. Provide a complete Integrated Door Assembly including the installation and adjustment of the latching mechanism within the door construction. The exit device shall be inset in door, clean and unobtrusive in design. The push bar shall be made of heavy duty aluminum extrusion, with satin stainless steel (BHMA 630) cladding. End caps shall be metal, plated satin nickel (BHMA 619). The Push and Pull devices shall be clean and unobtrusive in design. Lever handles shall be clean and unobtrusive in design with and shall match style of other hardware furnished on project. The hinges shall be continuous pin-and-barrel type of stainless steel material for both hinge leaves and pin.
 - a. At doors with plastic laminate faces, provide hinges with wrap-around hinge guards and provide stainless steel wrap-around edge guards at the leading edge of the door.
- D. Performance Requirements:
1. Assembly performance test standards per ANSI/BHMA A156.32-2008:
Integrated Door Opening Assemblies
 - a. Grade 1: 1,000,000

2.2 FINISHES

A. Finish Symbols

US	BHMA	DESCRIPTION OF FINISH
USP	600	Primed for field painting
US26D	626/652	Satin Chrome
US28	628	Satin Aluminum
US32	629	Bright Stainless
US32D	630	Satin Stainless
N/A	689	Aluminum Painted

B. Finish Requirements

1. Door Faces: Factory Pre-Finished
2. Frames: Factory Pre-Finished
3. Door Hardware:
 - a. Continuous Hinges: 630
 - b. Push Bar: 630 clad with 619 end caps
 - c. Lever Exit Device Trim: 630
 - d. Push/Pull Trim: 626
 - e. Door Closers: 689
 - f. Miscellaneous: To match other finishes
4. Anti-microbial Coating: All hand-operated hardware (levers, pulls, push bars, push plates, paddles, and panic bars) shall be provided with an anti-microbial/anti-fungal coating that has passed ASTM E2180 tests. Coating to consist of ionic silver (Ag+). Silver ions surround bacterial cells, inhibiting growth of bacteria, mold, and mildew by blockading food and respiration supplies.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Contractor is responsible for notification of any wall conditions or building structure that would prevent proper execution of the installation of products produced in accordance with approved hardware schedule.
- B. Note short or damaged deliveries on the bill of lading at the time of delivery.
- C. The fire label is a manufacturer's certification only. Proper installation of products and proper wall construction are requirements to meet fire label.
- D. Verify that power supplies, as required, are available to power electrically operated devices.
- E. Do not fabricate any product until receipt of approved submittal

drawings.

F. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Mount furnished hardware accessories at heights indicated in "Recommended Locations or Builder's Hardware" for Standard Doors and Frames, Custom Steel Doors and Frames, established by the Door and Hardware Institute (DHI), except if otherwise indicated or to comply with requirements of governing regulations, or if otherwise directed by the architect.
- B. Install furnished hardware accessories in compliance with the manufacturer's instructions, templates and recommendations. Comply with specified degree of opening for doors with automatic operators, overhead door closers, etc. Securely fasten all furnished parts. Make sure all operating parts move freely and smoothly without binding, sticking and void of any excessive clearance.
- C. Coordinate installation and interface wiring with fire alarm and smoke detection systems.
- D. Remove or protect furnished hardware accessories, prior to any painting or finishing that is to be completed after the installation of the hardware accessories.

3.3 ADJUSTMENT AND CLEANING

- A. Adjust and check door assembly and each operating item of hardware to ensure correct operation and function. Units which cannot be adjusted to operate as intended for the application made shall be replaced.
- B. Final Adjustment: Wherever hardware installation is made more than a month prior to building acceptance or occupancy of a space or area, the installer shall return to the work during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items. Hardware Accessories shall be cleaned as necessary to restore correct operation, function, and finish. Do not use cleaners that will harm finish.

3.4 PROTECTION

- A. Whenever furnished hardware accessories are located in areas where it may be subject to damage during construction by handling, cleaning, etc., (e.g. painting, cleaning of bricks) it shall be protected and/or removed from its location until the hazardous condition is terminated.

3.5 SCHEDULES:

A. The following is a general listing of the Integrated Door Assembly requirements and is not intended for use as a final door submittal. Any items of hardware required by established standards or practices, or to meet federal building codes shall be furnished whether or not specifically called out in the following listed group.

1. Door 33A, see drawings for hardware item and location. Section 08 71 00, Door Hardware.

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PART 2 - PRODUCTS**2.1 FABRICATION, GENERAL**

- A. Fabricate components to be straight, square, flat and in same plane where required.
 - 1. Slightly round exposed edges and without burrs, snags and sharp edges.
 - 2. Exposed welds continuous and ground smooth.
 - 3. Weld in accordance with AWS D1.3.
- B. Number of locks and non-continuous hinges as required to maintain alignment of panel with frame. For fire rated doors, use hinges and locks as required by fire test.
- C. Provide anchors or make provisions in frame for anchoring to adjacent construction. Provide size, number and location of anchors on four sides to secure access door in opening. Provide anchors as required by fire test.

2.2 ACCESS DOORS, FIRE RATED:

- A. Shall meet requirements for "B" label 1-1/2 hours with maximum temperature rise of 120 degree C (250 degrees F).
- B. Comply with NFPA 80 and have Underwriters Laboratories Inc., or other nationally recognized laboratory label for Class B opening.
- C. Door Panel: Form of 0.9 mm (0.0359 inch) thick steel sheet, insulated sandwich type construction. Use stainless steel at wet areas.
- D. Frame: Form of 1.5 mm (0.0598 inch) thick steel sheet of depth and configuration to suit material and type of construction where installed. Provide frame flange at perimeter where installed in concrete masonry or gypsum board openings.
 - 1. Weld exposed joints in flange and grind smooth.
 - 2. Provide frame flange at perimeter where installed in concrete masonry or gypsum board.
- E. Automatic Closing Device: Provide automatic closing device for door.
- F. Hinge: Continuous steel hinge with stainless steel pin.
- G. Lock:
 - 1. Self-latching, with provision for fitting flush a standard screw-in type lock cylinder. Lock cylinder specified in Section 08 71 00, DOOR HARDWARE.
 - 2. Provide latch release device operable from inside of door. Mortise case in door.

2.3 ACCESS DOORS, FLUSH PANEL:

A. Door Panel:

1. Form of 1.9 mm (0.0747 inch) thick steel sheet. Use 1.5 mm (0.0598 inch) thick stainless steel at wet areas.
2. Reinforce to maintain flat surface.

B. Frame:

1. Form of 1.5 mm (0.0598 inch) thick steel sheet of depth and configuration to suit material and type of construction where installed. Use stainless steel at wet areas.
2. Provide surface mounted units having frame flange at perimeter where installed in concrete, masonry, or gypsum board construction.
3. Weld exposed joints in flange and grind smooth.

C. Hinge:

1. Concealed spring hinge to allow panel to open 175 degrees.
2. Provide removable hinge pin to allow removal of panel from frame.

D. Lock:

1. Flush, screwdriver operated cam lock.

2.4 ACCESS DOOR, RECESSED PANEL:

A. Door Panel:

1. Form of 1.2 mm (0.0478 inch) thick steel sheet to form a 25 mm (one inch) deep recessed pan to accommodate the installation of acoustical units or other materials where shown in walls and ceiling. Use stainless steel at wet areas.
2. Reinforce as required to prevent sagging.

B. Frame:

1. Form of 1.5 mm (0.0598 inch) thick steel sheet of depth and configuration to suit installation in suspension system of ceiling or wall framing.
2. Extend sides of frame to protect edge of acoustical units when panel is in open position.
3. Provide shims, bushings, clips and other devices necessary for installation.

C. Hinge: Continuous steel hinge with stainless steel pin or concealed hinge.

D. Lock:

1. Flush screwdriver operated cam lock.

2. Provide sleeve of plastic or stainless steel grommet to protect hole made in acoustical unit for screwdriver access to lock.

2.5 FINISH:

- A. Provide in accordance with NAAMM AMP 500 series on exposed surfaces.
- B. Steel Surfaces: Baked-on prime coat over a protective phosphate coating. Spray paint only and work shall be done with the door open.
- C. Stainless Steel: No. 4 for exposed surfaces.

2.6 SIZE:

Minimum 600 mm (24 inches) square door unless otherwise shown in the drawings.

PART 3 - EXECUTION**3.1 LOCATION:**

- A. Provide access panels or doors wherever any valves, traps, dampers, cleanouts, and other control items of mechanical, electrical and conveyor work are concealed in wall or partition, or are above ceiling of gypsum board or plaster.
- B. Use fire rated doors in fire rated partitions and ceilings.
- C. Use flush panels in partitions and gypsum board or plaster ceilings, except lay-in acoustical panel ceilings or upward access acoustical tile ceilings.

3.2 INSTALLATION, GENERAL:

- A. Install access doors in openings to have sides vertical in wall installations, and parallel to ceiling suspension grid or side walls when installed in ceiling.
- B. Set frames so that edge of frames without flanges will finish flush with surrounding finish surfaces.
- C. Set frames with flanges to overlap opening and so that face will be uniformly spaced from the finish surface.
- D. Set recessed panel access doors recessed so that face of surrounding materials will finish on the same plane, when finish in door is installed.
- E. Caulk or seal between edges of frames and any hard surfaces that they abut.

3.3 ANCHORAGE:

- A. Secure frames to adjacent construction using anchors attached to frames or by use of bolts or screws through the frame members.

- B. Type, size and number of anchoring device suitable for the material surrounding the opening, maintain alignment, and resist displacement during normal use of access door.
- C. Anchors for fire rated access doors shall meet requirements of applicable fire test.

3.4 ADJUSTMENT:

- A. Adjust hardware so that door panel will open freely.
- B. Adjust door when closed so door panel is centered in the frame.

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**SECTION 08341
COILING COUNTER SHUTTERS**

PART 1 -GENERAL

1.1 DESCRIPTION

- A. Section specifies overhead roll up coiling shutters over counter in walls, including frame and counter.
- B. Manual push up operation, crank up operation and electric operation through activation of fire alarm system.

1.2 RELATED WORK

- A. Lock cylinder and keying: Section 08 71 00, DOOR HARDWARE.
- B. Color of shutter; Section 09 06 00, INTERIOR/EXTERIOR FINISHES, MATERIALS, AND FINISH SCHEDULES.
- C. Field Painting: Section 09 91 00, PAINTING.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Manufacturer's Literature and Data:
 - 1. Shutter, each type.
 - 2. Installation procedures and instructions.
- C. Shop Drawings:
 - Shutter, each type, showing details of construction and installation.

1.4 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
 - A47-99.....Malleable Iron Castings
 - A48-03.....Gray Iron Castings
 - A53-01.....Pipe, Steel, Black and Hot-Dipped, Zinc-Coated
Welded and Seamless
 - A167-99.....Stainless and Heat-Resisting Chromium-Nickel
Steel Plate, Sheet and Strip
 - A653-04.....Steel Sheet Zinc-Coated (Galvanized) or Zinc-
Iron Alloy Coated (Galvannealed) by the Hot Dip
Process
 - B209-04.....Aluminum and Aluminum-Alloy Sheet and Plate
 - B221-02.....Aluminum and Aluminum-Alloy Extruded Bars, Rods,
Wire, Shapes, and Tubes

- F468-03.....Nonferrous Bolts, Hex Cap Screws, and Studs for
General Use
- F593-02.....Stainless Steel Bolts, Hex Cap Screws, and Studs
- C. American Welding Society (AWS):
 - D1.1-00.....Structural Welding Code Steel
 - D1.2-03.....Structural Welding Code Aluminum
 - D1.3-98.....Structural Welding Code Sheet Steel
- D. National Association of Architectural Metal Manufacturers (NAAMM)
AMP 500 Series-1988.....Metal Finishes Manual
- E. Federal Specifications (Fed. Spec):
 - TT-P-645B.....Primer, Paint, Zinc-Molybdates, Alkyd Type
- F. National Fire Protection Association (NFPA)
 - 80-99.....Fire Doors and Fire Window

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum:
 - 1. Extruded: ASTM B221, alloy 6063-T5.
 - 2. Sheet: ASTM B209.
- B. Stainless Steel: ASTM A167, Type 302 or 304.
- C. Galvanized Repair Compound: Mil. Spec. MIL-P-21035.
- D. Primer: Fed. Spec. TT-P-645.
- E. Galvanized Steel: ASTM A653.
- F. Steel Pipe: ASTM A53.
- G. Casting: ASTM A47 or A48.

2.2 FABRICATION

- A. Weld in accordance with AWS applicable code.
- B. Non-Fire Rated Shutter:
 - 1. Integral counter, shutter, and frame type unit for installation with hood and fascia, sloping top, and related accessories and components required for a complete working installation.
 - 2. Construct for recessed installation.
 - 3. Exposed to view components of same metal except as specified.
 - 4. Counter: 0.0747-inch thick stainless steel with flush closed soffits and ends.
 - 5. Frame: Minimum 0.0598-inch thick steel jamb sections formed to include guide slots for curtain with receiver for bolts and locks and continuous closure angles.
 - 6. Counterbalance Assembly:

- a. Spring barrel or shaft of steel pipe of sufficient strength to ensure deflection not exceeding 0.03 inch per 1-foot) of span.
 - b. Barrel or shaft house oil-tempered, helically wound steel spring, and rotate on grease-sealed ball or roller bearings.
 - c. Springs adjustable from outside.
7. Brackets: 1/8-inch thick steel plate designed to form end closure support for hood.
8. Operation: Manual Push-up type for curtains less than 2130 mm (7-foot) wide. Crank operated for curtains over 7-foot wide.
9. Curtain:
- a. Flat type slats approximately 1-1/4-inches wide.
 - b. Bottom bar, equipped with recessed flush handles, recessed slide bolts for locking on one end, key operated cylinder lock on other end, and a continuous flexible seal to make tight contact with counter. Lock cylinder specified in BUILDERS HARDWARE.
10. Hoods: Formed with beads or flanges to prevent deflection. Sloping tops exposed ends and flush closures. Fastened to hood with sheet metal screws as recommended by manufacturer.
11. Aluminum Shutter:
- a. Curtain: Extruded aluminum, minimum 0.050-inch thick, with extruded aluminum bottom angle or bars.
 - b. Sloping Top Hood and Fascia: Minimum 0.040-inch thick, sheet aluminum or 0.0239-inch thick stainless steel.
 - c. Frames: Stainless steel.
 - d. Counter: Stainless steel.

2.3 FINISH

- A. Aluminum:
1. Finish in accordance with NAAMM AMP 500 and 501 or 504.
 2. Chemically etched medium matte, with clear anodic coating, AA-C-22A41. Class II Architectural, 0.4 mils thick (AMP 501). Class II Architectural, 0.4 mils) thick. (AMP 501).
- B. Stainless Steel: Mechanical finish No. 4 in accordance with NAAMM AMP 500 and AMP 503.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with approved shop drawings and manufacturer's instructions.
- B. Locate anchors and inserts for guides, brackets, supports, hardware, and other accessories and components accurately.

- C. Securely attach guides to adjoining construction with not less than 3/8-inch diameter bolts, spaced near each end and not over 24 inches apart.
 - 1. Use fasteners conforming to ASTM F468 and F593.
 - 2. Use stainless steel bolts with aluminum or stainless steel.
 - 3. Use toggle bolts to frame walls or hollow masonry.
 - 4. Use expansion bolts in solid masonry or concrete.

3.2 PROTECTION

- A. Isolate aluminum in contact with or fastened to dissimilar metal other than stainless steel, white bronze or other metals compatible with aluminum by painting the dissimilar or aluminum with a coat of TT-P-645 primer, or by placing an approved caulking compound, or a non-absorptive tape, or gasket between the aluminum and dissimilar metal.
- B. Paint aluminum in contact with masonry or concrete with a coat of TT-P-645.

3.3 ADJUSTING AND CLEANING

- A. Lubricate properly, adjust and demonstrate, to operate freely and as specified.
- B. Clean upon completion.

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SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Door hardware and related items necessary for complete installation and operation of doors.

1.2 RELATED WORK

- A. Caulking: Section 07 92 00 JOINT SEALANTS.
- B. Application of Hardware: Section 08 14 00, WOOD DOORS Section 08 11 13, HOLLOW METAL DOORS AND FRAMES Section 08 17 10, INTEGRATED DOOR ASSEMBLIES Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS Section 08 33 00, COILING DOORS AND GRILLES Section 08 34 53, SECURITY DOORS AND FRAMES Section 08 42 29, AUTOMATIC ENTRANCES Section 08 71 13, AUTOMATIC DOOR OPERATORS Section 08 71 13.11, LOW ENERGY DOOR OPERATORS Section 32 31 33, CHAIN LINK FENCES AND GATES
- C. Finishes: Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Painting: Section 09 91 00, PAINTING.
- E. Card Readers: Section 28 13 11, PHYSICAL ACCESS CONTROL SYSTEMS.
- F. Electrical: Division 26, ELECTRICAL.
- G. Fire Detection: Section 28 31 00, FIRE DETECTION AND ALARM.
- H. Sustainability and LEED requirements. Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS.

1.3 GENERAL

- A. All hardware shall comply with UFAS, (Uniform Federal Accessible Standards) unless specified otherwise.
- B. Provide rated door hardware assemblies where required by most current version of the International Building Code (IBC).
- C. Hardware for Labeled Fire Doors and Exit Doors: Conform to requirements of NFPA 80 for labeled fire doors and to NFPA 101 for exit doors, as well as to other requirements specified. Provide hardware listed by UL, except where heavier materials, large size, or better grades are specified herein under paragraph HARDWARE SETS. In lieu of UL labeling and listing, test reports from a nationally recognized testing agency may be submitted showing that hardware has been tested in accordance with UL test methods and that it conforms to NFPA requirements.

- D. Hardware for application on metal and wood doors and frames shall be made to standard templates. Furnish templates to the fabricator of these items in sufficient time so as not to delay the construction.
- E. The following items shall be of the same manufacturer, if possible, except as otherwise specified:
1. Mortise locksets.
 2. Hinges for hollow metal and wood doors.
 3. Surface applied overhead door closers.
 4. Exit devices.
 5. Floor closers.

1.4 WARRANTY

- A. Automatic door operators shall be subject to the terms of FAR Clause 52.24-21, except that the Warranty period shall be two years in lieu of one year for all items except as noted below:
1. Locks, latchsets, and panic hardware: 5 years.
 2. Door closers and continuous hinges: 10 years.

1.5 MAINTENANCE MANUALS

- A. In accordance with Section 01 00 00, GENERAL REQUIREMENTS Article titled "INSTRUCTIONS", furnish maintenance manuals and instructions on all door hardware.

1.6 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Submit 6 copies of the schedule per Section 01 33 23 plus 2 copies to the VAMC Locksmith (VISN Locksmith if the VAMC does not have a locksmith).
- B. Hardware Schedule: Prepare and submit hardware schedule in the following form:

Hardware Item	Quantity	Size	Reference Publication Type No.	Finish	Mfr. Name and Catalog No.	Key Control Symbols	UL Mark (if fire rated and listed)	ANSI/BHMA Finish Designation

- C. Samples and Manufacturers' Literature:

1. Samples: All hardware items (proposed for the project) that have not been previously approved by Builders Hardware Manufacturers Association shall be submitted for approval. Tag and mark all items with manufacturer's name, catalog number and project number.
 2. Samples are not required for hardware listed in the specifications by manufacturer's catalog number, if the contractor proposes to use the manufacturer's product specified.
- D. Certificate of Compliance and Test Reports: Submit certificates that hardware conforms to the requirements specified herein. Certificates shall be accompanied by copies of reports as referenced. The testing shall have been conducted either in the manufacturer's plant and certified by an independent testing laboratory or conducted in an independent laboratory, within four years of submittal of reports for approval.

1.7 DELIVERY AND MARKING

- A. Deliver items of hardware to job site in their original containers, complete with necessary appurtenances including screws, keys, and instructions. Tag one of each different item of hardware and deliver to Resident Engineer for reference purposes. Tag shall identify items by Project Specification number and manufacturer's catalog number. These items shall remain on file in Resident Engineer's office until all other similar items have been installed in project, at which time the Resident Engineer will deliver items on file to Contractor for installation in predetermined locations on the project.

1.8 PREINSTALLATION MEETING

- A. Convene a preinstallation meeting not less than 30 days before start of installation of door hardware. Require attendance of parties directly affecting work of this section, including Contractor and Installer, Architect, Project Engineer and VA Locksmith, Hardware Consultant, and Hardware Manufacturer's Representative. Review the following:
1. Inspection of door hardware.
 2. Job and surface readiness.
 3. Coordination with other work.
 4. Protection of hardware surfaces.
 5. Substrate surface protection.
 6. Installation.
 7. Adjusting.
 8. Repair.

9. Field quality control.

10. Cleaning.

1.9 INSTRUCTIONS

- A. Hardware Set Symbols on Drawings: Except for protective plates, door stops, mutes, thresholds and the like specified herein, hardware requirements for each door are indicated on drawings by symbols. Symbols for hardware sets consist of letters (e.g., "HW") followed by a number. Each number designates a set of hardware items applicable to a door type.
- B. Manufacturers' Catalog Number References: Where manufacturers' products are specified herein, products of other manufacturers which are considered equivalent to those specified may be used. Manufacturers whose products are specified are identified by abbreviations as follows:

Adams-Rite	Adams Rite Mfg. Co.	Pomona, CA
Best	Best Access Systems	Indianapolis, IN
Don-Jo	Don-Jo Manufacturing	Sterling, MA
G.E. Security	GE Security, Inc.	Bradentown, FL
Markar	Markar Architectural Products	Pomona, CA
Pemko	Pemko Manufacturing Co.	Ventura, CA
Rixson	Rixson	Franklin Park, IL
Rockwood	Rockwood Manufacturing Co.	Rockwood, PA
Securitron	Securitron Magnalock Corp.	Sparks, NV
Southern Folger	Southern Folger Detention Equipment Co.	San Antonio, TX
Stanley	The Stanley Works	New Britain, CT
Tice	Tice Industries	Portland, OR
Trimco	Triangle Brass Mfg. Co.	Los Angeles, CA
Zero	Zero Weather Stripping Co.	New York, NY

- C. Keying: All cylinders shall be keyed into existing Hospital Great Grand Master Key System Provide removable core cylinders that are removable only with a special key or tool without disassembly of knob or lockset. Cylinders shall be match hospital pin type. Keying information shall be furnished at a later date by the Resident Engineer.

1.10 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. In text, hardware items are referred to by series, types, etc., listed in such specifications and standards, except as otherwise specified.
- B. American Society for Testing and Materials (ASTM):
- F883-09.....Padlocks
- E2180-07.....Standard Test Method for Determining the
Activity of Incorporated Antimicrobial Agent(s)
In Polymeric or Hydrophobic Materials
- C. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):
- A156.1-06.....Butts and Hinges
- A156.2-03.....Bored and Pre-assembled Locks and Latches
- A156.3-08.....Exit Devices, Coordinators, and Auto Flush
Bolts
- A156.4-08.....Door Controls (Closers)
- A156.5-01.....Auxiliary Locks and Associated Products
- A156.6-05.....Architectural Door Trim
- A156.8-05.....Door Controls-Overhead Stops and Holders
- A156.12-05Interconnected Locks and Latches
- A156.13-05.....Mortise Locks and Latches Series 1000
- A156.14-07Sliding and Folding Door Hardware
- A156.15-06.....Release Devices-Closer Holder, Electromagnetic
and Electromechanical
- A156.16-08.....Auxiliary Hardware
- A156.17-04Self-Closing Hinges and Pivots
- A156.18-06.....Materials and Finishes
- A156.20-06Strap and Tee Hinges, and Hasps
- A156.21-09.....Thresholds
- A156.22-05.....Door Gasketing and Edge Seal Systems
- A156.23-04.....Electromagnetic Locks
- A156.24-03.....Delayed Egress Locking Systems
- A156.25-07Electrified Locking Devices
- A156.26-06.....Continuous Hinges
- A156.28-07Master Keying Systems
- A156.29-07Exit Locks and Alarms

A156.30-03High Security Cylinders

A156.31-07Electric Strikes and Frame Mounted Actuators

A250.8-03.....Standard Steel Doors and Frames

D. National Fire Protection Association (NFPA):

80-10.....Fire Doors and Fire Windows

101-09.....Life Safety Code

E. Underwriters Laboratories, Inc. (UL):

Building Materials Directory (2008)

PART 2 - PRODUCTS

2.1 BUTT HINGES

A. ANSI A156.1. Provide only three-knuckle hinges, except five-knuckle where the required hinge type is not available in a three-knuckle version (e.g., some types of swing-clear hinges). The following types of butt hinges shall be used for the types of doors listed, except where otherwise specified:

1. Exterior Doors: Type A2112/A5112 for doors 900 mm (3 feet) wide or less and Type A2111/A5111 for doors over 900 mm (3 feet) wide. Hinges for exterior outswing doors shall have non-removable pins. Hinges for exterior fire-rated doors shall be of stainless steel material.
2. Interior Doors: Type A8112/A5112 for doors 900 mm (3 feet) wide or less and Type A8111/A5111 for doors over 900 mm (3 feet) wide. Hinges for doors exposed to high humidity areas (shower rooms, toilet rooms, kitchens, janitor rooms, etc. shall be of stainless steel material.

B. Provide quantity and size of hinges per door leaf as follows:

1. Doors up to 1210 mm (4 feet) high: 2 hinges.
2. Doors 1210 mm (4 feet) to 2260 mm (7 feet 5 inches) high: 3 hinges minimum.
3. Doors greater than 2260 mm (7 feet 5 inches) high: 4 hinges.
4. Doors up to 900 mm (3 feet) wide, standard weight: 114 mm x 114 mm (4-1/2 inches x 4-1/2 inches) hinges.
5. Doors over 900 mm (3 feet) to 1065 mm (3 feet 6 inches) wide, standard weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
6. Doors over 1065 mm (3 feet 6 inches) to 1210 mm (4 feet), heavy weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
7. Provide heavy-weight hinges where specified.

8. At doors weighing 330 kg (150 lbs.) or more, furnish 127 mm (5 inch) high hinges.

C. See Articles "MISCELLANEOUS HARDWARE" and "HARDWARE SETS" for pivots and hinges other than butts specified above and continuous hinges specified below.

2.2 CONTINUOUS HINGES

A. ANSI/BHMA A156.26, Grade 1-600.

1. Listed under Category N in BHMA's "Certified Product Directory."

B. General: Minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete

C. Continuous, Barrel-Type Hinges: Hinge with knuckles formed around a Teflon-coated 6.35mm (0.25-inch) minimum diameter pin that extends entire length of hinge.

1. Base Metal for Exterior Hinges: Stainless steel.

2. Base Metal for Interior Hinges: Stainless steel.

3. Base Metal for Hinges for Fire-Rated Assemblies: Stainless steel.

4. Provide with non-removable pin (hospital tip option) at lockable outswing doors.

5. Where required to clear adjacent casing, trim, and wall conditions and allow full door swing, provide wide throw hinges of minimum width required.

6. Provide with manufacturer's cut-outs for separate mortised power transfers and/or mortised automatic door bottoms where they occur.

7. Where thru-wire power transfers are integral to the hinge, provide hinge with easily removable portion to allow easy access to wiring connections.

8. Where models are specified that provide an integral wrap-around edge guard for the hinge edge of the door, provide manufacturer's adjustable threaded stud and machine screw mechanism to allow the door to be adjusted within the wrap-around edge guard.

2.3 DOOR CLOSING DEVICES

A. Closing devices shall be products of one manufacturer for each type specified.

2.4 OVERHEAD CLOSERS

A. Conform to ANSI A156.4, Grade 1.

B. Closers shall conform to the following:

1. The closer shall have minimum 50 percent adjustable closing force over minimum value for that closer and have adjustable hydraulic back check effective between 60 degrees and 85 degrees of door opening.
2. Where specified, closer shall have hold-open feature.
3. Size Requirements: Provide multi-size closers, sizes 1 through 6, except where multi-size closer is not available for the required application.
4. Material of closer body shall be forged or cast.
5. Arm and brackets for closers shall be steel, malleable iron or high strength ductile cast iron.
6. Where closers are exposed to the exterior or are mounted in rooms that experience high humidity, provide closer body and arm assembly of stainless steel material.
7. Closers shall have full size metal cover; plastic covers will not be accepted.
8. Closers shall have adjustable hydraulic back-check, separate valves for closing and latching speed, adjustable back-check positioning valve, and adjustable delayed action valve.
9. Provide closers with any accessories required for the mounting application, including (but not limited to) drop plates, special soffit plates, spacers for heavy-duty parallel arm fifth screws, bull-nose or other regular arm brackets, longer or shorter arm assemblies, and special factory templating. Provide special arms, drop plates, and templating as needed to allow mounting at doors with overhead stops and/or holders.
10. Closer arms or backcheck valve shall not be used to stop the door from overswing, except in applications where a separate wall, floor, or overhead stop cannot be used.
11. Provide parallel arm closers with heavy duty rigid arm.
12. Where closers are to be installed on the push side of the door, provide parallel arm type except where conditions require use of top jamb arm.
13. Provide all surface closers with the same body attachment screw pattern for ease of replacement and maintenance.
14. All closers shall have a 1 ½" (38mm) minimum piston diameter.

2.5 DOOR STOPS

- A. Conform to ANSI A156.16.
- B. Provide door stops wherever an opened door or any item of hardware thereon would strike a wall, column, equipment or other parts of building construction. For concrete, masonry or quarry tile construction, use lead expansion shields for mounting door stops.
- C. Where cylindrical locks with turn pieces or pushbuttons occur, equip wall bumpers Type L02251 (rubber pads having concave face) to receive turn piece or button.
- D. Provide floor stops (Type L02141 or L02161 in office areas; Type L02121 x 3 screws into floor elsewhere. Wall bumpers, where used, must be installed to impact the trim or the door within the leading half of its width. Floor stops, where used, must be installed within 4-inches of the wall face and impact the door within the leading half of its width.
- E. Where drywall partitions occur, use floor stops, Type L02141 or L02161 in office areas, Type L02121 elsewhere.
- F. Provide stop Type L02011, as applicable for exterior doors. At outswing doors where stop can be installed in concrete, provide stop mated to concrete anchor set in 76mm (3-inch) core-drilled hole and filled with quick-setting cement.
- G. Omit stops where floor mounted door holders are required and where automatic operated doors occur.
- H. Provide appropriate roller bumper for each set of doors (except where closet doors occur) where two doors would interfere with each other in swinging.
- I. Provide appropriate door mounted stop on doors in individual toilets where floor or wall mounted stops cannot be used.
- J. Provide overhead surface applied stop Type C02541, ANSI A156.8 on patient toilet doors in bedrooms where toilet door could come in contact with the bedroom door.
- K. Provide door stops on doors where combination closer magnetic holders are specified, except where wall stops cannot be used or where floor stops cannot be installed within 4-inches of the wall.
- L. Where the specified wall or floor stop cannot be used, provide concealed overhead stops (surface-mounted where concealed cannot be used).

2.6 OVERHEAD DOOR STOPS AND HOLDERS

- A. Conform to ANSI Standard A156.8. Overhead holders shall be of sizes recommended by holder manufacturer for each width of door. Set overhead holders for 110 degree opening, unless limited by building construction or equipment. Provide Grade 1 overhead concealed slide type: stop-only at rated doors and security doors, hold-open type with exposed hold-open on/off control at all other doors requiring overhead door stops.

2.7 LOCKS AND LATCHES

- A. Conform to ANSI A156.2. Locks and latches for doors 45 mm (1-3/4 inch) thick or over shall have beveled fronts. Lock cylinders to match hospital pin. Cylinders for all locksets shall be removable core type. Cylinders shall be furnished with construction removable cores and construction master keys. Cylinder shall be removable by special key or tool. Construct all cores so that they will be interchangeable into the core housings of all mortise locks, rim locks, cylindrical locks, and any other type lock included in the Great Grand Master Key System. Disassembly of lever or lockset shall not be required to remove core from lockset. All locksets or latches on double doors with fire label shall have latch bolt with 19 mm (3/4 inch) throw, unless shorter throw allowed by the door manufacturer's fire label. Provide temporary keying device or construction core of allow opening and closing during construction and prior to the installation of final cores.
- B. In addition to above requirements, locks and latches shall comply with following requirements:
1. Mortise Lock and Latch Sets: Conform to ANSI/BHMA A156.13. Mortise locksets shall be series 1000, minimum Grade 2. All locksets and latchsets, except on designated doors in Psychiatric (Mental Health) areas, shall have lever handles fabricated from cast stainless steel. Provide sectional (lever x rose) lever design matching existing hospital. No substitute lever material shall be accepted. All locks and latchsets shall be furnished with 122.55 mm (4-7/8-inch) curved lip strike and wrought box. At outswing pairs with overlapping astragals, provide flat lip strip with 21mm (7/8-inch) lip-to-center dimension. Lock function F02 shall be furnished with emergency tools/keys for emergency entrance. All lock cases installed on lead lined doors shall be lead lined before applying final hardware finish. Furnish armored fronts for all mortise locks.

- Where mortise locks are installed in high-humidity locations or where exposed to the exterior on both sides of the opening, provide non-ferrous mortise lock case.
2. Cylindrical Lock and Latch Sets: levers shall meet ADA (Americans with Disabilities Act) requirements. Cylindrical locksets shall be series 4000 Grade I. All locks and latchsets shall be furnished with 122.55 mm (4-7/8-inch) curved lip strike and wrought box. At outswing pairs with overlapping astragals, provide flat lip strip with 21mm (7/8-inch) lip-to-center dimension. Provide lever design to match design selected by Architect or to match existing lever design. Where two turn pieces are specified for lock F76, turn piece on inside knob shall lock and unlock inside knob, and turn piece on outside knob shall unlock outside knob when inside knob is in the locked position. (This function is intended to allow emergency entry into these rooms without an emergency key or any special tool.)
 3. Auxiliary locks shall be as specified under hardware sets and conform to ANSI A156.5.
 4. Locks on designated doors in Psychiatric (Mental Health) areas shall be paddle type with arrow projection covers and be UL Listed. Provide these locks with paddle in the down position on both sides of the door. Locks shall be fabricated of wrought stainless steel.
 5. Privacy locks in non-mental-health patient rooms shall have an inside thumbturn for privacy and an outside thumbturn for emergency entrance. Single occupancy patient privacy doors shall typically swing out; where such doors cannot swing out, provide center-pivoted doors with rescue hardware (see HW-2B).

2.8 PUSH-BUTTON COMBINATION LOCKS

- A. ANSI/BHMA A156.13, Grade 1. Battery operated pushbutton entry.
- B. Construction: Heavy duty mortise lock housing conforming to ANSI/BHMA A156.13, Grade 1. Lever handles and operating components in compliance with the UFAS and the ADA Accessibility Guidelines. Match lever handles of locks and latchsets on adjacent doors.
- C. Special Features: Key override to permit a master keyed security system and a pushbutton security code activated passage feature to allow access without using the entry code.

2.9 ELECTRIC STRIKES

- A. ANSI/ BHMA A156.31 Grade 1.
- B. General: Use fail-secure electric strikes at fire-rated doors.

2.10 KEYS

- A. Stamp all keys with change number and key set symbol. Furnish keys in quantities as follows:

Locks/Keys	Quantity
Cylinder locks	2 keys each
Cylinder lock change key blanks	100 each different key way
Master-keyed sets	6 keys each
Grand Master sets	6 keys each
Great Grand Master set	5 keys
Control key	2 keys

- B. Psychiatric keys shall be cut so that first two bittings closest to the key shoulder are shallow to provide greater strength at point of greatest torque.

2.11 KEY CABINET

- A. ANSI Standard A156.5. Provide key cabinet made of cold rolled, 1.2 mm (0.0478 inch) thick furniture steel electro-welded. Doors shall have "no sag" continuous brass-pin piano type hinge and be equipped with chrome plated locking door handles, hook cam and mechanical pushbutton door lock. Key Cabinet and Key Control System shall accommodate all keys for this project plus 25 percent. Provide minimum number of multiple cabinets where a single cabinet of largest size will not accommodate the required number of keys.
- B. Key tags shall consist of two sets: Permanent self-locking and loan key snaphook type with tag colors as follows: Red fiber marker of the permanent self-locking type approximately 32 mm (1-1/4 inch) in diameter engraved with the legend "FILE KEY MUST NOT BE LOANED." Also furnish for each hook a white cloverleaf key marker with snap-hooks engraved with the legend "LOAN KEY."
- C. The manufacturer of the lock cylinders and locks shall attach a key tag to keys of each lock cylinder and shall mark thereon the respective item number and key change number. Provide each group of keys in a key gathering envelope (supplied by Key Cabinet Manufacturer) in which the

lock manufacturer shall include the following information: Item number, key change number and door number. The contractor shall furnish the Key Cabinet Manufacturer the hardware and keying schedules and change keys.

- D. The Key Cabinet Manufacturer shall set up a three-way cross index system, including master keys, listing the keys alphabetically, the hooks numerically and the key changes numerically on different colored index cards. Index cards shall be typewritten and inserted in a durable binder. Attach the keys to the two sets of numbered tags supplied with the cabinet. (The permanent tag and the loan key tag). Instruct the owner in proper use of the system. Install cabinet as directed by the Resident Engineer.

2.12 ARMOR PLATES, KICK PLATES, MOP PLATES AND DOOR EDGING

- A. Conform to ANSI Standard A156.6.
- B. Provide protective plates and door edging as specified below:
1. Kick plates, mop plates and armor plates of metal, Type J100 series.
 2. Provide kick plates and mop plates where specified. Kick plates shall be 254 mm (10 inches) or 305 mm (12 inches) high. Mop plates shall be 152 mm (6 inches) high. Both kick and mop plates shall be minimum 1.27 mm (0.050 inches) thick. Provide kick and mop plates beveled on all 4 edges (B4E). On push side of doors where jamb stop extends to floor, make kick plates 38 mm (1-1/2 inches) less than width of door, except pairs of metal doors which shall have plates 25 mm (1 inch) less than width of each door. Extend all other kick and mop plates to within 6 mm (1/4 inch) of each edge of doors. Kick and mop plates shall butt astragals. For jamb stop requirements, see specification sections pertaining to door frames.
 3. Kick plates and/or mop plates are not required on following door sides:
 - a. Armor plate side of doors;
 - b. Exterior side of exterior doors;
 - c. Closet side of closet doors;
 - d. Both sides of aluminum entrance doors.
 4. Armor plates for doors are listed under Article "Hardware Sets". Armor plates shall be thickness as noted in the hardware set, 875 mm (35 inches) high and 38 mm (1-1/2 inches) less than width of doors, except on pairs of metal doors. Provide armor plates beveled on all 4 edges (B4E). Plates on pairs of metal doors shall be 25 mm (1 inch) less than width of each door. Where top of intermediate rail

- of door is less than 875 mm (35 inches) from door bottom, extend armor plates to within 13 mm (1/2 inch) of top of intermediate rail. On doors equipped with panic devices, extend armor plates to within 13 mm (1/2 inch) of panic bolt push bar.
5. Where louver or grille occurs in lower portion of doors, substitute stretcher plate and kick plate in place of armor plate. Size of stretcher plate and kick plate shall be 254 mm (10 inches) high.
 6. Provide stainless steel edge guards where so specified at wood doors. Provide mortised type instead of surface type except where door construction and/or ratings will not allow. Provide edge guards of bevel and thickness to match wood door. Provide edge guards with factory cut-outs for door hardware that must be installed through or extend through the edge guard. Provide full-height edge guards except where door rating does not allow; in such cases, provide edge guards to height of bottom of typical lockset armor front. Forward edge guards to wood door manufacturer for factory installation on doors.

2.13 EXIT DEVICES

- A. Conform to ANSI Standard A156.3. Exit devices shall be Grade 1; type and function are specified in hardware sets. Provide flush with finished floor strikes for vertical rod exit devices in interior of building. Trim shall have cast satin stainless steel lever handles of design similar to locksets, unless otherwise specified. Provide key cylinders for keyed operating trim and, where specified, cylinder dogging.
- B. Surface vertical rod panics shall only be provided less bottom rod; provide fire pins as required by exit device and door fire labels. Do not provide surface vertical rod panics at exterior doors.
- C. Concealed vertical rod panics shall be provided less bottom rod at interior doors, unless lockable or otherwise specified; provide fire pins as required by exit device and door fire labels. Where concealed vertical rod panics are specified at exterior doors, provide with both top and bottom rods.
- D. Where removable mullions are specified at pairs with rim panic devices, provide mullion with key-removable feature.
- E. At non-rated openings with panic hardware, provide panic hardware with key cylinder dogging feature.

- F. Exit devices for fire doors shall comply with Underwriters Laboratories, Inc., requirements for Fire Exit Hardware. Submit proof of compliance.

2.14 FLUSH BOLTS (LEVER EXTENSION)

- A. Conform to ANSI A156.16. Flush bolts shall be Type L24081 unless otherwise specified. Furnish proper dustproof strikes conforming to ANSI A156.16, for flush bolts required on lower part of doors.
- B. Lever extension manual flush bolts shall only be used at non-fire-rated pairs for rooms only accessed by maintenance personnel.
- C. Face plates for cylindrical strikes shall be rectangular and not less than 25 mm by 63 mm (1 inch by 2-1/2 inches).
- D. Friction-fit cylindrical dustproof strikes with circular face plate may be used only where metal thresholds occur.
- E. Provide extension rods for top bolt where door height exceeds 2184 mm (7 feet 2 inches).

2.15 FLUSH BOLTS (AUTOMATIC)

- A. Conform to ANSI A156.3. Dimension of flush bolts shall conform to ANSI A115. Bolts shall conform to Underwriters Laboratories, Inc., requirements for fire door hardware. Flush bolts shall automatically latch and unlatch. Furnish dustproof strikes conforming to ANSI A156.16 for bottom flushbolt. Face plates for dustproof strike shall be rectangular and not less than 38 mm by 90 mm (1-1/2 by 3-1/2 inches).
- B. At interior doors, provide auto flush bolts less bottom bolt, unless otherwise specified, except at wood pairs with fire-rating greater than 20 minutes; provide fire pins as required by auto flush bolt and door fire labels.

2.16 DOOR PULLS

- A. Conform to ANSI A156.6. Pull plate 90 mm by 350 mm (3-1/2 inches by 14 inches), unless otherwise specified. Cut plates of door pulls for cylinders, or turn pieces where required.

2.17 COORDINATORS

- A. Conform to ANSI A156.16. Coordinators, when specified for fire doors, shall comply with Underwriters Laboratories, Inc., requirements for fire door hardware. Coordinator may be omitted on exterior pairs of doors where either door will close independently regardless of the position of the other door. Coordinator may be omitted on interior pairs of non-labeled open where open back strike is used. Open back strike shall not be used on labeled doors. Paint coordinators to match

door frames, unless coordinators are plated. Provide bar type coordinators, except where gravity coordinators are required at acoustic pairs. For bar type coordinators, provide filler bars for full width and, as required, brackets for push-side surface mounted closers, overhead stops, and vertical rod panic strikes.

2.18 AUTOMATIC DOOR BOTTOM SEAL AND RUBBER GASKET FOR LIGHT PROOF OR SOUND CONTROL DOORS

- A. Conform to ANSI A156.22. Provide mortise or under-door type, except where not practical. For mortise automatic door bottoms, provide type specific for door construction (wood or metal).

2.19 MISCELLANEOUS HARDWARE

- A. Access Doors (including Sheet Metal, Screen and Woven Wire Mesh Types): Except for fire-rated doors and doors to Temperature Control Cabinets, equip each single or double metal access door with Lock Type E76213, conforming to ANSI A156.5. Key locks as directed. Ship lock prepaid to the door manufacturer. Hinges shall be provided by door manufacturer.
- B. Cylinders for Various Partitions and Doors: Key cylinders same as entrance doors of area in which partitions and door occur, except as otherwise specified. Provide cylinders to operate locking devices where specified for following partitions and doors:
 - 1. Folding doors and partitions.
 - 2. Fire-rated access doors-Engineer's key set.
- C. Mutes: Conform to ANSI A156.16. Provide door mutes or door silencers Type L03011 or L03021, depending on frame material, of white or light gray color, on each steel or wood door frame, except at fire-rated frames, lead-lined frames and frames for sound-resistant, lightproof and electromagnetically shielded doors. Furnish 3 mutes for single doors and 2 mutes for each pair of doors, except double-acting doors. Provide 4 mutes or silencers for frames for each Dutch type door. Provide 2 mutes for each edge of sliding door which would contact door frame.

2.20 THERMOSTATIC TEMPERATURE CONTROL VALVE CABINETS

- A. Where lock is shown, equip each cabinet door (metal) with lock Type E06213, conforming to ANSI A156.5. Key locks in Key Sets approved by Contracting Officer. See mechanical drawings and specifications for location of cabinets.
- B. Cabinet manufacturer shall supply the hinges, bolts and pulls. Ship locks to cabinet manufacturer for installation.

2.21 FINISHES

- A. Exposed surfaces of hardware shall have ANSI A156.18, finishes as specified below. Finishes on all hinges, pivots, closers, thresholds, etc., shall be as specified below under "Miscellaneous Finishes." For field painting (final coat) of ferrous hardware, see Section 09 91 00, PAINTING.
- B. 626 or 630: All surfaces on exterior and interior of buildings, except where other finishes are specified.
- C. Miscellaneous Finishes:
1. Hinges --exterior doors: 626 or 630.
 2. Hinges --interior doors: 652 or 630.
 3. Pivots: Match door trim.
 4. Door Closers: Factory applied paint finish. Dull or Satin Aluminum color.
 5. Thresholds: Mill finish aluminum.
 6. Cover plates for floor hinges and pivots: 630.
 7. Other primed steel hardware: 600.
- D. Special Finish: Exposed surfaces of hardware for dark bronze anodized aluminum doors shall have oxidized oil rubbed bronze finish (dark bronze) finish on door closers shall closely match doors.
- E. Anti-microbial Coating: All hand-operated hardware (levers, pulls, push bars, push plates, paddles, and panic bars) shall be provided with an anti-microbial/anti-fungal coating that has passed ASTM E2180 tests. Coating to consist of ionic silver (Ag+). Silver ions surround bacterial cells, inhibiting growth of bacteria, mold, and mildew by blockading food and respiration supplies.

2.22 BASE METALS

- A. Apply specified U.S. Standard finishes on different base metals as following:

Finish	Base Metal
652	Steel
626	Brass or bronze
630	Stainless steel

PART 3 - EXECUTION**3.1 HARDWARE HEIGHTS**

- A. For new buildings locate hardware on doors at heights specified below, with all hand-operated hardware centered within 864 mm (34 inches) to 1200 mm (48 inches), unless otherwise noted:
- B. Hardware Heights from Finished Floor:
1. Exit devices centerline of strike (where applicable) 1024 mm (40-5/16 inches).
 2. Locksets and latch sets centerline of strike 1024 mm (40-5/16 inches).
 3. Deadlocks centerline of strike 1219 mm (48 inches).
 4. Hospital arm pull 1168 mm (46 inches) to centerline of bottom supporting bracket.
 5. Centerline of door pulls to be 1016 mm (40 inches).
 6. Push plates and push-pull shall be 1270 mm (50 inches) to top of plate.
 7. Push-pull latch to be 1024 mm (40-5/16 inches) to centerline of strike.
 8. Locate other hardware at standard commercial heights. Locate push and pull plates to prevent conflict with other hardware.

3.2 INSTALLATION

- A. Closer devices, including those with hold-open features, shall be equipped and mounted to provide maximum door opening permitted by building construction or equipment. Closers shall be mounted on side of door inside rooms, inside stairs, and away from corridors. At exterior doors, closers shall be mounted on interior side. Where closers are mounted on doors they shall be mounted with sex nuts and bolts; foot shall be fastened to frame with machine screws.

B. Hinge Size Requirements:

Door Thickness	Door Width	Hinge Height
45 mm (1-3/4 inch)	900 mm (3 feet) and less	113 mm (4-1/2 inches)
45 mm (1-3/4 inch)	Over 900 mm (3 feet) but not more than 1200 mm (4 feet)	125 mm (5 inches)
35 mm (1-3/8 inch) (hollow core wood doors)	Not over 1200 mm (4 feet)	113 mm (4-1/2 inches)

- C. Hinge leaves shall be sufficiently wide to allow doors to swing clear of door frame trim and surrounding conditions.
- D. Where new hinges are specified for new doors in existing frames or existing doors in new frames, sizes of new hinges shall match sizes of existing hinges; or, contractor may reuse existing hinges provided hinges are restored to satisfactory operating condition as approved by Resident Engineer. Existing hinges shall not be reused on door openings having new doors and new frames. Coordinate preparation for hinge cut-outs and screw-hole locations on doors and frames.
- E. Hinges Required Per Door:

Doors 1500 mm (5 ft) or less in height	2 butts
Doors over 1500 mm (5 ft) high and not over 2280 mm (7 ft 6 in) high	3 butts
Doors over 2280 mm (7 feet 6 inches) high	4 butts
Dutch type doors	4 butts
Doors with spring hinges 1370 mm (4 feet 6 inches) high or less	2 butts
Doors with spring hinges over 1370 mm (4 feet 6 inches)	3 butts

- F. Fastenings: Suitable size and type and shall harmonize with hardware as to material and finish. Provide machine screws and lead expansion shields to secure hardware to concrete, ceramic or quarry floor tile, or solid masonry. Fiber or rawl plugs and adhesives are not permitted. All fastenings exposed to weather shall be of nonferrous metal.
- G. After locks have been installed; show in presence of Resident Engineer that keys operate their respective locks in accordance with keying requirements. (All keys, Master Key level and above shall be sent Registered Mail to the Medical Center Director along with the bitting list. Also a copy of the invoice shall be sent to the Resident Engineer for his records.) Installation of locks which do not meet specified keying requirements shall be considered sufficient justification for rejection and replacement of all locks installed on project.

3.3 FINAL INSPECTION

- A. Installer to provide letter to VA Resident/Project Engineer that upon completion, installer has visited the Project and has accomplished the following:
1. Re-adjust hardware.

2. Evaluate maintenance procedures and recommend changes or additions, and instruct VA personnel.
3. Identify items that have deteriorated or failed.
4. Submit written report identifying problems.

3.4 DEMONSTRATION

- A. Demonstrate efficacy of mechanical hardware and electrical, and electronic hardware systems, including adjustment and maintenance procedures, to satisfaction of Resident/Project Engineer and VA Locksmith.

3.5 HARDWARE SETS

- A. Following sets of hardware correspond to hardware symbols shown on drawings. Only those hardware sets that are shown on drawings will be required. Disregard hardware sets listed in specifications but not shown on drawings.

ELECTRIC HARDWARE ABBREVIATIONS LEGEND:

ADO = Automatic Door Operator

EMCH = Electro-Mechanical Closer-Holder

MHO = Magnetic Hold-Open (wall- or floor-mounted)

HW-1S

Each Door to Have:

Hinges	QUANTITY AND TYPE AS REQUIRED
1 Passage Latchset	F01
1 Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Outswing Doors)	L52101 Convex
1 Auto Door Bottom	R0Y346 HEAVY DUTY
2 Sets Self Adhesive Seals	R0E154

HW-1T

Each Door to Have:

Hinges	QUANTITY AND TYPE AS REQUIRED
1 Passage Latchset	F01
1 Closer	C02011/ C02021 (PT4D, PT4F, PT4H)
1 Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Outswing Doors)	L52101 Convex
1 Auto Door Bottom	R0Y346 HEAVY DUTY
2 Sets Self Adhesive Seals	R0E154

HW-1U

Each Door to Have:

Hinges	QUANTITY AND TYPE AS REQUIRED
1 Passage Latchset	F01
1 Closer	C02011/ C02021 (PT4D, PT4F, PT4H)
1 Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Outswing Doors)	L52101 Convex
3 Silencers	L03011

HW-2LEach Door to Have:

	Hinges	QUANTITY AND TYPE AS REQUIRED
1	Privacy Indicator Lock	F02-MOD X OCCUPANCY INDICATOR
1	Closer	C02011/ C02021 (PT4D, PT4F, PT4H)
1	Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1	Wall Stop (@ Outswing Doors)	L52101 Convex
3	Silencers	L03011

HW-3KEach Door to Have:

	Hinges	QUANTITY AND TYPE AS REQUIRED
1	Office Lockset	F04
1	Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1	Wall Stop (@ Outswing Doors)	L52101 Convex
1	Set Self Adhesive Seals	R0E154

HW-3LEach Door to Have:

	Hinges	QUANTITY AND TYPE AS REQUIRED
1	Office Lockset	F04
1	Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1	Wall Stop (@ Outswing Doors)	L52101 Convex
1	Auto Door Bottom	R0Y346 HEAVY DUTY
2	Sets Self Adhesive Seals	R0E154

HW-4GEach Door to Have:

	Hinges	QUANTITY AND TYPE AS REQUIRED
1	Classroom Lockset	F08
1	Closer	C02011/ C02021 (PT4D, PT4F, PT4H)
1	Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1	Wall Stop (@ Outswing Doors)	L52101 Convex
3	Silencers	L03011

HW-4W

Each Door to Have:

Hinges	QUANTITY AND TYPE AS REQUIRED
1 Classroom Lockset	F08
1 Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Outswing Doors)	L52101 Convex
1 Auto Door Bottom	R0Y346 HEAVY DUTY
2 Sets Self Adhesive Seals	R0E154

HW-9

Each Pair to Have:

Hinges	QUANTITY & TYPE AS REQUIRED
1 Passage Latchset	F01
1 Closer	C02011/ C02021 (PT4D, PT4F, PT4H)
1 Set Auto Flush Bolts	Type 25
1 DP Strike	L04021
1 Coordinator	TYPE 21A x Filler Bar x Brackets
2 Electromagnetic Holders	C00011
1 Overlapping Astragal	R0Y634
1 Meeting Stile Gasket	R0E714
1 Set Self Adhesive Seals	R0E154

HW-9C

Each Sliding Door to Have:

1 Set Sliding Door Hardware	TYPE REQUIRED FOR DOOR MATERIAL, WEIGHT AND MOUNTING DETAILS (COMPLETE WITH TRACK, TRACK BRACKETS, HANGERS, GUIDES, BUMPERS, AND TRACK STOPS)
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1 Privacy Lockset	D0852
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2 Pulls - BTB Mount	J401
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Sliding hardware similar to K.N. Crowder CRT-102 Series exposed stainless track and hangers. Pulls similar to Rockwood RM-3310 36" CTC. Privacy Lockset similar to Adams-Rite 5017-00 x 4810 x 1004 x 1004 (Thumbturns both sides.)

HW-11D

Each Door to Have:

Hinges	QUANTITY AND TYPE AS REQUIRED
1 Storeroom Lockset	F07
1 Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Outswing Doors)	L52101 Convex
3 Silencers	L03011

HW-11E

Each Pair to Have:

Hinges	QUANTITY & TYPE AS REQUIRED
1 Storeroom Lockset	F07
2 Flush Bolts	L04081
1 DP Strike	L04021
2 OH Concealed Stops	C01511
2 Silencers	L03011

SH-3J

Each Door to Have:

Hinges	QUANTITY AND TYPE AS REQUIRED
1 Push-button Combination Lock	N3 - A156.13 F07 G1 E06
1 Closer	C02011/ C02021 (PT4D, PT4F, PT4H)
1 Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Outswing Doors)	L52101 Convex
1 Set Self Adhesive Seals	R0E154
1 Electric Strike	E59321 Fail Secure 24VDC
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Door Position Switch	1078-G (G.E. SECURITY), OR EQUAL

120VAC Power, Conduit, and Wiring by DIVISION 26. Card Reader by DIVISION 28.

SH-3KEach Door to Have:

Hinges	QUANTITY AND TYPE AS REQUIRED
1 Electrified Hinge	4-WIRE TYPE AS REQUIRED
1 Electrified Lockset	F07 (E01-REX, E06) 24VDC
1 Closer	C02011/ C02021 (PT4D, PT4F, PT4H)
1 Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Outswing Doors)	L52101 Convex
1 Set Self Adhesive Seals	R0E154
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Door Position Switch	1078-G (G.E. SECURITY), OR EQUAL

120VAC Power, Conduit, and Wiring by DIVISION 26. Card Reader by DIVISION 28.

SH-4CEach Door to Have:

1 Continuous Hinge	A51031B
1 Exit Device	Type 1 F03
1 Cylinder	TO SUIT DEVICE
1 Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Outswing Doors)	L52101 Convex
1 Set Self Adhesive Seals	R0E154
1 Electric Strike	E59311 Fail Secure 24VDC
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Door Position Switch	1078-G (G.E. SECURITY), OR EQUAL

Auto Door Operator, Controls, and Reactivation/ Safety Sensors by SECTION 08 71 13.11. 120VAC Power, Conduit, and Wiring by DIVISION 26. Card Reader and Remote Release by DIVISION 28.

- - - E N D - - -

SECTION 08 80 00
GLAZING

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This section specifies glass, related glazing materials and accessories. Glazing products specified apply to factory or field glazed items.

1.2 RELATED WORK

- A. Factory glazed by manufacturer in following units:
1. Sound resistant doors: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES, and Section 08 14 00, WOOD DOORS.
 2. Mirrors: Section 10 28 00, TOILET, BATH, AND LAUNDRY ACCESSORIES.
 3. Color of spandrel glass, tinted (heat absorbing or light reducing) glass, and reflective (metallic coated) glass: Section 09 05 00, INTERIOR AND EXTERIOR FINISHES, MATERIALS AND SCHEDULE.

1.3 LABELS

- A. Temporary labels:
1. Provide temporary label on each light of glass identifying manufacturer or brand and glass type, quality and nominal thickness.
 2. Label in accordance with NFRC (National Fenestration Rating Council) label requirements.
 3. Temporary labels shall remain intact until glass is approved by Resident Engineer.
- B. Permanent labels:
1. Locate in corner for each pane.
 2. Label in accordance with ANSI Z97.1 and SGCC (Safety Glass Certification Council) label requirements.
 - a. Tempered glass.
 - b. Laminated glass or have certificate for panes without permanent label.
 - c. Organic coated glass.

1.4 PERFORMANCE REQUIREMENTS

- A. Building Enclosure Vapor Retarder and Air Barrier:
1. Utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapor retarder seal.

2. Maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

B. Glass Thickness:

1. Select thickness of exterior glass to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with ASCE 7 code.
2. Test in accordance with ASTM E 1300.
3. Thicknesses listed are minimum values. Coordinate/verify required thicknesses with glazing system manufacturers.

C. Blast resistant glass:

1. For blast resistant windows follow Unified Facilities Criteria, DOD Minimum Antiterrorism Standards for Buildings UFC4-010-01.
2. Coordinate with Physical Security Design Manual requirements.

1.5 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Manufacturer's Certificates:

1. Certificates stating that wire glass, meets requirements for safety glazing material as specified in ANSI Z97.1.
2. Certificate on shading coefficient.
3. Certificate on "U" value when value is specified.
4. Certificate that blast resistant glass meets the requirements of UFC4-010-01.

- C. Warranty: Submit written guaranty, conforming to General Condition requirements, and to "Warranty of Construction" Article in this Section.

D. Manufacturer's Literature and Data:

1. Glass, each kind required.
2. Insulating glass units.
3. Transparent (one-way vision glass) mirrors.
4. Elastic compound for metal sash glazing.
5. Glazing cushion.
6. Sealing compound.
7. Blast resistive material.

E. Samples:

1. Size: 150 mm by 150 mm (6 inches by 6 inches).
2. Tinted glass.

3. Transparent (one-way vision glass) mirrors.5. All insulating glass units.

F. Preconstruction Adhesion and Compatibility Test Report: Submit glazing sealant manufacturer's test report indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Schedule delivery to coincide with glazing schedules so minimum handling of crates is required. Do not open crates except as required for inspection for shipping damage.
- B. Storage: Store cases according to printed instructions on case, in areas least subject to traffic or falling objects. Keep storage area clean and dry.
- C. Handling: Unpack cases following printed instructions on case. Stack individual windows on edge leaned slightly against upright supports with separators between each.

1.7 PROJECT CONDITIONS

- 1. Field Measurements: Field measure openings before ordering tempered glass products. Be responsible for proper fit of field measured products.
- 2. Environmental Requirements: Installation of glass products at ambient air temperature below 40 degrees F (4.4 degrees C) is prohibited.

1.8 WARRANTY

- A. Warranty: Conform to terms of "Warranty of Construction", FAR clause 52.246-21, except extend warranty period for the following:
 - 1. Ceramic fritted glass: Warrant frit from deterioration for 20 years.
 - 2. Insulating glass units to remain completely sealed and sealants will not react with other glazing materials for 20 years.
 - 3. Laminated glass units to remain laminated for 5 years.

1.9 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):
 - Z97.1-04.....Safety Glazing Material Used in Building -
Safety Performance Specifications and Methods
of Test.

- C. American Society for Testing and Materials (ASTM):
- C1363-11.....Thermal Performance of Building Assemblies, by
Means of A Hot Box Apparatus
 - C542-05.....Lock-Strip Gaskets.
 - C716-06.....Installing Lock-Strip Gaskets and Infill
Glazing Materials.
 - C794-06.....Adhesion-in-Peel of Elastomeric Joint Sealants.
 - C864-05.....Dense Elastomeric Compression Seal Gaskets,
Setting Blocks, and Spacers.
 - C920-11.....Elastomeric Joint Sealants.
 - C964-07.....Standard Guide for Lock-Strip Gasket Glazing.
 - C1036-06.....Flat Glass.
 - C1048-04.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated
and Uncoated Glass.
 - C1172-09e1.....Laminated Architectural Flat Glass.
 - C1376-10.....Pyrolytic and Vacuum Deposition Coatings on
Flat Glass.
 - D635-10.....Rate of Burning and/or Extent and Time of
Burning of Self-Supporting Plastic in a
Horizontal Position.
 - D4802-10.....Poly (Methyl Methacrylate) Acrylic Plastic
Sheet.
 - E84-11a.....Surface Burning Characteristics of Building
Materials.
 - E1300-09.....Determining Load Resistance of Glass in
Buildings.
 - E2190-10.....Insulating Glass Unit
- D. Commercial Item Description (CID):
- A-A-59502.....Plastic Sheet, Polycarbonate
- E. Code of Federal Regulations (CFR):
- 16 CFR 1201 - Safety Standard for Architectural Glazing Materials;
1977, with 2010 Revision.
- F. National Fire Protection Association (NFPA):
- 80-10.....Fire Doors and Windows.
- G. National Fenestration Rating Council (NFRC)

- H. Safety Glazing Certification Council (SGCC)2009:
Certified Products Directory (Issued Semi-Annually).
- I. Underwriters Laboratories, Inc. (UL):
752-06.....Bullet-Resisting Equipment.
- J. Unified Facilities Criteria (UFC):
4-010-01-2007.....DOD Minimum Antiterrorism Standards for
Buildings
- K. Glass Association of North America (GANA):
Glazing Manual (Latest Edition)
Sealant Manual (2008)
- L. American Society of Civil Engineers (ASCE):
ASCE 7-10.....Wind Load Provisions

PART 2 - PRODUCTS

2.1 GLASS

- A. Use thickness stated unless specified otherwise in assemblies.
- B. Clear Glass:
 - 1. ASTM C1036, Type I, Class 1, Quality q3.
 - 2. Thickness, 6 mm (1/4 inch) or as indicated.
 - 3. Coordinate color/tint/coating to accommodate required security monitoring.
- C. Tinted Heat reflective and low emissivity coated glass:
 - 1. ASTM C1036, Type I, Class 2, Quality q3.
 - 2. Thickness, 6 mm (1/4 inch) as indicated.

2.2 HEAT-TREATED GLASS

- A. Clear Heat Strengthened Glass:
 - 1. ASTM C1048, Kind HS, Condition A, Type I, Class 1, Quality q3.
 - 2. Thickness, 6 mm (1/4 inch) or as indicated.
- B. Clear Tempered Glass:
 - 1. ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.
 - 2. Thickness, 6 mm (1/4 inch) or as indicated.

2.3 COATED GLASS

- A. Coated Spandrel Glass:
 - 1. ASTM C1048, Kind HS FT, Condition B, Type I, Class 1, Quality q3
with Silicone coating applied over and fused into glass surface.
 - 2. Thickness, 6 mm (1/4 inch) or as indicated.
 - 3. Pattern to be Manufacturer's standard opaque.
 - 4. For monolithic applications, apply the silicone opacification to the #2 surface, and for insulating glass units, to the #3 surface.

5. Silicone opacification consists of an elastomeric film of liquid silicone rubber applied to glass substrate via; spray, roller coat, or curtain coater. The chemistry utilizes strong bonding to the similarly composed glass substrate for adhesion and durability.
 6. Apply Silicone opacifier after the heat-treating process.
 7. Edge deletion is required for all structural applications, as well as the interior surface of an application of an insulating glass unit. Compatibility confirmation must be obtained from the spandrel manufacturer prior to installation.
 8. To attain fallout certification, the silicone opacifier must be applied at a thickness of at least 13 mils wet or 5 mils dry. Silicone spandrels will meet this classification if proper testing is documented per GANA Tempering Division Specification No. 89-1-6 - *Environmental Durability of Fully Tempered or Heat-Strengthened Spandrel Glass with Applied Opacifiers*, ASTM C 1048, and CAN/CGSB-12.9-M91 - *Spandrel Glass*.
 9. Silicone opacification product performance may vary between manufacturers. Consult with the manufacturer/fabricator to confirm compliance with specification performance requirements.
 10. Entire glass surface must be evenly coated, with no visible brush strokes or visible pin holes.
- B. Low-E Tempered Glass:
1. ASTM C1048, Kind FT, Condition C, Type I, Class 1, Quality q3 with low emissivity pyrolytic coating . Refer to Glazing Types at the end of this section for performance ratings.
 2. Apply coating to third surface of insulating glass units.
 3. Thickness, 4.8 mm (3/16 inch) or as indicated.
- C. Ceramic Coated Vision Glass:
1. ASTM C1048, Kind HS FT, Condition C, Type I, Class 1 , Quality q3 with ceramic coating applied by silk-screen process.
 2. Apply coating to second surface of monolithic glass and second surface of insulating glass units laminated glass.
 3. Thickness, 6 mm (1/4 inch) or as indicated.
- D. Organic Coated Glass:
1. Optional for tempered, heat strengthened, or laminated glass.
 2. Polyester coated to obtain safety glazing ANSI Z97.1 and SGCC label.
 3. Applied to clear or tinted glass.

2.4 LAMINATED GLASS

- A. Two or more lites of glass bonded with an interlayer material for use in building glazing
- B. Colored Interlayer:
 - 1. Use color interlayer ultraviolet light color stabilization.
 - 2. Option: Use colored interlayer with clear glass in lieu of tinted glass and clear interlayer.
 - 3. Option: Use white interlayer with clear glass in lieu of obscure glass and clear interlayer.
 - 4. The interlayer assembly shall have uniform color presenting same appearance as tinted glass assembly.
 - 5. The interlayer must conform to the performance requirements indicated in the Glazing Type heading at the end of the section.
- C. Use 1.5 mm (0.060 inch) thick, (Polyvinyl-butylal) interlayer for:
 - 1. Acoustical glazing.
 - 2. Heat strengthened or fully tempered glass assemblies.
- D. Use min. 0.75 mm (0.030 inch) thick interlayer for vertical glazing where 1.5 mm (0.060 inch) interlayer is not otherwise shown or required.

2.5 LAMINATED GLAZING ASSEMBLIES

- A. Clear Glazing:
 - 1. Both panes clear glass ASTM C1036, Type I, Class 1, Quality q3.
 - 2. Thickness: Each pane, 3 mm (1/8 inch) thick .
- B. Clear Tempered Glazing:
 - 1. Both panes ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.
 - 2. Thickness: Each pane 4.8 mm (3/16 inch) thick.
- C. Tinted Tempered Glazing:
 - 1. Exterior pane ASTM C1036, Type I, Class 3, Quality q3, 3 mm (1/8 inch) thick.
 - 2. Interior pane ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3, 3 mm (1/8 inch) thick.

2.6 BLAST MITIGATING GLAZING ASSEMBLY

- A. Provide window assemblies and glazing meeting GSA and ISC Performance Condition 3b.

- B. Fabricate from Type I, Class 1, Quality q3 glass with polyvinyl butyral plastic interlayers between the layers of glass. Provide at all exterior glazing conditions.
1. Exterior pane minimum 1/4 inch thick clear glass.
 2. Interior pane minimum 1/4 inch thick laminated glass.
 3. Provide silicone or other positive continuous sealed attachment to rigid aluminum frame.
 4. Provide fasteners with corresponding strength of attachment to building wall substrates to prevent separation of glazing and frame from wall.

2.7 INSULATING GLASS UNITS

- A. Provide factory fabricated, hermetically sealed glass unit consisting of two panes of glass separated by a dehydrated air space and comply with ASTM E2190.
- B. Assemble units using glass types specified:
- C. Sealed Edge Units (SEU):
1. Conform to ASTM E2190 performance requirements.
 2. Performance Characteristics (Center of Glass) . Refer to Glazing Types at the end of this section.
- D. SEU Clear Tempered Glass:
1. Exterior panes, ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3, 6 mm (1/4 inch) thick.
 2. Interior pane, ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3, 6 mm (1/4 inch) thick.
- E. SEU Tinted and Laminated Glass (GL-1, GL-2, GL-3):
1. Exterior Pane, ASTM C1036, Type I, Class 2, Quality q3, 6 mm (1/4 inch) thick, tinted, reflective and low emissivity coating on second surface.
 2. Interior Pane laminated of ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3. Thickness: Each pane 3 mm (1/8 inch) thick.
- F. SEU Spandrel Coated Glass (SP-1):
1. Exterior Pane, ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3, 6 mm (1/4 inch) thick,
 2. Interior Pane laminated of ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3. Thickness: Each pane 3 mm (1/8 inch) thick.

2.8 GLAZING ACCESSORIES

- A. As required to supplement the accessories provided with the items to be glazed and to provide a complete installation. Ferrous metal accessories exposed in the finished work shall have a finish that will not corrode or stain while in service.
- B. Setting Blocks: ASTM C864:
1. Channel shape; having 6 mm (1/4 inch) internal depth.
 2. Shore a hardness of 80 to 90 Durometer.
 3. Block lengths: 50 mm (two inches) except 100 to 150 mm (four to six inches) for insulating glass.
 4. Block width: Approximately 1.6 mm (1/16 inch) less than the full width of the rabbet.
 5. Block thickness: Minimum 4.8 mm (3/16 inch). Thickness sized for rabbet depth as required.
- C. Spacers: ASTM C864:
1. Channel shape having a 6 mm (1/4 inch) internal depth.
 2. Flanges not less 2.4 mm (3/32 inch) thick and web 3 mm (1/8 inch) thick.
 3. Lengths: One to 25 to 76 mm (one to three inches).
 4. Shore a hardness of 40 to 50 Durometer.
- D. Sealing Tapes:
1. Semi-solid polymeric based material exhibiting pressure-sensitive adhesion and withstanding exposure to sunlight, moisture, heat, cold, and aging.
 2. Shape, size and degree of softness and strength suitable for use in glazing application to prevent water infiltration.
- E. Spring Steel Spacer: Galvanized steel wire or strip designed to position glazing in channel or rabbeted sash with stops.
- F. Glazing Gaskets: ASTM C864:
1. Firm dense wedge shape for locking in sash.
 2. Soft, closed cell with locking key for sash key.
 3. Flanges may terminate above the glazing-beads or terminate flush with top of beads.
- G. Lock-Strip Glazing Gaskets: ASTM C542, shape, size, and mounting as indicated.
- H. Glazing Sealants: ASTM C920, silicone neutral cure:
1. Type S.

2. Class 25
 3. Grade NS.
 4. Shore A hardness of 25 to 30 Durometer.
- I. Structural Sealant: ASTM C920, silicone acetoxy cure:
1. Type S.
 2. Class 25.
 3. Grade NS.
 4. Shore a hardness of 25 to 30 Durometer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
1. Examine openings for glass and glazing units; determine they are proper size; plumb; square; and level before installation is started.
 2. Verify that glazing openings conform with details, dimensions and tolerances indicated on manufacturer's approved shop drawings.
- B. Advise Contractor of conditions which may adversely affect glass and glazing unit installation, prior to commencement of installation: Do not proceed with installation until unsatisfactory conditions have been corrected.
- C. Coordinate location of all surface glass coatings: Low-e, ceramic frits and spandrel coatings such that position of the coating on the number 1, 2, 3 or 4 surface does not change between the different types of IGU assemblies.

3.2 PREPARATION

- A. For sealant glazing, prepare glazing surfaces in accordance with GANA-02 Sealant Manual.
- B. Determine glazing unit size and edge clearances by measuring the actual unit to receive the glazing.
- C. Shop fabricate and cut glass with smooth, straight edges of full size required by openings to provide GANA recommended edge clearances.
- D. Verify that components used are compatible.
- E. Clean and dry glazing surfaces.
- F. Prime surfaces scheduled to receive sealants, as determined by preconstruction sealant-substrate testing.

3.3 INSTALLATION - GENERAL

- A. Install in accordance with GANA-01 Glazing Manual and GANA-02 Sealant Manual unless specified otherwise.
- B. Glaze in accordance with recommendations of glazing and framing manufacturers, and as required to meet the Performance Test Requirements specified in other applicable sections of specifications.
- C. Set glazing without bending, twisting, or forcing of units.
- D. Do not allow glass to rest on or contact any framing member.
- E. Tempered Glass: Install with roller distortions in horizontal position unless otherwise directed.
- F. Laminated Glass:
 - 1. Tape edges to seal interlayer and protect from glazing sealants.
 - 2. Do not use putty or glazing compounds.
- G. Insulating Glass Units:
 - 1. Glaze in compliance with glass manufacturer's written instructions.
 - 2. When glazing gaskets are used, they shall be of sufficient size and depth to cover glass seal or metal channel frame completely.
 - 3. Do not use putty or glazing compounds.
 - 4. Do not grind, nip, cut, or otherwise alter edges and corners of fused glass units after shipping from factory.
 - 5. Install with tape or gunnable sealant in wood sash.

3.4 INSTALLATION - WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

- A. Cut glazing tape to length and set against permanent stops, 5 mm (3/16 inch) below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- C. Place setting blocks at 1/4 points with edge block no more than 150 mm (6 inches) from corners.
- D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to achieve full contact at perimeter of pane or glass unit.
- E. Install removable stops, with spacer strips inserted between glazing and applied stops, 6 mm (1/4 inch) below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.

- F. Fill gap between glazing and stop with manufacturer's recommended type sealant to depth equal to bite of frame on glazing, but not more than 9 mm (3/8 inch) below sight line.
- G. Apply cap bead of manufacturer's recommended type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.5 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT)

- A. Cut glazing tape to length and install against permanent stops, projecting 1.6 mm (1/16 inch) above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 150 mm (6 inches) from corners.
- C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- D. Install removable stops, spacer shims inserted between glazing and applied stops at 600 mm (24 inch) intervals, 6 mm (1/4 inch) below sight line.
- E. Fill gaps between pane and applied stop with manufacturer's recommended type sealant to depth equal to bite on glazing, to uniform and level line.
- F. Trim protruding tape edge.

3.6 REPLACEMENT AND CLEANING

- A. Clean new glass surfaces removing temporary labels, paint spots, and defacement after approval by Resident Engineer.
- B. Replace cracked, broken, and imperfect glass, or glass which has been installed improperly.
- C. Leave glass, and other setting material in clean, whole, and acceptable condition.

3.7 PROTECTION

Protect finished surfaces from damage during erection, and after completion of work. Strippable plastic coatings on colored anodized finish are not acceptable.

3.8 GLAZING TYPES

- A. Tempered Glass:
 - 1. Use laminated glass assemblies in all areas, unless otherwise indicated, where tempered glass would be used.
- B. Clear Glass:
 - 1. Interior observation windows not specified otherwise.

C. Insulating Glass Units:

1. Insulating Glass Unit Makeup:

a. Outboard Lite

1. Glass Type: ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3
2. Nominal Thickness: 6mm (1/4")
3. Glass Strength: Clear Annealed

b. Spacer

1. Nominal Thickness: 1/2"
2. Gas Fill: Air

c. Laminated Inboard Lite

1. Outer Ply:

- a) Glass Type: ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3
- b) Nominal Thickness: 3mm (1/8")
- c) Glass Strength: Tempered

2. Interlayer:

- a) Interlayer Type: Polyvinyl-butyril
- b) Interlayer Tint: N/A
- c) Nominal Thickness: 0.03" (.06" at acoustical glass)

3. Inner Ply:

- a) Glass Type: ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3
- b) Nominal Thickness: 3mm (1/8")
- c) Glass Strength: *Tempered*

2. Performance Characteristics (Center of Glass)

a. GL-1: Clear, low SHGC (Solar Heat Gain Coefficient), and with an improved frame (3/4" Thermal break).

- | | |
|--|-----|
| 1. Visible Transmittance: | 62% |
| 2. Winter U-factor (U-value): | .29 |
| 3. Solar Heat Gain Coefficient (SHGC): | .29 |
| 4. Glass Tint: Refer to Finish schedule. | |
| 5. U-value of glazing and inproved frame | .36 |

b. GL-2: Clear, low-e, and improved frame (3/4" Thermal break).

- | | |
|--|-----|
| 1. Visible Transmittance: | 70% |
| 2. Winter U-factor (U-value): | .29 |
| 3. Solar Heat Gain Coefficient (SHGC): | .38 |

- 4. Glass Tint: Refer to Finish schedule.
- 5. U-value of glazing and improved frame .36
- c. GL-3: Tinted, low-e, and improved frame (3/4" Thermal break).
 - 1. Visible Transmittance: 35%
 - 2. Winter U-factor (U-value): .29
 - 3. Solar Heat Gain Coefficient (SHGC): .24
 - 4. Glass Tint: Refer to Finish schedule.
 - 5. U-value of glazing and improved frame .36
- d. SP-1: Spandrel glass, low-e, and improved frame (3/4" Thermal Break).
 - 1. Visible Transmittance: N/A
 - 2. Winter U-factor (U-value): .29
 - 3. Solar Heat Gain Coefficient (SHGC) .29
 - 5. Glass tint: Opaque. Refer to Finish Schedule for color.
 - 6. U-value of glazing and improved frame .36
- 3. Laminated glass products to be fabricated in autoclave with heat, plus pressure, free of foreign substances and air pockets.
- 4. Interlayer material: Polyvinyl Butyral sheets.
- 5. IG units with dehydrated airspace, dual sealed with a primary seal of polyisobutylene (PIB), or thermo plastic spacer (TPS) and a secondary seal of silicone or an organic sealant depending on the application.
- 6. US Requirements:
 - a. Insulating glass units are certified through the Insulating Glass Certification Council (IGCC) to either ASTM E774, or to ASTM E2190, or both.
 - b. Annealed float glass shall comply with ASTM C1036, Type I, Class 1 (clear), Class 2 (tinted), Quality-Q3.
 - c. Heat-Strengthened float glass shall comply with ASTM C1048, Type I, Class 1 (clear), Class 2 (tinted), Quality Q3, Kind HS.
 - d. Laminated glass shall comply with ASTM C1172 and with other requirements as specified (UL 972, ASTM F1233, etc.).
- D. Laminated Glass: Install as specified in doors, observation windows and interior pane of insulated glass unit windows, adjacent to walking surfaces at sidelights and in glass doors, mirrors, and skylights.
 - 1. Laminated glass is required for all exterior IGU (GL-1, GL-2, and GL-3) at interior panes only.

2. Spandrel panels (SP-1) need not include laminated glass in the IGU assembly.
 3. 1/4" (6mm) laminated glass consists of two nominal 1/8" tempered glass panes bonded together with a minimum of a 0.030-inch (0.75mm) polyvinyl-butylal interlayer.
- E. Spandrel Glass: Install specified spandrel coating and ceramic fritted spandrel coating on glazing where indicated.

- - - E N D - - -

SECTION 09050
INTERIOR/ EXTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE

VAMC:
Location: North Las Vegas, Nevada
Project no. and Name: 593-202 VA Medical Center Women's Health Center
Submission: 100% Construction Documents
Date: August 10, 2012

**SECTION 09050
INTERIOR / EXTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE**

PART I - GENERAL

1.1 DESCRIPTION

This section contains a coordinated system in which requirements for materials specified in other sections shown are identified by abbreviated material names and finish codes in the room finish schedule or shown for other locations.

1.2 MANUFACTURERS

Manufacturer's trade names and numbers used herein are only to identify colors, finishes, textures and patterns. Products of other manufacturer's equivalent to colors, finishes, textures and patterns of manufacturers listed that meet requirements of technical specifications will be acceptable upon approval in writing by contracting officer for finish requirements.

1.3 SUBMITALS

Submit in accordance with Section 01340, Samples and Shop Drawings provide quadruplicate samples for color approval of materials and finishes specified in this section. Interior Views: Include a series of photographic slides, representing a sequential walk-through. Show typical public, patient, staff and all specialized areas. The photography is of architectural quality and is the property of the Department of Veterans Affairs, Office of Facility Management.

1.4 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.
- B. MASTER PAINTING INSTITUTE: (MPI)
2001.....Architectural Painting Specification Manual
- C. Publications listed in individual sections of this specification.

PART 2- PRODUCTS

2.1 COLOR SLIDES

- A. Size 24 x 35 mm.
- B. Labeled for:
 - 1. Building name and Number.
 - 2. Room Name and Number.

2.2 DIVISION 2 - SITEWORK

- A. FENCES AND GATES (02444)
NOT APPLICABLE
- B. PAVEMENT MARKING (02577)
NOT APPLICABLE

C. CONCRETE PAVERS

NOT APPLICABLE

D. BOLLARDS (ORNAMENTAL)

NOT APPLICABLE

E. SITE AND STREET FURNISHINGS

NOT APPLICABLE

2.3 DIVISION 3 - CONCRETE

A. CAST IN PLACE CONCRETE (03300)

NOT APPLICABLE

2.4 DIVISION 4 - MASONRY

A. MORTAR AND GROUT (04100)

NOT APPLICABLE

B. UNIT MASONRY (04200)

NOT APPLICABLE

2.5 DIVISION 5 - METALS

A. STRUCTURAL STEEL (05120)

NOT APPLICABLE

B. STEEL DECKING (05311) OR (05321)

NOT APPLICABLE

C. COLD FORMED METAL FRAMING (05400)

NOT APPLICABLE

D. METAL FABRICATION (05500)

NOT APPLICABLE

E. INTERIOR METAL STAIRS (05510)

NOT APPLICABLE

F. EXPANSION JOINT COVER ASSEMBLY (05810)

NOT APPLICABLE

2.6 DIVISION 6 - WOOD AND PLASTIC

A. ROUGH CARPENTRY (06100)

Item	Finish	Color
Braces, exposed parts of blocking	Primed, painted latex enamel	Match adjacent
Exterior	Stained w/integral stain sealer	Complement adjacent surfaces

B. FINISH CARPENTRY AND MILLWORK (06200)

1. Finish Material

Finish Code	Material	Manufacturer	Product	Color No
PLM-7	Plastic Laminate	Formica	Storm Solidz	3503-58
SS-1	Solid Surfacing material	DuPont	Corian	Burled Beach

2. RECEPTION COUNTER PUBLIC OR PATIENT SIDE					
Room No. and Name	Component	Material	Species	Finish	Color
3A333	Countertop	SS-1	N.A.	Smooth	Burled Beach
	Vertical Surface(s)	PLM-7	N.A.	Smooth	Storm Solidz
	Base	Rubber	N.A.	Smooth	#20 Charcoal

3. RECEPTION COUNTER STAFF SIDE					
Room No. and Name	Component	Material	Finish	Color	
3A334	Task Surface	SS-1	Smooth	Burled Beach	
	Vertical Surface	PLM-7	Smooth	Storm Solidz	
	Tackable Wall Covering on divider walls	Polyester	AWP-2	501AM884 AFAIC	
	Shelving	Particleboard	PLM-7	Storm Solidz	
	Trim	N.A.	N.A.	N.A.	
	Drawers	PLM-7	Smooth	Storm Solidz	

4. NURSES STATION STAFF SIDE			
Room No. and Name	Component	Material	Finish/Color
C3-13	Task Surface	SS-1	Burled Beach
	Vertical Surface(s)	PLM-7	Storm Solidz
	Tackable Wall Covering	Polyester	TBD from manufacturer's standard
	Shelving	Particleboard and PLM-7	Storm Solidz
	Trim	N.A.	N.A.
	Drawers	Particleboard and PLM-7	Storm Solidz
	Misc. Items	Particleboard and PLM/nylon	PLM-7 Burled Beach/Vinyl to match PLM-7
	Base	As Scheduled	
5. NURSES STATION - PATIENT SIDE			
NOT APPLICABLE			
Room No. and Name.	Component	Material	Finish
NOT APPLICABLE			

6. OFFICES & EXAM ROOMS			
Room No. and Name	Component	Material	Finish/Color
3A341, 3A342, 3A343, 3A344, 3A346, 3A347, 3A348, 3A349, 3A350, 3A355, 3A356, 3A357, 3A358, 3A359, 3A360, 3A361, 3A362	Task Surface	SS-1	Burled Beach
	Vertical Surface(s)	PLM-1	Storm Solidz
	Tackable Wall Covering	Polyester	TBD from manufacturer's standard
	Shelving	Particleboard and PLM-7	Storm Solidz
	Trim	N.A.	N.A.
	Drawers	Particleboard and PLM-7	Storm Solidz
	Misc. Items	Particleboard and PLM/nylon	PLM-7 Burled Beach/Vinyl to match PLM-7
	Base	As scheduled	

7. MOUNTING STRIPS, SHELVES AND RODS		
Room No. and Name	Component	Finish/Color
Coat & Storage Closets, typical	Strips	N.A.
	Shelf	Metal, integral with Rod
	Rod	Metal, integral with shelf

8. PEGBOARD (PERFORATED STAINLESS STEEL PANELS)			
ITEM No.	Room No. and Name	Component	Finish/Color
DP-1	3A333 Waiting	Display Panel	Stainless Steel

9. VANITIES (TYPES S4, S4 M)		
Room No. and Name	Component	Finish/Color
NOT APPLICABLE		

10. FOLDING SHELVES (TYPE B OR A)		
Room No. and Name	Component	Finish/Color
Patient Exam Rooms	Folding Shelf (WALLaroo)	White PLM; Wood grain Sides

11. THROUGH - WALL COUNTER OR PASS THROUGH COUNTER (TYPE B)		
Room No. and Name	Component	Finish/Color
NOT APPLICABLE		

12. RECEIVING SHELF IN AGENT CASHIER		
Room No. and Name	Component	Finish
NOT APPLICABLE		

13. SURFACE DISPLAY CABINET (TYPE 25)		
Room No. and Name	Component	Finish
NOT APPLICABLE		

14. WOOD TOP FOR WORK BENCHES
NOT APPLICABLE

.7 DIVISION 7 - THERMAL AND MOISTURE PROTECTION

A. PREFORMED WALL AND ROOF PANELS (07410)

Type	Shape	Ext. Finish	Int. Finish	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE					

B. BITUMINOUS BUILT-UP ROOFING (07510)

Color	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE		

C. PAVERS AND AGGREGATE ROOF BALLASTS (07570)

Pavers	Size	Material	Color	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE					

D. FLASHING AND SHEET METAL (07600)

Item	Material	Finish
NOT APPLICABLE		

E. ROOF SPECIALITIES AND ACCESSORIES (07700)

Item	Material	Finish	Manufacturer	Manufacturer/Color Name/Number.
NOT APPLICABLE				

F. SEALANTS AND CAULKING (07920)

Location	Color	Manufacturer	Manufacturer Color
NOT APPLICABLE			

2.8 DIVISION 8 - DOORS AND WINDOWS

A. STEEL DOORS AND FRAMES (08110)

Paint both sides of door & frames same color including ferrous metal louvers, and painted hardware attached to door	
Component	Color of Paint Type and Gloss
Door	Match adjacent wall finish, semi-gloss latex enamel over primer color - See wall materials elsewhere in this schedule for colors
Frame	Match adjacent wall finish, semi-gloss latex enamel over primer color - See wall materials elsewhere in this schedule for colors
Window frame	Aluminum, Kynar type, Platinum to match metal panel color - See wall materials elsewhere in this schedule for colors

B. WOOD DOORS (08210)

Component	Finish/Color
Doors	Satin polyurethane, Golden Oak stain, red oak veneer, balance matched
Frames	Latex enamel over primed KD steel

C. ACCESS DOORS (08305)

Material	Finish/Color
Steel	Latex enamel over primed steel to match adjacent wall material. Color - See wall materials elsewhere in this schedule for colors - Use paint manufacturer's system for primers and finish coats.

D. OVERHEAD ROOL-UPS DOORS AND GRILLES (08331)

Location	Item	Material	Finish	Manufacturer	Manufacturer Color Name/No.
NOT APPLICABLE					

E. COILING COUNTER SHUTTERS (08341) Note shutters with required fire/smoke ratings shown on plans.
Other shutters to be for security only.

Location	Material	Finish	Manufacturer	Manufacturer Color Name/No.
3A334 Reception	Aluminum	Clear Anodized	Bilco Security Shutter	Silver

F. ACCORDION FOLDING DOORS (08353)

Exposed steel framework to be stainless steel # 4 finish, hardware to have finishes of st.stl, polished chrome (over nickel) aluminum for astragals, black neoprene sound seals, black neoprene seals and accessories.

Location	Component	Finish	Manufacturer	Manufacturer Color Name/No.
NOT APPLICABLE				

G. SECTIONAL OVERHEAD DOORS (08360)

Finish	Manufacturer	Manufacturer Color Name/No.
NOT APPLICABLE		

H. HORIZONTAL SLIDING ACCORDION TYPE FIRE DOORS (08360)

Finish	Manufacturer	Manufacturer Color Name/No.
Enamel coated steel	Won-Dor FireGuard model FG	Platinum/No. 55

I. ALUMINUM ENTRANCES AND STOREFRONTS (08410)

Material	Finish	Manufacturer	Manufacturer Color Name/No.
NOT APPLICABLE			

J. ALUMINUM WINDOWS (08520)

Type	Finish	Glazing	Manufacturer	Mfg. Color Name/No.
Fixed	Kynar type	1", reflective, Lo-E, IGU	Viracon	Exterior:Platinum - match Centria aluminum panel color/Interior: Clear Anodized

K. METAL FRAMED SKYLIGHTS (08630)

Finish	Glazing	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE			

L. SLIDING PASS WINDOWS (08665)

Room No. and Name	Finish	Glazing	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE				

M. WINDOW SILLS

Room No. and Name	Material	Finish
Typical	Aluminum (With Windows)	Platinum - match aluminum panel color - Platinum

N. WINDOW STOOLS

Room No. and Name	Material	Finish
Typical	Aluminum	Clear anodized

O. BUILDERS HARDWARE (08710)

Item	Material	Finish
Hinges	Brass/Bronze	Brushed chrome/nickel
Door Closers	Stainless Steel	#4 Stainless Steel
Floor Closers	Stainless Steel	#4 Stainless Steel
Floor Pivot Sets	Stainless Steel	#4 Stainless Steel
Closer/ Holder	Stainless Steel	#4 Stainless Steel
Floor Stops	Stainless Steel/Neoprene	#4 Stainless Steel/black
Door Holders	Stainless Steel	#4 Stainless Steel

Lock/ Latches	Brass/Bronze	Brushed chrome/nickel
Key Cabinet	Steel	Medium (VA) Blue powder coat
Armor Plates	Stainless Steel	#4 Stainless Steel - N.A.
Kick Mop Plates	Stainless Steel	#4 Stainless Steel - N.A.
Door Edging	Stainless Steel	#4 Stainless Steel
Exit Device	Stainless Steel/Aluminum	#4 Stainless Steel/Clr. Anodized
Flush Bolts	Stainless Steel	#4 Stainless Steel
Door Pulls	Stainless Steel	#4 Stainless Steel
Push Plates	Stainless Steel	#4 Stainless Steel
Combination Push Pull Plate	Stainless Steel	#4 Stainless Steel
Coordinators	Stainless Steel	#4 Stainless Steel
Light Proof Seals	Neoprene	Black
Weather Strip	Neoprene	Black
Threshold	Aluminum	Mill finish Aluminum

P. GLASS AND GLAZING (08810) (MIRRORS SPECIFIED ELSEWHERE AS A TOILET ACCESSORY)

Glazing Type	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE		

Q. GLAZED ALUMINUM CURTAIN WALL (08920)

Component	Material	Finish	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE				

2.9 DIVISION 9 - FINISHES

A. CERAMIC TILE (09310)

1. CERAMIC MOSAIC TILE (CTFT/CTWT)						
Finish Code	Size	Shape	Pattern	Manufacturer	Mfg. Color Name/No.	
CTWT-1	2 x 2	square	none	Daltile	D166-Elemental Tan	
CB-1	Ceramic Tile Base	4" cove	None	Daltile Keystones	D166-Elemental Tan	
CTFT-1	2 x 2	square	None	Daltile	D166-Elemental Tan	

2. CERAMIC MOSAIC TILE GROUT (09310)	
Finish code	Manufacturer
CTG	Laticrete
	Mfg. Color Name/No 64 - Parchment

3. QUARRY TILE (QT) (09310)				
Finish Code	Size	Shape	Pattern	Manufacturer
NOT APPLICABLE				

4. QUARRY TILE GROUT (09310)	
Finish Code	Manufacturer
	NOT APPLICABLE
	Mfg. Color Name/No.

5. PORCELAIN PAVER TILE (PPT) (09310)				
Finish Code	Size	Shape	Pattern	Manufacturer
NOT APPLICABLE				
			Manufacturer	Mfg. Color Name/No.

6. PORCELAIN PAVER TILE GROUT (03310)				
Finish Code	Manufacturer		Mfg. Color Name/No.	
NOT APPLICABLE				

7. MARBLE THRESHOLDS (09310)				
Marble Type	Manufacturer		Mfg. Color Name/No.	
NOT APPLICABLE				

B. TERRAZZO TILE (TT) (09421)				
Size	Manufacturer		Color Pattern/Name/No.	
NOT APPLICABLE				

C. TERRAZZO TILE GROUT (09421)				
Finish Code	Manufacturer		Mfg. Color/Name/No.	
NOT APPLICABLE				

D. ACCOUSTICAL CEILING (AT) (09510)				
Finish Code	Component	Color Pattern	Manufacturer	Mfg Name/No.
AT-1	Optima 2'x2' Tegular	White	Armstrong	#3354w/ 15/16" grid
AT-3	Fine Fissured 2'x2' Sq Edge	White	Armstrong	#1728w/ 15/16" grid

E. Perforated Wood Ceilings Tiles

Finish Code	Strip material	Size	Manufacturer	Mfg Name/No.
NOT APPLICABLE				

F. RESILIENT TILE FLOORING (09650)

Finish Code	Size	Material/Component	Manufacturer	Mfg Name/No.
VCT-1	12"x12"	Vinyl Comp/Stonetex	Armstrong	Stone White 52127
VCT-2	12"x12"	Vinyl Comp/Stonetex	Armstrong	Bamboo Yellow 52156
VCT-3	12"x12"	Vinyl Comp/Stonetex	Armstrong	Terra Stone 52151
VCT-4	12"x12"	Vinyl Comp/Stonetex	Armstrong	Blue Spruce 52148

G. VINYL SHEET FLOORING (VSF) (096655)

Finish Code	Pattern name	Manufacturer	Mfg. Color Name/No.
RSF-4	Fine Fields w/chemical welds	Mannington	10146 - Bright White
RSF-5	Fine Fields w/chemical welds	Mannington	10162 - Ecru

H. VINYL SHEET FLOORING, HEAT WELDED SEAMS (WSF) (09666)

Finish Code	Pattern name	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE			

1. WELDING RODS (WR) (09666)

Finish code	Manufacturer	Mfg. Color Name/No.
WR-1	Mannington	Match Adjacent

2. CAP STRIPS (WSF) (09666)	
Finish Code	Manufacturer
CS-1	Mannington
	Mfg. Color Name/No.
	Match Adjacent

I. RESILIENT BASE STAIR TREADS AND ACCESSORIES (09679) - Note: also used in stairs

Finish Code	Item	Height	Manufacturer	Mfg Name/No.
RB-1	Rubber Base	4" Straight	Johnsonite	32 - Pebble
RB-4	Rubber Base	4" Cove	Johnsonite	20 - Charcoal
IB-1	Integral Base	6" Cove	Mannington	To match adjacent floor

J. CARPET (CP) (09680)

Finish Code	Pattern	Manufacture	Mfg. Color Name/No.
CP-1	Tailor Made	Mannington	Oil Cloth
CP-6	Centerfield II	Mannington	Strike

1. CARPET EDGE STRIP (CES)(09680)

Finish Code	Material	Manufacturer	Mfg. Color Name/No.
CES	Metal	Schluter	Brushed Aluminum

K. LATEX MASTIC FLOORING (LM) (09701)

Finish Code	Material	Manufacturer	Mfg. Color Name/No.

LM	Vinyl Resin	Dex-O-Tex	Neotex 261 / TQ23
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L. EPOXY RESINOUS FLOORING (ERF) (09704)

Finish code	Manufacturer	Mfg. Color Name/No.
ERF-1	TNEMEC/Series 210 Even-Flow SL	Iceberg/02WH/w/ non-slip additive

1. PAINT AND COATINGS (09900)

1. MPI Gloss and Sheen Standards

Gloss Level 1	a traditional matte finish-flat	Gloss @60	Sheen @85
Gloss Level 2	a high side sheen flat-"a velvet-like" finish	max 5 units, and	max 10 units
Gloss Level 3	a traditional "egg-shell like" finish	max 10 units, and	10-35 units
Gloss Level 4	a "satin-like" finish	10-25 units, and	10-35 units
Gloss Level 5	a traditional semi-gloss	20-35 units, and	min. 35 units
Gloss Level 6	a traditional gloss	35-70 units	
Gloss level 7	a high gloss	70-85 units	
		more than 85 units	

2. Paint code	Gloss	Manufacturer	Mfg. Color Name/No.
P-1	4	Benjamin Moore	Gray Owl 2137-60
P-2	4	Benjamin Moore	November Rain 2142-60
P-22	4	Benjamin Moore	Desert Tan 2153-50
P-24	4	Benjamin Moore	Charlotte Slate AC-24
3. Stains	Gloss	Manufacturer	Mfg. Color name/Mo.
Clear	None	MinWax water based wood stain and water based wood conditioner	Clear
4. Clear coatings	Gloss	Manufacturer	Mfg. Color Name/No.
Code(CC)			
CC1	Semi-gloss	MinWax	Clear catalyzed

			polyurethane
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M. VINYL COATED FABRIC WALLCOVERING (W) (09951)

Finish Code	Manufacturer	Mfg. Color Name/No.
VWC-7	Sanitas	Excess Alpaca 3E21-29
VWC-9	Maharam	Pinpoint 398890/004 Butternut

N. EDGE GUARD OR TRIM (W) (09951)

Finish Code	Manufacturer	Mfg. Color Name/No.
W-1	CS/Acrovyn - SCO-8	Stainless Steel, from top of base to ceiling

O. EDGE GUARDS (PFW) (09952)

Finish Code	Manufacturer	Mfg. Color Name/No.
PFW-1	CS Group - Acrovyn	Match wall that trim is affixed to.

P. WAINSCOT CAP (PEW) (09952)

Manufacturer	Mfg. Color Name/No.
CS Group - Acrovyn	Match wall that trim is affixed to.

Q. ACCOUSTICAL WALL PANELLING (AWF) (09953)

Finish Code	Manufacturer	Mfg. Color Name/No.

AMP-1	Novawall Acoustic Panels	1" thick panels w/SS reveals square edge w/ Maharam Fabric Outline. Mounted on Z-clips.
		F-1 Maharam: Outline #397420-003 Strada

R. WALL PANELING (WP)

Finish Code	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE		

2.10 DIVISION 10 - SPECIALTIES

A. CHALKBOARDS AND TACKBOARDS (10100) Note: Dry-Erase/Magnetic Marker boards used in lieu of chalkboards

Room No. and Name	Component	Material	Manufacturer	Mfg. Color Name/No.
C3-13 Nurses Stations Above work counter	Dry Erase Marker Board	Porcelain on steel - magnetic dry erase	US Markerboard	White, satin anodized aluminum edge
3A345 Classrooms North Wall	Bulletin Boards	Backed Forbo (linoleum) on fiberboard	US Markerboard	Color 2187/ satin anodized aluminum edge
3A333 Waiting Room North Wall	Magazine Rack M 433P - 3 Pocket Horizontal magazine Rack with Acrylic front panels	Oak wood and Acrylic	Peter Pepper Products	Oak, clear stain and clear finish; clear acrylic; backboard - white

B. HOSPITAL CUBICLE CURTAINS AND INTRAVENOUS SUPPORT TRACKS (10152)

Finish Code	Manufacturer	Mfg. Color Name/No.
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TBD	Click-Eze	White/ Anodized aluminum

C. TOILET PARTITIONS (10162)

Finish Code	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE		

D. (ROOF TOP) EQUIPMENT SCREENS (10240) (Bed Tower, Ambulatory Care) - See Alternates for information affecting this item

Component	Material	Manufacturer	Mfg. Color Name/No.
Frame	Aluminum	Cityscapes, Inc. - Envisor3	Mill finish
NOT APPLICABLE			

ACCORDION FOLDING PARTITION (AFP) (10623) (Education, Administration, Mental Health)

Component	Material	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE			

E. LOUVERS AND WALL VENTS (10200) Exterior

Item	Material	Finish	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE				

F. PATIENT BED SERVICE WALLS (10251)

Item	Material	Finish	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE				

G. WALL GUARDS AND CORNER GUARDS (10260)

Item	Material	Manufacturer	Mfg. Color Name/No.
End Wall Guards @ Reception Desk	Steel/Stainless Steel	CS/Acrovyn - SCO-8	#4 non-directional finish Full Height
Corner Guards	Vinyl	CS/Acrovyn	# 262 Driftwood
Handrail	Ash wood , Vinyl	CS/Acrovyn	Ash clear finish
Wall Guard	Vinyl	CS/Acrovyn	# 262 Driftwood
Wall Panels	Vinyl	CS/Acrovyn	# 262 Driftwood

H. ACCESS FLOORING (AF) (10270)

Floor Panel Covering	Panel Edges	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE			

I. SPECIALITIES (Various Sections)

Room No. and Name	Item/Section	Finish	Manufacturer	Mfg. Color Name/No.
Lobby	Lobby Clock/ 16738	Powder coated frame	Performance specified	Anodized aluminum
Exam Rooms	Single Wall Charting Desk/ 11028	Matte acrylic enamel	Carstens, Inc. Wallaroo 2000PC	Gray
Bracket	Material / 11052	Finish	Manufacturer	Mfg. Color Name/No.
Monitor Wall Bracket	Steel/ 11052	Powder coat, semi-gloss	GCX Corporation, Polymount Wall Channel.	Black
Monitor Ceiling Bracket	Steel/ 11052	Powder coat, semi-gloss	Peerless Industries, Jumbo 200019-21" deep [JMC2640D]	Black
Adjustable book ends	Galvanized steel rod/ 11050	Smooth; galvanized	Liberty Systems. Inc.	Black
Keyboard Bracket	Steel/ 11028	Powder coat, semi-gloss	Ergotron Inc., LX Wall Mount Keyboard Arm	Black

Flat Screen Television Ceiling Bracket	Steel/11052	Powder coat, semi-gloss	Lucasey Mfg. Corp.; Model FSCT	Black
Flat Screen Television Wall Mount Bracket	Steel/11052	Powder coat, semi-gloss	Peerless Industries, Smart Mount FPLWT-UN	Black

J. EXTERIOR SIGNS (10430)

Sign Type	Component	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE			

K. INTERIOR SIGNS (10440)

Sign Type	Component	Manufacturer	Mfg. Color Name/No.
SEE SIGNAGE PACKAGE WITHIN DRAWING SET			

L. METAL LOCKERS (10500)

Component	Material	Finish
Single and Double tier, Duplex Lockers, Box Purse Lockers	steel	Electrostatically applied baked enamel finish
Bases, sloped tops, sides	steel	Electrostatically applied baked enamel finish
Metal accessories and hardware	Cast zinc with chrome; polished stainless steel	Chrome

M. FIRE EXTINGUISHER CABINETS (10522)

Component	Material	Finish
Flush mount extinguisher cabinet; fire rated and non-fire rated	steel	Semi-gloss, white powder-coated finish
Surface mount bracket	steel	Powder coat - red
Fire Hose Cabinets; fire rated and non-fire rated	steel	Semi-gloss, white powder-coated finish

N. MAIL BOXES

Component	Material	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE			

O. MESH PARTITIONS (10601)

Room No. and Name	Paint Code
NOT APPLICABLE	

P. FOLDING PANEL PARTITION (FP) (10623)

Location	Component	Finish	Manufacturer	Manufacturer Color Name/No.
NOT APPLICABLE				

Q. WALKWAY COVERINGS (10732)

Component	Finish and color
NOT APPLICABLE	

R. TOILET AND BATH ACCESSORIES (10800) See Specification Section 10800 and drawings for Schedule and purchasing/installation status.

Item	Material	Manufacturer	Mfg. Color Name/No.
Toilet paper holder-surface mounted	#4 Stainless Steel	Bobrick	Silver/B-4288
Toilet paper holder-flush mounted	#4 Stainless Steel	Bobrick	Silver/B-4388
Grab bars: security, single, swing up and combination	#4 Stainless Steel Textured finish	MegaJailhouse. com Bobrick Bobrick Bobrick	Silver/Security & Anti-Suicide Grab Bar with Closure Plate - Exposed Mounting D-751X-SEC Silver/B-6806 x length indicated Silver, textured/B-4998.99 Combination-Silver/B-6846.99 & B- 6856.99
Framed mirror	#4 Stainless Steel channel frame	Bobrick	Silver/B-290
Paper towel dispenser-surface mounted	#4 Stainless Steel	Bobrick	Silver/B-4262
Paper towel dispenser-flush mounted	#4 Stainless Steel	Bobrick	Silver/B-4362
Baby Changing Station, Child Protection Seat	Horizontal Design - high density polyethylene	Koala Kare	Color: White Granite /KB100-05
Soap dispenser-lavatory mounted	#4 Stainless Steel	Bobrick	Silver/B-826
Soap dispenser-wall (surface) mounted	#4 Stainless Steel/polypropylene	Bobrick	Silver/B-2111
Sanitary napkin dispenser-surface mounted	#4 Stainless Steel	Bobrick	Silver/B-435009-25
Sanitary napkin dispenser-flush mounted	#4 Stainless Steel	Bobrick	Silver/B-43500-29
Surface mounted sanitary napkin disposal	#4 Stainless Steel	Bobrick	Silver/B-254
Coat hook	#4 Stainless Steel	Bobrick	Silver/B-2116

Access doors	#4 Stainless Steel	Bobrick	Silver/B-505
Purse shelf	#4 Stainless Steel	Bobrick	Silver/B-287
Combination purse shelf and coat rack	#4 Stainless Steel	Bobrick	Silver/B-968
Combination paper towel dispenser/disposal-flush mount	#4 Stainless Steel	Bobrick	Silver/B-43944
Paper towel disposal-flush mount	#4 Stainless Steel	Bobrick	Silver/B-43949
Pipe Protector Cover	Vinyl	TruBro	White/LavGuard2
Combination Sharps Disposal and glove box	ABS Plastic	Tyco/Kendall	White with clear top panel/ 8556H
Surface Mounted seat cover dispenser	#4 Stainless Steel	Bobrick	Silver/B-221
Partiton Mounted seat cover dispenser and toilet tissue dispenser	#4 Stainless Steel	Bobrick	Silver/B-347
Surface Mounted seat cover dispenser and toilet tissue dispenser	#4 Stainless Steel	Bobrick	Silver/B-3479
Recessed Mounted seat cover dispenser and toilet tissue dispenser	#4 Stainless Steel	Bobrick	Silver/B-3474
Surface Mounted Sanitary Napkin/Tampon Vendor	#4 Stainless Steel	Bobrick	Silver/B-282-25

S. CUSTOM TOILET ACCESSORIES (10800)

Item	Component	Finish	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE				

2.11 DIVISION 11 - EQUIPMENT

A. HEADWALL RAIL SYSTEM (11005)

Item	Material	Manufacturer	Mfg. Color Name/No.
MATCH EXISTING EXAM & TREATMENT ROOM HEADWALL RAILS			

B. LIBRARY STACK SHELVING (11054)

Component	Material	Finish	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE				

C. CONTRACTOR SUPPLIED AND INSTALLED MEDICAL EQUIPMENT (11076)

Component	Material	Finish	Manufacturer	Mfg. Color Name/No.
All	Steel and Aluminum	Powder coat, semi-gloss	All	Warm White; Clear Anodized Aluminum; Stainless steel or manufacturer's standard

D. PARKING CONTROL EQUIPMENT (11150)

Component	Material	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE			

E. PROJECTION SCREENS (11132)- Note: All screens will be the same, but will be different sizes.

Component	Material	Finish	Manufacturer	Mfg. Color
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Women's Health Clinic 09 05 00

VA Medical Center - 100% Construction Documents

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RTKL/JMA A JOINT VENTURE

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Motorized Front Projection Screens Access Series V	Projection Surface	Matte	Draper	Name/No.
	Masking Borders	Matte	Draper	Black
	Case	Semi-Gloss	Draper	White

F. LOADING DOCK EQUIPMENT (11160)

Item	Material	Finish Color	Manufacturer
NOT APPLICABLE			

G. FOOD SERVICE SELF CONTAINED REFRIGERATION EQUIPMENT (11415) See Specification Section 11400

Component	Material	Finish	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE				

H. WOOD SHOP DUST COLLECTOR (11570)

Component	Item	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE			

I. BIOHAZARD SAFETY CABINETS (11604)

Type	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE		

J. LAB FUME HOODS

Component	Manufacturer	Mfg. Color Name/No.
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NOT APPLICABLE

K. LABORATORY CONTROLLED TEMPERATURE ROOMS AND REFRIGERATORS (11615)

Room No. & Location	Exterior Material	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE			

2.12 DIVISION 12-FURNISHINGS

A. NOT APPLICABLE

B. WOOD CASEWORK (12302)

Cabinet elevations and dimensions are shown in construction documents in Wood Casework Schedule and in individual room elevations.. Multiple locations for each casework type are indicated on Room Elevations

C. ENTRANCE MATS AND GRILLES (12482)

Item	Material	Locations	Finish	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE					

D. SYSTEMS FURNITURE (12590) See 12301

Item/Component	Material	Finish	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE				

E. COUNTERTOPS AND ACCESSORIES (12303)

Type	Finish/Color
Solid Surface SS-1	Corian Burled Beach

F. RECESSED FLOOR MATS AND FRAMES (12481)

Component	Material	Finish	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE				

NOT APPLICABLE

G. WINDOW SHADES (12513)

Component	Material	Manufacturer	Mfg. Color Name/No.
Vertical Blinds	PVC - vinyl	Bali Contract/Graeber	Americana Khaki - 3970 Match existing

H. LIGHTPROOF SHADES (12514)

Component	Material	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE			

2.13 DIVISION 13 - SPECIAL CONSTRUCTION

A. WALK - IN REFRIGERATORS AND FREEZERS (13062) - See Equipment list for equipment cut sheets

Component	Finish	Color
NOT APPLICABLE		

B. PRE ENGINEERED METAL BUILDINGS (13121) - Facility Entrance police shelters

Component	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE		

C. PRE ENGINEERED METAL BUILDINGS (13121) - Smoking shelters - 12 ft. X 16 ft.

Component	Manufacturer	Mfg. Color Name/No.
	Austin Mohawk - Classic	
NOT APPLICABLE		

D. PRE ENGINEERED METAL BUILDINGS (13121) - Transit shelters

Component	Manufacturer	Mfg. Color Name/No.
NOT APPLICABLE		

F. CART ELEVATORS (14125)

Component	Material	Finish	Color
NOT APPLICABLE			

G. ELECTRIC TRACTION ELEVATORS (14210)

Elevator	Component	Material	Finish	Color
NOT APPLICABLE				

H. HYDRAULIC ELEVATORS (14240) - SAME AS PASSENGER ELEVATOR

1. Passenger Elevator No. P Typical	Component	Material	Color
NOT APPLICABLE			

2.15 DIVISION 15 - MECHANICAL

A. PLUMBING FIXTURES AND TRIM (15450)

Item	Color
Water Closet	White
Urinal	White
Lavatories	White
Service Sink Corner	White
Service Sink	White

Clinic Service Sink	White
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2.16 DIVISION 16 - ELECTRICAL

A. BUILDING LIGHTING INTERIOR (16510) See Fixture cut sheets at the end of the interior lighting specification

Fixture Type	Exterior Finish	Color
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B. SITE LIGHTING (16520) See Fixture cut sheets at the end of the exterior lighting specification

Type and Component	Exterior Finish	Manufacturer	Mfg. Name/No.
NOT APPLICABLE			

C. PATIENT WALL SYSTEMS (16685) See Activation list for equipment cut sheets

Component	Material	Finish	Manufacturer	Mfg. Color/Name
NOT APPLICABLE				

PART III EXECUTION

3.1 FINISH SCHEDULES & MISCELLANEOUS ABBREVIATIONS

Women's Health Clinic
 VA Medical Center - 100% Construction Documents
 Addendum B - January 25, 2013

09 05 00

FINISH SCHEDULE & MISCELLANEOUS ABBREVIATIONS	
Term	Abbreviation
Access Flooring	AF
Accordion Folding Partition	AFP
Acoustical Ceiling	AT
Acoustical Ceiling, Special Faced	AT (SP)
Acoustical Metal Pan Ceiling	AMP
Acoustical Wall Panel	AWP
Acoustical Wall Treatment	AWT
Acoustical Wallcovering	AWF
Anodized Aluminum Colored	AAC
Anodized Aluminum Natural Finish	AA
Baked On Enamel	BE
Brick Face	BR
Brick Flooring	BF
Brick Paving	BP
Cap Strip	CS
Carpet	CP
Carpet Athletic Flooring	CAF
Carpet Edge Strip	CES
Carpet Module Tile	CPT
Ceramic Glazed Facing Brick	CGFB
Ceramic Mosaic Tile	FTCT
Ceramic Mosaic Tile Grout	CTG
Ceramic Mosaic Wall Tile	CTWT
Concrete	C
Concrete Masonry Unit	CMU
Divider Strips Marble	DS MB

Epoxy Coating	EC
Epoxy Resin Flooring	ERF
Existing	E
Exposed Divider Strips	EXP
Exterior	EXT
Exterior Finish System	EFS
Exterior Paint	EXT-P
Exterior Stain	EXT-ST
Fabric Wallcovering	WF
Facing Tile	SCT
Feature Strips	FS
Floor Mats & Frames	FM
Floor Tile, Mosaic	FT
Fluorocarbon	FC
Folding Panel Partition	FP
Foot Grille	FG
Glass Masonry Unit	GUMU
Glazed Face CMU	GCMU
Glazed Structural Facing Tile	SFTU
Granite	GT
Gypsum Wallboard	GWB
High Glazed Coating	SC
Latex Mastic Flooring	LM
Linear Metal Ceiling	LMC
Linear Wood Ceiling	LWC
Marble	MB
Material	MAT
Mortar	M
Multi-Color Coating	MC
Natural Finish	NF
Paint	P
Paver Tile	PVT
Perforated Metal Facing (Tile or Panels)	PMF
Plaster	PL
Plaster High Strength	HSPL
Plaster Keene Cement	KC
Plastic Laminate	PLM

Polypropylene Fabric Wallcovering	PFW	
Porcelain Tile	PPT/PWT	
Porcelain Tile Grout	PPTG	
Quarry Tile	QT/QWT	
Quarry Tile Grout	QTG	
Radiant Ceiling Panel System	RCP	
Resilient Sheet Flooring	RSF	
Resilient Stair Tread	RST	
Rubber Base	RB	
Rubber Flooring	RF	
Sealed Concrete	SLC	
Spandrel Glass	SLG	
Stain	ST	
Stainless Steel	SS STL.	
Stone Flooring	SF	
Structural Clay	SC	
Suspension Decorative Grids	SDG	
Grids		
Terrazzo Portland Cement	PCT	
Terrazzo Tile	TT	

Terrazzo, Thin Set		
Textured Gypsum Ceiling Panel	TGC	
Textured Metal Ceiling Panel	TMC	
Thin set Terrazzo	TST	
Veneer Plaster	VP	
Vinyl Base	VB	
Vinyl Coated Fabric Wallcovering	VVC (W)	
Vinyl Composition Tile	VCT	
Vinyl Sheet Flooring	VSF	
Vinyl Sheet Flooring (Welded Seams)	WSF	
Vinyl Sheet Flooring Integral Base	IB	
Vinyl Sheet Flooring Integral Base Cap Strip	CS	
Wall Paneling	WP	
Welding Rods	WR	
Wood	WD	
Wood Ceiling	WDC	

3.2 FINISH SCHEDULE SYMBOLS

- Symbol Definition
 ** Same finish as adjoining walls
 - No color required
 E Existing
 XX To match existing
 EFTR Existing finish to remain
 RM Remove

3.3 ROOM FINISH SCHEDULE / DOOR SCHEDULE

- A. Match adjoining or existing similar surfaces colors, textures or patterns where disturbed or damaged by alterations or new work when not scheduled.

B. Room Finish Schedule Symbols:

Room No. and Name	FLOOR	BASE	WALL	WAINSCOT	CEILING	DOORS	HARDWARE	
	MAT FC	MAT FCC	MAT FCC	MAT FC	MAT FCC	DOOR SYMBOL	H.W. No.	
3A331 PUBLIC RR	CTFT CTFT-1	N CB	CTWT/GWB	CTWT-1/P-2	N/A			
		E CB	CTWT/GWB	CTWT-1/P-2	N/A			
		S CB	CTWT/GWB	CTWT-1/P-2	N/A			
		W CB	CTWT/GWB	CTWT-1/P-2	N/A			
		C				GWB P-1		
3A332 LACTATE	VCT VCT-1	N RB	GWB	P-22	N/A			
		E RB	GWB	P-2	N/A			
		S RB	GWB	P-2	N/A			
		W RB	GWB	P-2	N/A			
		C				AT AT-1		
3A333A PLAY AREA	CP CP-1	N N/A	N/A	N/A	N/A			
		E RB	GWB	P-2	N/A			
		S RB	GWB/GL	P-2	N/A			
		W RB	GWB/GL	P-2	N/A			
		C				AT AT-1		
3A333 WAITING ROOM	CP CP-1	N RB	GWB	P-2/VWC-7	N/A			
		E RB	GWB	P-2	N/A			
		S RB	GWB	P-2	N/A			
		W RB	GWB	P-2	N/A			
		C				AT AT-1		

N = North, S = South, E = East, W = West and C = Ceiling

Room No. and Name	FLOOR		BASE		WALL		WAINSCOT		CEILING		DOORS		HARDWARE	
	MAT	FC	MAT	FCC	MAT	FCC	MAT	FCC	MAT	FCC	DOOR SYMBOL	H.W. No.		
3A334 RECEPT	CP	CP-1	N	RB	RB-1	GWB	P-2	N/A	N/A	AT				
			E	RB	RB-1	GWB	P-2	N/A	N/A					
			S	RB	RB-1	GWB/GL	P-2	N/A	N/A					
			W	RB	RB-1	GWB	P-2	N/A	N/A					
			C							AT-1				
3A335 PHARM OFFICE	VCT	VCT-1	N	RB	RB-1	GWB	P-22	N/A	N/A	AT				
			E	RB	RB-1	GWB	P-2	N/A	N/A					
			S	RB	RB-1	GWB/GL	P-2	N/A	N/A					
			W	RB	RB-1	GWB	P-2	N/A	N/A					
			C							AT				
3A336 MGR OFFICE	VCT	VCT-1	N	RB	RB-1	GWB	P-22	N/A	N/A	AT				
			E	RB	RB-1	GWB	P-2	N/A	N/A					
			S	RB	RB-1	GWB/GL	P-2	N/A	N/A					
			W	RB	RB-1	GWB	P-2	N/A	N/A					
			C							AT				
3A337 TREATMENT ROOM	RSF	RSF 4&5	N	IB	IB-1	GWB	P-2	N/A	N/A	AT				
			E	IB	IB-1	GWB	P-2	N/A	N/A					
			S	IB	IB-1	GWB	P-24	N/A	N/A					
			W	IB	IB-1	GWB	P-2	N/A	N/A					
			C							AT				
3A338 TREATMENT ROOM	RSF	RSF 4&5	N	IB	IB-1	GWB	P-24	N/A	N/A	AT				
			E	IB	IB-1	GWB	P-2	N/A	N/A					
			S	IB	IB-1	GWB	P-2	N/A	N/A					
			W	IB	IB-1	GWB	P-2	N/A	N/A					
			C							AT				

Room No. and Name	FLOOR		BASE		WALL		WAINSCOT		CEILING		DOORS		HARDWARE	
	MAT	FC	MAT	FCC	MAT	FCC	MAT	FC	MAT	FCC	DOOR SYMBOL	H.W. No.		
3A337A PATIENT REST RM	CTFT	CTFT-1	N	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A	GWB	P-1			
			E	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			S	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			W	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			C											
3A339 DIET OFFICE	VCT	VCT-1 VCT-2	N	RB	RB-1	GWB	P-2	N/A	N/A	AT	AT-3			
			E	RB	RB-1	GWB	P-2	N/A	N/A					
			S	RB	RB-1	GWB/GL	P-2	N/A	N/A					
			W	RB	RB-1	GWB	P-22	N/A	N/A					
			C											
3A340 SWING OFFICE	VCT	VCT-1 VCT-2	N	RB	RB-1	GWB	P-2	N/A	N/A	AT	AT-3			
			E	RB	RB-1	GWB	P-2	N/A	N/A					
			S	RB	RB-1	GWB/GL	P-2	N/A	N/A					
			W	RB	RB-1	GWB	P-22	N/A	N/A					
			C											
3A341 OFFICE	VCT	VCT-1 VCT-2	N	RB	RB-1	GWB	P-2	N/A	N/A	AT	AT-3			
			E	RB	RB-1	GWB	P-22	N/A	N/A					
			S	RB	RB-1	GWB/GL	P-2	N/A	N/A					
			W	RB	RB-1	GWB	P-2	N/A	N/A					
			C											
3A342 OFFICE	VCT	VCT-1 VCT-2	N	RB	RB-1	GWB	P-2	N/A	N/A	AT	AT-3			
			E	RB	RB-1	GWB	P-2	N/A	N/A					
			S	RB	RB-1	GWB/GL	P-2	N/A	N/A					
			W	RB	RB-1	GWB	P-22	N/A	N/A					
			C											

Room No. and Name	FLOOR		BASE		WALL		WAINSCOT		CEILING		DOORS		HARDWARE	
	MAT	FC	MAT	FCC	MAT	FCC	MAT	FC	MAT	FCC	DOOR SYMBOL	H.W. No.		
3A343 OFFICE	CVCTP	VCT-1	N	RB	RB-1	GWB	P-2	N/A	N/A					
		VCT-2	E	RB	RB-1	GWB	P-22	N/A	N/A					
			S	RB	RB-1	GWB	P-2	N/A	N/A					
			W	RB	RB-1	GWB	P-2	N/A	N/A					
			C							AT	AT-3			
3A344 OFFICE	VCT	VCT-1	N	RB	RB-1	GWB	P-2	N/A	N/A					
		VCT-2	E	RB	RB-1	GWB	P-2	N/A	N/A					
			S	RB	RB-1	GWB	P-2	N/A	N/A					
			W	RB	RB-1	GWB	P-22	N/A	N/A					
			C							AT	AT-3			
3A345 CLASS ROOM	VCT	VCT-2	N	RB	RB-1	GWB	P-2	N/A	N/A					
			E	RB	RB-1	GWB	P-2	N/A	N/A					
			S	RB	RB-1	GWB	P-2	N/A	N/A					
			W	RB	RB-1	GWB	VWC-9	N/A	N/A					
			C							AT	AT-3			
3A346 EXAM	VCT	VCT 1, 2, 3	N	RB	RB-2	GWB	P-2	N/A	N/A					
			E	RB	RB-2	GWB	P-22	N/A	N/A					
			S	RB	RB-2	GWB	P-2	N/A	N/A					
			W	RB	RB-2	GWB	P-2	N/A	N/A					
			C							AT	AT-3			
3A346A PATIENT RR	CTFT	CTFT 1	N	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			E	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			S	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			W	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			C							GWB	P-1			

Room No. and Name	FLOOR		BASE		WALL		WAINSCOT		CEILING		DOORS		HARDWARE
	MAT	FC	MAT	FCC	MAT	FCC	MAT	FC	MAT	FCC	DOOR SYMBOL	H.W. No.	
3A347 EXAM	VCT	VCT 1, 2, 4	N	RB-4	GWB	P-2	N/A	N/A					
			E	RB-4	GWB	P-24	N/A	N/A					
			S	RB-4	GWB	P-2	N/A	N/A					
			W	RB-4	GWB	P-2	N/A	N/A					
			C							AT	AT-2		
3A347A PATIENT RR	CTFT	CTFT 1	N	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			E	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			S	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			W	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			C						GWB		P-1		
3A348 EXAM	VCT	VCT 1, 2, 3	N	RB-1	GWB	P-2	N/A	N/A					
			E	RB-1	GWB	P-2	N/A	N/A					
			S	RB-1	GWB	P-2	N/A	N/A					
			W	RB-1	GWB	P-22	N/A	N/A					
			C							AT	AT-2		
3A348A PATIENT RR	CTFT	CTFT 1	N	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			E	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			S	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			W	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A					
			C							GWB		P-1	
3A349 EXAM	VCT	VCT 1, 2, 4	N	RB-4	GWB	P-2	N/A	N/A					
			E	RB-4	GWB	P-2	N/A	N/A					
			S	RB-4	GWB	P-2	N/A	N/A					
			W	RB-4	GWB	P-24	N/A	N/A					
			C							AT	AT-2		

Room No. and Name	FLOOR		BASE	WALL		WAINSCOT		CEILING		DOORS	HARDWARE
	MAT	FC		MAT	FCC	MAT	FCC	MAT	FCC		
3A350 BARIATRIC EXAM RM	VCT	VCT	N	RB	RB-1	GWB	P-2	N/A	N/A		
		1, 2, 3	E	RB	RB-1	GWB	P-22	N/A	N/A		
			S	RB	RB-1	GWB	P-2	N/A	N/A		
			W	RB	RB-1	GWB	P-2	N/A	N/A		
			C					AT		AT-2	
3A350A PATIENT RR	CTFT	CTFT	N	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A		
		1	E	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A		
			S	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A		
			W	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A		
			C					GWB		P-1	
3A351 SOIL RM	VCT	VCT	N	RB	RB-1	GWB	P-2	N/A	N/A		
		1	E	RB	RB-1	GWB	P-2	N/A	N/A		
			S	RB	RB-1	GWB	P-2	N/A	N/A		
			W	RB	RB-1	GWB	P-2	N/A	N/A		
			C					GWB		P-1	
3A352 CLEAN RM	VCT	VCT	N	RB	RB-1	GWB	P-2	N/A	N/A		
		1	E	RB	RB-1	GWB	P-2	N/A	N/A		
			S	RB	RB-1	GWB	P-2	N/A	N/A		
			W	RB	RB-1	GWB	P-2	N/A	N/A		
			C					GWB		P-1	
3A353 SUPPLY RM	VCT	VCT	N	RB	RB-1	GWB	P-2	N/A	N/A		
		1	E	RB	RB-1	GWB	P-2	N/A	N/A		
			S	RB	RB-1	GWB	P-2	N/A	N/A		
			W	RB	RB-1	GWB	P-2	N/A	N/A		
			C					AT		AT-2	

Room No. and Name	FLOOR		BASE		WALL		WAINSCOT		CEILING		DOORS		HARDWARE
	MAT	FC	MAT	FCC	MAT	FCC	MAT	FC	MAT	FCC	DOOR SYMBOL	H.W. No.	
3A354 SUPPLY RM	VCT	VCT	N	RB	RB-1	GWB	P-2	N/A	N/A				
		1	E	RB	RB-1	GWB	P-2	N/A	N/A				
			S	RB	RB-1	GWB	P-2	N/A	N/A				
			W	RB	RB-1	GWB	P-2	N/A	N/A				
			C							AT	AT-2		
3A355 MENTAL HEALTH OFFICE	VCT	VCT-1	N	RB	RB-1	GWB	P-2	N/A	N/A				
		VCT-2	E	RB	RB-1	GWB	P-2	N/A	N/A				
			S	RB	RB-1	GWB	P-22	N/A	N/A				
			W	RB	RB-1	GWB	P-2	N/A	N/A				
			C							AT	AT-3		
3A356 MENTAL HEALTH OFFICE	VCT	VCT-1	N	RB	RB-1	GWB	P-22	N/A	N/A				
		T-2	E	RB	RB-1	GWB	P-2	N/A	N/A				
			S	RB	RB-1	GWB	P-2	N/A	N/A				
			W	RB	RB-1	GWB	P-2	N/A	N/A				
			C							AT	AT-3		
3A357 MENTAL HEALTH OFFICE	VCT	VCT-1	N	RB	RB-1	GWB	P-2	N/A	N/A				
		VCT-2	E	RB	RB-1	GWB	P-2	N/A	N/A				
			S	RB	RB-1	GWB	P-22	N/A	N/A				
			W	RB	RB-1	GWB	P-2	N/A	N/A				
			C							AT	AT-3		

Room No. and Name	FLOOR		BASE		WALL		WAINSCOT		CEILING		DOORS		HARDWARE
	MAT	FC	MAT	FCC	MAT	FCC	MAT	FC	MAT	FCC	DOOR SYMBOL	H.W. No.	
3A358 NEG PRES EXAM	VCT	VCT	N	RB	RB-1	GWB	P-2	N/A	N/A				
		1, 2, 3	E	RB	RB-1	GWB	P-22	N/A	N/A				
			S	RB	RB-1	GWB	P-2	N/A	N/A				
			W	RB	RB-1	GWB	P-2	N/A	N/A				
			C							AT	AT-2		
3A358A PATIENT RR	CTFT	CTFT	N	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A				
		1	E	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A				
			S	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A				
			W	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A				
			C							GWB	P-1		
3A359 EXAM	VCT	VCT	N	RB	RB-4	GWB	P-2	N/A	N/A				
		1, 2, 4	E	RB	RB-4	GWB	P-2	N/A	N/A				
			S	RB	RB-4	GWB	P-2	N/A	N/A				
			W	RB	RB-4	GWB	P-24	N/A	N/A				
			C							AT	AT-2		
3A359A PATIENT RR	CTFT	CTFT	N	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A				
		1	E	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A				
			S	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A				
			W	CB	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A				
			C							GWB	P-1		

Room No. and Name	FLOOR		BASE	WALL		WAINSCOT		CEILING		DOORS	HARDWARE
	MAT	FC		MAT	FCC	MAT	FCC	MAT	FC		
3A360 EXAM	VCT	VCT	N	RB-1	GWB	P-2	N/A	N/A	AT	DOOR SYMBOL	H.W. No.
		1, 2, 3	E	RB-1	GWB	P-2	N/A	N/A			
			S	RB-1	GWB	P-2	N/A	N/A			
			W	RB-1	GWB	P-22	N/A	N/A			
			C								
3A360A PATIENT RR	CTFT	CTFT	N	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A	AT		
		1	E	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A			
			S	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A			
			W	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A			
			C								
3A361 EXAM	VCT	VCT	N	RB-4	GWB	P-2	N/A	N/A	GWB		
		1, 2, 4	E	RB-4	GWB	P-24	N/A	N/A			
			S	RB-4	GWB	P-2	N/A	N/A			
			W	RB-4	GWB	P-2	N/A	N/A			
			C								
3A361A PATIENT RR	CTFT	CTFT	N	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A	AT		
		1	E	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A			
			S	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A			
			W	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A			
			C								

Room No. and Name	FLOOR		BASE		WALL		WAINSCOT		CEILING		DOORS	HARDWARE
	MAT	FC	MAT	FCC	MAT	FCC	MAT	FC	MAT	FCC	DOOR SYMBOL	H.W. No.
3A362 EXAM	VCT	VCT 1, 2, 3	N	RB-2	GWB	P-2	N/A	N/A				
			E	RB-2	GWB	P-22	N/A	N/A				
			S	RB-2	GWB	P-2	N/A	N/A				
			W	RB-2	GWB	P-2	N/A	N/A				
			C						AT	AT-2		
3A362A PATIENT RR	CTFT	CTFT 1	N	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A				
			E	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A				
			S	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A				
			W	CB-1	CTWT/GWB	CTWT-1/P-2	N/A	N/A				
			C						GWB	P-1		
CORRIDOR C3-13 C3-14 C3-20	VCT	VCT-1	N	RB-1	GWB	P-2	N/A	N/A				
			E	RB-1	GWB	P-2	N/A	N/A				
			S	RB-1	GWB	P-2	N/A	N/A				
			W	RB-1	GWB	P-2	N/A	N/A				
			C						AT	AT-1		
CORRIDOR 3C-15 3C-16 3C-17	VCT	VCT 1, 2	N	RB-1	GWB	P-2/P-22*	N/A	N/A				
			E	RB-1	GWB	P-2	N/A	N/A				
			S	RB-1	GWB	P-2/P-22*	N/A	N/A				
			W	RB-1	GWB	P-2/P-22*	N/A	N/A				
			C						GWB	P-1		

*SEE FINISH FLOOR PLAN FOR LOCATION OF ALL ACCENT WALLS

CEILINGS

ACOUSTIC CEILING TILES - All ceiling tile systems to be supplied with seismic clips

- AT-1 ARMSTRONG OPTIMA 24X24X1 W/SQUARE TEGULAR EDGE, 15/16 GRID
TYPICAL IN PUBLIC ACCESS WAITING SPACES AND SPINES, PATIENT
PATIENT EDUCATION AND GROUP THERAPY ROOMS
- AT-3 ARMSTRONG FINE FISSURED 24X24 SQUARE LAYIN W/ 15/16
TYPICAL FOR CLOSED OFFICES AND ADMIN SPACES

WALLS

PAINT - BASED ON BENJAMIN MOORE PAINT COLORS

- P-1 GRAY OWL 2137-60
- P-2 NOVEMBER RAIN 2142-60
- P-22 DESERT TAN 2153-50
- P-24 WATERBORNE POLYAMIDE EPOXY-BENJAMIN MOORE-GLOSS LEVEL 6

VINYL WALLCOVERING - TYPE II

- VWC-7 SANITAS EXCESS ALPACA 3E21-29
- VWC-9 MAHARAM PINPOINT 398890/004 BUTTERNUT

ACCOUSTICAL WALL PANELING / TACK BOARD

- AWP-1 Novawall Acoustic, tackable panels, wrapped in F1-Maharam: Outline, #397420-003 Strada

WALL TILE

- CTWT-1 CERAMIC TILE, DALITILE PERMABRITES TBD, AT SINGLE TOILETS STAFF AND PATIENT, GANG TOILETS AT
STAFF ACCESS

WALL BASE

- CB-1** CERAMIC TILE BASE, DALITILE KEYSTONES, D-166, Elemental Tan, AT SINGLE TOILETS STAFF AND PATIENT, GANG TOILETS AT STAFF ACCESS
- RB-1** RUBBER BASE, JOHNSONITE PEBBLE #32, RECYCLED RUBBER 4" STRAIGHT BASE AT CARPETED AREAS
- RB-4** RUBBER BASE, JOHNSONITE CHARCOAL #20, RECYCLED RUBBER 4" COVERED BASE AT HARD SURFACES
- IB-1** INTEGRAL BASE FOR SHEET VINYL LOCATIONS, COVE UP TO 6" WITH FULL FILLER BACK ROD AT BEND OF COVE, PROVIDE J-BEAD CAP AT TOP EDGE OF BASE

FLOORS

CARPET

- CP-1** MANNINGTON TAILOR MADE, OIL CLOTH, BROADLOOM CARPET WITH LARGE SCALE GRAPHIC PATTERN - GEOMETRIC, PRECISION LOOP CONSTRUCTION, ANTRON LUMINA SOLUTION DYED NYLON WITH DURATECH SOIL RESISTANCE TREATMENT., 28OZ/YD, 100% WOVEN SYNTHETIC BACKING WITH ULTRABAC PLUS, 10 YR WARRANTY, GREEN LABEL INDOOR AIR QUALITY
- CP-6** MANNINGTON CENTERFIELD II, STRIKE, BROADLOOM CARPET, TUFTED TEXTURE LOOP CONSTRUCTION, SOLUTION DYED NYLON 200Z/YD, 100% WOVEN SYNTHETIC BACKING, 10 YR WARRANTY, GREEN LABEL INDOOR AIR QUALITY

VINYL COMPOSITION TILE - ARMSTRONG STONETEX 12X12

- VCT-1** STONE WHITE 52127
- VCT-2** BAMBOO YELLOW 52156
- VCT-3** TERRA STONE 52151
- VCT-4** BLUE SPRUCE 52148

SHEET VINYL

RSF-4 MANNINGTON FINE FIELDS WITH CHEMICAL WELD PRICE, COLOR:10146 BRIGHT WHITE (GENERAL COLOR)
(AT \$2.55 - \$3.15SF FOR MATERIALS ONLY)

RSF-5 MANNINGTON FINE FIELDS WITH CHEMICAL WELD, COLOR: 10162 ECRU

FLOOR TILE

CTWT-1 PORCELAIN TILE, DALTILE, D-166, ELEMENTAL TAN PRICE OPTION FOR DALTILE CITY VIEW 12X24, PROVIDE ALL BULLNOSE TRIM AND COVE TRIM ACCESSORIES FOR INSTALLATION, AT PUBLIC ACCESS GANG TOILETS, PATIENT ROOM TOILETS AND SHOWER STALLS

MILLWORK

PLASTIC LAMINATE

PLM-7 FORMICA STORM SOLIDZ 3503-58

SOLID SURFACE

SS-1 CORIAN Burred Beach

- END OF SECTION -

4. Typical fire rated assembly and column fireproofing showing details of construction same as that used in fire rating test.

D. Test Results: Fire rating test designation, each fire rating required for each assembly.

1.5 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE

A. In accordance with the requirements of ASTM C754.

1.6 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American Society For Testing And Materials (ASTM)

A123-09.....Zinc (Hot-dip Galvanized) Coatings on Iron and Steel Products

A653/A653M-10.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process

A641-09a.....Zinc-Coated (Galvanized) Carbon Steel Wire

C11-10a.....Terminology Relating to Gypsum and Related Building Materials and Systems

C635-07.....Manufacture, Performance, and Testing of Metal Suspension System for Acoustical Tile and Lay-in Panel Ceilings

C636-06.....Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels

C645-11.....Non-Structural Steel Framing Members

C754-09a.....Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products

C841-03(R2008)e1.....Installation of Interior Lathing and Furring

C954-10.....Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness

C1002-07.....Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs

E580-11ae1.....Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Moderate Seismic Restraint.

PART 2 - PRODUCTS**2.1 PROTECTIVE COATING**

- A. Galvanize steel studs, runners (track), rigid (hat section) furring channels, "Z" shaped furring channels, and resilient furring channels, with coating designation of G-60 minimum, per ASTM 123.

2.2 STEEL STUDS AND RUNNERS (TRACK)

- A. ASTM C645, modified for thickness specified and sizes as shown.
 - 1. Use ASTM A525 steel, 0.8 mm (0.0329-inch) thick bare metal (33 mil).
 - 2. Runners same thickness as studs.
- B. Provide not less than two cutouts in web of each stud, approximately 300 mm (12 inches) from each end, and intermediate cutouts on approximately 600 mm (24-inch) centers.
- C. Doubled studs for openings and studs for supporting concrete backer-board.
- D. Studs 3600 mm (12 feet) or less in length shall be in one piece.
- E. Shaft Wall Framing:
 - 1. Conform to rated wall construction.
 - 2. C-H Studs.
 - 3. E Studs.
 - 4. J Runners.
 - 5. Steel Jamb-Strut.

2.3 FURRING CHANNELS

- A. Rigid furring channels (hat shape): ASTM C645.
- B. Resilient furring channels:
 - 1. Not less than 0.45 mm (0.0179-inch) thick bare metal.
 - 2. Semi-hat shape, only one flange for anchorage with channel web leg slotted on anchorage side, channel web leg on other side stiffens fastener surface but shall not contact anchorage surface other channel leg is attached to.
- C. "Z" Furring Channels:
 - 1. Not less than 0.45 mm (0.0179-inch)-thick bare metal, with 32 mm (1-1/4 inch) and 19 mm (3/4-inch) flanges.
 - 2. Web furring depth to suit thickness of insulation with slotted perforations.
- D. Rolled Steel Channels: ASTM C754, cold rolled; or, ASTM C841, cold rolled.

2.4 FASTENERS, CLIPS, AND OTHER METAL ACCESSORIES

- A. ASTM C754, except as otherwise specified.

- B. For fire rated construction: Type and size same as used in fire rating test.
- C. Fasteners for steel studs thicker than 0.84 mm (0.033-inch) thick. Use ASTM C954 steel drill screws of size and type recommended by the manufacturer of the material being fastened.
- D. Clips: ASTM C841 (paragraph 6.11), manufacturer's standard items. Clips used in lieu of tie wire shall have holding power equivalent to that provided by the tie wire for the specific application.
- E. Concrete ceiling hanger inserts (anchorage for hanger wire and hanger straps): Steel, zinc-coated (galvanized), manufacturers standard items, designed to support twice the hanger loads imposed and the type of hanger used.
- F. Tie Wire and Hanger Wire:
 - 1. ASTM A641, soft temper, Class 1 coating.
 - 2. Gage (diameter) as specified in ASTM C754 or ASTM C841.
- G. Attachments for Wall Furring:
 - 1. Manufacturers standard items fabricated from zinc-coated (galvanized) steel sheet.
 - 2. For concrete or masonry walls: Metal slots with adjustable inserts or adjustable wall furring brackets. Spacers may be fabricated from 1 mm (0.0396-inch) thick galvanized steel with corrugated edges.
- H. Power Actuated Fasteners: Type and size as recommended by the manufacturer of the material being fastened.

2.5 SUSPENDED CEILING SYSTEM FOR GYPSUM BOARD (OPTION)

- A. Conform to ASTM C635, heavy duty, with not less than 35 mm (1-3/8 inch) wide knurled capped flange face designed for screw attachment of gypsum board.
- B. Wall track channel with 35 mm (1-3/8 inch) wide flange.

PART 3 - EXECUTION

3.1 INSTALLATION CRITERIA

- A. Where fire rated construction is required for walls, partitions, columns, beams and floor-ceiling assemblies, the construction shall be same as that used in fire rating test.
- B. Construction requirements for fire rated assemblies and materials shall be as shown and specified, the provisions of the Scope paragraph (1.2) of ASTM C754 and ASTM C841 regarding details of construction shall not apply.

3.2 INSTALLING STUDS

- A. Install studs in accordance with ASTM C754, except as otherwise shown or specified.
- B. Space studs not more than 610 mm (24 inches) on center.
- C. Cut studs 6 mm to 9 mm (1/4 to 3/8-inch) less than floor to underside of structure overhead when extended to underside of structure overhead.
- D. Where studs are shown to terminate above suspended ceilings, provide bracing as shown or extend studs to underside of structure overhead.
- E. Extend studs to underside of structure overhead for fire, rated partitions, smoke partitions, shafts, and sound rated partitions and insulated exterior wall furring.
- F. At existing plaster ceilings and where shown, studs may terminate at ceiling as shown.
- G. Openings:
 - 1. Frame jambs of openings in stud partitions and furring with two studs placed back to back or as shown.
 - 2. Fasten back to back studs together with 9 mm (3/8-inch) long Type S pan head screws at not less than 600 mm (two feet) on center, staggered along webs.
 - 3. Studs fastened flange to flange shall have splice plates on both sides approximately 50 X 75 mm (2 by 3 inches) screwed to each stud with two screws in each stud. Locate splice plates at 600 mm (24 inches) on center between runner tracks.
- H. Fastening Studs:
 - 1. Fasten studs located adjacent to partition intersections, corners and studs at jambs of openings to flange of runner tracks with two screws through each end of each stud and flange of runner.
 - 2. Do not fasten studs to top runner track when studs extend to underside of structure overhead.
- I. Chase Wall Partitions:
 - 1. Locate cross braces for chase wall partitions to permit the installation of pipes, conduits, carriers and similar items.
 - 2. Use studs or runners as cross bracing not less than 63 mm (2-1/2 inches wide).
- J. Form building seismic or expansion joints with double studs back to back spaced 75 mm (three inches) apart plus the width of the seismic or expansion joint.
- K. Form control joint, with double studs spaced 13 mm (1/2-inch) apart.

3.3 INSTALLING WALL FURRING FOR FINISH APPLIED TO ONE SIDE ONLY

- A. In accordance with ASTM C754, or ASTM C841 except as otherwise specified or shown.
- B. Wall furring-Stud System:
 - 1. Framed with 63 mm (2-1/2 inch) or narrower studs, 600 mm (24 inches) on center.
 - 2. Brace as specified in ASTM C754 for Wall Furring-Stud System or brace with sections or runners or studs placed horizontally at not less than three foot vertical intervals on side without finish.
 - 3. Securely fasten braces to each stud with two Type S pan head screws at each bearing.
- C. Direct attachment to masonry or concrete; rigid channels or "Z" channels:
 - 1. Install rigid (hat section) furring channels at 600 mm (24 inches) on center, horizontally or vertically.
 - 2. Install "Z" furring channels vertically spaced not more than 600 mm (24 inches) on center.
 - 3. At corners where rigid furring channels are positioned horizontally, provide mitered joints in furring channels.
 - 4. Ends of spliced furring channels shall be nested not less than 200 mm (8 inches).
 - 5. Fasten furring channels to walls with power-actuated drive pins or hardened steel concrete nails. Where channels are spliced, provide two fasteners in each flange.
 - 6. Locate furring channels at interior and exterior corners in accordance with wall finish material manufacturers printed erection instructions. Locate "Z" channels within 100 mm (4 inches) of corner.
- D. Installing Wall Furring-Bracket System: Space furring channels not more than 400 mm (16 inches) on center.

3.4 INSTALLING SUPPORTS REQUIRED BY OTHER TRADES

- A. Provide for attachment and support of electrical outlets, plumbing, laboratory or heating fixtures, recessed type plumbing fixture accessories, access panel frames, wall bumpers, wood seats, toilet stall partitions, dressing booth partitions, urinal screens, chalkboards, tackboards, wall-hung casework, handrail brackets, recessed fire extinguisher cabinets and other items like auto door buttons and auto door operators supported by stud construction.
- B. Provide additional studs where required. Install metal backing plates, or special metal shapes as required, securely fastened to metal studs.

3.5 INSTALLING SHAFT WALL SYSTEM

- A. Conform to UL Design No. U438 for two-hour fire rating and one hour fire rating Shaft. Provide ratings as indicated by design numbers on Partition Type drawing.
- B. Position J runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power driven fasteners at both ends and 600 mm (24 inches) on center.
- C. After liner panels have been erected, cut C-H studs and E studs, from 9 mm (3/8-inch) to not more than 13 mm (1/2-inch) less than floor-to-ceiling height. Install C-H studs between liner panels with liner panels inserted in the groove.
- D. Install full-length steel E studs over shaft wall line at intersections, corners, hinged door jambs, columns, and both sides of closure panels.
- E. Suitably frame all openings to maintain structural support for wall:
 - 1. Provide necessary liner fillers and shims to conform to label frame requirements.
 - 2. Frame openings cut within a liner panel with E studs around perimeter.
 - 3. Frame openings with vertical E studs at jambs, horizontal J runner at head and sill.

3.6 INSTALLING FURRED AND SUSPENDED CEILINGS OR SOFFITS

- A. Install furred and suspended ceilings or soffits in accordance with ASTM C754 or ASTM C841 except as otherwise specified or shown for screw attached gypsum board ceilings and for plaster ceilings or soffits.
 - 1. Space framing at 400 mm (16-inch) centers for metal lath anchorage.
 - 2. Space framing at 600 mm (24-inch) centers for gypsum board anchorage.
- B. Concrete slabs on steel decking composite construction:
 - 1. Use pull down tabs when available.
 - 2. Use power activated fasteners when direct attachment to structural framing can not be accomplished.
- C. Where bar joists or beams are more than 1200 mm (48 inches) apart, provide intermediate hangers so that spacing between supports does not exceed 1200 mm (48 inches). Use clips, bolts, or wire ties for direct attachment to steel framing.
- D. Existing concrete construction exposed or concrete on steel decking:
 - 1. Use power actuated fasteners either eye pin, threaded studs or drive pins for type of hanger attachment required.
 - 2. Install fasteners at approximate mid height of concrete beams or joists. Do not install in bottom of beams or joists.

- E. Steel decking without concrete topping:
1. Do not fasten to steel decking 0.76 mm (0.0299-inch) or thinner.
 2. Toggle bolt to decking 0.9 mm (0.0359-inch) or thicker only where anchorage to steel framing is not possible.
- F. Installing suspended ceiling system for gypsum board (ASTM C635 Option):
1. Install only for ceilings to receive screw attached gypsum board.
 2. Install in accordance with ASTM C636.
 - a. Install main runners spaced 1200 mm (48 inches) on center.
 - b. Install 1200 mm (four foot) tees not over 600 mm (24 inches) on center; locate for edge support of gypsum board.
 - c. Install wall track channel at perimeter.
- G. Installing Ceiling Bracing System:
1. Construct bracing of 38 mm (1-1/2 inch) channels for lengths up to 2400 mm (8 feet) and 50 mm (2 inch) channels for lengths over 2400 mm (8 feet) with ends bent to form surfaces for anchorage to carrying channels and over head construction. Lap channels not less than 600 mm (2 feet) at midpoint back to back. Screw or bolt lap together with two fasteners.
 2. Install bracing at an approximate 45 degree angle to carrying channels and structure overhead; secure as specified to structure overhead with two fasteners and to carrying channels with two fasteners or wire ties.
 3. Brace suspended ceiling or soffit framing in seismic areas in accordance with ASTM E580.

3.7 TOLERANCES

- A. Fastening surface for application of subsequent materials shall not vary more than 3 mm (1/8-inch) from the layout line.
- B. Plumb and align vertical members within 3 mm (1/8-inch.)
- C. Level or align ceilings within 3 mm (1/8-inch.)

3.8 STUD SPAN

In all cases, ensure that span, thickness of members, and framing Spacing meet manufacturer's specifications for flexure. In no case will flexure be less than 1/240. Use 1/360 for walls of elevator shafts, dumbwaiters or walls with hard surfaces applied such as panels, tile or other applied materials.

- - - E N D - - -

SECTION 09 29 00
GYPSUM BOARD

PART 1 - GENERAL**1.1 DESCRIPTION**

A. This section specifies installation and finishing of gypsum board.

1.2 RELATED WORK

A. Installation of steel framing members for walls, partitions, furring, soffits, and ceilings: Section 05 40 00, COLD-FORMED METAL FRAMING, and Section 09 22 16, NON-STRUCTURAL METAL FRAMING.

B. Section 07 21 13, THERMAL INSULATION.

C. Acoustical Sealants: Section 07 92 00, JOINT SEALANTS.

1.3 TERMINOLOGY

A. Definitions and description of terms shall be in accordance with ASTM C11, C840, and as specified.

B. Underside of Structure Overhead: In spaces where steel trusses or bar joists are shown, the underside of structure overhead shall be the underside of the floor or roof construction supported by the trusses or bar joists.

C. "Yoked": Gypsum board cut out for opening with no joint within 12" of openings at interior windows and unglazed openings or within 12" of top and jambs of door openings. The same requirement applies to both sides of the partition.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Cornerbead and edge trim.
2. Finishing materials.
3. Laminating adhesive.
4. Gypsum board, each type.

C. Shop Drawings:

1. Typical gypsum board installation, showing corner details, edge trim details, rated and unrated control joints, rated and unrated horizontal gypsum board construction and the like.
2. Typical sound rated assembly, showing treatment at perimeter of partitions and penetrations at gypsum board.
3. Typical shaft wall assembly.

4. Typical fire rated assembly and column fireproofing, indicating details of construction same as that used in fire rating test.

D. Samples:

1. Cornerbead.
2. Edge trim.
3. Rated and unrated control joints.

E. Test Results:

1. Fire rating test, each fire rating required for each assembly.
2. Sound rating test.

1.5 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE

- A. In accordance with the requirements of ASTM C840.

1.6 ENVIRONMENTAL CONDITIONS

- A. In accordance with the requirements of ASTM C840.

1.7 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing And Materials (ASTM):
- C11-10a.....Terminology Relating to Gypsum and Related Building Materials and Systems
- C475-02(R2007).....Joint Compound and Joint Tape for Finishing Gypsum Board
- C840-08.....Application and Finishing of Gypsum Board
- C919-08.....Sealants in Acoustical Applications
- C954-10.....Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Stud from 0.033 in. (0.84mm) to 0.112 in. (2.84mm) in thickness
- C1002-07.....Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
- C1047-10a.....Accessories for Gypsum Wallboard and Gypsum Veneer Base
- C1177-08.....Glass Mat Gypsum Substrate for Use as Sheathing
- C1658-06.....Glass Mat Gypsum Panels
- C1396-11.....Gypsum Board
- E84-11a.....Surface Burning Characteristics of Building Materials

- C. Underwriters Laboratories Inc. (UL):
Latest Edition.....Fire Resistance Directory
- D. Inchcape Testing Services (ITS):
Latest Editions.....Certification Listings

PART 2 - PRODUCTS

2.1 GYPSUM BOARD

- A. Gypsum Board: ASTM C1396, Type X, 16 mm (5/8 inch) thick unless shown otherwise. Shall contain a minimum of 20 percent recycled gypsum.
- B. Coreboard or Shaft Wall Liner Panels.
 - 1. ASTM C1396, Type X.
 - 2. ASTM C1658: Glass Mat Gypsum Panels,
 - 3. Coreboard for shaft walls 300, 400, 600 mm (12, 16, or 24 inches) wide by required lengths 25 mm (one inch) thick with paper faces treated to resist moisture.
- C. Water Resistant Gypsum Backing Board: ASTM C620, Type X, 16 mm (5/8 inch) thick.
- D. Gypsum cores shall contain a minimum of 95 percent post industrial recycled gypsum content. Paper facings shall contain 100 percent post-consumer recycled paper content.

2.2 GYPSUM SHEATHING BOARD

- A. ASTM C1396, Type X, water-resistant core, 16 mm (5/8 inch) thick.
- B. ASTM C1177, Type X.

2.3 ACCESSORIES

- A. ASTM C1047, except form of 0.39 mm (0.015 inch) thick zinc coated steel sheet or rigid PVC plastic.
- B. Flanges not less than 22 mm (7/8 inch) wide with punchouts or deformations as required to provide compound bond.

2.4 FASTENERS

- A. ASTM C1002 and ASTM C840, except as otherwise specified.
- B. ASTM C954, for steel studs thicker than 0.04 mm (0.33 inch).
- C. Select screws of size and type recommended by the manufacturer of the material being fastened.
- D. For fire rated construction, type and size same as used in fire rating test.
- E. Clips: Zinc-coated (galvanized) steel; gypsum board manufacturer's standard items.

2.5 FINISHING MATERIALS AND LAMINATING ADHESIVE

- A. ASTM C475 and ASTM C840. Free of antifreeze, vinyl adhesives, preservatives, biocides and other VOC. Adhesive shall contain a maximum VOC content of 50 g/l.

PART 3 - EXECUTION

3.1 GYPSUM BOARD HEIGHTS

- A. Extend all layers of gypsum board from floor to underside of structure overhead on following partitions and furring:
 - 1. Two sides of partitions:
 - a. Fire rated partitions.
 - b. Smoke partitions.
 - c. Sound rated partitions.
 - d. Full height partitions shown (FHP).
 - 2. One side of partitions or furring:
 - a. Inside of exterior wall furring or stud construction.
 - b. Room side of room without suspended ceilings.
 - c. Furring for pipes and duct shafts, except where fire rated shaft wall construction is shown.
 - 3. Extend all layers of gypsum board construction used for fireproofing of columns from floor to underside of structure overhead, unless shown otherwise.
- B. In locations other than those specified, extend gypsum board from floor to heights as follows:
 - 1. Not less than 100 mm (4 inches) above suspended acoustical ceilings.
 - 2. At ceiling of suspended gypsum board ceilings.
 - 3. At existing ceilings.

3.2 INSTALLING GYPSUM BOARD

- A. Coordinate installation of gypsum board with other trades and related work.
- B. Install gypsum board in accordance with ASTM C840, except as otherwise specified.
- C. Moisture and Mold-Resistant Assemblies: Provide and install moisture and mold-resistant glass mat gypsum wallboard products with moisture-resistant surfaces complying with ASTM C1658 where shown and in locations which might be subject to moisture exposure during construction.
- D. Use gypsum boards in maximum practical lengths to minimize number of end joints.
- E. Bring gypsum board into contact, but do not force into place.

F. Ceilings:

1. For single-ply construction, use perpendicular application.
2. For two-ply assemblies:
 - a. Use perpendicular application.
 - b. Apply face ply of gypsum board so that joints of face ply do not occur at joints of base ply with joints over framing members.

G. Walls (Except Shaft Walls):

1. When gypsum board is installed parallel to framing members, space fasteners 300 mm (12 inches) on center in field of the board, and 200 mm (8 inches) on center along edges.
2. When gypsum board is installed perpendicular to framing members, space fasteners 300 mm (12 inches) on center in field and along edges.
3. Stagger screws on abutting edges or ends.
4. For single-ply construction, apply gypsum board with long dimension either parallel or perpendicular to framing members as required to minimize number of joints except gypsum board shall be applied vertically over "Z" furring channels.
5. For two-ply gypsum board assemblies, apply base ply of gypsum board to assure minimum number of joints in face layer. Apply face ply of wallboard to base ply so that joints of face ply do not occur at joints of base ply with joints over framing members.
6. For three-ply gypsum board assemblies, apply plies in same manner as for two-ply assemblies, except that heads of fasteners need only be driven flush with surface for first and second plies. Apply third ply of wallboard in same manner as second ply of two-ply assembly, except use fasteners of sufficient length enough to have the same penetration into framing members as required for two-ply assemblies.
7. No offset in exposed face of walls and partitions will be permitted because of single-ply and two-ply or three-ply application requirements.
8. Installing Two Layer Assembly Over Sound Deadening Board:
 - a. Apply face layer of wallboard vertically with joints staggered from joints in sound deadening board over framing members.
 - b. Fasten face layer with screw, of sufficient length to secure to framing, spaced 300 mm (12 inches) on center around perimeter, and 400 mm (16 inches) on center in the field.
9. Control Joints ASTM C840 and as follows:
 - a. Locate at both side jambs of all openings and both sides of the partition if gypsum board is not "yoked". Use one system

throughout. The exception to this is that a control joint is not required at the opening corner if there is an abutting perpendicular partition within 12" on the same side of the partition and corner.

- b. Not required for uninterrupted (by an opening) wall lengths less than 9000 mm (30 feet).
- c. Extend control joints the full height of the wall or length of soffit/ceiling membrane.

H. Acoustical or Sound Rated Partitions, Fire and Smoke Partitions:

1. Cut gypsum board for a space approximately 3 mm to 6 mm (1/8 to 1/4 inch) wide around partition perimeter.
2. Coordinate for application of caulking or sealants to space prior to taping and finishing.
3. For sound rated partitions, use sealing compound (ASTM C919) to fill the annular spaces between all receptacle boxes and the partition finish material through which the boxes protrude to seal all holes and/or openings on the back and sides of the boxes. STC minimum values as shown.

I. Electrical and Telecommunications Boxes:

1. Seal annular spaces between electrical and telecommunications receptacle boxes and gypsum board partitions.

J. Accessories:

1. Set accessories plumb, level and true to line, neatly mitered at corners and intersections, and securely attach to supporting surfaces as specified.
2. Install in one piece, without the limits of the longest commercially available lengths.
3. Corner Beads:
 - a. Install at all vertical and horizontal external corners and where shown.
 - b. Use screws only. Do not use crimping tool.
4. Edge Trim (casings Beads):
 - a. At both sides of expansion and control joints unless shown otherwise.
 - b. Where gypsum board terminates against dissimilar materials and at perimeter of openings, except where covered by flanges, casings or permanently built-in equipment.
 - c. Where gypsum board surfaces of non-load bearing assemblies abut load bearing members.

d. Where shown.

3.3 INSTALLING GYPSUM SHEATHING

- A. Install in accordance with ASTM C840, except as otherwise specified or shown.
- B. Use screws of sufficient length to secure sheathing to framing.
- C. Space screws 9 mm (3/8 inch) from ends and edges of sheathing and 200 mm (8 inches) on center. Space screws a maximum of 200 mm (8 inches) on center on intermediate framing members.
- D. Apply 600 mm by 2400 mm (2 foot by 8 foot) sheathing boards horizontally with tongue edge up.
- E. Apply 1200 mm by 2400 mm or 2700 mm (4 ft. by 8 ft. or 9 foot) gypsum sheathing boards vertically with edges over framing.

3.4 CAVITY SHAFT WALL

- A. Coordinate assembly with Section 09 22 16, NON-STRUCTURAL METAL FRAMING, for erection of framing and gypsum board.
- B. Conform to UL Design No. U438 or FM WALL CONSTRUCTION 12-2/HR (Nonbearing for two-hour fire rating. Conform to FM WALL CONSTRUCTION 25-1/HR (Non-loadbearing) for one-hour fire rating where shown.
- C. Cut coreboard (liner) panels 25 mm (one inch) less than floor-to-ceiling height, and erect vertically between J-runners on shaft side.
 - 1. Where shaft walls exceed 4300 mm (14 feet) in height, position panel end joints within upper and lower third points of wall.
 - 2. Stagger joints top and bottom in adjacent panels.
- D. Gypsum Board:
 - 1. Two hour wall:
 - a. Erect base layer (backing board) vertically on finish side of wall with end joints staggered. Fasten base layer panels to studs with 25 mm (one inch) long screws, spaced 600 mm (24 inches) on center.
 - b. Use laminating adhesive between plies in accordance with UL or FM if required by fire test.
 - c. Apply face layer of gypsum board required by fire test vertically over base layer with joints staggered and attach with screws of sufficient length to secure to framing staggered from those in base, spaced 300 mm (12 inches) on center.
 - 2. One hour wall with one layer on finish side of wall: Apply face layer of gypsum board vertically. Attach to studs with screws of sufficient length to secure to framing, spaced 300 mm (12 inches) on center in field and along edges.

3. Where coreboard is covered with face layer of gypsum board, stagger joints of face layer from those in the coreboard base.
- E. Treat joints, corners, and fasteners in face layer as specified for finishing of gypsum board.

3.5 FINISHING OF GYPSUM BOARD

- A. Finish joints, edges, corners, and fastener heads in accordance with ASTM C840. Use Level 5 finish for all finished areas open to public view.
1. Provide a mock-up of the Level 5 finishes for review and approval by the VA Representative and/or the Architect. The mock-up must be a minimum of 15'-0" wide x 9'-0" high and be maintained until all Level 5 finishes are approved. The VA Representative will inspect all Level 5 finishes prior to painting. The review process is at the discretion of the VA.
- B. Before proceeding with installation of finishing materials, assure the following:
1. Gypsum board is fastened and held close to framing or furring.
 2. Fastening heads in gypsum board are slightly below surface in dimple formed by driving tool.
- C. Finish joints, fasteners, and all openings, including openings around penetrations, on that part of the gypsum board extending above suspended ceilings to seal surface of non decorated smoke barrier, fire rated and sound rated gypsum board construction. After the installation of hanger rods, hanger wires, supports, equipment, conduits, piping and similar work, seal remaining openings and maintain the integrity of the smoke barrier, fire rated and sound rated construction/ Sanding is not required of non decorated surfaces.

3.6 REPAIRS

- A. After taping and finishing has been completed, and before decoration, repair all damaged and defective work, including nondecorated surfaces.
- B. Patch holes or openings 13 mm (1/2 inch) or less in diameter, or equivalent size, with a setting type finishing compound or patching plaster.
- C. Repair holes or openings over 13 mm (1/2 inch) diameter, or equivalent size, with 16 mm (5/8 inch) thick gypsum board secured in such a manner as to provide solid substrate equivalent to undamaged surface.
- D. Tape and refinish scratched, abraded or damaged finish surfaces including cracks and joints in non decorated surface to provide smoke

tight construction fire protection equivalent to the fire rated
construction and STC equivalent to the sound rated construction.

- - - E N D - - -

SECTION 09 30 13
CERAMIC/PORCELAIN TILING

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This section specifies ceramic, porcelain and quarry tile, waterproofing membranes for thin-set applications, crack isolation membranes, and tile backer board.

1.2 RELATED WORK

- A. Sealing of joints where specified: Section 07 92 00, JOINT SEALANTS.
- B. Color, texture and pattern of field tile and trim shapes, size of field tile, trim shapes, and color of grout specified: Section 09 06 00, INTERIOR/EXTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
1. Base tile, each type, each color, each size.
 2. Paver tile, each size, type, color and pattern.
 3. Wall (or wainscot) tile, each color, size and pattern.
 4. Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, color, and size.
- C. Product Data:
1. Ceramic and porcelain tile, marked to show each type, size, and shape required.
 2. Chemical resistant mortar and grout (Epoxy and Furan).
 3. Cementitious backer unit.
 4. Dry-set Portland cement mortar and grout.
 5. Divider strip.
 6. Elastomeric membrane and bond coat.
 7. Reinforcing tape.
 8. Leveling compound.
 9. Latex-Portland cement mortar and grout.
 10. Commercial Portland cement grout.
 11. Organic adhesive.
 12. Slip resistant tile.
 13. Waterproofing isolation membrane.
 14. Fasteners.

D. Certification:

1. Master grade, ANSI A137.1.
2. Manufacturer's certificates indicating that the following materials comply with specification requirements:
 - a. Chemical resistant mortar and grout (epoxy and furan).
 - b. Modified epoxy emulsion.
 - c. Commercial Portland cement grout.
 - d. Cementitious backer unit.
 - e. Dry-set Portland cement mortar and grout.
 - f. Elastomeric membrane and bond coat.
 - g. Reinforcing tape.
 - h. Latex-Portland cement mortar and grout.
 - i. Leveling compound.
 - j. Organic adhesive.
 - k. Waterproof isolation membrane.
 - l. Factory mounted tile suitability for application in wet area specified under 2.1, A, 3 with list of successful in-service performance locations.

E. Provide Tile layout prior to performing work.

1. Rooms must be field measured prior to submission.
2. The room sizes must reflect the actual room sizes in the field.
3. Provide a starting point for the tile based on the field measurements.

1.4 DELIVERY AND STORAGE

- A. Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- B. Store material to prevent damage or contamination.

1.5 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):
 - A10.20-06.....Safety Requirements for Ceramic Tile, Terrazzo, and Marble Works
 - A108.1A-11.....Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar
 - A108.1B-11.....Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with dry-Set or latex-Portland Cement Mortar

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- A108.1C-11.....Contractors Option; Installation of Ceramic Tile in the Wet-Set method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar
- A108.4-11.....Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesives
- A108.5-11.....Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar
- A108.6-11.....Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy
- A108.8-11.....Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout
- A108.10-11.....Installation of Grout in Tilework
- A108.11-11.....Interior Installation of Cementitious Backer Units
- A108.13-11.....Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone
- A118.1-11.....Dry-Set Portland Cement Mortar
- A118.3-11.....Chemical Resistant, Water Cleanable Tile-Setting Epoxy and Water Cleanable Tile-Setting and Grouting Epoxy Adhesive
- A118.4-11.....Latex-Portland Cement Mortar
- A118.5-11.....Chemical Resistant Furan Mortars and Grouts for Tile Installation
- A118.6-11.....Standard Cement Grouts for Tile Installation
- A118.9-11.....Cementitious Backer Units
- A118.10-11.....Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation
- A136.1-11.....Organic Adhesives for Installation of Ceramic Tile
- A137.1-08.....Ceramic Tile
- C. American Society For Testing And Materials (ASTM):
- A185/A185M-07.....Steel Welded Wire Fabric, Plain, for Concrete Reinforcing

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- C109/C109M-11.....Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch. or [50-mm] Cube Specimens)
- C241-09.....Abrasion Resistance of Stone Subjected to Foot Traffic
- C348-08.....Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
- C627-10.....Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester
- C954-10.....Steel Drill Screws for the Application of Gypsum Board on Metal Plaster Base to Steel Studs from 0.033 in (0.84 mm) to 0.112 in (2.84 mm) in thickness
- C979-10.....Pigments for Integrally Colored Concrete
- C1002-07.....Steel Self-Piercing Tapping Screws for the Application of Panel Products
- C1027-09.....Determining "Visible Abrasion Resistance on Glazed Ceramic Tile"
- C1028-07e1.....Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method
- C1127-01(R2009).....Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with an Integral Wearing Surface
- C1178/C1178M-08.....Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
- D4397-10.....Standard Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications
- D5109-99(R2004).....Standard Test Methods for Copper-Clad Thermosetting Laminates for Printed Wiring Boards
- D. Marble Institute of America (MIA): Design Manual III-2007
- E. Tile Council of America, Inc. (TCA):
2008.....Handbook for Ceramic Tile Installation

PART 2 - PRODUCTS

2.1 TILE

- A. Comply with ANSI A137.1, Standard Grade, except as modified:
1. Inspection procedures listed under the Appendix of ANSI A137.1.
 2. Abrasion Resistance Classification:

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- a. Tested in accordance with values listed in Table 1, ASTM C 1027.
 - b. Class V, 12000 revolutions for floors in Corridors, Kitchens, Storage including Refrigerated Rooms
 - c. Class IV, 6000 revolutions for remaining areas.
3. Slip Resistant Tile for Floors:
- a. Coefficient of friction, when tested in accordance with ASTM C1028, required for level of performance:
 - 1) Not less than 0.7 (wet condition) for bathing areas.
 - 2) Not less than 0.8 on ramps for wet and dry conditions.
 - 3) Not less than 0.6, except 0.8 on ramps as stated above, for wet and dry conditions for other areas.
 - b. Tile Having Abrasive Grains:
 1. Unglazed Ceramic Mosaic Tile: Abrasive grains throughout body of the tile.
 2. Quarry Tile: Abrasive grains uniformly embedded in face at rate of approximately 7.5 percent of surface area.
 - c. Porcelain Paver Tile: Matte surface finish
4. Do not use back mounted tiles in showers unless certified by manufacturer as noted in paragraph 1.3.D.
5. Factory Blending: For tile with color variations, within the ranges selected during sample submittals blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.
6. Factory-Applied Temporary Protective Coating:
- a. Protect exposed face surfaces (top surface) of tile against adherence of mortar and grout by pre-coating with a continuous film of petroleum paraffin wax, applied hot.
 - b. Do not coat unexposed tile surfaces.
 - c. Pre-wax tiles set or grouted with furan or epoxy or latex modified mortars.
- B. Unglazed Ceramic Mosaic Tile: Nominal 6 mm (1/4 inch) thick with cushion edges.
- C. Unglazed Quarry Tile: Nominal 13 mm (1/2 inch) thick, square edges.
- D. Glazed Wall Tile: Cushion edges, glazing, as specified in Section 09 06 00, INTERIOR/EXTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
- E. Porcelain Paver Tile: Nominal 8 mm (5/16 inch) thick, with cushion edges. Porcelain tile produced by the dust pressed method shall be made of approximately 50% feldspar; the remaining 50% shall be made up of various high-quality light firing ball clays yielding a tile with a

water absorption rate of 0.5% or less and a breaking strength of between 390 to 400 pounds.

F. Trim Shapes:

1. Conform to applicable requirements of adjoining floor and wall tile.
2. Use slip resistant trim shapes for horizontal surfaces of showers, overflow ledges, recessed steps, shower curbs, drying area curbs, and seats.
3. Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces unless detailed or specified otherwise in Section 09 06 00, INTERIOR/EXTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
4. Internal and External Corners:
 - a. Square internal and external corner joints are not acceptable.
 - b. External corners including edges: Use bullnose shapes.
 - c. Internal corners: Use cove shapes.
 - d. Base to floor internal corners: Use special shapes providing integral cove vertical and horizontal joint.
 - e. Base to floor external corners: Use special shapes providing bullnose vertical edge with integral cove horizontal joint. Use stop at bottom of openings having bullnose return to wall.
 - f. Wall top edge internal corners: Use special shapes providing integral cove vertical joint with bullnose top edge.
 - g. Wall top edge external corners: Use special shapes providing bullnose vertical and horizontal joint edge.
 - h. For unglazed ceramic mosaic and glazed wall tile installed in Portland cement mortar setting bed, use cove and bullnose shapes as applicable. When ceramic mosaic wall and base tile is required, use C Series cove and bullnose shapes.
 - i. For unglazed ceramic mosaic and glazed wall tile installed in dry-set Portland cement mortar, latex-Portland cement mortar, and organic adhesive (thin set methods), use cove and surface bullnose shapes as applicable.
 - j. For quarry tile work, use cove and bullnose shapes as applicable.
 - k. Provide cove and bullnose shapes where shown, and required to complete tile work.

2.2 CEMENTITIOUS BACKER UNITS

- A. Use in showers or wet areas.
- B. ANSI A118.9.
- C. Use Cementitious backer units in maximum available lengths.
- D. Backer unit meet or exceed the following additional physical properties:

<u>Property</u>	<u>Test Method</u>	<u>Value</u>
Water absorption	ASTM C948	Less than 20 percent by weight

2.3 JOINT MATERIALS FOR CEMENTITIOUS BACKER UNITS

- A. Reinforcing Tape: Vinyl coated woven glass fiber mesh tape, open weave, 50 mm (2 inches) wide. Tape with pressure sensitive adhesive backing will not be permitted.
- B. Tape Embedding Material: Latex-Portland cement mortar complying with ANSI A118.4.
- C. Joint material, including reinforcing tape, and tape embedding material, shall be as specifically recommended by the backer unit manufacturer.

2.4 FASTENERS

- A. Screws for Cementitious Backer Units.
 - 1. Standard screws for gypsum board are not acceptable.
 - 2. Minimum 11 mm (7/16 inch) diameter head, corrosion resistant coated, with washers.
 - 3. ASTM C954 for steel 1 mm (0.033 inch) thick.
 - 4. ASTM C1002 for steel framing less than 0.0329 inch thick.
- B. Washers: Galvanized steel, 13 mm (1/2 inch) minimum diameter.

2.5 GLASS MAT WATER RESISTANT GYPSUM BACKER BOARD

- A. Confirm to ASTM C1178/C1178M, Optional System for Cementitious Backer Units.

2.6 SETTING MATERIALS OR BOND COATS

- A. Conform to TCA Handbook for Ceramic Tile Installation.
- B. Portland Cement Mortar: ANSI A108.1.
- C. Latex-Portland Cement Mortar: ANSI A118.4.
 - 1. For wall applications, provide non-sagging, latex-Portland cement mortar complying with ANSI A118.4.
 - 2. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of Portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.
- D. Dry-Set Portland Cement Mortar: ANSI A118.1. For wall applications, provide non-sagging, latex-Portland cement mortar complying with ANSI A118.4.
- E. Organic Adhesives: ANSI A136.1, Type 1.
- F. Chemical-Resistant Bond Coat:
 - 1. Epoxy Resin Type: ANSI A118.3.
 - 2. Furan Resin Type: ANSI A118.5.

2.7 GROUTING MATERIALS

A. Coloring Pigments:

1. Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
2. Add coloring pigments to grout by the manufacturer.
3. Job colored grout is not acceptable.
4. Use is required in Commercial Portland Cement Grout, Dry-Set Grout, and Latex-Portland Cement Grout.

B. White Portland Cement Grout:

1. ANSI A118.6.
2. Use one part white Portland cement to one part white sand passing a number 30 screen.
3. Color additive not permitted.

C. Commercial Portland Cement Grout: ANSI A118.6 color as specified.

D. Dry-Set Grout: ANSI A118.6 color as specified.

E. Latex-Portland Cement Grout: ANSI A118.6 color as specified.

1. Unsanded grout mixture for joints 3.2 mm (1/8 inch) and narrower.
 2. Sanded grout mixture for joints 3.2 mm (1/8 inch) and wider.
- Chemical-Resistant with stain protection Grout for wet areas:
3. Epoxy grout, ANSI A118.3.

2.8 PATCHING AND LEVELING COMPOUND

A. Portland cement base, polymer-modified, self-leveling compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.

B. Shall have minimum following physical properties:

1. Compressive strength - 25 MPa (3500 psig) per ASTM C109/C109M.
2. Flexural strength - 7 MPa (1000 psig) per ASTM C348 (28 day value).
3. Tensile strength - 600 psi per ANSI 118.7.
4. Density - 1.9.

C. Capable of being applied in layers up to 38 mm (1-1/2 inches) thick without fillers and up to 100 mm (four inches) thick with fillers, being brought to a feather edge, and being trowelled to a smooth finish.

D. Primers, fillers, and reinforcement as required by manufacturer for application and substrate condition.

E. Ready for use in 48 hours after application.

2.9 WATER

A. Clean, potable and free from salts and other injurious elements to mortar and grout materials.

2.10 CLEANING COMPOUNDS

- A. Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
- B. Materials containing acid or caustic material not acceptable.

2.11 FLOOR MORTAR BED REINFORCING

- A. ASTM A185 welded wire fabric without backing, MW3 x MW3 (2 x 2-W0.5 x W0.5).

2.12 POLYETHYLENE SHEET

- A. Polyethylene sheet conforming to ASTM D4397.
- B. Nominal thickness: 0.15 mm (six mils).
- C. Use sheet width to minimize joints.

PART 3 - EXECUTION**3.1 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain ambient temperature of work areas at not less than 16 degree C (60 degrees F), without interruption, for not less than 24 hours before installation and not less than three days after installation.
- B. Maintain higher temperatures for a longer period of time where required by manufacturer's recommendation and ANSI Specifications for installation.
- C. Do not install tile when the temperature is above 38 degrees C (100 degrees F).
- D. Do not install materials when the temperature of the substrate is below 16 degrees C (60 degrees F).
- E. Do not allow temperature to fall below 10 degrees C (50 degrees F) after fourth day of completion of tile work.

3.2 ALLOWABLE TOLERANCE

- A. Variation in plane of sub-floor, including concrete fills leveling compounds and mortar beds:
 - 1. Not more than 1 in 500 (1/4 inch in 10 feet) from required elevation where Portland cement mortar setting bed is used.
 - 2. Not more than 1 in 1000 (1/8 inch in 10 feet) where dry-set Portland cement, and latex-Portland cement mortar setting beds and chemical-resistant bond coats are used.
- B. Variation in Plane of Wall Surfaces:
 - 1. Not more than 1 in 400 (1/4 inch in eight feet) from required plane where Portland cement mortar setting bed is used.

2. Not more than 1 in 800 (1/8 inch in eight feet) where dry-set or latex-Portland cement mortar or organic adhesive setting materials is used.

3.3 SURFACE PREPARATION

A. Patching and Leveling:

1. Mix and apply patching and leveling compound in accordance with manufacturer's instructions.
2. Fill holes and cracks and align concrete floors that are out of required plane with patching and leveling compound.
 - a. Thickness of compound as required to bring finish tile system to elevation shown.
 - b. Float finish except finish smooth for elastomeric waterproofing.
 - c. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
3. Apply patching and leveling compound to concrete and masonry wall surfaces that are out of required plane.
4. Apply leveling coats of material compatible with wall surface and tile setting material to wall surfaces, other than concrete and masonry that are out of required plane.

B. Mortar Bed for Slopes to Drains:

1. Slope compound to drain where drains are shown.
2. Install mortar bed in depressed slab sloped to drains not less than 1 in 200 (1/16 inch per foot).
3. Allow not less than 50 mm (2 inch) depression at edge of depressed slab.
4. Screed for slope to drain and float finish.
5. Cure mortar bed for not less than seven days. Do not use curing compounds or coatings.

C. Additional preparation of concrete floors for tile set with epoxy, or furan-resin shall be in accordance with the manufacturer's printed instructions.

D. Cleavage Membrane:

1. Install polythene sheet as cleavage membrane in depressed slab when waterproof membrane is not scheduled or indicated.
2. Turn up at edge of depressed floor slab to top of floor.

E. Walls:

1. In showers or other wet areas cover studs with polyethylene sheet.
2. Apply patching and leveling compound to concrete and masonry surfaces that are out of required plane.

3. Apply leveling coats of material compatible with wall surface and tile setting material to wall surfaces, other than concrete and masonry that are out of required plane.
4. Apply metal lath to framing in accordance with ANSI A108.1:
 - a. Use fasteners specified in paragraph "Fasteners." Use washers when lath opening is larger than screw head.
 - b. Apply scratch and leveling coats to metal lath in accordance with ANSI A108.1.C.
 - c. Total thickness of scratch and leveling coats:
 - 1) Apply 9 mm to 16 mm (3/8 inch to 5/8 inch) thick over solid backing.
 - 2) 16 mm to 19 mm (5/8 to 3/4 inch) thick on metal lath over studs.
 - 3) Where wainscots are required to finish flush with wall surface above, adjust thickness required for flush finish.
 - d. Apply scratch and leveling coats more than 19 mm (3/4 inch) thick in two coats.

F. Existing Floors and Walls:

1. Remove existing composition floor finishes and adhesive. Prepare surface by grinding, chipping, self-contained power blast cleaning or other suitable mechanical methods to completely expose uncontaminated concrete or masonry surfaces. Follow safety requirements of ANSI A10.20.
2. Remove existing concrete fill or topping to structural slab. Clean and level the substrate for new setting bed and waterproof membrane or cleavage membrane.
3. Where new tile bases are required to finish flush with plaster above or where they are extensions of similar bases in conjunction with existing floor tiles cut channel in floor slab and expose rough wall construction sufficiently to accommodate new tile base and setting material.

3.4 CEMENTITIOUS BACKER UNITS

- A. Remove polyethylene wrapping from cementitious backer units and separate to allow for air circulation. Allow moisture content of backer units to dry down to a maximum of 35 percent before applying joint treatment and tile.
- B. Install in accordance with ANSI A108.11 except as specified otherwise.
- C. Install units horizontally or vertically to minimize joints with end joints over framing members. Units with rounded edges; face rounded edge away from studs to form a V joint for joint treatment.

- D. Secure cementitious backer units to each framing member with screws spaced not more than 200 mm (eight inches) on center and not closer than 13 mm (1/2 inch) from the edge of the backer unit or as recommended by backer unit manufacturer. Install screws so that the screw heads are flush with the surface of the backer unit.
- E. Where backer unit joins shower pans or waterproofing, lap backer unit over turned up waterproof system. Install fasteners only through top one-inch of turned up waterproof systems.
- F. Do not install joint treatment for seven days after installation of cementitious backer unit.
- G. Joint Treatment:
 - 1. Fill horizontal and vertical joints and corners with latex-Portland cement mortar. Apply fiberglass tape over joints and corners and embed with same mortar.
 - 2. Leave 6 mm (1/4 inch) space for sealant at lips of tubs, sinks, or other plumbing receptors.

3.5 GLASS MAT WATER-RESISTANT GYPSUM BACKER BOARD

- A. Install in accordance with manufacturer's instructions. TCA Systems W245-01.
- B. Treat joints with tape and latex-Portland cement mortar or adhesive.

3.6 CERAMIC TILE - GENERAL

- A. Comply with ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" applicable to methods of installation.
- B. Comply with TCA Installation Guidelines:
- C. Installing Mortar Beds for Floors:
 - 1. Install mortar bed to not damage cleavage or waterproof membrane; 32 mm (1-1/2 inch) minimum thickness.
 - 2. Install floor mortar bed reinforcing centered in mortar fill.
 - 3. Screed finish to level plane or slope to drains where shown, float finish.
 - 4. For thin set systems cure mortar bed not less than seven days. Do not use curing compounds or coatings.
 - 5. For tile set with Portland cement paste over plastic mortar bed coordinate to set tile before mortar bed sets.
- D. Setting Beds or Bond Coats:
 - 1. Where recessed or depressed floor slabs are filled with Portland cement mortar bed, set ceramic mosaic floor tile in either Portland cement paste over plastic mortar bed or latex-Portland cement mortar

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- over cured mortar bed except as specified otherwise, ANSI A108-1C, TCA System F121-02 or F111-02.
2. Set wall tile installed over concrete or masonry in dry-set Portland cement mortar, or latex-Portland cement mortar, ANSI 108.1B.and TCA System W211-02, W221-02 or W222-02.
 3. Set wall tile installed over concrete backer board in latex-Portland cement mortar, ANSI A108.1B.
 4. Set wall tile installed over Portland cement mortar bed on metal lath base in Portland cement paste over plastic mortar bed, or dry-set Portland cement mortar or latex-Portland cement mortar over a cured mortar bed, ANSI A108.1C, TCA System W231-02, W241-02.
 5. Set tile installed over gypsum board and gypsum plaster in organic adhesive, ANSI A108.4, TCA System W242-02.
 6. Set trim shapes in same material specified for setting adjoining tile.

E. Workmanship:

1. Lay out tile work so that no tile less than one-half full size is used. Make all cuts on the outer edge of the field. Align new tile work scheduled for existing spaces to the existing tile work unless specified otherwise. Under no circumstances should tiles be less than 6" wide.
2. Set tile firmly in place with finish surfaces in true planes. Align tile flush with adjacent tile unless shown otherwise.
3. Form intersections and returns accurately.
4. Cut and drill tile neatly without marring surface.
5. Cut edges of tile abutting penetrations, finish, or built-in items:
 - a. Fit tile closely around electrical outlets, piping, fixtures and fittings, so that plates, escutcheons, collars and flanges will overlap cut edge of tile.
 - b. Seal tile joints water tight as specified in Section 07 92 00, JOINT SEALANTS, around electrical outlets, piping fixtures and fittings before cover plates and escutcheons are set in place.
6. Completed work shall be free from hollow sounding areas and loose, cracked or defective tile.
7. Remove and reset tiles that are out of plane or misaligned.
8. Floors:
 - a. Extend floor tile beneath casework and equipment, except those units mounted in wall recesses.
 - b. Align finish surface of new tile work flush with other and existing adjoining floor finish where shown.

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- c. In areas where floor drains occur, slope to drains where shown.
 - d. Shove and vibrate tiles over 200 mm (8 inches) square to achieve full support of bond coat.
9. Walls:
- a. Cover walls and partitions, including pilasters, furred areas, and freestanding columns from floor to ceiling, or from floor to nominal wainscot heights shown with tile.
 - b. Finish reveals of openings with tile, except where other finish materials are shown or specified.
 - c. At window openings, provide tile stools and reveals, except where other finish materials are shown or specified.
 - d. Finish wall surfaces behind and at sides of casework and equipment, except those units mounted in wall recesses, with same tile as scheduled for room proper.
10. Joints:
- a. Keep all joints in line, straight, level, perpendicular and of even width unless shown otherwise.
 - b. Make joints 2 mm (1/16 inch) wide for glazed wall tile and mosaic tile work.
 - c. Make joints in quarry tile work not less than 6 mm (1/4 inch) nor more than 9 mm (3/8 inch) wide. Finish joints flush with surface of tile.
 - d. Make joints in Paver tile, porcelain type; maximum 3 mm (1/8 inch) wide.
11. Back Buttering: For installations indicated below, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:
- a. Tile wall installations in wet areas, including showers, tub enclosures, laundries and swimming pools.
 - b. Tile installed with chemical-resistant mortars and grouts.
 - c. Tile wall installations composed of tiles 200 by 200 mm (8 by 8 inches or larger).
 - d. Exterior tile wall installations.

3.7 CERAMIC TILE INSTALLED WITH PORTLAND CEMENT MORTAR

- A. Mortar Mixes for Floor, Wall And Base Tile (including Showers): ANSI A108.1.except specified otherwise.
- B. Installing Wall and Base Tile: ANSI A108.1, except specified otherwise.
- C. Installing Floor Tile: ANSI A108.1, except as specified otherwise. Slope mortar beds to floor drains a minimum of 1 in 100 (1/8 inch per foot).

3.8 GROUTING

A. Grout Type and Location:

1. Grout for glazed wall and base tile, paver tile and unglazed mosaic tile Portland cement grout, latex-Portland cement grout, dry-set grout, or commercial Portland cement grout.

B. Workmanship:

1. Install and cure grout in accordance with the applicable standard.
2. Portland Cement grout: ANSI A108.10.
3. Epoxy Grout: ANSI A108.6.
4. Furan and Commercial Portland Cement Grout: ANSI A108.8 and in accordance with the manufacturer's printed instructions.
5. Dry-set grout: ANSI A108.5.

3.9 MOVEMENT JOINTS

- A. Prepare tile expansion, isolation, construction and contraction joints for installation of sealant. Refer to Section 07 92 00, JOINT SEALANTS.
- B. TCA details EJ 171-02.
- C. At expansion joints, rake out joint full depth of tile and setting bed and mortar bed. Do not cut waterproof or isolation membrane.
- D. Rake out grout at joints between tile, service sink, and where shown not less than 6 mm (1/4 inch) deep.

3.10 CLEANING

- A. Thoroughly sponge and wash tile. Polish glazed surfaces with clean dry cloths.
- B. Methods and materials used shall not damage or impair appearance of tile surfaces.
- C. The use of acid or acid cleaners on glazed tile surfaces is prohibited.
- D. Clean tile grouted with epoxy, furan and commercial Portland cement grout and tile set in elastomeric bond coat as recommended by the manufacturer of the grout and bond coat.

3.11 PROTECTION

- A. Keep traffic off tile floor, until grout and setting material is firmly set and cured.
- B. Where traffic occurs over tile floor, cover tile floor with not less than 9 mm (3/8 inch) thick plywood, wood particle board, or hardboard securely taped in place. Do not remove protective cover until time for final inspection. Clean tile of any tape, adhesive and stains.

3.12 TESTING FINISH FLOOR

- A. Test floors in accordance with ASTM C627 to show compliance with codes 1 through 10.

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1.5 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in the text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
- A641/A641M-09a.....Zinc-coated (Galvanized) Carbon Steel Wire
- A653/A653M-10.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip Process
- C423-09a.....Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- C634-10a.....Standard Terminology Relating to Environmental Acoustics
- C635-07.....Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
- C636-08.....Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
- E84-11a.....Surface Burning Characteristics of Building Materials
- E119-11.....Fire Tests of Building Construction and Materials
- E413-10.....Classification for Rating Sound Insulation.
- E580-11ae1.....Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint
- E1264-08e1.....Classification for Acoustical Ceiling Products

PART 2- PRODUCTS**2.1 METAL SUSPENSION SYSTEM**

- A. ASTM C635, heavy-duty system, except as otherwise specified.
1. Ceiling suspension system members may be fabricated from either of the following unless specified otherwise.
 - a. Galvanized cold-rolled steel, bonderized.
 - b. Extruded aluminum.
 - c. Fire resistant plastic (glass fiber) having a flame spread and smoke developed rating of not more than 25 when tested in accordance with ASTM E84.
 2. Use same construction for cross runners as main runners. Use of lighter-duty sections for cross runners is not acceptable.

3. Use aluminum suspension in kitchens and aluminum or fire resistant plastic in toilets adjacent to shower areas, hydrotherapy, and swimming pools.
- B. Exposed grid suspension system for support of lay-in panels:
1. Exposed grid width not less than 22 mm (7/8 inch) with not less than 8 mm (5/16 inch) panel bearing surface.
 2. Fabricate wall molding and other special molding from the same material with same exposed width and finish as the exposed grid members.
 3. On exposed metal surfaces apply baked-on enamel flat texture finish in color to match adjacent acoustical units unless specified otherwise in Section 09 06 00, INTERIOR/EXTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
- C. Concealed grid suspension system for support of mineral base acoustical tile:
1. Concealed grid upward access suspension system to provide an initial opening of 300 mm by 600 mm (12 by 24 inches) and for removal of adjacent runners and tile without the use of special tools, and without damage to suspension system and acoustical tile.
 2. Minimum flange width of 22 mm (7/8 inch) except for access hook and angle.
 3. Minimum flange width of 11 mm (7/16 inch) for access hook and angle.
- D. Suspension system for support of Metal Type V, VI, and VII tiles:
Concealed grid type having runners designed for the snap-in attachment of metal tile (pans).

2.2 PERIMETER SEAL

- A. Provide paintable caulk at the junction of the bottom of the wall angles and the wall. Caulk color to match wall angle. There are to be no visible gaps between the wall angle and the wall.

2.3 WIRE

- A. ASTM A641.
- B. For wire hangers: Minimum diameter 2.68 mm (0.1055 inch).
- C. For bracing wires: Minimum diameter 3.43 mm (0.1350 inch).

2.4 ANCHORS AND INSERTS

- A. Use anchors or inserts to support twice the loads imposed by hangers attached thereto.
- B. Hanger Inserts:
1. Fabricate inserts from steel, zinc-coated (galvanized after fabrication).

2. Nailing type option for wood forms:
 - a. Upper portion designed for anchorage in concrete and positioning lower portion below surface of concrete approximately 25 mm (one inch).
 - b. Lower portion provided with not less than 8 mm (5/16 inch) hole to permit attachment of hangers.
3. Flush ceiling insert type:
 - a. Designed to provide a shell covered opening over a wire loop to permit attachment of hangers and keep concrete out of insert recess.
 - b. Insert opening inside shell approximately 16 mm (5/8 inch) wide by 9 mm (3/8 inch) high over top of wire.
 - c. Wire 5 mm (3/16 inch) diameter with length to provide positive hooked anchorage in concrete.

C. Clips:

1. Galvanized steel.
2. Designed to clamp to steel beam or bar joists, or secure framing member together.
3. Designed to rigidly secure framing members together.
4. Designed to sustain twice the loads imposed by hangers or items supported.

D. Tile Splines: ASTM C635.

2.5 CARRYING CHANNELS FOR SECONDARY FRAMING

- A. Fabricate from cold-rolled or hot-rolled steel, black asphaltic paint finish, free of rust.
- B. Weighing not less than the following, per 300 m (per thousand linear feet):

Size mm	Size Inches	Cold-rolled		Hot-rolled	
		Kg	Pound	Kg	Pound
38	1 1/2	215.4	475	508	1120
50	2	267.6	590	571.5	1260

2.6 ADHESIVE

- A. ASTM D1779, having flame spread index of 25 or less when tested in accordance with ASTM E84.
- B. Developing minimum strength of 7 kg/m² (one psi) of contact surface 48 hours after installation in temperature of 21 °C (70 °F).

2.7 ACOUSTICAL UNITS

A. General:

1. Ceiling Tile shall meet minimum 37% bio-based content in accordance with USDA Bio-Preferred Product requirements.
2. ASTM E1264, weighing 3.6 kg/m² (3/4 psf) minimum for mineral fiber panels or tile.
3. Class A Flame Spread: ASTM 84
4. Minimum NRC (Noise Reduction Coefficient): 0.55 unless specified otherwise: ASTM C423.
5. Minimum CAC (Ceiling Attenuation Class): 40-44 range unless specified otherwise: ASTM E413.
6. Manufacturers standard finish, minimum Light Reflectance (LR) coefficient of 0.75 on the exposed surfaces, except as specified otherwise in Section 09 06 00, INTERIOR/EXTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
7. Lay-in panels: Sizes as shown, with reveal edges.
8. Tile for concealed grid upward access system: Optional 300 by 300 or 300 by 600 mm (12 by 12 or 12 by 24 inch) size.
 - a. Cross score 300 by 600 mm (12 by 24 inch) tile to simulate 300 by 300 mm (12 by 12 inch) tile edges.
 - b. Provide tile with square edges and joints as required to suit suspension and access system.
9. Perforated metal facing (pan); tile or panels:
 - a. Tiles: Size of units optional, 300 by 300, 300 by 600, 300 by 900, and 300 by 1200 mm (12 by 12, 12 by 24, 12 by 36, and 12 by 48 inches). Cross score units larger than 300 by 300 mm (12 by 12 inches) to simulate 300 by 300 mm (12 by 12 inch) units. Use beveled edge units. Design joints for snap-in attachment to suspension system.
 - b. Panels: Sizes as shown with flat panel with square edges to finish flush with exposed grid suspension system.
 - c. Sound absorbent element; either non-sifting mineral wool or glass fiber (free of formaldehyde) of density and thickness to provide specified noise reduction coefficient. Enclosure sound absorbent elements within plastic envelopes.
 - d. Support sound absorbent elements on wire spacer about 6 mm (1/4 inch) high. Fit both the sound absorbent element and the spacer into the unit.

- B. Type III Units - Mineral base with water-based painted finish less than 10 g/l VOC, Form 2 - Water felted, minimum 16 mm (5/8 inch) thick. Mineral base to contain minimum 65 percent recycled content.
- C. Type IV Units - Mineral base with membrane-faced overlay, Form 2 - Water felted, minimum 16 mm (5/8 inch) thick. Apply over the paint coat on the face of the unit a poly (vinyl) chloride overspray having a flame spread index of 25 or less when tested in accordance with ASTM E84.
- D. Type V Units - Perforated steel facing (pan) with mineral or glass fiber base backing.
 - 1. Steel ASTM A653, not less than 0.38 mm (0.015 inch) thick, minimum G30 galvanizing.
 - 2. Bonderize both sides of sheet and apply two coats of baked-on enamel finish, free from gloss or sheen, on surfaces exposed to view and at least one coat on concealed surfaces.

2.9 ACCESS IDENTIFICATION

- A. Markers:
 - 1. Use colored markers with pressure sensitive adhesive on one side.
 - 2. Make colored markers of paper or plastic, 6 to 9 mm (1/4 to 3/8 inch) in diameter.
- B. Use markers of the same diameter throughout building.
- C. Color Code: Use following color markers for service identification:

Color.....	Service
Red.....	Sprinkler System: Valves and Controls
Green.....	Domestic Water: Valves and Controls
Yellow.....	Chilled Water and Heating Water
Orange.....	Ductwork: Fire Dampers
Blue.....	Ductwork: Dampers and Controls
Black.....	Gas: Laboratory, Medical, Air and Vacuum

PART 3 EXECUTION

3.1 CEILING TREATMENT

- A. Treatment of ceilings shall include sides and soffits of ceiling beams, furred work 600 mm (24 inches) wide and over, and vertical surfaces at changes in ceiling heights unless otherwise shown. Install acoustic tiles after wet finishes have been installed and solvents have cured.
- B. Lay out acoustical units symmetrically about center lines of each room or space unless shown otherwise on reflected ceiling plan.
 - 1. Under no circumstances will there be allowed any ceiling panel less than 6" in width. All layouts should reflect this.
- C. Moldings:

1. Install metal wall molding at perimeter of room, column, or edge at vertical surfaces.
2. Install special shaped molding at changes in ceiling heights and at other breaks in ceiling construction to support acoustical units and to conceal their edges.

D. Perimeter Seal:

1. Provide paintable caulk at the junction of the bottom of the wall angles and the wall. Caulk color to match wall angle. There are to be no visible gaps between the wall angle and the wall.

E. Existing ceiling:

1. Where extensions of existing ceilings occur, match existing.
2. Where acoustical units are salvaged and reinstalled or joined, use salvaged units within a space. Do not mix new and salvaged units within a space which results in contrast between old and new acoustic units.
3. Comply with specifications for new acoustical units for new units required to match appearance of existing units.

3.2 CEILING SUSPENSION SYSTEM INSTALLATION

A. General:

1. Install metal suspension system for acoustical tile and lay-in panels in accordance with ASTM C636, except as specified otherwise.
2. Use direct or indirect hung suspension system or combination thereof as defined in ASTM C635.
3. Support a maximum area of 1.48 m² (16 sf) of ceiling per hanger.
4. Prevent deflection in excess of 1/360 of span of cross runner and main runner.
5. Provide extra hangers, minimum of one hanger at each corner of each item of mechanical, electrical and miscellaneous equipment supported by ceiling suspension system not having separate support or hangers.
6. Provide not less than 100 mm (4 inch) clearance from the exposed face of the acoustical units to the underside of ducts, pipe, conduit, secondary suspension channels, concrete beams or joists; and steel beam or bar joist unless furred system is shown,
7. Use main runners not less than 1200 mm (48 inches) in length.
8. Install hanger wires vertically. Angled wires are not acceptable except for seismic restraint bracing wires.

B. Anchorage to Structure:

1. Concrete:

- a. Install hanger inserts and wire loops required for support of hanger and bracing wire in concrete forms before concrete is placed. Install hanger wires with looped ends through steel deck if steel deck does not have attachment device.
 - b. Use eye pins or threaded studs with screw-on eyes in existing or already placed concrete structures to support hanger and bracing wire. Install in sides of concrete beams or joists at mid height.
2. Steel:
- a. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels for attachment of hanger wires.
 - (1) Size and space carrying channels to insure that the maximum deflection specified will not be exceeded.
 - (2) Attach hangers to steel carrying channels, spaced four feet on center, unless area supported or deflection exceeds the amount specified.
 - b. Attach carrying channels to the bottom flange of steel beams spaced not 1200 mm (4 feet) on center before fire proofing is installed. Weld or use steel clips to attach to beam to develop full strength of carrying channel.
 - c. Attach hangers to bottom chord of bar joists or to carrying channels installed between the bar joists when hanger spacing prevents anchorage to joist. Rest carrying channels on top of the bottom chord of the bar joists, and securely wire tie or clip to joist.
- B. Direct Hung Suspension System:
1. As illustrated in ASTM C635.
 2. Support main runners by hanger wires attached directly to the structure overhead.
 3. Maximum spacing of hangers, 1200 mm (4 feet) on centers unless interference occurs by mechanical systems. Use indirect hung suspension system where not possible to maintain hanger spacing.
- C. Indirect Hung Suspension System:
1. As illustrated in ASTM C635.
 2. Space carrying channels for indirect hung suspension system not more than 1200 mm (4 feet) on center. Space hangers for carrying channels not more than 2400 mm (8 feet) on center or for carrying channels less than 1200 mm (4 feet) on center so as to insure that specified requirements are not exceeded.

3. Support main runners by specially designed clips attached to carrying channels.

D. Seismic Ceiling Bracing System:

1. Construct system in accordance with ASTM E580.
2. Connect bracing wires to structure above as specified for anchorage to structure and to main runner or carrying channels of suspended ceiling at bottom.

3.3 ACOUSTICAL UNIT INSTALLATION

- A. Cut acoustic units for perimeter borders and penetrations to fit tight against penetration for joint not concealed by molding.
- B. Install lay-in acoustic panels in exposed grid with not less than 6 mm (1/4 inch) bearing at edges on supports.
 1. Install tile to lay level and in full contact with exposed grid.
 2. Replace cracked, broken, stained, dirty, or tile not cut for minimum bearing.
 3. Cut and paint edges of partial tegular panels to match tegular edge and color of face of panel.
- C. Tile in concealed grid upward access suspension system:
 1. Install acoustical tile with joints close, straight and true to line, and with exposed surfaces level and flush at joints.
 2. Make corners and arises full, and without worn or broken places.
 3. Locate acoustical units providing access as specified under Article, ACCESS.
- D. Adhesive applied tile:
 1. Condition of surface shall be in accordance with ASTM D1779, Note 1, Cleanliness of Surface, and Note 4, Rigidity of Base Surface.
 2. Size or seal surface as recommended by manufacturer of adhesive and allow to dry before installing units.
- E. Markers:
 1. Install markers of color code specified to identify the various concealed piping, mechanical, and plumbing systems.
 2. Attach colored markers to exposed grid on opposite sides of the units providing access.
 3. Attach marker on exposed ceiling surface of upward access acoustical unit.

3.5 CLEAN-UP AND COMPLETION

- A. Replace damaged, discolored, dirty, cracked and broken acoustical units.
- B. Leave finished work free from defects.

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SECTION 09 65 13
RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This section specifies the installation of vinyl or rubber base and resilient stair treads with sheet rubber flooring on landings.

1.2 RELATED WORK

- A. Color and texture: Section 09 06 00, INTERIOR/EXTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
- B. Integral base with sheet flooring: Section 09 65 16, RESILIENT SHEET FLOORING.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
1. Description of each product.
 2. Base and stair material manufacturer's recommendations for adhesives.
 3. Application and installation instructions.
- C. Samples:
1. Base: 150 mm (6 inches) long, each type and color.
 2. Resilient Stair Treads: 150 mm (6 inches) long.
 3. Sheet Rubber Flooring: 300 mm (12 inches) square.
 4. Adhesive: Literature indicating each type.

1.4 DELIVERY

- A. Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.
- B. Materials from containers which have been distorted, damaged or opened prior to installation will be rejected.

1.5 STORAGE

- A. Store materials in weather tight and dry storage facility.
- B. Protect material from damage by handling and construction operations before, during, and after installation.

1.6 APPLICABLE PUBLICATIONS

- A. The publication listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):

F1344-10.....Rubber Floor Tile
 F1859-10.....Rubber Sheet Floor Covering without Backing
 F1860-10.....Rubber Sheet Floor Covering with Backing
 F1861-08.....Resilient Wall Base

C. Federal Specifications (Fed. Spec.):

RR-T-650E.....Treads, Metallic and Non-Metallic, Nonskid

PART 2 - PRODUCTS

2.1 GENERAL

A. Use only products by the same manufacturer and from the same production run.

2.2 RESILIENT BASE

- A. ASTM F1861, 3 mm (1/8 inch) thick, 100 mm (4 inches) high, Thermoplastics, Group 2-layered. Style B-cove.
- B. Where carpet occurs, use Style A-straight.
- C. Use only one type of base throughout.

2.3 RESILIENT TREADS

- A. Fed. Spec. RR-T-650, Composition A, Type 2, 5 mm (3/16 inch) thick on wear surface tapering to 3 mm (1/8 inch) thick at riser end.
- B. Nosing shape to conform to sub-tread nosing shape.

2.4 SHEET RUBBER FLOORING

- A. ASTM F1344, F1859 or F1860, 900 mm (36 inches) wide, 3 mm (1/8 inch) thick, smooth face, material by the same manufacturer as the rubber treads, color and pattern to match treads.
- B. Use for stair landings.
- C. Use rubber flooring made with a minimum of 90% consumer rubber where possible.

2.5 PRIMER (FOR CONCRETE FLOORS)

A. As recommended by the adhesive and tile manufacturer.

2.6 LEVELING COMPOUND (FOR CONCRETE FLOORS)

A. Provide products with latex or polyvinyl acetate resins in the mix.

2.7 ADHESIVES

- A. Use products recommended by the material manufacturer for the conditions of use.
- B. Use low-VOC adhesive during installation. Water based adhesive with low VOC is preferred over solvent based adhesive.

PART 3 - EXECUTION

3.1 PROJECT CONDITIONS

A. Maintain temperature of materials above 21° C (70 °F), for 48 hours before installation.

- B. Maintain temperature of rooms where work occurs, between 21° C and 27° C (70°F and 80°F) for at least 48 hours, before, during, and after installation.
- C. Do not install materials until building is permanently enclosed and wet construction is complete, dry, and cured.

3.2 INSTALLATION REQUIREMENTS

- A. The respective manufacturer's instructions for application and installation will be considered for use when approved by the Resident Engineer.
- B. Submit proposed installation deviation from this specification to the Resident Engineer indicating the differences in the method of installation.
- C. The Resident Engineer reserves the right to have test portions of material installation removed to check for non-uniform adhesion and spotty adhesive coverage.

3.3 PREPARATION

- A. Examine surfaces on which material is to be installed.
- B. Fill cracks, pits, and dents with leveling compound.
- C. Level to 3 mm (1/8 inch) maximum variations.
- D. Do not use adhesive for leveling or filling.
- E. Grind, sand, or cut away protrusions; grind high spots.
- F. Clean substrate area of oil, grease, dust, paint, and deleterious substances.
- G. Substrate area dry and cured. Perform manufacturer's recommended bond and moisture test.
- H. Preparation of existing installation:
 - 1. Remove existing base and stair treads including adhesive.
 - 2. Do not use solvents to remove adhesives.
 - 3. Prepare substrate as specified.

3.4 BASE INSTALLATION

- A. Location:
 - 1. Unless otherwise specified or shown, where base is scheduled, install base over toe space of base of casework, lockers, laboratory, pharmacy furniture island cabinets and where other equipment occurs.
 - 2. Extend base scheduled for room into adjacent closet, alcoves, and around columns.
- B. Application:
 - 1. Apply adhesive uniformly with no bare spots.
 - 2. Set base with joints aligned and butted to touch for entire height.

3. Before starting installation, layout base material to provide the minimum number of joints with no strip less than 600 mm (24 inches) length.
 - a. Short pieces to save material will not be permitted.
 - b. Locate joints as remote from corners as the material lengths or the wall configuration will permit.
- C. Form corners and end stops as follows:
 1. Score back of outside corner.
 2. Score face of inside corner and notch cove.
- D. Roll base for complete adhesion.

3.5 SHEET RUBBER INSTALLATION.

- A. Prepare surfaces to receive sheet rubber in accordance with applicable portions of paragraph, preparation.
- B. Layout of Sheet Rubber:
 1. Use minimum number of joints compatible with material direction and symmetrical joint location.
 2. Where sheet rubber intersect vertical stair members, other sheets, stair treads, and other resilient materials at the floor landings, material shall touch for the entire length within 5 mils (0.005 inch).
 3. Install sheet rubber on floors and intermediate landings where resilient stair treads are installed; center joint with other flooring material under doors.
- C. Application:
 1. Apply adhesive uniformly with no bare spots.
 2. Roll sheet rubber to assure adhesion.

3.6 CLEANING AND PROTECTION

- A. Clean all exposed surfaces of base and adjoining areas of adhesive spatter before it sets.
- B. Keep traffic off resilient material for at least 72 hours after installation.
- C. Clean and polish materials in the following order:
 1. After two weeks, scrub resilient base, sheet rubber and treads materials with a minimum amount of water and a mild detergent. Leave surfaces clean and free of detergent residue. Polish resilient base to a gloss finish.
 2. Do not polish tread and sheet rubber materials.

- D. When construction traffic is anticipated, cover tread materials with reinforced kraft paper and plywood or hardboard properly secured and maintained until removal is directed by the Resident Engineer.
- E. Where protective materials are removed and immediately prior to acceptance, replace damaged materials and re-clean resilient materials. Damaged materials are defined as having cuts, gouges, scrapes or tears and not fully adhered.

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SECTION 09 65 16
RESILIENT SHEET FLOORING

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This Section specifies the installation of sheet flooring with backing and integral cove base.
- B. Grades of resilient sheet vinyl floor covering without backing having vinyl plastic wearlayer with backing.
- C. Installation of sheet flooring including following:
 - 1. Heat welded seams.
 - 2. Integral cove base: Installed at intersection of floor and vertical surfaces.

1.2 RELATED WORK

- A. Color, pattern and texture: Section 09 06 00, INTERIOR/EXTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
- B. Resilient base required over metal base of casework: Section 12 30 00, MANUFACTURED WOOD CASEWORK.
- C. Resilient base over base of lockers, equipment and casework: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

1.3 QUALITY CONTROL-QUALIFICATIONS:

- A. The Contracting Officer shall approve products or service of proposed manufacturer, suppliers, and installers, and the Contractor shall submit certification that:
 - 1. Heat welded seaming is manufacturer's prescribed method of installation.
 - 2. Installer is approved by manufacturer of materials and has technical qualifications, experience, trained personnel, and facilities to install specified items.
 - 3. Manufacturer's product submitted has been in satisfactory operation, on three installations similar and equivalent in size to this project for three years. Submit list of installations.
- B. The sheet vinyl floor coverings shall meet fire performance characteristics as determined by testing products, per ASTM test method, indicated below by Underwriters Laboratories, Inc. (UL) or another recognized testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Critical Radiant Flux: 0.45 watts per sq. cm or more, Class I, per ASTM E648.
 - 2. Smoke Density: Less than 450 per ASTM E662.

- C. The floor covering manufacturer shall certify that products supplied for installation comply with local regulations controlling use of volatile organic compounds (VOC's).

1.4 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, submit following:
- B. Manufacturer's Literature and Data:
1. Description of resilient material and accessories to be provided.
 2. Resilient material manufacturer's recommendations for adhesives, weld rods, sealants, and underlayment.
 3. Application and installation instructions.
- C. Samples:
1. Sheet material, 38 mm by 300 mm (1-1/2 inch by 12 inch), of each color and pattern with a welded seam using proposed welding rod 300 mm (12 inches) square for each type, pattern and color.
 2. Cap strip and fillet strip, 300 mm (12 inches) for integral base.
 3. Shop Drawings and Certificates: Layout of joints showing patterns where joints are expressed, and type and location of obscure type joints. Indicate orientation of directional patterns.
 4. Certificates: Quality Control Certificate Submittals and lists specified in paragraph, QUALIFICATIONS.
 5. Edge strips: 150 mm (6 inches) long each type.
 6. Adhesive, underlayment and primer: Pint container, each type.

1.5 PROJECT CONDITIONS

- A. Maintain temperature of floor materials and room, where work occurs, above 18 ° C (65 °F) and below 38 ° C (100 °F) for 48 hours before, during and for 48 hours after installation. After above period, room temperature shall not fall below 13 ° C (55 °F).
- B. Construction in or near areas to receive flooring work shall be complete, dry and cured. Do not install resilient flooring over slabs until they have been cured and are sufficiently dry to achieve a bond with adhesive. Follow flooring manufacturer's recommendations for bond and moisture testing.
- C. Building shall be permanently enclosed. Schedule construction so that floor receives no construction traffic when completed.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site in original sealed packages or containers; labeled for identification with manufacturer's name and brand.

- B. Deliver sheet flooring full width roll, completely enclosed in factory wrap, clearly marked with the manufacturer's number, type and color, production run number and manufacture date.
- C. Store materials in weathertight and dry storage facility. Protect from damage due to handling, weather, and construction operations before, during and after installation. Store sheet flooring on end with ambient temperatures maintained as recommended by manufacturer.
- D. Store sheet flooring on end.
- E. Move sheet vinyl floor coverings and installation accessories into spaces where they will be installed at least 48 hours in advance of installation.

1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society For Testing Materials (ASTM):
 - E648-09.....Critical Radiant Flux of Floor-Covering Systems
Using a Radiant Energy Source.
 - E662-09.....Specific Optical Density of Smoke Generated by
Solid Materials.
 - F710-08.....Practice for Preparing Concrete Floors and Other
Monolithic Floors to Receive Resilient Flooring.
 - F1303-04.....Sheet Vinyl Floor Covering with Backing.
 - F1869-04.....Moisture Vapor Emission Rate of Concrete
Subfloor using Anhydrous Calcium Chloride
 - F1913-04.....Sheet Vinyl Flooring without Backing
 - F2170-09.....Determining Relative Humidity in Concrete Floor
Slabs using In-situ Probes
- C. Resilient Floor Covering Institute (RFCI):
 - Recommended Work Practices for Removal of Resilient Floor Coverings.

1.8 SCHEDULING

- A. Interior finish work such as plastering, drywall finishing, concrete, terrazzo, ceiling work, and painting work shall be complete and dry before installation. Mechanical, electrical, and other work above ceiling line shall be completed. Heating, ventilating, and air conditioning systems shall be installed and operating in order to maintain temperature and humidity requirements.

1.9 WARRANTY:

- A. Submit written warranty, in accordance with FAR clause 52.246-21, Warranty of Construction requirements except that warranty period shall be extended to include two (2) years.

PART 2 - PRODUCTS**2.1 SHEET VINYL FLOOR COVERINGS**

- A. Sheet Vinyl Floor Coverings: Smooth face, minimum thickness nominal 2 mm (0.08 inch). Sheet flooring shall conform to ASTM F1913 and material requirements specified in ASTM F1303, Type II, Grade 1, backing classification not applicable. Foam backed sheet flooring is not acceptable.
- B. Size: Provide maximum size sheet vinyl material produced by manufacturer to provide minimum number of joints. Minimum size width acceptable - 1200 mm (48 inches).
- C. Each color and pattern of sheet flooring shall be of same production run.

2.2 WELDING ROD:

- A. Product of floor covering manufacturer in color shall match field color of sheet vinyl covering.

2.3 APPLICATION MATERIALS AND ACCESSORIES

- A. Floor and Base Adhesive: Type recommended by sheet flooring material manufacturer for conditions of use.
- B. Mastic Underlayment (for concrete floors): Provide products with latex or polyvinyl acetate resins in mix. Condition to be corrected shall determine type of underlayment selected for use.
- C. Base Accessories:
 - 1. Fillet Strip: 19 mm (3/4 inch) radius fillet strip compatible with resilient sheet material.
 - 2. Cap Strip: Extruded flanged zero edge vinyl reducer strip approximately 25 mm (one inch) exposed height with 13 mm (1/2 inch) flange.

2.4 SHEET FLOORING

- A. ASTM F1303, Type II, Grade 1, except for backing requirements. Foam backed sheet flooring is not acceptable.
- B. Minimum nominal thickness 2 mm (0.08 inch); 1800 mm (6 ft) minimum width.
- C. Critical Radiant Flux: 0.45 watts per sq.cm or more, Class I, per ASTM E648.
- D. Smoke density: less than 450 per ASTM E662.
- E. Color and pattern of sheet flooring of the same production run.

2.5 ADHESIVES

Water resistant type recommended by the sheet flooring manufacturer for the conditions of use. VOC not to exceed 50g/L

2.6 BASE CAP STRIP AND COVE STRIP

- A. Extruded vinyl compatible with the sheet flooring.
- B. Cap strip "J" shape with feathered edge flange approximately 25 mm (one inch) wide; top designed to receive sheet flooring with 13 mm (1/2 inch) flange lapping top of flooring
- C. Cove strip 70 mm (2-3/4 inch) radius.

2.7 LEVELING COMPOUND (FOR CONCRETE FLOORS)

- A. Provide cementitious products with latex or polyvinyl acetate resins in the mix.

2.8 PRIMER (FOR CONCRETE SUBFLOORS)

- A. As recommended by the adhesive or sheet flooring manufacturer.

2.9 EDGE STRIPS

- A. Extruded aluminum, mill finish, mechanically cleaned.
- B. 28 mm (1-1/8 inch) wide, 6 mm (1/4 inch) thick, bevel one edge to 3 mm (1/8 inch) thick.
- C. Drill and counter sink edge strips for flat head screws. Space holes near ends and approximately 225 mm (9 inches) on center in between.

2.10 SEALANT

- A. As specified in Section 07 92 00, JOINT SEALANTS.
- B. Compatible with sheet flooring.

PART 3 - EXECUTION**3.1 PROJECT CONDITIONS**

- A. Maintain temperature of sheet flooring above 36 °C (65 °F), for 48 hours before installation.
- B. Maintain temperature of rooms where sheet flooring work occurs above 36 °C (65 °F), for 48 hours, before installation and during installation.
- C. After installation, maintain temperature at or above 36 °C (65 °F.)
- D. Building is permanently enclosed.
- E. Wet construction in or near areas to receive sheet flooring is complete, dry and cured.

3.2 SUBFLOOR PREPARATION

- A. Concrete Subfloors: Verify that concrete slabs comply with ASTM F710.
 - 1. Installer shall examine surfaces on which resilient sheet flooring is to be installed, and shall advise Contractor, in writing, of areas which are unacceptable for installation of flooring material.

Installer shall advise Contractor which methods are to be used to correct conditions that will impair proper installation. Installation shall not proceed until unsatisfactory conditions have been corrected.

2. Slab substrates dry, free of curing compounds, sealers, hardeners, and other materials which would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by Resilient Floor Covering Institute recommendations in manual RFCI-MRP.
- B. Broom or vacuum clean substrates to be covered by sheet vinyl floor coverings immediately before installation. Following cleaning, examine substrates to determine if there is visually any evidence of moisture, alkaline salts, carbonation, or dust.
- C. Primer: If recommended by flooring manufacturer, prior to application of adhesive, apply concrete slab primer in accordance with manufacturer's directions.
- D. Correct conditions which will impair proper installation, including trowel marks, pits, dents, protrusions, cracks or joints.
- E. Fill cracks, joints, depressions, and other irregularities in concrete with leveling compound.
 1. Do not use adhesive for filling or leveling purposes.
 2. Do not use leveling compound to correct imperfections which can be corrected by spot grinding.
 3. Trowel to smooth surface free of trowel marks, pits, dents, protrusions, cracks or joint lines.
- F. Clean floor of oil, paint, dust and deleterious substances. Leave floor dry and cured free of residue from existing curing or cleaning agents.
- G. Moisture Testing: Perform moisture and pH test as recommended by the flooring and adhesive manufacturers. Perform test locations starting on the deepest part of the concrete structure. Proceed with installation only after concrete substrates meet or exceed the manufacturer's requirements. In the absence of specific guidance from the flooring or adhesive manufacturer the following requirements are to be met:
 1. Perform moisture vapor emission tests in accordance with ASTM F1869. Proceed with installation only after substrates have a maximum moisture-vapor-emission rate of 1.36 kg of water/92.9 sq. m (3lb of water/1000 sq. ft.) in 24 hours.
 2. Perform concrete internal relative humidity testing using situ probes in accordance with ASTM F2170. Proceed with installation only after

concrete reaches maximum 75 percent relative humidity level measurement.

- H. Preparation shall include the removal of existing resilient floor and existing adhesive. Do not use solvents to remove adhesives. Coordinate with Asbestos Abatement Section if asbestos abatement procedures will be involved.
- I. Remove existing resilient flooring and adhesive completely in accordance with Resilient Floor Covering Institute recommendations in manual RFCI-WP. Solvents shall not be used.

3.3 INSTALLATION OF FLOORING

- A. Install work in strict compliance with manufacturer's instructions and approved layout drawings.
- B. Maintain uniformity of sheet vinyl floor covering direction and avoid cross seams.
- C. Arrange for a minimum number of seams and place them in inconspicuous and low traffic areas, but in no case less than 150 mm (6 inches) away from parallel joints in flooring substrates.
- D. Match edges of resilient floor coverings for color shading and pattern at seams.
- E. Where resilient sheet flooring abuts other flooring material floors shall finish level.
- F. Extend sheet vinyl floor coverings into toe spaces, door reveals, closets, and similar openings.
- G. Inform the Resident Engineer of conflicts between this section and the manufacturer's instructions or recommendations for auxiliary materials, or installation methods, before proceeding.
- H. Install sheet in full coverage adhesives.
 - 1. Air pockets or loose edges will not be accepted.
 - 2. Trim sheet materials to touch in the length of intersection at pipes and vertical projections; seal joints at pipe with waterproof cement or sealant.
- I. Keep joints to a minimum; avoid small filler pieces or strips.
- J. Follow manufacturer's recommendations for seams at butt joints. Do not leave any open joints that would be readily visible from a standing position.
- K. Follow manufacturer's recommendations regarding pattern match, if applicable.
- L. Installation of Edge Strips:
 - 1. Locate edge strips under center lines of doors unless otherwise indicated.

2. Set aluminum strips in adhesive, anchor with lead anchors and stainless steel Phillips screws.

M. Integral Cove Base Installation:

1. Set preformed fillet strip to receive base.
2. Install the base with adhesive, terminate expose edge with the cap strip.
3. Form internal and external corners to the geometric shape generated by the cove at either straight or radius corners.
4. Solvent weld joints as specified for the flooring. Seal cap strip to wall with an adhesive type sealant.
5. Unless otherwise specified or shown where sheet flooring is scheduled, provide integral base at intersection of floor and vertical surfaces. Provide sheet flooring and base scheduled for room on floors and walls under and behind areas where casework, laboratory and pharmacy furniture and other equipment occurs, except where mounted in wall recesses.

3.4 INSTALLATION OF INTEGRAL COVED BASE

- A. Set preformed cove to receive base. Install base material with adhesive and terminate exposed edge with cap strip. Integral base shall be 150 mm (6 inches) high.
- B. Internal and external corners shall be formed to geometric shape generated by cove at either square or radius corners.

3.5 WELDING

- A. Heat weld all joints of flooring and base using equipment and procedures recommended by flooring manufacturer.
- B. Welding shall consist of routing joint, inserting a welding rod into routed space, and terminally fusing into a homogeneous joint.
- C. Upon completion of welding, surface across joint shall finish flush, free from voids, and recessed or raised areas.
- D. Fusion of Material: Joint shall be fused a minimum of 65 percent through thickness of material, and after welding shall meet specified characteristics for flooring.

3.6 CLEANING

- A. Clean small adhesive marks during application of sheet flooring and base before adhesive sets, excessive adhesive smearing will not be accepted.
- B. Remove visible adhesive and other surface blemishes using methods and cleaner recommended by floor covering manufacturers.
- C. Clean and polish materials per flooring manufacturer's written recommendations.
- D. Vacuum floor thoroughly.

- E. Do not wash floor until after period recommended by floor covering manufacturer and then prepare in accordance with manufacturer's recommendations.
- F. Upon completion, Resident Engineer shall inspect floor and base to ascertain that work was done in accordance with manufacturer's printed instructions.
- G. Perform initial maintenance according to flooring manufacturer's written recommendations.

3.7 PROTECTION:

- A. Protect installed flooring as recommended by flooring manufacturer against damage from rolling loads, other trades, or placement of fixtures and furnishings.
- B. Keep traffic off sheet flooring for 24 hours after installation.
- C. Where construction traffic is anticipated, cover sheet flooring with reinforced kraft paper properly secured and maintained until removal is authorized by the Resident Engineer.
- D. Where protective materials are removed and immediately prior to acceptance, repair any damage, re-clean sheet flooring, lightly re-apply polish and buff floor.

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SECTION 09 65 19
RESILIENT TILE FLOORING

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This section specifies the installation of solid vinyl tile flooring, vinyl composition tile flooring, rubber tile flooring, and accessories.

1.2 RELATED WORK

- A. Color and pattern and location in room finish schedule: Section 09 06 00, INTERIOR/EXTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
- B. Resilient Base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
1. Description of each product.
 2. Resilient material manufacturers recommendations for adhesives, underlayment, primers and polish.
 3. Application and installation instructions.
- C. Samples:
1. Tile: 300 mm by 300 mm (12 inches by 12 inches) for each type, pattern and color.
 2. Edge Strips: 150 mm (6 inches) long, each type.
 3. Feature Strips: 150 mm (6 inches) long.
- D. Shop Drawings:
1. Layout of patterns shown on the drawings and in Section 09 06 00, INTERIOR/EXTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE
 - a. Rooms must be field measured prior to submission.
 - b. The room sizes must reflect the actual room sizes in the field.
 - c. Provide a starting point for the tile based on the field measurements.
 - d. Under no circumstances should tiles be less than 6" wide.
 2. Edge strip locations showing types and detail cross sections.
- E. Test Reports:
1. Abrasion resistance: Depth of wear for each tile type and color and volume loss of tile, certified by independent laboratory.
 2. Tested per ASTM F510.

1.4 DELIVERY

- A. Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.
- B. Materials from containers which have been distorted, damaged or opened prior to installation will be rejected.

1.5 STORAGE

- A. Store materials in weathertight and dry storage facility.
- B. Protect from damage from handling, water, and temperature.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
 - D4078-02 (2008).....Water Emulsion Floor Finish
 - E648-10e1.....Critical Radiant Flux of Floor Covering Systems
Using a Radiant Energy Source
 - E662-09.....Specific Optical Density of Smoke Generated by
Solid Materials
 - E1155-96 (R2008).....Determining Floor Flatness and Floor Levelness
Numbers
 - F510-93 (R 2008).....Resistance to Abrasion of Resilient Floor
Coverings Using an Abrader with a Grit Feed
Method
 - F710-11.....Preparing Concrete Floors to Receive Resilient
Flooring
 - F1066-04 (R2010)e1.....Vinyl Composition Floor Tile
 - F1344-10.....Rubber Floor Tile
 - F1700-04 (R2010).....Solid Vinyl Floor Tile
- C. Resilient Floor Covering Institute (RFCI):
 - IP #2.....Installation Practice for Vinyl Composition Tile
(VCT)
- D. Federal Specifications (Fed. Spec.):
 - SS-T-312.....Tile Floor: Asphalt, Rubber, Vinyl and Vinyl
Composition

PART 2 - PRODUCTS**2.1 GENERAL**

- A. Furnish product type, materials of the same production run and meeting following criteria.

- B. Use adhesives, underlayment, primers and polish recommended by the floor resilient material manufacturer.
- C. Critical Radiant Flux: 0.45 watts per sq. cm or more, Class I, per ASTM E 648.
- D. Smoke density: Less than 450 per ASTM E662.

2.2 VINYL COMPOSITION TILE

- A. ASTM F1066, Composition 1, Class I (solid color) Class 2 (through pattern), 300 mm (12 inches) square, 3 mm (1/8 inch) thick.
- B. Color and pattern uniformly distributed throughout thickness.

2.3 SOLID VINYL-TILE

- A. ASTM F1700, 300 mm (12 by 12 inches) square, 3 mm (1/8 inch) thick, homogenous throughout.
- B. Color and Pattern uniformly distributed throughout thickness.
- C. Where solid vinyl tiles are specified, seek products with recycled content.

2.4 RUBBER TILE

- A. ASTM F1344, Class 1, homogenous rubber tile, B, through mottled, 300 mm (12 inches) square, 3 mm (1/8 inch) thick.
- B. Color and pattern uniformly distributed throughout tile.
- C. Molded pattern wearing surface base thickness 3 mm (1/8 inch) thick.
- D. Where rubber tile is used provide tiles with a minimum of 90% post consumer rubber.

2.5 ADHESIVES

- A. Comply with applicable regulations regarding toxic and hazardous materials Green Seal (GS-36) for commercial adhesive.
- B. Use low-VOC adhesive during installation. Water based is preferred over solvent based adhesives.

2.6 PRIMER (FOR CONCRETE SUBFLOORS)

As recommended by the adhesive and tile manufacturer.

2.7 LEVELING COMPOUND (FOR CONCRETE FLOORS)

- A. Provide cementitious products with latex or polyvinyl acetate resins in the mix.
- B. Determine the type of underlayment selected for use by the condition to be corrected.

2.8 POLISH AND CLEANERS

- A. Cleaners RFCI CL-1.
- B. Polish: ASTM D4078.

2.9 EDGE STRIPS

- A. 28 mm (1-1/8 inch) wide unless shown otherwise.
- B. Bevel from maximum thickness to minimum thickness for flush joint unless shown otherwise.
- C. Extruded aluminum, mill finish, mechanically cleaned:
 - 1. Drill and counter sink edge strip for flat head screws.
 - 2. Space holes near ends and approximately 225 mm (9 inches) on center between.
- D. Resilient Edge Strip or Reducer Strip: Fed. Specs. SS-T-312, Solid vinyl.

2.10 SCREWS

- A. Stainless steel flat head screw.

2.11 FEATURE STRIPS

- A. Use same material as floor tile.
- B. Sizes and shapes as shown.

PART 3 - EXECUTION**3.1 PROJECT CONDITIONS**

- A. Maintain temperature of materials a minimum of 22 °C (70 °F,) for 48 hours before installation.
- B. Maintain temperature of rooms where work occurs between 21 °C and 27 °C (70 °F and 80 °F), for at least 48 hours, before, during and after installation.
- C. Do not install flooring until building is permanently enclosed and wet construction in or near areas to receive tile materials is complete, dry and cured.

3.2 SUBFLOOR PREPARATION

- A. Verify that concrete slabs comply with ASTM F710. At existing slabs, determine levelness by F-number method in accordance with ASTM E1155. Overall value shall not exceed as follows:
 - FF30/FL20
- B. Correct conditions which will impair proper installation.
- C. Fill cracks, joints and other irregularities in concrete with leveling compound:
 - 1. Do not use adhesive for filling or leveling purposes.
 - 2. Do not use leveling compound to correct imperfections which can be corrected by spot grinding.
 - 3. Trowel to smooth surface free of trowel marks, pits, dents, protrusions, cracks or joints.

- D. Clean floor of oil, paint, dust, and deleterious substances: Leave floor dry and cured free of residue from existing curing or cleaning agents.
- E. Concrete Subfloor Testing:
Determine Adhesion and dryness of the floor by bond and moisture tests as recommended by RFCI manual MRP.
- F. Perform additional subfloor preparation to obtain satisfactory adherence of flooring if subfloor test patches allows easy removal of tile.
- G. Prime the concrete subfloor if the primer will seal slab conditions that would inhibit bonding, or if priming is recommended by the tile or adhesive manufacturers.
- H. Preparation of existing installation shall include the removal of existing resilient floor and existing adhesive. Do not use solvents to remove adhesives.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions for application and installation unless specified otherwise.
- B. Mix tile from at least two containers. An apparent line either of shades or pattern variance will not be accepted.
- C. Tile Layout:
 - 1. If layout is not shown on drawings, lay tile symmetrically about center of room or space with joints aligned.
 - 2. No tile shall be less than 150 mm (6 inches) and of equal width at walls.
 - 3. Place tile pattern in the same direction; do not alternate tiles.
- D. Trim tiles to touch for the length of intersections at pipes and vertical projections, seal joints at pipes with waterproof cement.
- E. Application:
 - 1. Apply adhesive uniformly with no bare spots.
 - a. Conform to RFC1-TM-6 for joint tightness and for corner intersection unless layout pattern shows random corner intersection.
 - b. More than 5 percent of the joints not touching will not be accepted.
 - 2. Roll tile floor with a minimum 45 kg (100 pound) roller. No exceptions.
 - 3. The Resident Engineer may have test tiles removed to check for non-uniform adhesion, spotty adhesive coverage, and ease of removal.
Install new tile for broken removed tile.
- F. Installation of Edge Strips:

1. Locate edge strips under center line of doors unless otherwise shown.
2. Set resilient edge strips in adhesive. Anchor metal edge strips with anchors and screws specified.
3. Where tile edge is exposed, butt edge strip to touch along tile edge.
4. Where thin set ceramic tile abuts resilient tile, set edge strip against floor file and against the ceramic tile edge.

3.4 CLEANING AND PROTECTION

- A. Clean adhesive marks on exposed surfaces during the application of resilient materials before the adhesive sets. Exposed adhesive is not acceptable.
- B. Keep traffic off resilient material for a minimum 72 hours after installation.
- C. Clean and polish materials in the following order:
 1. For the first two weeks sweep and damp mopped only.
 2. After two weeks, scrub resilient materials with a minimum amount of water and a mild detergent. Leave surface clean and free of detergent residue.
 3. Apply polish to the floors in accordance with the polish manufacturer's instructions.
- D. When construction traffic occurs over tile, cover resilient materials with reinforced kraft paper properly secured and maintained until removal is directed by Resident Engineer. At entrances and where wheeled vehicles or carts are used, cover tile with plywood, hardboard, or particle board over paper, secured and maintained until removal is directed by Resident Engineer.
- E. When protective materials are removed and immediately prior to acceptance, replace any damage tile, re-clean resilient materials, lightly re-apply polish and buff floors.

3.6 LOCATION

- A. Unless otherwise specified or shown, install tile flooring, on floor under areas where casework, laboratory and pharmacy furniture and other equipment occurs, except where mounted in wall recesses.
- B. Extend tile flooring for room into adjacent closets and alcoves.

- - - E N D - - -

SECTION 09 68 00
CARPETING

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. Section specifies carpet, edge strips, adhesives, and other items required for complete installation.

1.2 RELATED WORK

- A. Color and texture of carpet and edge strip: Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
- B. Resilient wall base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

1.3 QUALITY ASSURANCE

- A. Carpet installed by mechanics certified by the Floor Covering Installation Board.
- B. Certify and label the carpet that it has been tested and meets criteria of CRI IAQ Carpet Testing Program for indoor air quality.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Product Data:
 - 1. Manufacturer's catalog data and printed documentation stating physical characteristics, durability, resistance to fading and flame resistance characteristics for each type of carpet material and installation accessory.
 - 2. Manufacturer's printed installation instructions for the carpet, including preparation of installation substrate, seaming techniques and recommended adhesives and tapes.
 - 3. Manufacturer's certificate verifying carpet containing recycled materials include percentage of recycled materials as specified.
- C. Samples:
 - 1. Carpet: "Production Quality" samples 300 x 300 mm (12 x 12 inches) of carpets, showing quality, pattern and color specified in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
 - 2. Floor Edge Strip (Molding): 150 mm (6 inches) long of each color and type specified.
 - 3. Base Edge Strip (Molding): 150 mm (6 inches) long of each color specified.

- D. Shop Drawings: Installers layout plan showing seams and cuts for sheet carpet and carpet module. Provide carpet and layout prior to performing work.
 - 1. Rooms must be field measured prior to submission.
 - 2. The room sizes must reflect the actual room sizes in the field.
 - 3. Under no circumstances should carpet tiles be less than 6" wide.
- E. Maintenance Data: Carpet manufacturer's maintenance instructions describing recommended type of cleaning equipment and material, spotting and cleaning methods and cleaning cycles.

1.5 DELIVERY AND STORAGE

- A. Deliver carpet in manufacturer's original wrappings and packages clearly labeled with manufacturer's name, brand, name, size, dye lot number and related information.
- B. Deliver adhesives in containers clearly labeled with manufacturer's name, brand name, number, installation instructions, safety instructions and flash points.
- C. Store in a clean, dry, well ventilated area, protected from damage and soiling. Maintain storage space at a temperature above 16 degrees C (60 degrees F) for 2 days prior to installation.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Areas in which carpeting is to be installed shall be maintained at a temperature above 16 degrees C (60 degrees F) for 2 days before installation, during installation and for 2 days after installation. A minimum temperature of 13 degrees C (55 degrees F) shall be maintained thereafter for the duration of the contract. Traffic or movement of furniture or equipment in carpeted area shall not be permitted for 24 hours after installation. Other work which would damage the carpet shall be completed prior to installation of carpet.

1.7 WARRANTY

- A. Carpet and installation subject to terms of "Warranty of Construction" FAR clause 52.246-21, except that warranty period is extended to two years.

1.8 APPLICABLE PUBLICATIONS

- A. Publication listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):
 - ANSI/NSF 140-10.....Sustainable Carpet Assessment Standard
- C. American Association of Textile Chemists and Colorists (AATCC):

AATCC 16-04.....Colorfastness to Light

AATCC 129-10.....Colorfastness to Ozone in the Atmosphere under
High Humidities

AATCC 134-11.....Electric Static Propensity of Carpets

AATCC 165-08.....Colorfastness to Crocking: Textile Floor
Conerings-AATCC Crockmeter Method

D. American Society for Testing and Materials (ASTM):

ASTM D1335-05.....Tuft Bind of Pile Yarn Floor Coverings

ASTM D3278-96 (R2004)...Flash Point of Liquids by Small Scale Closed-Cup
Apparatus

ASTM D5116-10.....Determinations of Organic Emissions from Indoor
Materials/Products

ASTM D5252-05.....Operation of the Hexapod Tumble Drum Tester

ASTM D5417-05.....Operation of the Vettermann Drum Tester

ASTM E648-10e1.....Critical Radiant Flux of Floor-Covering Systems
Using a Radiant HeatEnergy Source

E. The Carpet and Rug Institute (CRI):

CRI 104-11.....Installation of Commercial Carpet

PART 2 - PRODUCTS

2.1 CARPET

A. Physical Characteristics:

1. Carpet free of visual blemishes, streaks, poorly dyed areas, fuzzing of pile yarn, spots or stains and other physical and manufacturing defects.
2. Manufacturers standard construction commercial carpet:
 - a. Broadloom; maximum width to minimum use
 - b. Modular Tile: 660 mm (24 inches) square tile.
3. Provide static control to permanently control static build upto less than 2.0 kV when tested at 20 percent relative humidity and 21 degrees C (70 degrees F) in accordance with AATCC 134.
4. Pile Height: Maximum 3.25 mm (0.10 inch).
5. Pile Fiber: Nylon with recycled content 25 percent minimum branded (federally registered trademark).
6. Pile Type: Level Loop.
7. Backing materials: Manufacturer's unitary backing designed for glue-down installation using recovered materials.
8. Appearance Retention Rating (ARR): Carpet shall be tested and have the minimum 3.5-4.0 Severe ARR when tested in accordance with either the ASTM D 5252 (Hexapod) or ASTM D 5417 (Vettermann) test methods

- using the number of cycles for short and long term tests as specified.
9. Tuft Bind: Minimum force of 40 N (10 lb) required to pull a tuft or loop free from carpet backing. Test per ASTM D1335.
 10. Colorfastness to Crocking: Dry and wet crocking and water bleed, comply with AATCC 165 Color Transference Chart for colors, minimum class 4 rating.
 11. Colorfastness to Ozone: Comply with AATCC 129, minimum rating of 4 on the AATCC color transfer chart.
 12. Delamination Strength: Minimum of 440 N/m (2.5 lb/inch) between secondary backing.
 13. Flammability and Critical Radiant Flux Requirements:
 - a. Test Carpet in accordance with ASTM E 648.
 - b. Class I: Not less than 0.45 watts per square centimeter.
 - c. Class II: Not less than 0.22 watts per square centimeter.
 - d. Carpet in corridors, exits and Medical Facilities: Class I.
 14. Density: Average Pile Yarn Density (APYD):
 - a. Corridors, lobbies, entrances, common areas or multipurpose rooms, open offices, waiting areas and dining areas: Minimum APYD 6000.
 - b. Other areas: Minimum APYD 4000.
 15. VOC Limits: Use carpet and carpet adhesive that comply with the following limits for VOC content when tested according to ASTM D 5116:
 - a. Carpet, Total VOCs: 0.5 mg/sq.m x hr.
 - b. Carpet, 4-PC (4-Phenylcyclohexene): 0.05 mg/sq.m x hr.
 - c. Carpet, Formaldehyde: 0.05 mg/sq.m x hr.
 - d. Carpet, Styrene: 0.4 mg/sq.m x hr.
 - e. Adhesive, Total VOCs: 10.00 mg/sq.m x hr.
 - f. Adhesive, Formaldehyde: 0.05 mg/sq.m x hr.
 - g. Adhesive, 2-Ethyl-1-Hexanol: 3.00 mg/sq.m x hr.
- B. Shall meet platinum level of ANSI/NSF 140.
- C. Color, Texture, and Pattern: As specified in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.

2.2 ADHESIVE AND CONCRETE PRIMER

- A. Waterproof, resistant to cleaning solutions, steam and water, nonflammable, complies with air-quality standards as specified. Adhesives flashpoint minimum 60 degrees C (140 degrees F), complies with ASTM D 3278.
- B. Seam Adhesives: Waterproof, non-flammable and non-staining.

2.3 SEAMING TAPE

- A. Permanently resistant to carpet cleaning solutions, steam, and water.
- B. Recommended by carpet manufacturer.

2.4 EDGE STRIPS (MOLDING)

A. Metal:

- 1. Hammered surface aluminum, pinless, clamp down type designed for the carpet being installed.
- 2. Floor flange not less than 38 mm (1-1/2 inches) wide, face not less than 16 mm (5/8 inch) wide.
- 3. Finish: Clear anodic coating unless specified otherwise in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.

B. Vinyl Edge Strip:

- 1. Beveled floor flange minimum 50 mm (2 inches) wide.
- 2. Beveled surface to finish flush with carpet for tight joint and other side to floor finish.
- 3. Color as specified in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.

2.5 LEVELING COMPOUND (FOR CONCRETE FLOORS)

- A. Provide Portland cement bases polymer modifier with latex or polyvinyl acetate resin manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.
- B. Determine the type of underlayment selected for use by condition to be corrected.

PART 3 - EXECUTION**3.1 SURFACE PREPARATION**

- A. Examine surfaces on which carpeting is to be installed.
- B. Clean floor of oil, waxy films, paint, dust and deleterious substances that prevent adhesion, leave floor dry and cured, free of residue from curing or cleaning agents.
- C. Correct conditions which will impair proper installation, including trowel marks, pits, dents, protrusions, cracks or joints.
- D. Fill cracks, joints depressions, and other irregularities in concrete with leveling compound.
 - 1. Do not use adhesive for filling or leveling purposes.
 - 2. Do not use leveling compound to correct imperfections which can be corrected by spot grinding.
 - 3. Trowel to smooth surface free of trowel marks, pits, dents, protrusions, cracks or joint lines.

- E. Test new concrete subfloor prior to adhesive application for moisture and surface alkalinity per CRI 104 Section 6.3.1 or per ASTM E1907.

3.2 CARPET INSTALLATION

- A. Do not install carpet until work of other trades including painting is complete and dry.
- B. Install in accordance with CRI 104 direct glue down installation.
 - 1. Relax carpet in accordance with Section 6.4.
 - 2. Comply with indoor air quality recommendations noted in Section 6.5.
 - 3. Maintain temperature in accordance with Section 15.3.
- C. Secure carpet to subfloor of spaces with adhesive applied as recommended by carpet manufacturer.
- D. Follow carpet manufacturer's recommendations for matching pattern and texture directions.
- E. Cut openings in carpet where required for installing equipment, pipes, outlets, and penetrations.
 - 1. Bind or seal cut edge of sheet carpet and replace flanges or plates.
 - 2. Use additional adhesive to secure carpets around pipes and other vertical projections.
- G. Broadloom Carpet:
 - 1. Install per CRI 104, Section 8.
 - 2. Lay broadloom carpet lengthwise in longest dimension of space, with minimum seams, uniformly spaced to provide a tight smooth finish, free from movement when subjected to traffic.
 - 3. Use tape-seaming method to join sheet carpet edges. Do not leave visible seams.
- H. Carpet Modules:
 - 1. Install per CRI 104, Section 13, Adhesive Application.
 - 2. Lay carpet modules with pile in same direction unless specified otherwise in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
 - 3. Install carpet modules so that cleaning methods and solutions do not cause dislocation of modules.
 - 4. Lay carpet modules uniformly to provide tight flush joints free from movement when subject to traffic.

3.3 EDGE STRIPS INSTALLATION

- A. Install edge strips over exposed carpet edges adjacent to uncarpeted finish flooring.
- B. Anchor metal strips to floor with suitable fasteners. Apply adhesive to edge strips, insert carpet into lip and press it down over carpet.

- C. Anchor vinyl edge strip to floor with adhesive apply adhesive to edge strip and insert carpet into lip and press lip down over carpet.

3.4 PROTECTION AND CLEANING

- A. Remove waste, fasteners and other cuttings from carpet floors.
- B. Vacuum carpet and provide suitable protection. Do not use polyethylene film.
- C. Do not permit traffic on carpeted surfaces for at least 48 hours after installation. Protect the carpet in accordance with CRI 104.
- D. Do not move furniture or equipment on unprotected carpeted surfaces.
- E. Just before final acceptance of work, remove protection and vacuum carpet clean.

- - - E N D - - -

SECTION 09 72 16
VINYL-COATED FABRIC WALL COVERINGS

PART 1 - GENERAL**1.1 DESCRIPTION**

A. Section specifies vinyl coated fabric wallcovering and installation.

1.2 RELATED WORK

A. Color, pattern, type, direction of hanging and areas to receive wall covering: Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Samples:

1. Each type and pattern as specified in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
2. Size: Full width of mill run.

C. Manufacturer's Certificates:

1. Compliance with CFFA W-101D.
2. Wallcovering manufacturer's approval of adhesive.

D. Manufacturer's Literature and Data:

1. Primer and adhesive.
2. Installation instructions.
3. Maintenance instructions, including recommended materials and methods for maintaining wallcovering with precautions in use of cleaning material.

1.4 QUALITY ASSURANCE

- A. Finish one complete space with each type (color and pattern) of wallcovering showing specified colors and patterns.
- B. Use approved sample spaces as a standard for work throughout the project.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver in original unopened containers bearing the manufacturer's name, brand name, and product designation.
- B. Store in accordance with manufacturer's instructions.
- C. Handle to prevent damage to material.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. Chemical Fabrics and Film Association, Inc., (CFFA):
2575-96(R2011).....Vinyl Coated Fabric Wallcovering
- C. American Society for Testing and Materials (ASTM)
G21-09.....Determining Resistance of Synthetic Polymeric
Materials to Fungi

PART 2 - PRODUCTS

2.1 VINYL COATED FABRIC WALLCOVERING

- A. Comply with CFFA-2575.
- B. Fungi Resistance: ASTM G21, rating of 0.
- C. Factory-applied clear delustered polyvinyl-fluoride (PVF) coating:
 - 1. Minimum 0.0125 mm (1/2 mil) thickness.
 - 2. Do not include PVF coating weight in minimum total weight.
 - 3. Fire hazard classification with PVF coating: Class A unless specified otherwise.
- D. Type I (Light Duty).

2.2 ADHESIVE

- A. Use only water-based adhesive having volatile organic compounds not more than 50 g/l.
- B. Vermin and mildew resistant.

2.3 EDGE GUARDS OR TRIM

- A. "J" shape with groove to receive the wallcovering.
- B. Concealed edge feathered, not less than 19 mm (3/4 inch) wide.
- C. Designed for adhesive attachment.
- D. Use Vinyl

PART 3 - EXECUTION

3.1 JOB CONDITIONS

- A. Temperatures:
 - 1. Do not perform work until surfaces and materials have been maintained at minimum of 60 °F. for three days before work begins.
 - 2. Maintain minimum temperatures of 60 °F. until adhesives are dried or cured.
- B. Lighting:
 - 1. Do not proceed unless a minimum lighting level of 15 candlepower per square foot occurs.
 - 2. Measure light level at mid-height of wall.
- C. Ventilation:

1. Provide uniform continuous ventilation in space.
 2. Ventilate for a time for not less than complete drying or curing of adhesive.
- D. Protect other surfaces from damage which may be caused by this work.
- E. Remove waste from building daily.

3.2 SURFACE CONDITION

- A. Inspect surfaces to receive wallcoverings to assure that:
1. Patches and repairs are completed.
 2. Surface are clean, smooth and prime painted.
- B. Do not proceed until discovered defects have been corrected by other trades and surfaces are ready to receive wallcovering.
- C. Carefully remove electrical outlet and switch plates, mechanical diffusers, escutcheons, registers, surface hardware, fittings and fastenings, prior to starting work.
- D. Carefully store items for reinstallation.
- E. Install Edge Guard or Trim:
1. Locate where shown or specified.
 2. Run edge guards from top of base to ceiling or wainscot cap in continuous length.
 3. Install as specified by manufacturer of edge guard or trim, in adhesive.
 4. Smooth adhesive edge. Do not leave adhesive exposed to view.
 5. Leave ready to receive wallcovering.

3.3 APPLICATION OF ADHESIVE

- A. Mix and apply adhesives in accordance with manufacturer's directions.
- B. Prevent adhesive from getting on face of wallcovering.
- C. Apply adhesive to wallcovering back.

3.4 WALLCOVERING INSTALLATION

- A. Use wallcovering of same batch or run in an area. Use fabric rolls in consecutive numerical sequence of manufacture.
- B. Install material completely adhered, smooth, clean, without wrinkles, air pockets, gaps or overlaps.
- C. Extend wallcovering continuous behind non-built-in casework and other items which are close to but not bolted to or touching the walls.
- D. Install wallcovering before installation of resilient base. Extend wallcovering not more than 6 mm (1/4 inch) below top of resilient base.
- E. Install panels consecutively in order in which they are cut from the roll including filling spaces above or below windows, doors, or similar penetrations.

- F. Do not install horizontal seams.
- G. Except on match patterns, hang fabric by reversing alternate strips, except as recommended by the manufacturer.
- H. Cutting:
 - 1. Cut on a work table with a straight edge.
 - 2. Joints or seams that are not cut clean are unacceptable.
 - 3. Trim additional selvage to achieve a color and pattern match at seams. Overlapped seams are not allowed.
 - 4. Do not double cut seams on wall unless specified.
 - 5. If double cutting on the wall is necessary, place a three inch strip of Type I wallcovering under pasted edge.
 - a. Do not cut into wall surface.
 - b. After cutting, remove strip and excess adhesive from seam before proceeding to next seam.
 - c. Smooth down seam in adhesive for tight bond and joint.
- I. Trim strip-matched patterns, which are not factory pre-trimmed.
- J. Inside Corners:
 - 1. Wrap wallcovering around corner.
 - 2. Do not seam within 50 mm (2 inches) of inside corners.
 - 3. Double cut seam.
- K. Outside Corners:
 - 1. Wrap wallcovering around corner.
 - 2. Do not seam within 150 mm (6 inches) of outside corners.
 - 3. Double cut seam.

3.5 PATCHING

- A. Replace surface damaged wallcovering in a space as specified for new work:
 - 1. Replace full height of surface.
 - 2. Replace from break in plane to break in plane when same batch or run is not used. Double cut seams.
 - 3. Adjoining differential colors from separate batches or runs are not acceptable.
- B. Correct loose or raised seams with adhesives to lay flat with tight bonded joint as specified for new work.

3.5 CLEANING AND INSTALLING TEMPORARY REMOVED ITEMS

- A. Remove adhesive from wallcovering as work proceeds.
- B. Remove adhesives where spilled, splashed or splattered on wallcoverings or adjacent surfaces in a manner not to damage surface from which it is removed.

- C. Reinstall previously removed electrical outlet and switch plates, mechanical diffusers, escutcheons, registers, surface hardware, fittings and fastenings.

- - - E N D - - -

SECTION 09 91 00
PAINTING

PART 1-GENERAL**1.1 DESCRIPTION**

- A. Section specifies field painting.
- B. Section specifies prime coats which may be applied in shop under other sections.
- C. Painting includes shellacs, stains, varnishes, coatings specified, and striping or markers and identity markings.

1.2 RELATED WORK

- A. Shop prime painting of steel and ferrous metals: Division 05 - METALS, Division 08 - OPENINGS, Division 10 - SPECIALTIES, Division 21 - FIRE SUPPRESSION, Division 22 - PLUMBING, Division 23 - HEATING, VENTILATION AND AIR-CONDITIONING, Division 26 - ELECTRICAL, Division 27 - COMMUNICATIONS, and Division 28 - ELECTRONIC SAFETY AND SECURITY sections.
- B. Contractor option: Prefinished flush doors with transparent finishes: Section 08 14 00, WOOD DOORS.
- C. Type of Finish, Color, and Gloss Level of Finish Coat: Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
Before work is started, or sample panels are prepared, submit manufacturer's literature, the current Master Painters Institute (MPI) "Approved Product List" indicating brand label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use subsequent MPI "Approved Product List", however, only one list may be used for the entire contract and each coating system is to be from a single manufacturer. All coats on a particular substrate must be from a single manufacturer. No variation from the MPI "Approved Product List" where applicable is acceptable.
- C. Sample Panels:
 - 1. After painters' materials have been approved and before work is started submit sample panels showing each type of finish and color specified.
 - 2. Panels to show color: Color samples to be provided on actual material to be painted. Sample sizes shall be 12" x 12."

3. Panel to show transparent finishes: Wood of same species and grain pattern as wood approved for use, 100 by 250 by 3 mm (4 inch by 10 inch face by 1/4 inch) thick minimum, and where both flat and edge grain will be exposed, 250 mm (10 inches) long by sufficient size, 8" x 12" minimum or actual wood member to show complete finish.
 4. Attach labels to panel stating the following:
 - a. Federal Specification Number or manufacturers name and product number of paints used.
 - b. Specification code number specified in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
 - c. Product type and color.
 - d. Name of project.
 5. Strips showing not less than 50 mm (2 inch) wide strips of undercoats and 100 mm (4 inch) wide strip of finish coat.
- D. Sample of identity markers if used.
- E. Manufacturers' Certificates indicating compliance with specified requirements:
1. Manufacturer's paint substituted for Federal Specification paints meets or exceeds performance of paint specified.
 2. High temperature aluminum paint.
 3. Epoxy coating.
 4. Intumescent clear coating or fire retardant paint.
 5. Plastic floor coating.

1.4 DELIVERY AND STORAGE

- A. Deliver materials to site in manufacturer's sealed container marked to show following:
1. Name of manufacturer.
 2. Product type.
 3. Batch number.
 4. Instructions for use.
 5. Safety precautions.
- B. In addition to manufacturer's label, provide a label legibly printed as following:
1. Federal Specification Number, where applicable, and name of material.
 2. Surface upon which material is to be applied.
 3. If paint or other coating, state coat types; prime, body or finish.
- C. Maintain space for storage, and handling of painting materials and equipment in a neat and orderly condition to prevent spontaneous combustion from occurring or igniting adjacent items.

- D. Store materials at site at least 24 hours before using, at a temperature between 18 and 30 degrees C (65 and 85 degrees F).

1.5 MOCK-UP PANEL

- A. Before starting application of water paint mixtures, apply each color of paint as specified to an area, not to exceed 9 m² (100 ft²), selected by Resident Engineer.
- B. Finish and texture approved by Resident Engineer will be used as a standard of quality for remainder of work.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.
- B. American Conference of Governmental Industrial Hygienists (ACGIH):
 ACGIH TLV-BKLT-2008.....Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)
 ACGIH TLV-DOC-2010.....Documentation of Threshold Limit Values and Biological Exposure Indices, (Seventh Edition)
- C. American National Standards Institute (ANSI):
 A13.1-07.....Scheme for the Identification of Piping Systems
- D. Commercial Item Description (CID):
 A-A-1555.....Water Paint, Powder (Cementitious, White and Colors) (WPC) (cancelled)
 A-A-3120.....Paint, For Swimming Pools (RF) (cancelled)
- E. Federal Specifications (Fed Spec):
 TT-P-1411A.....Paint, Copolymer-Resin, Cementitious (For Waterproofing Concrete and Masonry Walls) (CEP)
- F. Master Painters Institute (MPI):
 No. 1-07.....Aluminum Paint (AP)
 No. 4-07.....Interior/ Exterior Latex Block Filler
 No. 5-07.....Exterior Alkyd Wood Primer
 No. 7-07.....Exterior Oil Wood Primer
 No. 8-07.....Exterior Alkyd, Flat MPI Gloss Level 1 (EO)
 No. 9-07.....Exterior Alkyd Enamel MPI Gloss Level 6 (EO)
 No. 10-07.....Exterior Latex, Flat (AE)
 No. 11-07.....Exterior Latex, Semi-Gloss (AE)
 No. 18-07.....Organic Zinc Rich Primer
 No. 22-07.....Aluminum Paint, High Heat (up to 590° - 1100F) (HR)
 No. 26-07.....Cementitious Galvanized Metal Primer

- No. 27-07.....Exterior / Interior Alkyd Floor Enamel, Gloss (FE)
- No. 31-07.....Polyurethane, Moisture Cured, Clear Gloss (PV)
- No. 36-07.....Knot Sealer
- No. 43-07.....Interior Satin Latex, MPI Gloss Level 4
- No. 44-07.....Interior Low Sheen Latex, MPI Gloss Level 2
- No. 45-07.....Interior Primer Sealer
- No. 46-07.....Interior Enamel Undercoat
- No. 47-07.....Interior Alkyd, Semi-Gloss, MPI Gloss Level 5 (AK)
- No. 48-07.....Interior Alkyd, Gloss, MPI Gloss Level 6 (AK)
- No. 49-07.....Interior Alkyd, Flat, MPI Gloss Level 1 (AK)
- No. 50-07.....Interior Latex Primer Sealer
- No. 51-07.....Interior Alkyd, Eggshell, MPI Gloss Level 3
- No. 52-07.....Interior Latex, MPI Gloss Level 3 (LE)
- No. 53-07.....Interior Latex, Flat, MPI Gloss Level 1 (LE)
- No. 54-07.....Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)
- No. 59-07.....Interior/Exterior Alkyd Porch & Floor Enamel, Low
Gloss (FE)
- No. 60-07.....Interior/Exterior Latex Porch & Floor Paint, Low
Gloss
- No. 66-07.....Interior Alkyd Fire Retardant, Clear Top-Coat (ULC
Approved) (FC)
- No. 67-07.....Interior Latex Fire Retardant, Top-Coat (ULC
Approved) (FR)
- No. 68-07.....Interior/ Exterior Latex Porch & Floor Paint, Gloss
- No. 71-07.....Polyurethane, Moisture Cured, Clear, Flat (PV)
- No. 74-07.....Interior Alkyd Varnish, Semi-Gloss
- No. 77-07.....Epoxy Cold Cured, Gloss (EC)
- No. 79-07.....Marine Alkyd Metal Primer
- No. 90-07.....Interior Wood Stain, Semi-Transparent (WS)
- No. 91-07.....Wood Filler Paste
- No. 94-07.....Exterior Alkyd, Semi-Gloss (EO)
- No. 95-07.....Fast Drying Metal Primer
- No. 98-07.....High Build Epoxy Coating
- No. 101-07.....Epoxy Anti-Corrosive Metal Primer
- No. 108-07.....High Build Epoxy Coating, Low Gloss (EC)
- No. 114-07.....Interior Latex, Gloss (LE) and (LG)
- No. 119-07.....Exterior Latex, High Gloss (acrylic) (AE)
- No. 135-07.....Non-Cementitious Galvanized Primer
- No. 138-07.....Interior High Performance Latex, MPI Gloss Level 2
(LF)

No. 139-07.....Interior High Performance Latex, MPI Gloss Level 3
(LL)

No. 140-07.....Interior High Performance Latex, MPI Gloss Level 4

No. 141-07.....Interior High Performance Latex (SG) MPI Gloss
Level 5

G. Steel Structures Painting Council (SSPC):

SSPC SP 1-04 (R2004)....Solvent Cleaning

SSPC SP 2-04 (R2004)....Hand Tool Cleaning

SSPC SP 3-04 (R2004)....Power Tool Cleaning

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cementitious Paint (CEP): TT-P-1411A [Paint, Copolymer-Resin, Cementitious (CEP)], Type 1 for exterior use, Type II for interior use.

B. Wood Sealer: MPI 31 (gloss) or MPI 71 (flat) thinned with thinner recommended by manufacturer at rate of about one part of thinner to four parts of varnish.

C. Plastic Tape:

1. Pigmented vinyl plastic film in colors as specified in Section 09 06 00, SCHEDULE FOR FINISHES or specified.

2. Pressure sensitive adhesive back.

3. Widths as shown.

D. Identity markers options:

1. Pressure sensitive vinyl markers.

2. Snap-on coil plastic markers.

E. Aluminum Paint (AP): MPI 1.

F. Interior/Exterior Latex Block Filler: MPI 4.

G. Exterior Alkyd Wood Primer: MPI 5.

H. Exterior Oil Wood Primer: MPI 7.

I. Exterior Alkyd, Flat (EO): MPI 8.

J. Exterior Alkyd Enamel (EO): MPI 9.

K. Exterior Latex, Flat (AE): MPI 10.

L. Exterior Latex, Semi-Gloss (AE): MPI 11.

M. Organic Zinc rich Coating (HR): MPI 22.

N. High Heat Resistant Coating (HR): MPI 22.

O. Cementitious Galvanized Metal Primer: MPI 26.

P. Exterior/ interior Alkyd Floor Enamel, Gloss (FE): MPI 27.

Q. Knot Sealer: MPI 36.

R. Interior Satin Latex: MPI 43.

S. Interior Low Sheen Latex: MPI 44.

T. Interior Primer Sealer: MPI 45.

- U. Interior Enamel Undercoat: MPI 47.
- V. Interior Alkyd, Semi-Gloss (AK): MPI 47.
- W. Interior Alkyd, Gloss (AK): MPI 49.
- x. Interior Latex Primer Sealer: MPI 50.
- Y. Interior Alkyd, Eggshell: MPI 51
- Z. Interior Latex, MPI Gloss Level 3 (LE): MPI 52.
- AA. Interior Latex, Flat, MPI Gloss Level 1 (LE): MPI 53.
- BB. Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE): MPI 54.
- CC. Interior / Exterior Alkyd Porch & Floor Enamel, Low Gloss (FE): MPI 59.
- DD. Interior/ Exterior Latex Porch & Floor Paint, Low Gloss: MPI 60.
- EE. Interior Alkyd Fire Retardant, Clear Top-Coat (ULC Approved) (FC): MPI 66
(Intumescent Type).
- FF. Interior Latex Fire Retardant, Top-Coat (ULC Approved) (FR): MPI 67.
- GG. Interior/ Exterior Latex Porch & Floor Paint, gloss: MPI 68.
- HH. Epoxy Cold Cured, Gloss (EC): MPI 77.
- II. Marine Alkyd Metal primer: MPI 79.
- JJ. Interior Wood Stain, Semi-Transparent (WS): MPI 90.
- KK. Wood Filler Paste: MPI 91.
- LL. Exterior Alkyd, Semi-Gloss (EO): MPI 94.
- MM. Fast Drying Metal Primer: MPI 95.
- NN. Exterior High-Performance Epoxy Coating: MPI 98.
- OO. Epoxy Anti-Corrosive Metal Primer: MPI 101.
- PP. High Build Epoxy Marine Coating (EC): MPI 108.
- QQ. Interior latex, Gloss (LE) and (LG): MPI 114.
- RR. Exterior Latex, High Gloss (acrylic) (AE): MPI 119.
- SS. Waterborne Galvanized Primer: MPI 134.
- TT. Non-Cementitious Galvanized Primer: MPI 135.
- UU. Interior High Performance Latex, MPI Gloss Level 2(LF): MPI 138.
- VV. Interior High Performance Latex, MPI Gloss Level 3 (LL): MPI 139.
- WW. Interior High Performance Latex, MPI Gloss Level 4: MPI 140.
- XX. Interior High Performance Latex (SG), MPI Gloss Level 5: MPI 141.

2.2 PAINT PROPERTIES

- A. Use ready-mixed (including colors), except two component epoxies, polyurethanes, polyesters, paints having metallic powders packaged separately and paints requiring specified additives.
- B. Where no requirements are given in the referenced specifications for primers, use primers with pigment and vehicle, compatible with substrate and finish coats specified.

2.3 REGULATORY REQUIREMENTS/QUALITY ASSURANCE

- A. Paint materials shall conform to the restrictions of the local Environmental and Toxic Control jurisdiction.
1. Volatile Organic Compounds (VOC): VOC content of paint materials shall not exceed 10g/l for interior latex paints/primers and 50g/l for exterior latex paints and primers.
 2. Lead-Base Paint:
 - a. Comply with Section 410 of the Lead-Based Paint Poisoning Prevention Act, as amended, and with implementing regulations promulgated by Secretary of Housing and Urban Development.
 - b. Regulations concerning prohibition against use of lead-based paint in federal and federally assisted construction, or rehabilitation of residential structures are set forth in Subpart F, Title 24, Code of Federal Regulations, Department of Housing and Urban Development.
 - c. For lead-paint removal, see Section 02 83 33.13, LEAD-BASED PAINT REMOVAL AND DISPOSAL.
 3. Asbestos: Materials shall not contain asbestos.
 4. Chromate, Cadmium, Mercury, and Silica: Materials shall not contain zinc-chromate, strontium-chromate, Cadmium, mercury or mercury compounds or free crystalline silica.
 5. Human Carcinogens: Materials shall not contain any of the ACGIH-BKLT and ACGHI-DOC confirmed or suspected human carcinogens.
 6. Use high performance acrylic paints in place of alkyd paints, where possible.
 7. VOC content for solvent-based paints shall not exceed 250g/l and shall not be formulated with more than one percent aromatic hydro carbons by weight.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

- A. Safety: Observe required safety regulations and manufacturer's warning and instructions for storage, handling and application of painting materials.
1. Take necessary precautions to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion, or other harm.
 2. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at end of each days work.
- B. Atmospheric and Surface Conditions:
1. Do not apply coating when air or substrate conditions are:
 - a. Less than 3 degrees C (5 degrees F) above dew point.

- b. Below 10 degrees C (50 degrees F) or over 35 degrees C (95 degrees F), unless specifically pre-approved by the Contracting Officer and the product manufacturer. Under no circumstances shall application conditions exceed manufacturer recommendations.
2. Maintain interior temperatures until paint dries hard.
3. Do no exterior painting when it is windy and dusty.
4. Do not paint in direct sunlight or on surfaces that the sun will soon warm.
5. Apply only on clean, dry and frost free surfaces except as follows:
 - a. Apply water thinned acrylic and cementitious paints to damp (not wet) surfaces where allowed by manufacturer's printed instructions.
 - b. Dampened with a fine mist of water on hot dry days concrete and masonry surfaces to which water thinned acrylic and cementitious paints are applied to prevent excessive suction and to cool surface.
6. Varnishing:
 - a. Apply in clean areas and in still air.
 - b. Before varnishing vacuum and dust area.
 - c. Immediately before varnishing wipe down surfaces with a tack rag.

3.2 SURFACE PREPARATION

- A. Method of surface preparation is optional, provided results of finish painting produce solid even color and texture specified with no overlays.
- B. General:
 1. Remove prefinished items not to be painted such as lighting fixtures, escutcheon plates, hardware, trim, and similar items for reinstallation after paint is dried.
 2. Remove items for reinstallation and complete painting of such items and adjacent areas when item or adjacent surface is not accessible or finish is different.
 3. See other sections of specifications for specified surface conditions and prime coat.
 4. Clean surfaces for painting with materials and methods compatible with substrate and specified finish. Remove any residue remaining from cleaning agents used. Do not use solvents, acid, or steam on concrete and masonry.
- C. Wood:
 1. Sand to a smooth even surface and then dust off.
 2. Sand surfaces showing raised grain smooth between each coat.
 3. Wipe surface with a tack rag prior to applying finish.

4. Surface painted with an opaque finish:
 - a. Coat knots, sap and pitch streaks with MPI 36 (Knot Sealer) before applying paint.
 - b. Apply two coats of MPI 36 (Knot Sealer) over large knots.
5. After application of prime or first coat of stain, fill cracks, nail and screw holes, depressions and similar defects with wood filler paste. Sand the surface to make smooth and finish flush with adjacent surface.
6. Before applying finish coat, reapply wood filler paste if required, and sand surface to remove surface blemishes. Finish flush with adjacent surfaces.
7. Fill open grained wood such as oak, walnut, ash and mahogany with MPI 91 (Wood Filler Paste), colored to match wood color.
 - a. Thin filler in accordance with manufacturer's instructions for application.
 - b. Remove excess filler, wipe as clean as possible, dry, and sand as specified.

D. Ferrous Metals:

1. Remove oil, grease, soil, drawing and cutting compounds, flux and other detrimental foreign matter in accordance with SSPC-SP 1 (Solvent Cleaning).
2. Remove loose mill scale, rust, and paint, by hand or power tool cleaning, as defined in SSPC-SP 2 (Hand Tool Cleaning) and SSPC-SP 3 (Power Tool Cleaning). Exception: where high temperature aluminum paint is used, prepare surface in accordance with paint manufacturer's instructions.
3. Fill dents, holes and similar voids and depressions in flat exposed surfaces of hollow steel doors and frames, access panels, roll-up steel doors and similar items specified to have semi-gloss or gloss finish with TT-F-322D (Filler, Two-Component Type, For Dents, Small Holes and Blow-Holes). Finish flush with adjacent surfaces.
 - a. This includes flat head countersunk screws used for permanent anchors.
 - b. Do not fill screws of item intended for removal such as glazing beads.
4. Spot prime abraded and damaged areas in shop prime coat which expose bare metal with same type of paint used for prime coat. Feather edge of spot prime to produce smooth finish coat.
5. Spot prime abraded and damaged areas which expose bare metal of factory finished items with paint as recommended by manufacturer of item.

- E. Zinc-Coated (Galvanized) Metal, Aluminum, Copper and Copper Alloys Surfaces Specified Painted:
1. Clean surfaces to remove grease, oil and other deterrents to paint adhesion in accordance with SSPC-SP 1 (Solvent Cleaning).
 2. Spot coat abraded and damaged areas of zinc-coating which expose base metal on hot-dip zinc-coated items with MPI 18 (Organic Zinc Rich Coating). Prime or spot prime with MPI 134 (Waterborne Galvanized Primer) or MPI 135 (Non-Cementitious Galvanized Primer) depending on finish coat compatibility.
- F. Gypsum Plaster and Gypsum Board:
1. Remove efflorescence, loose and chalking plaster or finishing materials.
 2. Remove dust, dirt, and other deterrents to paint adhesion.
 3. Fill holes, cracks, and other depressions with CID-A-A-1272A [Plaster, Gypsum (Spackling Compound) finished flush with adjacent surface, with texture to match texture of adjacent surface. Patch holes over 25 mm (1-inch) in diameter as specified in Section for plaster or gypsum board.

3.3 PAINT PREPARATION

- A. Thoroughly mix painting materials to ensure uniformity of color, complete dispersion of pigment and uniform composition.
- B. Do not thin unless necessary for application and when finish paint is used for body and prime coats. Use materials and quantities for thinning as specified in manufacturer's printed instructions.
- C. Remove paint skins, then strain paint through commercial paint strainer to remove lumps and other particles.
- D. Mix two component and two part paint and those requiring additives in such a manner as to uniformly blend as specified in manufacturer's printed instructions unless specified otherwise.
- E. For tinting required to produce exact shades specified, use color pigment recommended by the paint manufacturer.

3.4 APPLICATION

- A. Start of surface preparation or painting will be construed as acceptance of the surface as satisfactory for the application of materials.
- B. Unless otherwise specified, apply paint in three coats; prime, body, and finish. When two coats applied to prime coat are the same, first coat applied over primer is body coat and second coat is finish coat.
- C. Apply each coat evenly and cover substrate completely.

- D. Allow not less than 48 hours between application of succeeding coats, except as allowed by manufacturer's printed instructions, and approved by Resident Engineer.
- E. Finish surfaces to show solid even color, free from runs, lumps, brushmarks, laps, holidays, or other defects.
- F. Apply by brush, roller or spray, except as otherwise specified.
- G. Do not spray paint in existing occupied spaces unless approved by Resident Engineer, except in spaces sealed from existing occupied spaces.
 - 1. Apply painting materials specifically required by manufacturer to be applied by spraying.
 - 2. In areas, where paint is applied by spray, mask or enclose with polyethylene, or similar air tight material with edges and seams continuously sealed including items specified in WORK NOT PAINTED, motors, controls, telephone, and electrical equipment, fronts of sterilizes and other recessed equipment and similar prefinished items.
- H. Do not paint in closed position operable items such as access doors and panels, window sashes, overhead doors, and similar items except overhead roll-up doors and shutters.

3.5 PRIME PAINTING

- A. After surface preparation prime surfaces before application of body and finish coats, except as otherwise specified.
- B. Spot prime and apply body coat to damaged and abraded painted surfaces before applying succeeding coats.
- C. Additional field applied prime coats over shop or factory applied prime coats are not required except for exterior exposed steel apply an additional prime coat.
- D. Prime rebates for stop and face glazing of wood, and for face glazing of steel.
- E. Wood and Wood Particleboard:
 - 1. Use same kind of primer specified for exposed face surface.
 - a. Exterior wood: MPI 7 (Exterior Oil Wood Primer) for new construction and MPI 5(Exterior Alkyd Wood Primer) for repainting bare wood primer except where MPI 90 (Interior Wood Stain, Semi-Transparent (WS)) is scheduled.
 - b. Interior wood except for transparent finish: MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat), thinned if recommended by manufacturer.
 - c. Transparent finishes as specified under Transparent Finishes on Wood except Floors.

2. Apply two coats of primer MPI 7 (Exterior Oil Wood Primer) or MPI 5 (Exterior Alkyd Wood Primer) or sealer MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat) to surfaces of wood doors, including top and bottom edges, which are cut for fitting or for other reason.
 3. Apply one coat of primer MPI 7 (Exterior Oil Wood Primer) or MPI 5 (Exterior Alkyd Wood Primer) or sealer MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat) as soon as delivered to site to surfaces of unfinished woodwork, except concealed surfaces of shop fabricated or assembled millwork and surfaces specified to have varnish, stain or natural finish.
 4. Back prime and seal ends of exterior woodwork, and edges of exterior plywood specified to be finished.
 5. Apply MPI 67 (Interior Latex Fire Retardant, Top-Coat (ULC Approved) (FR) to wood for fire retardant finish.
- F. Metals except boilers, incinerator stacks, and engine exhaust pipes:
1. Steel and iron: MPI 79 (Marine Alkyd Metal Primer). Use MPI 101 (Cold Curing Epoxy Primer) where MPI 98 (High Build Epoxy Coating) finish is specified.
 2. Zinc-coated steel and iron: MPI 135 (Non-Cementitious Galvanized Primer).
 3. Aluminum scheduled to be painted: MPI 95 (Fast Drying Metal Primer).
 4. Terne Metal: MPI 79 (Marine Alkyd Metal Primer) , MPI 95 (Fast Drying Metal Primer).
 5. Copper and copper alloys scheduled to be painted: MPI 95 (Fast Drying Metal Primer).
 6. Machinery not factory finished: MPI 9 (Exterior Alkyd Enamel (EO)).
 7. Asphalt coated metal: MPI 1 (Aluminum Paint (AP)).
 8. Metal over 94 degrees C. (200 degrees F), Boilers, Incinerator Stacks, and Engine Exhaust Pipes: MPI 22 (High Heat Resistant Coating (HR)).
- G. Gypsum Board and Hardboard:
1. Surfaces scheduled to have MPI 10 (Exterior Latex, Flat (AE)) MPI 119 (Exterior Latex, High Gloss (acrylic) (AE)) or MPI 53 (Interior Latex, Flat), MPI Gloss Level 1 (LE)) MPI 52 (Interior Latex, MPI Gloss Level 3 (LE)) MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)) finish: Use MPI 10 (Exterior Latex, Flat (AE)) MPI 11 (Exterior Latex, Semi-Gloss (AE)) MPI 119 (Exterior Latex, High Gloss (acrylic)(AE)) or MPI 53 (Interior Latex, MPI Gloss Level 3 (LE)) MPI 52 (Interior Latex, MPI Gloss Level 3 (LE)) MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)) respectively.

2. Primer: MPI 50 (Interior Latex Primer Sealer) except use MPI 45 (Interior Primer Sealer) in shower and bathrooms.
3. Surfaces scheduled to receive vinyl coated fabric wallcovering: Use MPI 45 (Interior Primer Sealer).
4. Use MPI 101 (Cold Curing Epoxy Primer) for surfaces scheduled to receive MPI 98 (High Build Epoxy Coating) finish.

3.6 EXTERIOR FINISHES

- A. Apply following finish coats where specified in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
- B. Steel and Ferrous Metal:
 1. Two coats of MPI 94 (Exterior Alkyd, Semi-Gloss (EO)) on exposed surfaces, except on surfaces over 94 degrees C (200 degrees F).
- C. Machinery without factory finish except for primer: One coat MPI 9 (Exterior Alkyd Enamel (EO)) or MPI 94 (Exterior Alkyd, Semi-Gloss (EO)).

3.7 INTERIOR FINISHES

- A. Apply following finish coats over prime coats in spaces or on surfaces specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Metal Work:
 1. Apply to exposed surfaces.
 2. Omit body and finish coats on surfaces concealed after installation except electrical conduit containing conductors over 600 volts.
 3. Ferrous Metal, Galvanized Metal, and Other Metals Scheduled:
 - a. Apply two coats of MPI 47 (Interior Alkyd, Semi-Gloss (AK)) unless specified otherwise.
 - b. Two coats of MPI 48 (Interior Alkyd Gloss (AK)) or MPI 51 (Interior Alkyd, Eggshell (AK)).
 - c. One coat of MPI 46 (Interior Enamel Undercoat) plus one coat of MPI 47 (Interior Alkyd, Semi-Gloss (AK)) on exposed interior surfaces of alkyd-amine enamel prime finished windows.
 - e. Machinery: One coat MPI 9 (Exterior Alkyd Enamel (EO)).
 - f. Asphalt Coated Metal: One coat MPI 1 (Aluminum Paint (AP)).
 - h. Access Panels, see Section 08 31 13. The Contractor shall spray paint the access panels with the door in the open position. If painted after installation, protect all mechanical, electrical and plumbing (MEP) equipment from overspray.
- C. Gypsum Board:
 1. One coat of MPI 45 (Interior Primer Sealer) .

2. Two coats of MPI 138 (Interior High Performance Latex, MPI Gloss Level 2 (LF)).

D. Masonry and Concrete Walls:

1. Over MPI 4 (Interior/Exterior Latex Block Filler) on CMU surfaces.
3. Two coats of MPI 138 (Interior High Performance Latex, MPI Gloss Level 2 (LF)) , MPI 139 (Interior High Performance Latex, MPI Gloss level 3 (LL)) , MPI 114 (Interior Latex, Gloss (LE) and (LG)).

E. Wood:

1. Sanding:

- a. Use 220-grit sandpaper.
- b. Sand sealers and varnish between coats.
- c. Sand enough to scarify surface to assure good adhesion of subsequent coats, to level roughly applied sealer and varnish, and to knock off "whiskers" of any raised grain as well as dust particles.

2. Sealers:

- a. Apply sealers specified except sealer may be omitted where pigmented, penetrating, or wiping stains containing resins are used.
- b. Allow manufacturer's recommended drying time before sanding, but not less than 24 hours or 36 hours in damp or muggy weather.
- c. Sand as specified.

3. Paint Finish:

- a. One coat of MPI 45 (Interior Primer Sealer) plus one coat of MPI 47 (Interior Alkyd, Semi-Gloss (AK)) (SG).
- b. One coat MPI 66 (Interior Alkyd Fire retardant, Clear Top-Coat (ULC Approved) (FC) or, MPI 67 (Interior Latex Fire Retardant, Top-Coat (ULC Approved) (FR), intumescent type (FR), on exposed wood and above ceilings where shown.
- c. One coat of MPI 45 Interior Primer Sealer) plus one coat of MPI 48 (Interior Alkyd Gloss (AK)).
- d. Two coats of MPI 51 (Interior Alkyd, Eggshell) (AK)).

4. Transparent Finishes on Wood Except Floors.

a. Natural Finish:

- 1) One coat of sealer as written in 2.1 E.
- 2) Two coats of MPI 71 (Polyurethane, Moisture Cured, Clear Flat (PV) or MPI 31 (Polyurethane, Moisture Cured, Clear Gloss (PV)).

b. Stain Finish:

- 1) One coat of MPI 90 (Interior Wood Stain, Semi-Transparent (WS)).
- 2) Use wood stain of type and color required to achieve finish specified. Do not use varnish type stains.

- 3) One coat of sealer as written in 2.1 E.
- 4) Two coats of MPI 71 (Polyurethane, Moisture Cured, Clear Flat (PV) or MPI 31 (Polyurethane Moisture Cured, Clear Gloss (PV))).

c. Varnish Finish:

- 1) One coat of sealer as written in 2.1 E.
- 2) Two coats of MPI 71 (Polyurethane, Moisture Cured, Clear Flat (PV) or MPI 31 (Polyurethane Moisture Cured, Clear Gloss (PV))).

- d. MPI 66 (Interior Alkyd Fire Retardant, Clear Top-Coat(ULC Approved) (FC)) Intumescent Type, Fire Retardant Coating (FC) where scheduled:
Two coats.

F. Concrete Floors: One coat of MPI 68 (Interior/ Exterior Latex Porch & Floor Paint, Gloss (FE)).

G. Miscellaneous:

1. Apply where specified in Section 09 06 00, SCHEDULE FOR FINISHES.
2. MPI 1 (Aluminum Paint): Two coats of aluminum paint.

3.8 REFINISHING EXISTING PAINTED SURFACES

- A. Clean, patch and repair existing surfaces as specified under surface preparation.
- B. Remove and reinstall items as specified under surface preparation.
- C. Remove existing finishes or apply separation coats to prevent non compatible coatings from having contact.
- D. Patched or Replaced Areas in Surfaces and Components: Apply spot prime and body coats as specified for new work to repaired areas or replaced components.
- E. Except where scheduled for complete painting apply finish coat over plane surface to nearest break in plane, such as corner, reveal, or frame.
- F. Refinish areas as specified for new work to match adjoining work unless specified or scheduled otherwise.
- G. Sand or dull glossy surfaces prior to painting.
- H. Sand existing coatings to a feather edge so that transition between new and existing finish will not show in finished work.

3.9 PAINT COLOR

- A. Color and gloss of finish coats is specified in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
- B. For additional requirements regarding color see Articles, REFINISHING EXISTING PAINTED SURFACE and MECHANICAL AND ELECTRICAL FIELD PAINTING SCHEDULE.
- C. Coat Colors:
 1. Color of priming coat: Lighter than body coat.
 2. Color of body coat: Lighter than finish coat.

3. Color prime and body coats to not show through the finish coat and to mask surface imperfections or contrasts.

D. Painting, Caulking, Closures, and Fillers Adjacent to Casework:

1. Paint to match color of casework where casework has a paint finish.
2. Paint to match color of wall where casework is stainless steel, plastic laminate, or varnished wood.

3.10 MECHANICAL AND ELECTRICAL WORK FIELD PAINTING SCHEDULE

- A. Field painting of mechanical and electrical consists of cleaning, touching-up abraded shop prime coats, and applying prime, body and finish coats to materials and equipment if not factory finished in space scheduled to be finished.
- B. In spaces not scheduled to be finish painted in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE paint as specified under paragraph H, colors.
- C. Paint various systems specified in Division 21 - FIRE SUPPRESSION, Division 22 - PLUMBING, Division 23 - HEATING, VENTILATION AND AIR-CONDITIONING, Division 26 - ELECTRICAL, Division 27 - COMMUNICATIONS, and Division 28 - ELECTRONIC SAFETY AND SECURITY.
- D. Paint after tests have been completed.
- E. Omit prime coat from factory prime-coated items.
- F. Finish painting of mechanical and electrical equipment is not required when located in interstitial spaces, above suspended ceilings, in concealed areas such as pipe and electric closets, pipe basements, pipe tunnels, trenches, attics, roof spaces, shafts and furred spaces except on electrical conduit containing feeders 600 volts or more.
- G. Omit field painting of items specified in paragraph, Building and Structural WORK NOT PAINTED.
- H. Color:
 1. Paint items having no color specified in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE to match surrounding surfaces.
 2. Paint colors as specified in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE except for following:
 - a. WhiteExterior unfinished surfaces of enameled plumbing fixtures. Insulation coverings on breeching and uptake inside boiler house, drums and drum-heads, oil heaters, condensate tanks and condensate piping.
 - b. Gray:Heating, ventilating, air conditioning and refrigeration equipment (except as required to match surrounding

surfaces), and water and sewage treatment equipment and sewage ejection equipment.

- c. Aluminum Color: Ferrous metal on outside of boilers and in connection with boiler settings including supporting doors and door frames and fuel oil burning equipment, and steam generation system (bare piping, fittings, hangers, supports, valves, traps and miscellaneous iron work in contact with pipe).
 - d. Federal Safety Red: Exposed fire protection piping hydrants, post indicators, electrical conducts containing fire alarm control wiring, and fire alarm equipment.
 - e. Federal Safety Orange: .Entire lengths of electrical conduits containing feeders 600 volts or more.
 - f. Color to match brickwork sheet metal covering on breeching outside of exterior wall of boiler house.
- I. Apply paint systems on properly prepared and primed surface as follows:
- 1. Exterior Locations:
 - a. Apply two coats of MPI 94 (Exterior Alkyd, Semi-gloss (EO)) to the following ferrous metal items:
Vent and exhaust pipes with temperatures under 94 degrees C (200 degrees F), roof drains, fire hydrants, post indicators, yard hydrants, exposed piping and similar items.
 - b. Apply two coats of MPI 119 (Exterior Latex, High Gloss (acrylic) (AE)) to the following metal items:
Galvanized and zinc-copper alloy metal.
 - c. Apply one coat of MPI 22 (High Heat Resistant Coating (HR)), 650 degrees C (1200 degrees F) to incinerator stacks, boiler stacks, and engine generator exhaust.
 - 2. Interior Locations:
 - a. Apply two coats of MPI 47 (Interior Alkyd, Semi-Gloss (AK)) to following items:
 - 1) Metal under 94 degrees C (200 degrees F) of items such as bare piping, fittings, hangers and supports.
 - 2) Equipment and systems such as hinged covers and frames for control cabinets and boxes, cast-iron radiators, electric conduits and panel boards.
 - 3) Heating, ventilating, air conditioning, plumbing equipment, and machinery having shop prime coat and not factory finished.
 - b. Ferrous metal exposed in hydrotherapy equipment room and chlorinator room of water and sewerage treatment plants: One coat of MPI 101

(Cold Curing Epoxy Primer) and one coat of MPI 108 (High Build Epoxy Marine coating (EC)).

- c. Apply one coat of MPI 50 (Interior Latex Primer Sealer) and one coat of MPI 114 (Interior Latex, Gloss (LE) and (LG)) on finish of insulation on boiler breeching and uptakes inside boiler house, drums, drumheads, oil heaters, feed water heaters, tanks and piping.
 - d. Apply two coats of MPI 22 (High Heat Resistant Coating (HR)) to ferrous metal surface over 94 degrees K (200 degrees F) of following items:
 - 1) Garbage and trash incinerator.
 - 2) Medical waste incinerator.
 - 3) Exterior of boilers and ferrous metal in connection with boiler settings including supporting members, doors and door frames and fuel oil burning equipment.
 - 4) Steam line flanges, bare pipe, fittings, valves, hangers and supports over 94 degrees K (200 degrees F).
 - 5) Engine generator exhaust piping and muffler.
 - e. Paint electrical conduits containing cables rated 600 volts or more using two coats of MPI 94 (Exterior Alkyd, Semi-gloss (EO)) in the Federal Safety Orange color in exposed and concealed spaces full length of conduit.
3. Other exposed locations:
- a. Metal surfaces, except aluminum, of cooling towers exposed to view, including connected pipes, rails, and ladders: Two coats of MPI 1 (Aluminum Paint (AP)).
 - b. Cloth jackets of insulation of ducts and pipes in connection with plumbing, air conditioning, ventilating refrigeration and heating systems: One coat of MPI 50 (Interior Latex Primer Sealer) and one coat of MPI 11 (Exterior Latex Semi-Gloss (AE)).

3.11 BUILDING AND STRUCTURAL WORK FIELD PAINTING

- A. Painting and finishing of interior and exterior work except as specified under paragraph 3.11 B.
 1. Painting and finishing of new and existing work including colors and gloss of finish selected is specified in Finish Schedule, Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
 2. Painting of disturbed, damaged and repaired or patched surfaces when entire space is not scheduled for complete repainting or refinishing.
 3. Painting of ferrous metal and galvanized metal.
 4. Identity painting and safety painting.
- B. Building and Structural Work not Painted:

1. Prefinished items:
 - a. Casework, doors, elevator entrances and cabs, metal panels, wall covering, and similar items specified factory finished under other sections.
 - b. Factory finished equipment and pre-engineered metal building components such as metal roof and wall panels.
2. Finished surfaces:
 - a. Hardware except ferrous metal.
 - b. Anodized aluminum, stainless steel, chromium plating, copper, and brass, except as otherwise specified.
 - c. Signs, fixtures, and other similar items integrally finished.
3. Concealed surfaces:
 - a. Inside dumbwaiter, elevator and duct shafts, interstitial spaces, pipe basements, crawl spaces, pipe tunnels, above ceilings, attics, except as otherwise specified.
 - b. Inside walls or other spaces behind access doors or panels.
 - c. Surfaces concealed behind permanently installed casework and equipment.
4. Moving and operating parts:
 - a. Shafts, chains, gears, mechanical and electrical operators, linkages, and sprinkler heads, and sensing devices.
 - b. Tracks for overhead or coiling doors, shutters, and grilles.
5. Labels:
 - a. Code required label, such as Underwriters Laboratories Inc., Inchcape Testing Services, Inc., or Factory Mutual Research Corporation.
 - b. Identification plates, instruction plates, performance rating, and nomenclature.
6. Galvanized metal:
 - a. Exterior chain link fence and gates, corrugated metal areaways, and gratings.
 - b. Gas Storage Racks.
 - c. Except where specifically specified to be painted.
7. Metal safety treads and nosings.
8. Gaskets.
9. Structural steel encased in concrete, masonry, or other enclosure.
10. Structural steel to receive sprayed-on fire proofing.
13. Ceilings, walls, and columns in pipe basements.
14. Sprayed-On Fireproofing.

3.12 IDENTITY PAINTING SCHEDULE

- A. Identify designated service in accordance with ANSI A13.1, unless specified otherwise, on exposed piping, piping above removable ceilings, piping in accessible pipe spaces, interstitial spaces, and piping behind access panels.
1. Legend may be identified using 2.1 G options or by stencil applications.
 2. Apply legends adjacent to changes in direction, on branches, where pipes pass through walls or floors, adjacent to operating accessories such as valves, regulators, strainers and cleanouts a minimum of 12 000 mm (40 feet) apart on straight runs of piping. Identification next to plumbing fixtures is not required.
 3. Locate Legends clearly visible from operating position.
 4. Use arrow to indicate direction of flow.
 5. Identify pipe contents with sufficient additional details such as temperature, pressure, and contents to identify possible hazard. Insert working pressure shown on drawings where asterisk appears for High, Medium, and Low Pressure designations as follows:
 - a. High Pressure - 414 kPa (60 psig) and above.
 - b. Medium Pressure - 104 to 413 kPa (15 to 59 psig).
 - c. Low Pressure - 103 kPa (14 psig) and below.
 - d. Add Fuel oil grade numbers.
 6. Legend name in full or in abbreviated form as follows:

PIPING	COLOR OF EXPOSED PIPING	COLOR OF BACKGROUND	COLOR OF LETTERS	LEGEND BBREVIATIONS
Blow-off		Yellow	Black	Blow-off
Boiler Feedwater		Yellow	Black	Blr Feed
A/C Condenser Water Supply		Green	White	A/C Cond Wtr Sup
A/C Condenser Water Return		Green	White	A/C Cond Wtr Ret
Chilled Water Supply		Green	White	Ch. Wtr Sup
Chilled Water Return		Green	White	Ch. Wtr Ret
Shop Compressed Air		Yellow	Black	Shop Air
Air-Instrument Controls		Green	White	Air-Inst Cont
Drain Line		Green	White	Drain
Emergency Shower		Green	White	Emg Shower
High Pressure Steam		Yellow	Black	H.P. _____*
High Pressure Condensate Return		Yellow	Black	H.P. Ret _____*

Medium Pressure Steam		Yellow	Black	M. P. Stm ____ *
Medium Pressure Condensate Return		Yellow	Black	M.P. Ret ____ *
Low Pressure Steam		Yellow	Black	L.P. Stm ____ *
Low Pressure Condensate Return		Yellow	Black	L.P. Ret ____ *
High Temperature Water Supply		Yellow	Black	H. Temp Wtr Sup
High Temperature Water Return		Yellow	Black	H. Temp Wtr Ret
Hot Water Heating Supply		Yellow	Black	H. W. Htg Sup
Hot Water Heating Return		Yellow	Black	H. W. Htg Ret
Gravity Condensate Return		Yellow	Black	Gravity Cond Ret
Pumped Condensate Return		Yellow	Black	Pumped Cond Ret
Vacuum Condensate Return		Yellow	Black	Vac Cond Ret
Fuel Oil - Grade		Green	White	Fuel Oil-Grade __ *
Boiler Water Sampling		Yellow	Black	Sample
Chemical Feed		Yellow	Black	Chem Feed
Continuous Blow-Down		Yellow	Black	Cont. B D
Pumped Condensate		Yellow	Black	Pump Cond
Pump Recirculating		Yellow	Black	Pump-Recirc.
Vent Line		Yellow	Black	Vent
Alkali		Yellow	Black	Alk
Bleach		Yellow	Black	Bleach
Detergent		Yellow	Black	Det
Liquid Supply		Yellow	Black	Liq Sup
Reuse Water		Yellow	Black	Reuse Wtr
Cold Water (Domestic)	White	Green	White	C.W. Dom
Hot Water (Domestic)				
Supply	White	Yellow	Black	H.W. Dom
Return	White	Yellow	Black	H.W. Dom Ret
Tempered Water	White	Yellow	Black	Temp. Wtr
Ice Water				
Supply	White	Green	White	Ice Wtr
Return	White	Green	White	Ice Wtr Ret
Reagent Grade Water		Green	White	RG
Reverse Osmosis		Green	White	RO
Sanitary Waste		Green	White	San Waste
Sanitary Vent		Green	White	San Vent
Storm Drainage		Green	White	St Drain
Pump Drainage		Green	White	Pump Disch
Chemical Resistant Pipe				
Waste		Yellow	Black	Acid Waste

Vent	Yellow	Black	Acid Vent
Atmospheric Vent	Green	White	ATV
Silver Recovery	Green	White	Silver Rec
Oral Evacuation	Green	White	Oral Evac
Fuel Gas	Yellow	Black	Gas
Fire Protection Water			
Sprinkler	Red	White	Auto Spr
Standpipe	Red	White	Stand
Sprinkler	Red	White	Drain

Hot Water Supply Domestic/Solar Water H.W. Sup Dom/SW

Hot Water Return Domestic/Solar Water H.W. Ret Dom/SW

7. Electrical Conduits containing feeders over 600 volts, paint legends using 50 mm (2 inch) high black numbers and letters, showing the voltage class rating. Provide legends where conduits pass through walls and floors and at maximum 6100 mm (20 foot) intervals in between. Use labels with yellow background with black border and words Danger High Voltage Class, 15000.
 8. See Sections for methods of identification, legends, and abbreviations of the following:
 - a. Conduits containing high voltage feeders over 600 volts: Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS / Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS / Section 28 05 33, RACEWAYS AND BOXES FOR ELECTRONIC SAFETY AND SECURITY.
- B. Fire and Smoke Partitions:
1. Identify partitions above ceilings on both sides of partitions except within shafts in letters not less than 64 mm (2 1/2 inches) high. In rooms without ceiling, provide partition information at 9'-0" A.F.F.
 2. Stenciled message: "SMOKE BARRIER" or, "FIRE BARRIER" as applicable, including hourly rating when applicable.
 3. Locate not more than 6100 mm (20 feet) on center on corridor sides of partitions, and with a least one message per room on room side of partition.
 4. Use semigloss paint of color that contrasts with color of substrate.
- C. Pipe Markers: (Alternate to stenciling)
1. Factory fabricated snap-on type.
 - a. Service legend.
 - b. Flow arrows.
 2. Weather-proof plastic coating.

3. Do not use where surface temperature exceeds 180 F.
4. Of following types:
 - a. Smaller than 6 in.: (Completely encircle pipe).
 - b. 6 in. and larger: (Stainless steel straps) .
5. Adhesive type markers not permitted.

3.14 PROTECTION CLEAN UP, AND TOUCH-UP

- A. Protect work from paint droppings and spattering by use of masking, drop cloths, removal of items or by other approved methods.
- B. Upon completion, clean paint from hardware, glass and other surfaces and items not required to be painted of paint drops or smears.
- C. Before final inspection, touch-up or refinished in a manner to produce solid even color and finish texture, free from defects in work which was damaged or discolored.

3.15 APPENDIX

- A. Coordinate the following abbreviations used in Section 09 91 00, PAINTING, with other Sections, especially Section 09 06 00, SCHEDULE FOR FINISHES and other COATING SECTIONS listed. Use the same abbreviation and terms consistently.

1. Paint or coating Abbreviation
2. Acrylic Emulsion AE (MPI 10 - flat/MPI 11 - semigloss/MPI 119 - gloss)
3. Alkyd Flat Ak (MPI 49)
4. Alkyd Gloss Enamel G (MPI 48)
5. Alkyd Semigloss Enamel SG (MPI 47)
6. Aluminum Paint AP (MPI 1)
7. Cementitious Paint CEP (TT-P-1411)
8. Exterior Latex EL (MPI 10 / 11 / 119)
9. Exterior Oil EO (MPI 9 - gloss/MPI 8 - flat/MPI 94 - semigloss)
10. Epoxy Coating EC (MPI 77 - walls, floors/MPI 108 - CMU, concrete)
11. Fire Retardant Paint FR (MPI 67)
12. Fire Retardant Coating (Clear) FC (MPI 66, intumescent type)
13. Floor Enamel FE (MPI 27 - gloss/MPI 59 - eggshell)
14. Heat Resistant Paint HR (MPI 22)
15. Latex Emulsion LE (MPI 53, flat/MPI 52, eggshell/MPI 54, semi-gloss/MPI 114, gloss Level 6)
16. Latex Flat LF (MPI 138)
17. Latex Gloss LG (MPI 114)
18. Latex Semigloss SG (MPI 141)
19. Latex Low Luster LL (MPI 139)
20. Plastic Floor Coating PL

**SECTION 10 21 23
CUBICLE CURTAIN TRACKS**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies cubicle curtain track (C.C.T.) and intravenous support assembly (I.V).

1.2 RELATED WORK

- A. Steel shapes for suspending track assembly: Section 05 50 00, METAL FABRICATIONS and Section 09 51 00, ACOUSTICAL CEILINGS.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
- One 300 mm (12 inch) long piece of cubicle curtain track with carrier access and end stop.
- One clip anchor for fastening track to grid system of acoustical ceilings. One curtain carrier: One intravenous support assembly consisting 300 mm (12 inch) long pieces of track, carrier assembly, and bottle pendant.
- C. Shop Drawings: Showing layout of tracks and method of anchorage.
- D. Manufacturer's Literature and Data:
- E. Cubicle curtain track.
- F. Intravenous support assembly.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver material in original package marked to identify the contents, brand name, and the name of the manufacturer or supplier.
- B. Store in dry and protected location. Store so as to not bend or warp the tracks.
- C. Do not open packages until contents are needed for installation, unless verification inspection is required.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
- B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- B456-03(R2009).....Electrodeposited Coatings for Copper Plus Nickel Plus Chromium and Nickel Plus Chromium

- C. The National Association of Architectural Metal Manufacturers (NAAMM):
AMP 500 Series.....Metal Finishes Manual

PART 2 - PRODUCTS

2.1 CUBICLE CURTAIN TRACKS

- A. Surface mounted suspended type:
1. Channel Tracks (Surface Mounted Type): Extruded aluminum, ASTM B221, alloy 6063, temper T5 or T6, channel shaped, with smooth inside raceway for curtain carriers.
 2. Tubular Track (Suspended Type): Seamless drawn aluminum tubing, ASTM B221, alloy 6061 temper T6, 25 mm (one inch) outside diameter, not less than 1.5 mm (0.060 inch) wall thickness, slotted for interior carriers.
- B. Curtain Carriers: Nylon or delrin carriers, with either nylon or delrin wheels on metal, delrin, or nylon axles. Equip each carrier with either stainless steel, chromium plated brass or steel hooks with swivel, or nickel chromium plated brass or stainless steel bead chain and hook assembly, or delrin carriers may have moulded on delrin hooks. Hook for bead chain may be the same material and finish as the bead chain or may be chromium plated steel. Provide 2.2 carriers for every 300 mm (onefoot) of each section of each track length, plus one additional carrier.
- C. End Stop Connectors, Ceiling Flanges and Other Accessories: Fabricate from the same material with the same finish as the tracks or from nylon.
- D. Hangers and Fittings: Fabricate from the same material with the same finish as the tracks. Hangers may be round or square for channel tracks and round for tubular tracks. Design fittings to be compatible with design of tracks and to safely transmit the track load to the hangers.
- E. At end of each section of track, make provision for insertion and removal of carriers. Design to prevent accidental removal of carrier. Any operating mechanism shall be removable with common tools.

2.2 INTRAVENOUS SUPPORT ASSEMBLY

- A. Assembly includes track, carrier assembly, bottle holding pendant, curved track sections and curved connectors, and all components and accessories required for a working installation.
- B. Track: Surface mounted channel or "I" beam shaped, extruded aluminum. Equip track with removable section at splicing clamp for carrier removal.

- C. Carrier Assembly: Assembly shall include a body made of either stainless steel or aluminum, and be equipped with four ball bearing nylon wheels and lockstop to insure insulation of carrier from track. Equip carrier with a positive locking device to hold carrier stationary when in use. Provide with either a stainless steel, or chromium plated brass hook for support of bottle holding pendent.
- D. Bottle Holding Pendent: Equip with a minimum of three, stainless steel, chromium plated steel, or chromium plated brass arms connected to adjustable shaft of same material. Adjustable shaft shall permit bottle holding hub to adjust from full height to approximately 1800 mm (six feet), 75 mm (three inches) above finished floor. Provide shaft with a built-in locking device for vertical height adjustments. Locking device shall be activated by push button or similar easily operated one hand control.

2.3 FASTENERS

- A. Exposed Fasteners, Screws and Bolts: Stainless steel or chromium/nickel plated brass.
- B. Concealed Fasteners, Screws and Bolts: Hot-dip galvanized (except in high moisture areas use stainless steel).
- C. Metal Clips: Anchor curtain tracks to exposed grid of lay-in acoustical tile ceilings, with concealed metal (butterfly) type or two piece snap locking type ceiling clip of high strength spring steel. When it is not possible to install the metal ceiling clip, the cubicle curtain track may be screwed to the ceiling grid.

2.4 FINISHES

- A. Aluminum: Finish numbers for aluminum specified are in accordance with The Aluminum Association's Designation System. AA-C22A31 finish Chemically etched medium matte, with clear anodic coating, Class II Architectural, 0.4 milsthick.

2.5 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form tracks and bends of lengths that will produce the minimum number of joints. Make track sections up to 4800 mm (16 feet) without joints. Form corner bend on a 300 mm (12 inch) radius.
- C. Provide steel anchor plates, supports, and anchors for securing components to building construction.
- D. Form flat surface without distortion.
- E. Shop assemble components and package complete with anchors and fittings.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Install tracks after finish painting and ceiling finishing operations are complete.
- B. Install track level and hangers plumb and securely anchor to the ceiling or suspend from above to form a rigid installation.
- C. Anchor surface mounted curtain tracks directly to exposed grid of lay-in acoustical tile ceilings with suitable fasteners, spaced approximately 600 mm (24 inches) on center.
- D. Anchor surface mounted curtain tracks to concrete, plaster and gypsum board ceilings with a minimum of 3 mm (1/8-inch) diameter fastenings or concealed clips spaced not more than 900 mm (three feet) on center.
- E. Install suspended track seven feet, three inches above the finished floor, with hangers spaced no more than four feet on center. At ceiling line, provide flange fittings secured to hangers with set screws. Secure track to walls with flanged fittings and to hangers with special fittings.
- F. Securely fasten end stop caps to prevent their being forced out by the striking weight of carriers.
- H. Remove damaged or defective components and replace with new components or repair to the original condition.

3.2 ACCEPTANCE

- A. Track shall be installed neat, rigid, plumb, level and true, and securely anchored to the overhead construction.
- B. Carrier units shall operate smoothly and easily over the full range of travel.

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SECTION 10 26 00
WALL AND DOOR PROTECTION

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This section specifies wall guards (crash rails or bumper guards), handrail/wall guard combinations, corner guards and door/door frame protectors and high impact wall covering.

1.2 RELATED WORK

- A. Structural steel corner guards: Section 05 50 00, METAL FABRICATIONS.
B. Armor plates and kick plates not specified in this section: Section 08 71 00, DOOR HARDWARE.
C. Color and texture of aluminum and resilient material: Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.
D. Caulking at top of door protection: Section 07 92 00, JOINT SEALANTS.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Shop Drawings: Show design and installation details.
C. Manufacturer's Literature and Data:
1. Handrail/Wall Guard Combinations.
2. Wall Guards.
3. Corner Guards.
4. Door/Door Frame Protectors.
5. High Impact Wall covering
D. Test Report: Showing that resilient material complies with specified fire and safety code requirements.

1.4 DELIVERY AND STORAGE

- A. Deliver materials to the site in original sealed packages or containers marked with the name and brand, or trademark of the manufacturer.
B. Protect from damage from handling and construction operations before, during and after installation.
C. Store in a dry environment of approximately 21° C (70 degrees F) for at least 48 hours prior to installation.

1.5 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

- B. American Society for Testing and Materials (ASTM):
- A167-99(R2009).....Stainless and Heat-Resisting Chromium-Nickel
Steel Plate, Sheet, and Strip
 - B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods,
Wire, Shapes, and Tubes
 - D256-10.....Impact Resistance of Plastics
 - D635-10.....Rate of Burning and/or Extent and Time of
Burning of Self-Supporting Plastics in a
Horizontal Position
 - E84-11a.....Surface Burning Characteristics of Building
Materials
- C. The National Association of Architectural Metal Manufacturers (NAAMM):
- AMP 500-06.....Metal Finishes Manual
- D. National Fire Protection Association (NFPA):
- 80-10.....Standard for Fire Doors and Windows
- E. Society of American Automotive Engineers (SAE):
- J 1545-05.....Instrumental Color Difference Measurement for
Exterior Finishes.
- F. Underwriters Laboratories Inc. (UL):
- Annual Issue.....Building Materials Directory

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless Steel: ASTM A167, Type 302B.
- B. Aluminum Extruded: ASTM B221, Alloy 6063, Temper T5 or T6. Aluminum alloy used for colored anodizing coating shall be as required to produce specified color.
- C. Resilient Material:
 1. Extruded and injection molded acrylic vinyl or extruded polyvinyl chloride meeting following requirements:
 - a. Minimum impact resistance of 1197 ps (25 ft lbs per sq.ft) when tested in accordance with ASTM D256 (Izod impact, ft.lbs. per inch notch).
 - b. Class 1 fire rating when tested in accordance with ASTM E84, having a maximum flame spread of 25 and a smoke developed rating of 450 or less.
 - c. Rated self extinguishing when tested in accordance with ASTM D635.
 - d. Material shall be labeled and tested by Underwriters Laboratories or other approved independent testing laboratory.

- e. Integral color with all colored components matched in accordance with SAE J 1545 to within plus or minus 1.0 on the CIE-LCH scales.
- f. Same finish on exposed surfaces.

2.2 CORNER GUARDS

- A. Resilient, Shock-Absorbing Corner Guards: Surface mounted type of 6 mm 1/4-inch corner) formed to profile shown.
 - 1. Snap-on corner guard formed from resilient material, minimum 2 mm (0.078-inch) thick, free floating on a continuous 1.6 mm (0.063-inch) thick extruded aluminum retainer. Provide appropriate mounting hardware, cushions and base plates as required.
 - 2. Provide factory fabricated end closure caps at top and bottom of surface mounted corner guards.
 - 3. Flush mounted corner guards installed on any fire rated wall shall maintain the fire rating of the wall. Provide fire test of proposed corner guard system to verify compliance.
 - a. Where insulating materials are an integral part of the corner guard system, the insulating materials shall be provided by the manufacturer of the corner guard system.
 - b. All exposed metal in fire rated assemblies shall have a paintable finish.
- B. Stainless Steel Corner Guards: Fabricate of 1.6 mm (0.0625-inch) thick stainless steel. Form guards of dimensions and to contour shown.

2.3 WALL GUARDS AND HANDRAILS

- A. Resilient Wall Guards and Handrails:
 - 1. Handrail/Wall Guard Combination: Snap-on covers of resilient material, minimum 2 mm (0.078-inch) thick, shall be free-floated on a continuous, extruded aluminum retainer, minimum 1.8 mm (0.072-inch) thick, anchored to wall at maximum 760 mm (30 inches) on center.
 - 2. Wall Guards (Crash Rails): Snap-on covers of resilient material, minimum 2.8 mm (0.110-inch) thick, shall be free-floated over 50 mm (two-inch) wide aluminum retainer clips, minimum 2.3 mm (0.090-inch) thick, anchored to wall at maximum 600 mm (24 inches) on center, supporting a continuous aluminum retainer, minimum 1.6 mm (0.062-inch) thick; or, shall be free-floated over a continuous extruded aluminum retainer, minimum 2.3 (0.090-inch) thick anchored to wall at maximum 600 mm (24 inches) on center.
 - 3. Provide handrails and wall guards (crash rails) with prefabricated and closure caps, inside and outside corners, concealed splices, cushions, mounting hardware and other accessories as required. End

caps and corners shall be field adjustable to assure close alignment with handrails and wall guards (crash rails). Screw or bolt closure caps to aluminum retainer.

- B. Aluminum Wall Guards: Extruded aluminum, closed tubular bumper assembly mounted on wall brackets as shown.
 - 1. Provide wall bumper with factory fabricated end closure caps, and inside and outside corner assemblies, concealed splice plates, and other accessories standard with the manufacturer.
 - 2. Fabricate tubular wall guards from material with a nominal wall thickness of 6 mm (0.250-inch), form grooves for and provide two strips of continuous polyvinyl chloride cushion bumper inserts.
 - 3. Fabricate adjustable wall brackets from aluminum having a nominal wall thickness of 5 mm (0.20-inch). Fasten bumper to brackets with 6 mm (1/4-inch) diameter aluminum or stainless steel bolts with locknuts.
- C. Stainless Steel Wall Guards: Construct wall guard, including brackets, of minimum 4.75 mm (0.1875-inch) thick stainless steel to design shown.

2.4 DOOR AND DOOR FRAME PROTECTION

- A. Fabricate door and door frame protection items from vinyl acrylic or polyvinyl chloride resilient material, minimum 1.5 mm (0.060-inch) thick, for doors, as shown.
- B. Coordinate door and door frame protection material requirements with door and frame suppliers to insure fit for all components, and color as specified.
- C. Provide adhesive as recommended by resilient material manufacturer.
- D. Provide caulk as appropriate for material, at top of door frame protection.

2.5 HIGH IMPACT WALL COVERING

- A. Fabricate from vinyl acrylic or polyvinyl chloride resilient material minimum 6mm (0.06 inch) thick designed specially for interior use.
- B. Coordinate with door protection material and supplier for proper fit, installation and color.
- C. Provide adhesive as recommended by the wall covering manufacturer.

2.6 FASTENERS AND ANCHORS

- A. Provide fasteners and anchors as required for each specific type of installation.
- B. Where type, size, spacing or method of fastening is not shown or specified, submit shop drawings showing proposed installation details.

2.7 FINISH

- A. In accordance with NAAMM AMP 500 series.
- B. Aluminum:
 - 1. Exposed aluminum: chemically etched medium matte, with clear anodic coating, Class II Architectural, 0.4 mil thick. AA-C22A32 chemically etched medium matte with integrally colored anodic coating, Class II Architectural 0.4 mil thick.
 - 2. Concealed aluminum: Mill finish as fabricated, uniform in color and free from surface blemishes.
- C. Stainless Steel: NAAMM finish Number 4.
- D. Resilient Material: Embossed texture and color in accordance with SAE J 1545 and as specified in Section 09 06 00, EXTERIOR / INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.

PART 3 - INSTALLATION

3.1 RESILIENT CORNER GUARDS

- A. Install corner guards on walls in accordance with manufacturer's instructions.

3.2 STAINLESS STEEL CORNER GUARDS

- A. Mount guards on external corners of interior walls, partitions and columns as shown.
- B. Where corner guards are installed on walls, partitions or columns finished with plaster or ceramic tile, anchor corner guards as shown on drawings. Provide continuous 16 gage perforated, galvanized Z-shape steel anchors welded to back edges of corner guards. Coat back surfaces of corner guards, where shown, with a non-flammable, sound deadening material. Corner guards shall overlap finish plaster surfaces.
 - 1. Where corner guards are installed on exposed structural glazed facing tile units or masonry wall, partitions or columns, anchor corner guards as shown on the drawings anchor corner guards to existing walls with 6 mm (1/4-inch) oval head stainless steel countersunk expansion or toggle bolts. Grout spaces solid between guards and backing with Portland cement and sand mortar.
 - 2. Where corner guards are installed on gypsum board, clean surface and anchor guards with a neoprene solvent-type contact adhesive specifically manufactured for use on gypsum board construction. Remove excess adhesive from around edge of guard and allow to cure undisturbed for 24 hours.

3.3 RESILIENT HANDRAIL AND RESILIENT WALL GUARDS (CRASH RAIL)

- A. Secure guards to walls with brackets and fasteners in accordance with manufacturer's details and instructions.

3.5 STAINLESS STEEL WALL GUARDS

Space brackets at not more than three feet on centers and anchor to the wall in accordance with manufacturer's installation instructions.

3.6 DOOR, DOOR FRAME PROTECTION AND HIGH IMPACT WALL COVERING

- A. Surfaces to receive protection shall be clean, smooth and free of obstructions.
- B. Install protectors after frames are in place but preceding installation of doors in accordance with approved shop drawings and manufacturers specific instructions.
- C. Apply with adhesive in controlled environment according to manufacture's recommendations.
- D. Protection installed on fire rated doors and frames shall be installed according to NFPA 80 and installation procedures listed in UL Building Materials Directory; or, equal listing by other approved independent testing laboratory establishing the procedures.

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**SECTION 10 28 00
TOILET, BATH, AND LAUNDRY ACCESSORIES**

DELETE SECTION -

ADDENDUM B - JANUARY 25, 3013

**See Section 09 60 00 Exterior/Interior Finishes, Materials and Finish Schedule
for toilet accessories**

SECTION 10 44 13
FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL**1.1 DESCRIPTION**

A. This section covers recessed fire extinguisher cabinets.

1.2 RELATED WORK

A. Acrylic glazing: Section 08 80 00, GLAZING.

B. Field Painting: Section 09 91 00, PAINTING.

C. Caulking at perimeter of Cabinets: Section 07 92 00, JOINT SEALANTS.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data: Fire extinguisher cabinet including installation instruction and rough opening required.

1.4 APPLICATION PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American Society of Testing and Materials (ASTM):

D4802-10.....Poly (Methyl Methacrylate) Acrylic Plastic Sheet

PART 2 - PRODUCTS**2.1 FIRE EXTINGUISHER CABINET**

A. Semi-recessed type with flat trim of size and design shown.

2.2 FABRICATION

A. Form body of cabinet from 0.9 mm (0.0359 inch) thick sheet steel.

B. Fabricate door and trim from 1.2 mm (0.0478 inch) thick sheet steel with all face joints fully welded and ground smooth.

1. Glaze doors with 6 mm (1/4 inch) thick ASTM D4802, clear acrylic sheet, Category B-1, Finish 1.

2. Design doors to open 180 degrees.

3. Provide continuous hinge, pull handle, and adjustable roller catch.

2.3 FINISH

A. Finish interior of cabinet body with baked-on semigloss white enamel.

B. Finish door, frame with manufacturer's standard baked-on prime coat suitable for field painting.

PART 3 - EXECUTION

A. Install fire extinguisher cabinets in prepared openings and secure in accordance with manufacturer's instructions.

B. Install cabinet so that bottom of cabinet is 975 mm (39 inches) above finished floor.

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SECTION 10 51 13

METAL LOCKERS

PART 1 -GENERAL

1.1 SUMMARY

- A. Related Requirements: Comply with following:
 - 1. Metal Finishes: Metal Fabrications, Section 05 50 00.
 - 2. Metal coatings and paints: Painting, Section 09 91 00.
 - 3. Finishes: Exterior/Interior Finishes, Materials and Finish Schedule, 09 06 00, 2.10 Division 10, L. Metal Lockers.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 33 23.
- B. Product Data: Submit technical data and descriptive literature for each product.
- C. Shop Drawings: Submit drawings indicating locker locations, types, sizes, configurations, layout of groups, numbering, and accessories. Indicate details of fillers, trim, base, and accessories.
- D. Samples: Submit 6" x 6" samples on metal substrate of each color in manufacturer's standard color range for Architect's selection.
- E. Informational Submittals: Submit manufacturer's instructions. Include detailed installation instructions.

1.3 FIELD SAMPLES

- A. Sample Installation:
 - 1. Provide locker assembly of each type, complete with specified options and accessories in location as directed by VA Project Manager.

Accepted Field Sample: May remain part of completed Work. **1.4 MAINTENANCE**

- A. Maintenance Materials: Provide 1 gallon of touch-up paint for each color used.

PART 2 -PRODUCTS

2.1 STANDARD METAL LOCKERS

- A. Type: Single tier double tier and two person duplex, half height and purse type.
- B. Unit Size, Single Tier: 12 inches wide by 18 inches deep by 72 inches high.
Duplex: 15" wide by 18" deep by 72" high. Double Tier 15 inches wide by 18 inches deep by 36 inches high. All Staff Lockers shall be double tier.
- C. Sheet Steel: ASTM A446, one-coat electroplated zinc cold rolled carbon steel.
 - 1. Surface: Free from buckle, scale, imperfections, and capable of taking

- high grade enamel finish.
2. Minimum Gages:
 - a. Front Frames and Doors: 16 gage.
 - b. Body Tops, Bottoms, Sides, Backs, and Shelves 24 gage minimum, adequately flanged to provide rigidity.
 - c. Fillers, Bases, Sloped Tops, Exposed Ends, Trim: 20 gage minimum.
 - D. Accessible Lockers: Provide accessible units in type and number meeting UFAS requirements.
 - E. Hardware:
 1. Locking and Latching Devices: Recessed, positive, automatic pre-locking type, for combination lock. Include tamper-proof locking bar with silencers, and stainless steel handle parts.
 2. Hinges: Three on doors higher than 36 inches; 2 inch wide, 5 knuckle, tight pin, welded to frame and riveted to door.
 3. Bumpers: Rubber type, mounted to door frame.
 - F. Accessories:
 1. Hooks: One double-prong ceiling hook and two single-prong wall hooks of cadmium-plated steel or cast aluminum for single and double tier units.
 2. Metal Base : Zinc coated steel, manufacturer's standard color to match locker, flush style.
 3. Metal Sloped Top : Continuous sloping type, with pre-fabricated corners, end panels, and splice plates.]
 4. Metal Filler and Boxed End Panels: Manufacturer's standard.
 5. Number Plates: Aluminum with etched figures, 1/2 inch high minimum attached at top of door.
 6. Hat Shelf: One per single tier units.
 - G. Fasteners: Cadmium, zinc, or nickel plated steel; no exposed bolts or rivet heads on front of lockers or frames.
 - H. Fabrication:
 1. Frames: Totally welded overlapping construction, channel formed with double thickness lock and catch housing, and interlocked intermediate cross members.
 2. Doors: Self closing channel box formed with reinforced ends returned and welded with manufacturer's standard louver pattern.
 3. Body: Flanged, reinforced.
 - a. Provide finished end panels for lockers with ends exposed to view.

2.2 FINISHES

- A. Lockers, Base, and Trim: Baked Enamel Finish : Electrostatically applied

in accordance with manufacturers standards and Section 09 91 00, Painting.

B. Section 09 06 00, Exterior/Interior Finishes, Materials and Finish Schedule.

PART 3 -EXECUTION

3.1 EXAMINATION

- A. Examine conditions prior to proceeding with Work. Notify VA Project Manager if conditions are unacceptable for installation
- B. Verify recesses and bases are properly sized and located.

3.2 INSTALLATION

- A. Metal Lockers: Install in accordance with Division 1 and approved Shop Drawings.
 - 1. Install plumb, level, rigid, and flush.
 - 2. Space fastenings 48 inches OC maximum and apply through backup reinforcing plates where necessary to prevent metal distortion. Conceal fasteners wherever possible. Use anchorage devices appropriate to suit materials encountered.
 - 3. Bolt adjoining locker units together to provide rigid installation. Install box end panels, filler panels and other closures for complete installation and to close off openings. **3.3 ADJUSTING**

- B. Touch-up marred finishes.
 - Use only materials and finishes recommended or furnished by locker manufacturer.
 - Adjust doors and latches to operate easily without bind.

3.4 LOCATIONS

See drawings for locations of each type:

- A. Single Tier Full Height
- B. Double Tier Full Height
- C. Duplex (Two Person) Full Height
- D. Purse (6 tier Box) Lockers

- - - END - - -

Wood Face Veneer or Hardwood Plywood

D. Shop Drawings (1/2 full size):

1. All casework, showing details of construction, including materials, hardware and accessories.
2. Cabinets and counters showing faucets in connection with sink bowls, and electrical fixtures and receptacles which are mounted on cabinets and counters.
3. Fastenings and method of installation.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
- A167-99 (R2009).....Stainless and Heat-Resisting chromium-Nickel
Steel Plate, Sheet and Strip
- A1008-11.....Steel, Sheet, Cold-Rolled, Carbon, Structural,
High Strength Low Alloy
- C1036-06.....Flat Glass
- C. Composite Panel Association (CPA):
- A208.1-09.....Particleboard
- D. U.S. Department of Commerce Product Standards (Prod. Std):
- PS1-95.....Construction and Industrial Plywood
- E. Hardwood, Plywood and Veneer Association (HPVA):
- HP-1-09.....Hardwood and Decorative Plywood
- F. Architectural Woodwork Institute (AWI):
- Architectural Woodwork Quality Standards, Guide Specifications Quality
Certification Program - 1999
- G. American Society of Mechanical Engineers (ASME):
- A112.18.1-05.....Plumbing Fixture Fittings
- H. National Electrical Manufacturers Association (NEMA):
- LD3-05.....High Pressure Decorative Laminates
- LD3.1-95.....Performance, Application Fabrication and
Installations of High-Pressure Decorative
Laminates

PART 2 - PRODUCTS

2.1 PLASTIC LAMINATE:

- A. Color and Finish of Plastic Laminate: Section 09 06 00, EXTERIOR /
INTERIOR FINISHES, MATERIALS AND FINISH SCHEDULE.

- B. Exposed decorative surfaces including countertops, both sides of cabinet doors, and for items having plastic laminate finish. General purpose Type HGL.
- C. Cabinet Interiors Including Shelving: Both of following options to comply with NEMA, LD3.1 as a minimum.
 - 1. Plastic laminate clad plywood or particle board.
 - 2. Resin impregnated decorative paper thermally fused to particle board.
- D. Backing sheet on bottom of plastic laminate covered wood tops. Backer Type BKL.
- E. Post Forming Fabrication, Decorative Surface: Post forming Type HGP.

2.2 PLYWOOD, SOFTWOOD

- A. Prod. Std. PS1, five ply construction from 13 mm to 28 mm (1/2 inch to 1-1/8 inch) thickness, and seven ply for 31 mm (1 1/4 inch) thickness.

2.3 PARTICLEBOARD

- A. CPA A208.1, Type 1, Grade 1-M-3.

2.4 RUBBER OR VINYL BASE

- A. Straight (for carpet), cove (for resilient floor); 100 mm (4 inch) high, 3 mm (1/8 inch) thick, flexible to conform to irregularities in walls, partitions and floors.

2.5. PLUMBING FIXTURES

- A. ASME A112.18.1, except die-cast zinc-alloy material is not acceptable.

2.6 SOLID WOOD

- A. Wood required for edge banding moldings, legs shall be of same species as wood face veneer.

2.7 STAINLESS STEEL

- A. ASTM A167, with No. 4 finish.

2.8 HARDWARE

- A. Where pin tumbler locks are specified, disc tumbler lock "Duo A", with brass working parts and case, as manufactured by the Illinois Lock Company will be an acceptable substitute. Locks for each type casework, shall be keyed differently and shall be master-keyed for each type service, such as Nurses, Psychiatric, and Administration. Provide two keys for each lock. Exposed hardware, except as otherwise specified, shall be satin finished chromium plated brass or nickel plated brass.
- B. Marking of Locks and Keys:
 - 1. The name of the manufacturer, or trademark by which manufacturer can readily be identified, legibly marked on each lock.
 - 2. The key change number marked on the exposed face of lock, and also stamped on each key.

3. Key change numbers shall provide sufficient information for replacement of the key by the manufacturer.

C. Hinged Doors:

1. Doors 900 mm (36 inches) and more in height shall have three hinges and doors less than 900 mm (36 inches) in height shall have two hinges. Each door shall close against two rubber bumpers.
2. Hinges: Fabricate hinges with minimum 2 mm (0.072 inch) thick chromium plated steel leaves, and with minimum 3.5 mm (0.139 inch) diameter stainless steel pin. Hinges shall be five knuckle design with 63 mm (2-1/2 inch) high leaves and hospital type tips.
3. Fasteners: Provide full thread wood screws to fasten hinge leaves to door and cabinet frame. Finish screws to match finish of hinges.

D. Door Catches:

1. Friction or Magnetic type, fabricated with metal housing.
2. Provide one catch for cabinet doors 1200 mm (48 inches) high and under, and two for doors over 1200 mm (48 inches) high.

E. Locks:

1. Cylinder type pin tumbler.
2. Equip doors and drawers where shown with locks.

F. Drawer and Door Pulls:

Doors and drawers shall have flush pulls, fabricated of either chromium plated brass, chromium plated steel, stainless steel, or anodized aluminum.

G. Drawer Slides:

1. Full extension steel slides with nylon ball-bearing rollers.
2. Slides shall have positive stop.
3. Equip drawers with rubber bumpers.

H. Sliding Doors:

1. Each door shall be supported by two ball bearing bronze or nylon rollers, or sheaves riding on a stainless steel track at top or bottom, and shall be restrained by a nylon or stainless steel guide at the opposite end.
2. Plastic guides are not acceptable.
3. Each door shall have rubber silencers set near top and bottom of each jamb.

I. Shelf Standards (Except For Fixed Shelves):

Bright zinc-plated steel for recessed mounting with screws, 16 mm (5/8 inch) wide by 5 mm (3/16 inch) high providing 13 mm (1/2 inch) adjustment, complete with shelf supports.

J. Gate Bolt:

Surface mounted barrel type with strike.

K. Hinged Gates:

Gates shall have two double-acting pivots, size as required.

2.9 FABRICATION

- A. Casework shall be of the flush overlay design and, except as otherwise specified, be of premium grade construction and of component thickness in conformance with AWI Quality Standards.
- B. Fabricate casework of plastic laminated covered plywood or particleboard as follows:
1. Where shown, gates, doors, drawers, shelves and all semi-concealed surfaces shall be plastic laminated.
 5. All exposed and semi-exposed lower cabinet casework shall have plastic laminate from top of panel to floor. Apply specified base to plastic laminate.
- C. Electrical fixtures, receptacles, wiring and junction boxes required for fixtures and receptacles:
1. Factory installed in casework.
 2. For electrical lighting fixtures, see drawings.
 3. For electric receptacles and lighting fixtures installed below or adjacent to wall cabinets or above counter tops, see electrical sections or specifications.
 4. Install wiring in built-in raceways and terminate at junction box mounted on rear of cabinet and counter.
 5. For final hook-up at junction box see electrical sections of specifications.
- D. Base:
1. Provide rubber or vinyl base with close, flush joints; set with adhesive.
 2. Remove adhesive from exposed surfaces.
 3. Install base at floor line after casework has been accurately leveled.
 4. Rub base to glossy finish.
- E. Sink bowls:
1. 18 gage stainless steel, of size and design shown.
 2. All interior corners of bowls shall be formed to manufacturer's standard radii.
 3. Sinks shall have rims with flanged edges overlapping tops to provide tight joints.
 4. Secure sink bowls with concealed fastenings.

5. For service lines from service fixtures, see other sections of specifications.
- F. Provide the following plumbing trim and fittings:
1. Faucets: ASME A112.18.1 Type I, compression type, countertop mounted, chromium plated brass, having two valves and with gooseneck spout as shown, elevated to clear handles.
 2. Fittings shall have an elongated escutcheon for spout and handles, replaceable valve seats and four arm or lever style indexed chromium plated brass or stainless steel handles; handles either with or without hood.
- G. Faucets:
1. ASME A112.18.1 Type I, compression type, splashback mounted, chromium plated brass, having two valves and with gooseneck spout as indicated.
 2. Fittings shall have exposed body union inlets and adjustable flanges.
 3. Valves shall have indexed chromium plated brass or stainless steel lever handles and replaceable valves seats; handles either with or without hood.
- H. Drain:
1. Cast or wrought brass or stainless steel with flat strainer.
 2. Surfaces of drains exposed from above shall have a chromium plated finish.
- I. Traps: Cast brass.
- J. Spray Hose:
1. Hose shall drop below counter top when not in use and be of sufficient length to reach the entire length of the countertop.
 2. Concealed trim may be rough brass.
- K. Support Members for Tops of Tables:
1. Construct as detailed.
 2. Provide miscellaneous steel members and anchor as shown.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set casework in place; level, plumb and accurately scribe and secure to walls, and/or floors.
- B. The installation shall be complete including all trim and hardware. Leave the casework clean and free from defects.

3.2 FASTENINGS

- A. Fastenings for securing casework to adjoining construction shall be as detailed on the drawings or approved shop drawings.

- B. See Section 05 50 00, METAL FABRICATIONS for reinforcement of walls and partitions for casework anchorage.
- C. See Section 13 05 41, SEISMIC RESTRAINT FOR NON-STRUCTURAL COMPONENTS for requirements for casework anchorage.

- - - E N D - - -

- E. American Society for Testing and Materials (ASTM):
- A167-99 (R2009).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
 - A1008-11.....Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength, Low Alloy
 - D256-10.....Pendulum Impact Resistance of Plastic
 - D570-98(R2010)e1.....Water Absorption of Plastics
 - D638-10.....Tensile Properties of Plastics
 - D785-08.....Rockwell Hardness of Plastics and Electrical Insulating Materials
 - D790-10.....Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 - D4690-99(2005).....Urea-Formaldehyde Resin Adhesives
 - G21-09.....Determining Resistance of Synthetic Polymeric Materials to Fungi
- F. Federal Specifications (FS):
- A-A-1936.....Adhesive, Contact, Neoprene Rubber
- G. U.S. Department of Commerce, Product Standards (PS):
- PS 1-95.....Construction and Industrial Plywood
- H. National Electrical Manufacturers Association (NEMA):
- LD 3-05.....High Pressure Decorative Laminates
 - LD 3.1-95.....Performance, Application, Fabrication, and Installation of High Pressure Decorative Laminates

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Plastic Laminate: NEMA LD 3.
1. Concealed backing sheet Type BKL.
 2. Decorative surfaces:
 - a. Flat components: Type GP-HGL.
 - b. Post forming: Type PF-HGP.
- B. Molded Resin:
1. Non-glare epoxy resin or furan resin compounded and cured for minimum physical properties specified:

Flexural strength	70 MPa (10,000 psi)	ASTM D790
Rockwell hardness	105	ASTM D785
Water absorption, 14 hours (weight)	.01%	ASTM D570

C. Adhesive

1. For plastic laminate FS A-A-1936.
2. For wood products: ASTM D4690, unextended urea resin or unextended melamine resin, phenol resin, or resorcinol resin.
3. For Field Joints:
 - a. Epoxy type, resistant to chemicals as specified for plastic laminate laboratory surfaces.
 - b. Fungi resistant: ASTM G-21, rating of 0.

D. Fasteners:

1. Metals used for welding same metal as materials joined.
2. Use studs, bolts, spaces, threaded rods with nuts or screws suitable for materials being joined with metal splice plates, channels or other supporting shape.

E. Solid Polymer Material:

1. Filled Methyl Methacrylic Polymer.
2. Performance properties required:

Property	Result	Test
Elongation	0.3% min.	ASTM D638
Hardness	90 Rockwell M	ASTM D785
Gloss (60° Gordon)	5-20	NEMA LD3.1
Color stability	No change	NEMA LD3 except 200 hour
Abrasion resistance	No loss of pattern Max wear depth 0.0762 mm (0.003 in) - 10000 cycles	NEMA LD3
Water absorption weight (5 max)	24 hours 0.9	ASTM D-570
Izod impact	14 N·m/m (0.25 ft-lb/in)	ASTM D256 (Method A)
Impact resistance	No fracture	NEMA LD-3 900 mm (36") drop 1 kg (2 lb.) ball
Boiling water surface resistance	No visible change	NEMA LD3
High temperature resistance	Slight surface dulling	NEMA LD3

3. Cast into sheet form and bowl form.
4. Color throughout with subtle veining through thickness.
5. Joint adhesive and sealer: Manufacturers silicone adhesive and sealant for joining methyl methacrylic polymer sheet.

6. Bio-based products will be preferred.

2.2 SINKS

A. Molded Resin:

1. Cast or molded in one piece with interior corners 25 mm (one inch) minimum radius.
2. Minimum thickness of sides and ends 13 mm (1/2 inch), bottom 16 mm (5/8 inch).
3. Molded resin outlet for drain and standpipe overflow.
4. Provide clamping collar permitting connection to 38 mm (1-1/2 inch) or 50 mm (2 inch) waste outlet and trap, making sealed but not permanent connection.

B. Stainless Steel:

1. ANSI/ASME A112.19.3, Type 304.
2. Self rim for plastic laminate or similar tops with concealed fasteners.
3. Flat rim for welded into stainless steel tops.
4. Ledge back or ledge sides with holes to receive required fixtures when mounted on countertop.
5. Apply fire resistant sound deadening material to underside.

C. Stainless steel circular or oval shaped bowl.

2.3 TRAPS AND FITTINGS

A. Material as specified in DIVISION 22, PLUMBING.

B. For Molded Resin Sinks:

1. Chemical resisting P-traps and fittings for chemical waste service.
2. Provide traps with cleanout plug easily removable without tools.

C. For Stainless Steel Sinks:

1. Either cast or wrought brass or stainless steel P-traps and drain fittings; ASME A112.18.1
2. Flat strainer, except where cup strainer or overflow standpipe specified.
 - a. Provide cup strainer in cabinet type 1B.
 - b. Provide stainless steel overflow stand pipe to within 38 mm (1-1/2 inches) of sink rim.
3. Exposed surface chromium plated finish.

E. Air Gap Fittings: ASME A112.1.2.

2.4 WATER FAUCETS

A. ASME A112.18.1.

1. Cast or forged brass, compression type with replaceable seat and stem assembly or replaceable cartridge.

2. Indexed lever handles either with or without head.
 3. Gooseneck minimum clearance above countertop of 190 mm (7-1/2 inches), bent 180 degrees for vertical discharge.
 4. Swing spouts elevated to clear handles.
 5. Exposed brass surfaces chromium plated.
 6. Cast combination hot and cold fixture with one piece body for multiple outlets.
 7. Adapter type connection which will permit field conversion of swing spouts to fixed or gooseneck grouts or vice versa.
- C. Automatic Controlled Faucets.
1. Infra-red photocell sensor and a solenoid valve to control water flow automatically.
 2. Breaking light beam activates water flow.
 3. Water stops when user moves away from light beam.

2.6 FIXTURE IDENTIFICATION

- A. Code fixtures with full view plastic index buttons.
- B. Use following colors and codes:

SERVICE	COLOR	CODE	COLOR OF LETTERS
Cold Water	Dark Green	CW	White
Hot Water	Red	HW	White

2.7 ELECTRICAL RECEPTACLES

- A. Hospital grade per electrical specifications.
- B. Curb Mounted Receptacles:
 1. NEMA 5-20R duplex in galvanized steel box.
 2. Chromium plated brass or steel face plate.
- C. Pedestal Mounted Receptacles:
 1. NEMA 5-20R duplex installed in double faces.

2. Polished stainless steel or aluminum, or chromium plated brass pedestal.

2.8 COUNTERTOPS

- A. Fabricate in largest sections practicable.
- B. Fabricate with joints flush on top surface.
- C. Fabricate countertops to overhang front of cabinets and end of assemblies 25 mm (one inch) except where against walls or cabinets.
- D. Provide 1 mm (0.039 inch) thick metal plate connectors or fastening devices (except epoxy resin tops).
- E. Join edges in a chemical resistant waterproof cement or epoxy cement, except weld metal tops.
- F. Fabricate with end splashes where against walls or cabinets.
- G. Splash Backs and End Splashes:
 1. Not less than 19 mm (3/4 inch) thick.
 2. Height 100 mm (4 inches) unless noted otherwise.
 3. Laboratories and pharmacy heights or where fixtures or outlets occur: Not less than 150 mm (6 inches) unless noted otherwise.
 4. Fabricate epoxy splash back in maximum lengths practical of the same material.
- H. Drill or cutout for sinks, and penetrations.
 1. Accurately cut for size of penetration.
 2. Provide braces under enlarger space to support not less than 45 kg (100 pounds) centered on opening side along backsplash.
- I. Plastic Laminate Countertops:
 1. Fabricate plastic laminate on five-ply plywood or particleboard core 19 mm (3/4 inch) thick with plastic laminate backing sheet.
 2. Front edge over cabinets not less than 38 mm (1-1/2 inches) thick except where plastic "T" insert is used, not less than 19 mm (3/4 inch) thick.
 3. Exposed Surface and edges of decorative laminated plastic or laboratory chemical resistant surface.
 - a. Use chemical resistant surface on tops 6A, 6B, and 6C.
 - b. Use decorative surface tops when noted plastic laminate, for tops 10A, 10B and 10C.
- J. Molded Resin Tops:
 1. Molded resin with drip groove cut on underside of overhanging edge.
 2. Finish thickness of top minimum 25 mm (1 inch).
 3. Joints: Epoxy Type.

4. Secure reagent shelves to counter tops with fasteners from underside and seal seam.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installing countertops verify that wall surfaces have been finished as specified and that mechanical and electrical service locations are as required.
- B. Secure countertops to supporting rails of cabinets with metal fastening devices, or screws through pierced slots in rails.
 1. Where type, size or spacing of fastenings is not shown or specified, submit shop drawings showing proposed fastenings and method of installation.
 2. Use round head bolts or screws.
 3. Use epoxy or silicone to fasten the epoxy resin countertops to the cabinets.
 4. Use wood or sheet metal screws for wood or plastic laminate tops; minimum penetration into top 16 mm (5/8 inch), screw size No 8, or 10.
 5. Caulk or seal between edges of countertop and back splash and any other hard surfaces that they abut.
- C. Rubber Moldings:
 1. Where shown install molding with butt joints in horizontal runs and mitered joints at corners where ceramic tile occurs omit molding.
 2. Fasten molding to wall and to splashbacks and splashends with adhesive.
- D. Sinks
 1. Install stainless steel sink in molded resin or solid surface tops with epoxy compound to form watertight seal under shelf rim.
 - a. In laboratory and pharmacy fit stainless steel sink with overflow standpipe.
 - b. Install faucets and fittings on sink ledges with watertight seals where shown.
 2. Install molded resin sinks with epoxy compound to form watertight seal with underside of molded resin top.
 - a. Install sink with not less than two channel supports with threaded rods and nuts at each end, expansion bolted to molded resin top.
 - b. Design support for a twice the full sink weight.
 - c. Install with overflow standpipes.
- E. Faucets, Fixtures, and Outlets:

SECTION 13 05 41
SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. Provide seismic restraint in accordance with the requirements of this section in order to maintain the integrity of nonstructural components of the building so that they remain safe and functional in case of seismic event.
- B. Definitions: Non-structural building components are components or systems that are not part of the building's structural system whether inside or outside, above or below grade. Non-structural components of buildings include:
 - 1. Architectural Elements: Facades that are not part of the structural system and its shear resistant elements; cornices and other architectural projections and parapets that do not function structurally; glazing; nonbearing partitions; suspended ceilings; stairs isolated from the basic structure; cabinets; bookshelves; and storage racks.
 - 2. Electrical Elements: Power and lighting systems; substations; switchgear and switchboards; auxiliary engine-generator sets; transfer switches; motor control centers; motor generators; selector and controller panels; fire protection and alarm systems; and telephone and communication systems.
 - 3. Mechanical Elements: Heating, ventilating, and air-conditioning systems; plumbing systems; sprinkler systems; pneumatic systems; boiler equipment and components.
 - 4. Transportation Elements: Mechanical, electrical and structural elements for transport systems, i.e., elevators and dumbwaiters, including hoisting equipment and counterweights.

1.2 RELATED WORK:

- A. Section 08 30 00 FIRE AND SMOKE RATED CURTAINS WITH EGRESS
- B. Section 08 33 13 COILING COUNTER DOORS
- C. Section 08 41 00 SWING AND SLIDE ALUMINUM ENTRANCES
- D. Section 08 62 00 TUBULAR DAYLIGHTING SYSTEM
- E. Section 09 51 00 CEILING TILE
- F. Section 10 21 13 TOILET COMPARTMENTS
- G. Section 10 22 27 OPERABLE PANEL PARTITIONS
- H. Section 22 05 11 COMMON WORK RESULTS FOR PLUMBING
- I. Section 23 05 11 COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION

- J. Section 23 05 41 NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT
- K. Section 23 21 13 HYDRONIC PIPING
- L. Section 23 21 23 HYDRONIC PUMPS
- M. Section 23 22 13 STEAM AND CONDENSATE HEATING PIPING
- N. Section 23 22 23 STEAM CONDENSATE PUMPS
- O. Section 23 31 00 HVAC DUCTS AND CASINGS
- P. Section 23 34 00 HVAC FANS
- Q. Section 23 36 00 AIR TERMINAL UNITS
- R. Section 23 37 00 AIR OUTLETS AND INLETS
- S. Section 23 73 00 INDOOR CENTRAL-STATION AIR-HANDLING UNITS
- T. Section 23 74 13 PACKAGED, OUTDOOR, CENTRAL-STATION AIR-HANDLING UNITS
- U. Section 23 81 23 COMPUTER ROOM AIR CONDITIONERS
- V. Section 23 81 46 WATER-SOURCE UNITARY HEAT PUMPS
- W. Section 26 11 16 SECONDARY UNIT SUBSTATIONS
- X. Section 26 23 00 LOW-VOLTAGE TRANSFORMERS
- Y. Section 26 24 11 DISTRIBUTION SWITCHBOARDS
- Z. Section 26 24 16 PANELBOARDS
- AA. Section 26 29 11 MOTOR STARTERS
- BB. Section 26 3623 AUTOMATIC TRANSFER SWITCHES
- CC. Section 26 51 00 INTERIOR LIGHTING
- DD. Sustainability and LEED requirements. Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS.

1.2 QUALITY CONTROL:

- A. Shop-Drawing Preparation:
 - 1. Have seismic-force-restraint shop drawings and calculations prepared by a professional structural engineer experienced in the area of seismic force restraints. The professional structural engineer shall be registered in the state of Nevada.
 - 2. Submit design tables and information used for the design-force levels, stamped and signed by a professional structural engineer registered in the State where project is located.
- B. Coordination:
 - 1. Do not install seismic restraints until seismic restraint submittals are approved by the Resident Engineer.
 - 2. Coordinate and install trapezes or other multi-pipe hanger systems prior to pipe installation.
- C. Seismic Certification:
 - 1. Permanent equipment and components required to remain operable after an earthquake including but not limited to fire suppression

equipment, emergency power equipment, and emergency lighting equipment are to have Special Seismic Certification in accordance with requirements of section 13.2.2 of ASCE 7 except for equipment that are considered rugged as listed in section 2.2 OSHPD code application notice CAN No. 2-1708A.5, and shall comply with section 13.2.6 of ASCE 7.

1.3 SUBMITTALS:

- A. Submit a coordinated set of equipment anchorage drawings prior to installation including:
 - 1. Description, layout, and location of items to be anchored or braced with anchorage or brace points noted and dimensioned.
 - 2. Details of anchorage or bracing at large scale with all members, parts brackets shown, together with all connections, bolts, welds etc. clearly identified and specified.
 - 3. Numerical value of design seismic brace loads.
 - 4. For expansion bolts, include design load and capacity if different from those specified.
- B. Submit prior to installation, a coordinated set of bracing drawings for seismic protection of piping, with data identifying the various support-to-structure connections and seismic bracing structural connections, include:
 - 1. Single-line piping diagrams on a floor-by-floor basis. Show all suspended piping for a given floor on the same plain.
 - 2. Type of pipe (Copper, steel, cast iron, insulated, non-insulated, etc.).
 - 3. Pipe contents.
 - 4. Structural framing.
 - 5. Location of all gravity load pipe supports and spacing requirements.
 - 6. Numerical value of gravity load reactions.
 - 7. Location of all seismic bracing.
 - 8. Numerical value of applied seismic brace loads.
 - 9. Type of connection (Vertical support, vertical support with seismic brace etc.).
 - 10. Seismic brace reaction type (tension or compression): Details illustrating all support and bracing components, methods of connections, and specific anchors to be used.
- C. Submit prior to installation, bracing drawings for seismic protection of suspended ductwork and suspended electrical and communication cables, include:

1. Details illustrating all support and bracing components, methods of connection, and specific anchors to be used.
 2. Numerical value of applied gravity and seismic loads and seismic loads acting on support and bracing components.
 3. Maximum spacing of hangers and bracing.
 4. Seal of registered structural engineer responsible for design.
- D. Submit design calculations prepared and sealed by the registered structural engineer specified above in paragraph 1.3A.
- E. Submit for concrete anchors, the appropriate ICBC evaluation reports, OSHPD pre-approvals, or lab test reports verifying compliance with OSHPD Interpretation of Regulations 28-6.

1.4 APPLICABLE PUBLICATIONS:

- A. The Publications listed below (including amendments, addenda revisions, supplements and errata) form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only.
- B. American Concrete Institute (ACI):
355.2-07.....Qualification for Post-Installed Mechanical Anchors in Concrete and Commentary
- C. American Institute of Steel Construction (AISC):
Load and Resistance Factor Design, Volume 1, Second Edition
- D. American Society for Testing and Materials (ASTM):
A36/A36M-08.....Standard Specification for Carbon Structural Steel
A53/A53M-10.....Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
A307-10.....Standard Specification for Carbon Steel Bolts and Studs; 60,000 PSI Tensile Strength.
A325-10.....Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
A500/A500M-10.....Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
A615/A615M-09.....Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
A992/A992M-06.....Standard Specification for Steel for Structural Shapes for Use in Building Framing
E488-96(R2003).....Standard Test Method for Strength of Anchors in Concrete and Masonry Element

- E. American Society of Civil Engineers (ASCE 7) Latest Edition.
- F. International Building Code (IBC) Latest Edition
- G. VA Seismic Design Requirements, H-18-8, February 2011
- H. National Uniform Seismic Installation Guidelines (NUSIG)
- I. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Seismic Restraint Manual - Guidelines for Mechanical Systems, 1998 Edition and Addendum

1.5 REGULATORY REQUIREMENT:

- A. IBC 2009.
- B. Exceptions: The seismic restraint of the following items may be omitted:
 - 1. All mechanical and electrical equipment and distribution systems not related to life safety equipment necessary after an earthquake or containing hazardous materials.
 - 2. Equipment weighing less than 400 pounds, which is supported directly on the floor or roof.
 - 3. Equipment weighing less than 20 pounds, which is suspended from the roof or floor or hung from a wall.
 - 4. Gas and medical piping less than 2 ½ inches inside diameter.
 - 5. Piping in boiler plants and equipment rooms less than 1 ¼ inches inside diameter.
 - 6. All other piping less than 2 ½ inches inside diameter, except for automatic fire suppression systems.
 - 7. All piping suspended by individual hangers, 12 inches or less in length from the top of pipe to the bottom of the support for the hanger.
 - 8. All electrical conduits, less than 2 ½ inches inside diameter.
 - 9. All rectangular air handling ducts less than six square feet in cross sectional area.
 - 10. All round air handling ducts less than 28 inches in diameter.
 - 11. All ducts suspended by hangers 12 inches or less in length from the top of the duct to the bottom of support for the hanger.

PART 2 - PRODUCTS

2.1 STEEL:

- A. Structural Steel: ASTM A992.
- B. Structural Tubing: ASTM A500, Grade B.
- C. Structural Tubing: ASTM A500.
- D. Steel Pipe: ASTM A53/A53M, Grade B.
- E. Bolts & Nuts: ASTM A325.

2.2 CAST-IN-PLACE CONCRETE:

- A. Concrete: 28 day strength, $f'c = 25$ MPa (3,000 psi) min. B. Reinforcing Steel: ASTM A615/615M or ASTM A706

PART 3 - EXECUTION

3.1 CONSTRUCTION, GENERAL:

- A. Provide equipment supports and anchoring devices to withstand the seismic design forces, so that when seismic design forces are applied, the equipment cannot displace, overturn, or become inoperable.
- B. Provide anchorages in conformance with recommendations of the equipment manufacturer and as shown on approved shop drawings and calculations.
- C. Construct seismic restraints and anchorage to allow for thermal expansion.
- D. Testing Before Final Inspection:
1. Test 10-percent of anchors in masonry and concrete per ASTM E488, and ACI 355.2 to determine that they meet the required load capacity. If any anchor fails to meet the required load, test the next 20 consecutive anchors, which are required to have zero failure, before resuming the 10-percent testing frequency.
 2. Before scheduling Final Inspection, submit a report on this testing indicating the number and location of testing, and what anchor-loads were obtained.

3.2 MECHANICAL DUCTWORK AND PIPING; ELECTRICAL BUSWAYS, CONDUITS, AND CABLE TRAYS; AND TELECOMMUNICATION WIRES AND CABLE TRAYS RELATED TO EQUIPMENT TO REMAIN OPERATIONAL AFTER AN EARTHQUAKE

- A. Support and brace mechanical ductwork and piping; electrical busways, conduits and cable trays; and telecommunication wires and cable trays to resist directional forces (lateral, longitudinal and vertical).
- B. Brace duct and breeching branches with a minimum of 1 brace per branch.
- C. Provide supports and anchoring so that, upon application of seismic forces, piping remains fully connected as operable systems which will not displace sufficiently to damage adjacent or connecting equipment, or building members.
- D. Seismic Restraint of Piping:
1. Design criteria:
 - a. Piping: Restrain to support seismic loads in accordance with the IBC.

3.3 PARTITIONS

- A. In buildings with flexible structural frames, anchor partitions to only structural element, such as a floor slab, and separate such partition by a physical gap from all other structural elements.

3.4 CEILINGS AND LIGHTING FIXTURES

- A. At regular intervals, laterally brace suspended ceilings against lateral and vertical movements, and provide with a physical separation at the walls.
- B. Independently support and laterally brace all lighting fixtures. Refer to applicable portion of lighting specification, Section 26 51 00, INTERIOR LIGHTING.

3.5 FACADES AND GLAZING

A. INSTALL ATTACHMENTS TO STRUCTURE FOR ALL FAÇADE MATERIALS AS SHOWN ON CONSTRUCTION DRAWINGS TO ENSURE STRENGTH AGAINST APPLICABLE SEISMIC FORCES AT THE PROJECT LOCATION.

3.6 STORAGE RACKS, CABINETS, AND BOOKCASES

- A. Install storage racks to withstand earthquake forces and anchored to the floor or laterally braced from the top to the structural elements.
- B. Anchor medical supply cabinets to the floor or walls and equip them with properly engaged, lockable latches.
- C. Anchor filing cabinets that are more than 2 drawers high to the floor or walls, and equip all drawers with properly engaged, lockable latches.
- D. Anchor bookcases that are more than 30 inches high to the floor or walls, and equip any doors with properly engaged, lockable latches.

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