



**ALEDA E. LUTZ VA MEDICAL CENTER  
1500 WEISS STREET  
SAGINAW, MICHIGAN 48602**

**VA PROJECT 655-11-128  
Roof Replacement  
Buildings 1 and 9**

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Aleda E. Lutz VAMC  
Saginaw, Michigan  
11-1-11

Roof Replacement BLDG. 1,9  
655-11-128

**DEPARTMENT OF VETERANS AFFAIRS**  
**Project 655-11-128 SPECIFICATIONS**

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**SECTION 00 01 15**  
**LIST OF DRAWING SHEETS**

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

REFERENCES		
DRAWING NUMBER	TITLE	REVISION
G-001	COVER SHEET	1
1AD-101	BUILDING 1 ROOF PLAN DEMOLITION	1
1AD-102	BUILDING 1 ROOF PLAN DEMOLITION	1
1AD-103	BUILDING 1 ROOF PLAN DEMOLITION	1
1A-101	BUILDING 1 ROOF PLAN AREA 1	1
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1A-103	BUILDING 1 ROOF PLAN AREA 3	1
1A-701	ROOF DETAILS AND SCHEDULES	1
9AD-101	BUILDING 9 ROOF PLAN DEMO	1
9A-101	BUILDING 9 ROOF PLAN	1

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**SECTION 01 00 00**  
**GENERAL REQUIREMENTS**

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**SECTION 01 00 00**  
**GENERAL REQUIREMENTS**

**1.1. GENERAL INTENTION**

- A. Contractor shall completely prepare site for building operations, including demolition and removal of existing structures, and furnish labor and materials and perform work for Building 1 and 9 Roof replacement as required by drawings and specifications. The contractor is responsible to perform a site survey and investigation to satisfy themselves as to the extent of the work. The place of work is located at Aleda E. Lutz VA Medical Center, Saginaw, Michigan. The period of performance for the work is 120 calendar days from receipt of Notice to Proceed.
- B. Visits to the site will take place during the designated site visit. All references to Resident Engineer (RE), Senior Resident Engineer (SRE), Engineer, COTR, or Project Manager shall all be referred to as Contracting Officers Representative (COR).
- C. All employees of general contractor and subcontractors shall comply with VA security management program. Be identified by project and employer. Be restricted from unauthorized access to areas not affected by this project.
- D. Prior to commencing work, general contractor shall provide proof that an OSHA certified "competent person" (CP) (29 CFR 1926.20(b) (2) will maintain a presence at the work site whenever the general or subcontractors are present.
- E. All employees of general contractor and subcontractors shall comply with VA security management program and obtain permission of the VA Police, be identified by project and employer, and restricted from unauthorized access.
- F. Before placement and installation of work subject to tests by testing laboratory retained by Department of Veterans Affairs, the Contractor shall notify the VA COTR in sufficient time to enable testing laboratory personnel to be present at the site in time for proper taking and testing of specimens and field inspection. Such prior notice shall be not less than three work days unless otherwise designated by the VA COTR.
- G. Training:
  - 1. All employees of General Contractor or Subcontractors (having supervisory authority over the project in total or over tradesmen on the project) shall have the 30-hour OSHA certified Construction Safety course and/or other relevant competency training, as determined by VA Competent Person (VACP).

2. All other employees of General Contractor or Subcontractors on the project shall have the 10-hour OSHA certified Construction Safety course and/or other relevant competency training, as determined by VACP.
3. Submit OSHA training records of all such employees for approval before the start of work.
4. Prior to commencing work, general contractor shall provide proof that an OSHA certified "competent person" (CP) (29 CFR 1926.20(b) (2) will maintain a presence at the work site whenever the general or subcontractors are present.
5. All tradesmen shall have relevant competency training as determined by the VA COTR. The General Contractor shall provide proof that all tradesmen are certified or properly training in their field of work.

**1.2. STATEMENT OF BID ITEM(S)**

BID ITEM I, ENTIRE PROJECT, LUMP SUM (Bidders are to enter their lump sum bid price using the offer section of the SF 1442 Solicitation, Offer, and Award): Contractor shall completely remove existing roofing and prepare surface for new roofing. Contractor shall install new roofing surface, base and associated work as required to provide a complete roofing renovation. Performance time is **120** Calendar Days from receipt of the Notice to Proceed.

**1.3. SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR**

- A. Contractor may make the number of sets he has need of from the electronic set furnished to him during the bidding process.
- B. Refer to drawing list table in specification section 00 01 15.

**1.4. ADMINISTRATIVE WORKING HOURS**

- A. Administrative working hours for the Medical Center are normally between the hours of 8:00 A.M. to 4:30 P.M. excluding Saturday and Sunday. This project involves work at different shift hours (3PM-12AM) as required in drawings and specifications, due to the activities involved in replacement of flooring. If the Contractor desires to work during periods other than above, which he may, the Contractor must make his/her request to the VA Contracting officer three (3) days in advance of his/her intention to work during other periods and await approval from contracting officer.

**1.5. CONTRACTOR EMPLOYEE BEHAVIOR ON VA MEDICAL CENTER SITE**

- A. Objectionable Employees: The VA Contracting Officer, in writing, may require the Contractor to remove from the work site, area, or Medical Center, employees deemed objectionable regarding dress, language

and/or behavior. VA Police will investigate any alledged criminal behavior of any contractor employee that occurs on VA property.

**1.6. IDENTIFICATION OF CONTRACTOR'S AND MATERIAL SUPPLIERS MECHANIZED EQUIPMENT**

- A. All Contractor's machinery, motor vehicles, and mechanized equipment shall have acceptable identification showing the owner's name and identifying number. This identification shall be posted in a conspicuous location on each piece of equipment as may be required by the Contracting Officer. The Contractor shall submit a listing of his vehicles intended for use on this project by listing type of vehicle, color, and license number.

**1.7. MEDICAL CENTER STAFF, PATIENTS, VISITOR SAFETY**

- A. Contractor and/or Sub-Contractors shall not expose VA workers, patients, and visitors to unsafe or unhealthy conditions during Construction operations. Contractor should be reminded that adherence to OSHA regulations may not be sufficient in some situations, and more stringent regulations (Veterans Affairs, Veterans Health Administration, local Veterans Affairs Medical Center) may apply. Extra precautions should always be observed to insure patient, visitor, and employee safety when working in a medical center/hospital environment. Make sure to secure all tools and follow all safety and infection control requirements.

**1.8. OMISSIONS**

- A. The drawings and specifications are intended to include all work and materials necessary for completion of the work. Any incidental item of material, labor or detail required for the proper execution and completion of the work and omitted from either the drawings and specifications or both, but obviously required by governing codes, local regulations, trade practices, operational functions, and good workmanship, shall be provided as a part of the contract work without extra charge, even though not specifically detailed or mentioned.
- B. In all cases of discrepancies between the drawings and specifications, the contractor shall notify the Saginaw VAMC CO and COTR. The specifications shall govern over the drawings. If work proceeds without obtaining proper interpretations of the conflicting drawings and specifications from the VA Contracting Officer, the installed work, which is not in accordance with the design and best practices, shall be replaced at no additional cost.

**1.9. DRAWINGS AND SPECIFICATIONS**

- A. The drawings show the general arrangement, general design, and extent of the work for the project and are diagrammatic. Exact location of

pipng, ductwork and equipment, not located by dimensions on drawings, shall be determined in the field considering interference's and appearance.

- B. In general, the horizontal pipe and ductwork indicated on drawings is intended to be installed above the ceiling unless otherwise noted.
- C. The drawings are not intended to be scaled for rough-in measurements.
- D. The drawings are not to be reproduced or marked-up, to serve or submitted as "shop drawings".
- E. The Contractor shall take Field measurements necessary for securing materials and fitting the installation to the building construction and arrangement.
- F. The Contractor shall be responsible for the correct fit of the work installed.

**1.10. ENTERTAINMENT SYSTEMS**

- A. Contractor or subcontractor employees shall not be allowed to bring into the job site AM/FM radios, cassette player, compact disc player, mp3 player, or any other sound/music entertainment device, nor operate aforementioned equipment from vehicles on VA Medical Center property.

**1.11. GREEN ENVIRONMENTAL MANAGEMENT SYSTEM (GEMS)**

- A. The following is the Green Environmental Management System Mission Statement for the Aleda E. Lutz VA Medical Center which is shared with all contractors working on our medical center site and it is expected to be adhered to too the greatest extent possible by the contractors.
- B. The mission of the VA Medical Center, Saginaw, Michigan is to deliver quality health care to our nation's veterans. In order to accomplish this mission, the Medical Center recognizes that it must operate so as to protect both the environment and the health and safety of patients, employees and visitors. In order to accomplish this, the VA Medical Center is committed to the following actions: Operating a Green Environmental Management System (GEMS) that meets requirements of Presidential Executive Order 13148 and the guidance provided by Veterans Health Administration.
- C. Being a good steward of the environment by complying with federal, state and local environmental laws and other requirements, preventing pollution, minimizing waste, conserving cultural and natural resources and continually improving environmental programs.
- D. Utilizing sustainable practices to eliminate minimize or mitigate adverse environmental impacts.

- E. Evaluating the operation of the VA Medical Center to incorporate actions into facility planning and procedures to reduce environmental vulnerabilities.
- F. Integrating pollution prevention, waste minimization, resource conservation into the VA Medical Center operations, whenever practical.
- G. Using natural resources efficiently, and maintain a policy of protecting plant and wildlife habitats consistent with the VA Medical Center's mission.
- H. Recognizing that the development and construction at the VA Medical Center must consider the unique conditions of the environment of which the facility is part.
- I. Training VA Medical Center staff, as needed, to carry out the environmental responsibilities of their positions.
- J. Soliciting input, as appropriate, from stakeholders including staff, patients, visitors, and the local community regarding environmental matters affecting the operation of the medical center.
- K. Operating a Green Environmental Management System (GEMS) that meets requirements of Presidential Executive Order 13148 and the guidance provided by Veterans Health Administration.
- L. The official environmental policy document is MEDICAL CENTER MEMORANDUM NO.00-08, which can be obtained by contacting Mr. William Merrill at (989)497-2500 Extension 13918.

#### **1.12. CONSTRUCTION SECURITY REQUIREMENTS**

##### **A. Security Plan:**

- 1. The security plan defines both physical and administrative security procedures that will remain effective for the entire duration of the project.
- 2. The General Contractor is responsible for assuring that all sub-contractors working on the project and their employees also comply with these regulations.

##### **B. Security Procedures:**

- 1. Neither General Contractor's employees nor Sub-Contractor's employees shall enter the project site without appropriate badge. They may also be subject to inspection of their personal effects when entering or leaving the project site.
- 2. For working outside the "regular hours" as defined in the contract, The General Contractor shall give 3 days notice to the Contracting Officer so that security escort arrangements can be provided for the employees. This notice is separate

from any notices required for utility shutdown described later in this section.

3. No photography of VA premises is allowed without written permission of the Contracting Officer.
4. VA reserves the right to close down or shut down the project site and order General Contractor's employees off the premises in the event of a national emergency. The General Contractor may return to the site only with the written approval of the Contracting Officer.

C. Key Control:

1. The General Contractor shall provide duplicate keys and lock combinations to the VA COTR for the purpose of security inspections of every area of project including tool boxes and parked machines and take any emergency action.
2. The General Contractor shall turn over all permanent lock cylinders to the VA locksmith for permanent installation.

D. Document Control:

1. Before starting any work, the General Contractor/Sub Contractors shall submit an electronic security memorandum describing the approach to following goals and maintaining confidentiality of "sensitive information".
  - i. VA sensitive information is all Department data, on any storage media or in any form or format, which requires protection due to the risk of harm that could result from inadvertent or deliberate disclosure, alteration, or destruction of the information. The term includes information whose improper use or disclosure could adversely affect the ability of an agency to accomplish its mission, proprietary information, records about individuals requiring protection under various confidentiality provisions such as the Privacy Act and the HIPAA Privacy rule, and information that can be withheld under the Freedom of Information Act. Examples of VA sensitive information include the following: individually-identifiable medical, benefits, and personnel information; financial, budgetary, research, quality assurance; confidential commercial, critical infrastructure, investigatory, and law enforcement information; information that is confidential and privileged in litigation such as information protected by the deliberative process privilege, attorney work-product

privilege, and the attorney client privilege; and other information which, if released, could result in violation of law or harm or unfairness to any individual or group, or could adversely affect the national interest or the conduct of federal programs.

2. The General Contractor shall be responsible for safekeeping of all drawings, project manual and other project information. This information shall be shared only with those with a specific need to accomplish the project.
3. Certain documents, sketches, videos or photographs and drawings may be marked "Law Enforcement Sensitive" or "Sensitive Unclassified". Secure such information in separate containers and limit the access to only those who will need it for the project. Return the information to the Contracting Officer upon request.
4. These security documents shall not be removed or transmitted from the project site without the written approval of Contracting Officer.
5. All paper waste or electronic media such as CD's and diskettes shall be shredded and destroyed.
6. Notify Contracting Officer and Site Security Officer immediately when there is a loss or compromise of "sensitive information".
7. All electronic information shall be stored in specified location following VA standards and procedures using an Engineering Document Management Software (EDMS).
  - i. Security, access and maintenance of all project drawings, both scanned and electronic shall be performed and tracked through the EDMS system.
  - ii. "Sensitive information" including drawings and other documents may be attached to e-mail provided all VA encryption procedures are followed.

E. Motor Vehicle Restrictions

1. Vehicle authorization request shall be required for any vehicle entering the site and such request shall be submitted 24 hours before the date and time of access. Access shall be restricted to picking up and dropping off materials and supplies.
2. Separate permits shall be issued for General Contractor and its employees for parking in designated areas only.

**1.13. FIRE SAFETY**

- A. Applicable Publications: Publications listed below form part of this Article to extent referenced. Publications are referenced in text by basic designations only.
1. American Society for Testing and Materials (ASTM):
    - i. E84-2008 Surface Burning Characteristics of Building Materials
  2. National Fire Protection Association (NFPA):
    - i. 10-2006 Standard for Portable Fire Extinguishers
    - ii. 30-2007 Flammable and Combustible Liquids Code
    - iii. 51B-2003 Standard for Fire Prevention During Welding, Cutting and Other Hot Work
    - iv. 70-2011 National Electrical Code
    - v. 241-2004 Standard for Safeguarding Construction, Alteration, and Demolition Operations
  3. Occupational Safety and Health Administration (OSHA):
    - i. 29 CFR 1926 Safety and Health Regulations for Construction
- B. Fire Safety Plan: Establish and maintain a fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to VA COTR and Facility Safety Manager for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the general contractor's competent person per OSHA requirements. This briefing shall include information on the construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, and all other VA requirements as discussed at the pre-construction meeting. Documentation shall be provided to the VA COR that individuals have undergone contractor's safety briefing.
- C. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.
- D. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).
- E. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.

- F. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with VA COTR and facility Safety Manager.
- G. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to VA COTR and facility Safety Manager.
- H. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- I. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- J. Sprinklers: Install, test and activate new automatic sprinklers prior to removing existing sprinklers.
- K. Existing Fire Protection: Do not impair automatic sprinklers, smoke and heat detection, and fire alarm systems, except for portions immediately under construction, and temporarily for connections. Provide fire watch for impairments more than 4 hours in a 24-hour period. Request interruptions in accordance with Article, OPERATIONS AND STORAGE AREAS, and coordinate with VA COTR and facility Safety Manager. All existing or temporary fire protection systems (fire alarms, sprinklers) located in construction areas shall be tested as coordinated with the medical center. Parameters for the testing and results of any tests performed shall be recorded by the medical center and copies provided to the VA COTR.
- L. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with VA COTR and facility Safety Manager.
- M. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with VA COTR. Obtain permits from facility Safety Manager in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.
- N. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to VA COTR and facility Safety Manager.
- O. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.
- P. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.

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- Q. Perform other construction, alteration and demolition operations in accordance with 29 CFR 1926.

<b>FIRE ALARM SHUTDOWN / HOT WORK PERMIT</b>	<b>Emergency No.: 989-321-4222</b>
<b>BEFORE INITIATING HOT WORK, ENSURE PRECAUTIONS ARE IN PLACE!        MAKE SURE AN APPROPRIATE FIRE EXTINGUISHER IS READILY AVAILABLE!</b>	

This Hot Work Permit is required for any operation involving open flames or producing heat and/or sparks. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch-Applied Roofing<sup>2</sup>, and Cadwelding.

<p><b>INSTRUCTIONS</b>          A. Verify precautions listed at right (or do not proceed with the work).          B. Complete and retain this permit.</p> <p><b>HOT WORK BEING DONE BY:</b></p> <p><input type="checkbox"/> EMPLOYEE  <input type="checkbox"/> CONTRACTOR _____</p> <p><b>DATE:</b> _____ <b>TIME:</b> _____</p> <p><b>BUILDING - FLOOR - LOCATION:</b></p> <p><b>TYPE OF WORK / JOB:</b></p> <p><b>PERSON PERFORMING HOT WORK:</b></p> <p><b>PHONE NUMBER:</b></p> <p><b>PERMIT NO.:</b> _____ <b>PROJECT NO.:</b> _____</p> <p style="text-align: center;"><b>VAMC USE BELOW THIS LINE</b></p> <p>I verify the above location has been examined, the precautions checked on the Required Precautions Checklist have been taken to prevent fire, and permission is authorized for work.</p> <p><b>SIGNATURE:</b> _____</p> <p><b>PERMIT EXPIRES:</b> _____ <b>Date:</b> _____ <b>Time:</b> _____</p> <p><b>FIRE WATCH REQUIRED:</b>  <input type="checkbox"/> YES    <input type="checkbox"/> NO</p> <p><b>FIRE ALARM SHUTDOWN REQUIRED:</b>  <input type="checkbox"/> YES    <input type="checkbox"/> NO</p>	<p style="text-align: center;"><b>Required Precautions Checklist</b></p> <p><input type="checkbox"/> Available sprinklers, hose streams, and extinguishers are in service/operable.</p> <p><input type="checkbox"/> Hot work equipment in good repair.</p> <p><input type="checkbox"/> Confined space entry permit when required.</p> <p><input type="checkbox"/> Lockout/tagout required.</p> <p><input type="checkbox"/> Ensure all conditions are safe and remain unchange.</p> <p><input type="checkbox"/> Work not conducted on pipes or other metal in contact with combustible material if close enough to cause ignition by conduction.</p> <p><b>Requirements within 35 ft. (10 m) of work:</b></p> <p><input type="checkbox"/> Flammable liquids, dust, lint, and oil deposits removed.</p> <p><input type="checkbox"/> Explosive atmosphere in area eliminated.</p> <p><input type="checkbox"/> Floors swept clean.</p> <p><input type="checkbox"/> Combustible floors wet down, covered with damp sand or fire resistant sheets.</p> <p><input type="checkbox"/> Remove other combustibles where possible. Otherwise protect with fire resistant tarpaulins or welding screens.</p> <p><input type="checkbox"/> All wall and floor openings covered.</p> <p><input type="checkbox"/> Fire resistant tarpaulins suspended beneath work.</p> <p><b>Work on walls or ceilings/enclosed equipment:</b></p> <p><input type="checkbox"/> Construction is noncombustible and without combustible covering insulation.</p> <p><input type="checkbox"/> Combustibles are moved 30 feet away from any wall (both sides).</p> <p><input type="checkbox"/> Danger does not exist by conduction of heat into another area.</p> <p><input type="checkbox"/> Enclosed equipment cleaned of all combustibles.</p> <p><input type="checkbox"/> Containers purged of all flammable liquids/ vapors. (verified by gas detection instrument).</p> <p><b>Fire watch/hot work monitor: Name:</b> _____</p> <p><input type="checkbox"/> Fire watch will be provided during and for 30 minutes after work including any breaks.</p> <p><input type="checkbox"/> Firewatch is supplied with suitable extinguishers.</p> <p><input type="checkbox"/> Firewatch is trained in use of this equipment and sounding alarms.</p> <p><input type="checkbox"/> Fire watch may be required for adjoining areas above, and below.</p> <p><input type="checkbox"/> Ample ventilation to remove smoke/ vapor from work area.</p> <p><b>Final Check-up List:</b></p> <p><input type="checkbox"/> Monitor hot work area for 30 minutes after job is complete.</p> <p><input type="checkbox"/> Clean up work space / sweep area.</p> <p><input type="checkbox"/> Sign and turn in permits.</p>
<p><b>THIS PERMIT IS GOOD FOR ONE SHIFT ONLY</b></p> <p><b>IF ALARM SOUNDS, THIS PERMIT IS VOID, MUST HAVE NEW PERMIT ISSUED</b></p>	<p><b>FINAL CHECK-UP (PERMIT REQUESTER)</b>          Work area and all adjacent areas to which sparks and heat might have spread (including floors above and below and on opposite sides of walls) were inspected thirty (30) minutes after the work was completed and were found fire safe.</p> <p><b>SIGNATURE:</b> _____ <b>Time:</b> _____</p>
<p><b>Notes:</b> 1. When used in accordance with NFPA 51B, this permit is to be used for, but not limited to, the following: welding, cutting, grinding, open-flame soldering, and thawing pipe.          2. Torch applied roofing is exempt from NFPA 51B per 1-2.3.</p>	

**Aleda E. Lutz VA Medical Center, Saginaw, MI  
BURNING, WELDING, CUTTING AND FIRE ALARM SHUTDOWN PERMIT**

**ATTENTION**

Before approving any cutting and welding permit, the contractor's authorized representative or their appointee shall inspect the work area and confirm that precautions have been taken to prevent fire in accordance with NFPA Standard No. 51B.

**STEPS TO GET A PERMIT**

1. Bring filled in permit to the project COTR. If they are unavailable, you may see any of the following VAMC personnel listed below:
  - A. Tom Belongia, COTR
  - B. Kevin Russell, PE, COTR
  - C. Ernie Graham, COTR
  - D. Sheila Taylor, Safety Manager
  - E. Larry Unrein, M&R Supervisor
  - F. George Berg, FMS Chief
2. After receiving their signature, make a copy of the permit at the FMS copier.
3. This copy must be posted at the Work Permit Bulletin Board located in FMS Office area.
4. When the work is completed or the permit expires, the original permit and the copy of the permit must be signed off, remove the signed copy of the permit from the board and place the copy in the closed permit mailbox, below the bulletin board. The original permit will be returned to the general contractor.

**PRECAUTIONS**

1. Sprinklers are in service where installed
2. Cutting and welding equipment in good repair
3. Within 10,500 mm (35 feet); floors swept clean of combustible, no combustible material or flammable liquids, all wall and floor openings covered, and covers suspended beneath work to collect sparks
4. When working on enclosed equipment and in confined space, equipment and area is free of flammable vapors
5. Fire watch provided during and 30 minutes after operation (60 minutes for torch applied roofing operations)
6. Portable fire extinguisher with adequate rating available in the immediate vicinity
7. Standpipe system in service where installed
8. Protection of any sprinkler heads when hot work is in close proximity
9. Smoking prohibited in immediate vicinity
10. Non-combustible shields provided when hot work is done near combustible walls, partitions, floors, roofs
11. Prohibition of hot work on pipes contacting combustible walls
12. Personnel trained in use of equipment including portable fire extinguishers and sounding a fire alarm
13. Final check-up conducted 30 minutes after finishing task.

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**1.14. OPERATIONS AND STORAGE AREAS**

- A. The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.
- B. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the COTR and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the COTR, the buildings and utilities may be abandoned and need not be removed.
- C. The Contractor shall, under regulations prescribed by the COTR, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the COTR. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.
- D. Working space and space available for storing materials shall be as determined by the Saginaw VAMC COTR.
- E. Workmen are subject to rules of Medical Center applicable to their conduct.
- F. Execute work to interfere as little as possible with normal functioning of Medical Center as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others. Use of equipment and tools that transmit vibrations and noises through the building structure, are not permitted in buildings that are occupied, during construction, jointly by patients or medical personnel, and Contractor's personnel, except as permitted by VA COTR where required by limited working space.
  - 1. Do not store materials and equipment in other than assigned areas.

2. Schedule delivery of materials and equipment to immediate construction working areas within buildings in use by Department of Veterans Affairs in quantities sufficient for not more than two work days. Provide unobstructed access to Medical Center areas required to remain in operation.
- G. NO CONTRACT WORK ON Federal Holidays
1. No work will be scheduled on the following federal holidays or any other day specifically declared a federal holiday by the President of the United States.
    - New Year's Day
    - Birthday of Martin Luther King, Jr.
    - Washington's Birthday
    - Memorial Day
    - Independence Day
    - Labor Day
    - Columbus Day
    - Veterans Day
    - Thanksgiving Day
    - Christmas Day
- H. Contractor shall maintain access to Building 1 at all times.
- I. Contractor shall construct safety barriers as determined necessary prior to the start of work and they must remain in place until the completion.
- J. Contractor shall perform all work in or adjacent to VA occupied areas in such a manner to ensure:
1. Protection of patients and personnel in occupied areas from the hazards and dust associated with a construction environment.
- K. Outages:
1. All outages shall be scheduled and approved in writing at least five working days or more in advance. The Contractor shall understand and plan for that the majority of outages will be scheduled only at night and on weekends. Daytime outages will be scheduled as can be planned for by the medical center without interfering with medical center operations.
  2. Contractor shall submit a request to interrupt any such services to Saginaw VAMC COTR, in writing. Request shall state reason, date, exact time of, and approximate duration of such interruption. In no case shall the contractor begin work in an area to interrupt services without obtaining written approval from the Saginaw VAMC COTR. Normal Administrative working Hours for the Aleda E. Lutz VA Medical Center are between the times

of 8:00 A.M. and 4:30 P.M. Most utility outages will have to be scheduled between the hours of 5:00 P.M. and 5:30 A.M. Monday through Friday, or 5:00 P.M. Friday night and 5:30 A.M. on Monday morning. Depending on the system involved some outages can occur at times between 5:30 A.M. and 6:30 P.M.

3. Building 1 will be occupied during performance of work.
- L. Contractor shall take all measures and provide all material necessary for protecting existing equipment and property in affected areas of construction against dust and debris, so that equipment and affected areas to be used in the Medical Centers operations will not be hindered. Contractor shall permit access to Department of Veterans Affairs personnel and patients through other construction areas which serve as routes of access to such affected areas and equipment. Coordinate alteration work in areas occupied by Department of Veterans Affairs so that Medical Center operations will continue during the construction period.
- M. When an area is turned over to Contractor, Contractor shall accept entire responsibility therefore.
1. Contractor shall maintain a minimum temperature of 4 degrees C (40 degrees F) at all times, except as otherwise specified.
  2. In areas affected where owner still occupies during construction, the contractor shall maintain a minimum temperature of 70 degrees F at all times.
  3. Contractor shall maintain in operating condition existing fire protection and alarm equipment. In connection with fire alarm equipment, Contractor shall make arrangements for pre-inspection of site with Department of Veterans Affairs, whichever will be required to respond to an alarm from Contractor's employee or watchman.
- N. Utilities Services: Maintain existing utility services for Medical Center at all times. Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, steam, gases, sewer or air pipes, or conduits, wires, cables, etc. of utility services or of fire protection systems and communications systems (including telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by VA COTR.
1. No utility service such as water, gas, steam, sewers or electricity, or fire protection systems and communications systems may be interrupted without prior approval of VA COTR. Electrical work shall be accomplished with all affected

- circuits or equipment de-energized. When an electrical outage cannot be accomplished, work on any energized circuits or equipment shall not commence without the Medical Center Director's prior knowledge and written approval.
2. Contractor shall submit a request to interrupt any such services to VA COTR, in writing, 5 working days in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.
  3. Contractor shall be advised (in writing) of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of Medical Center. Interruption time approved by Medical Center may occur at other than Contractor's normal working hours.
  4. Major interruptions of any system must be requested, in writing, at least 15 calendar days prior to the desired time and shall be performed as directed by the VA COTR.
  5. In case of a contract construction emergency, service will be interrupted on approval of VA COTR. Such approval will be confirmed in writing as soon as practical.
  6. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.
- O. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, shall be sealed, capped or plugged. The lines shall not be capped in finished areas, but shall be removed and sealed, capped or plugged in ceilings, within furred spaces, in unfinished areas, or within walls or partitions; so that they are completely behind the finished surfaces.
- P. To minimize interference of construction activities with flow of Medical Center traffic, comply with the following:
1. Keep roads, walks and entrances to grounds, to parking and to occupied areas of buildings clear of construction materials, debris and standing construction equipment and vehicles. Wherever excavation for new utility lines cross existing roads, at least one lane must be open to traffic at all times.

2. Method and scheduling of required cutting, altering and removal of existing roads, walks and entrances must be approved by the VA COTR.
- Q. Coordinate the work for this contract with other construction operations as directed by VA COTR. This includes the scheduling of traffic and the use of roadways, as specified in Article, USE OF ROADWAYS.
- R. In order to minimize the exposure to diesel exhaust by veterans, visitors, VA employees, and workmen directly on the construction site it is highly recommended that all non-road construction equipment to be used on this project that has higher emissions than U.S. EPA Tier II standards shall be retrofitted with diesel oxidation catalysts, and use biodiesel fuel.
- S. In order to minimize the exposure to veterans, visitors, VA employees, and workmen directly on the construction site it shall be required that all vehicles and construction equipment left running and unused or unattended shall not be allowed to sit idling more than three minutes otherwise they shall be turned off." The reasons for shutting down both gasoline and diesel vehicles and equipment when engine power is not required will reduce emissions of carbon monoxide, carbon dioxide, particular matter, volatile organic compounds, oxides of nitrogen, and mobile sources of air toxics. These emissions can adversely affect local indoor air quality by seeping into the buildings as well as outside all buildings on the Aleda E. Lutz VA Medical Center site, thereby adversely affect veterans, visitors, VA employees, and workmen health through exposure. This requirement will be an item for presentation at the preconstruction meeting for each project.
- T. Contractor Parking: Parking shall be allowed on the project site on the north parking lot unless designated or approved otherwise by the Saginaw VAMC COTR. Saginaw VAMC COTR reserves the right to limit the number of vehicles allowed on the project site.
- U. Construction Site Maintenance:
1. Provide labor and material necessary to maintain the site in a safe condition.
  2. Keep the premises free from accumulation of waste materials, rubbish and other debris resulting from the work.
  3. At completion of the work, remove all waste materials, rubbish, and debris from about the premises, as well as all tools, construction equipment, machinery, and surplus materials.

4. Repair, at contractor's expense, damage which may have occurred to any permanent structure completed under the contract work, or to private or public property.
5. Leave the site clean and ready for use by the VA Medical Center. Restore to their original condition those portions of the site not designated for alteration by the contract documents, but disturbed by construction activities.
6. Failure to continually maintain site or to immediately clean the site after a complaint or project completion may result in the Government completing the work by hire or by the VA Medical Center's maintenance and repair staff or another contractor. All cost would be responsibility of the contractor failing to complete the work.

**1.15. USE OF CELLULAR PHONES**

- A. Cellular telephones are permitted in the Building 1-HOSPITAL except [3rd floor (Surgery area), 2nd floor (Clinical Laboratory) and 1st floor (Urgent Care Area)]. Cellular phones in these areas must be completely turned off, not on stand-by.
- B. Cellular telephones are permitted in the following Buildings without exception, except for security reasons as determined by VAMC Police Service:
  - Building 2-ADMINISTRATION
  - Building 3-ADMINISTRATION
  - Building 4-ADMINISTRATION
  - Building 6-BOILER PLANT
  - Building 9-WAREHOUSE
  - Building 19-GENERATOR BUILDING
  - Building 20-SUBSTATION
  - Building 21-VEHICLE GARAGE
  - Building 22-COMMUNITY LIVING CENTER (NURSING HOME).

**1.16. ALTERATIONS**

- A. Survey: Before any work is started, the Contractor shall make a thorough survey with the VA COTR and a representative of VA Medical Center, of buildings in which alterations occur and areas which are anticipated routes of access, and furnish a report, signed by all three, to the Contracting Officer. This report shall list by rooms and spaces:
  1. Existing condition and types of resilient flooring, doors, windows, walls and other surfaces not required to be altered throughout affected areas of the buildings.

2. Existence and conditions of items such as plumbing fixtures and accessories, electrical fixtures, equipment, venetian blinds, shades, etc., required by drawings to be either reused or relocated, or both.
  3. Shall note any discrepancies between drawings and existing conditions at site.
  4. Shall designate areas for working space, materials storage and routes of access to areas within buildings where alterations occur and which have been agreed upon by Contractor and VA COTR.
- B. Any items required by drawings to be either reused or relocated or both, found during this survey to be nonexistent, or in opinion of VA COTR, to be in such condition that their use is impossible or impractical, shall be furnished and/or replaced by Contractor with new items in accordance with specifications which will be furnished by Government. Provision of new items will only be accomplished after mutual agreement to an equitable adjustment by the contracting parties.
- C. Re-Survey: Thirty days before expected partial or final inspection date, the Contractor and VA COTR together shall make a thorough re-survey of the areas of buildings involved. They shall furnish a report on conditions then existing, of resilient flooring, doors, windows, walls and other surfaces as compared with conditions of same as noted in first condition survey report:
1. Re-survey report shall also list any damage caused by Contractor to such flooring and other surfaces, despite protection measures; and, shall form basis for determining extent of repair work required of Contractor to restore damage caused by Contractor's workmen in executing work of this contract.
- D. Protection: Provide the following protective measures:
1. Wherever existing roof surfaces are disturbed they shall be protected against water infiltration. In case of leaks, they shall be repaired immediately upon discovery.
  2. Temporary protection against damage for portions of existing structures and grounds where work is to be done, materials handled and equipment moved and/or relocated.
  3. Protection of interior of existing structures at all times, from damage, dust and weather inclemency. Wherever work is performed, floor surfaces that are to remain in place shall be adequately protected prior to starting work, and this

protection shall be maintained intact until all work in the area is completed.

**1.17. CONTRACTORS NOT ALLOWED USE OF GOVERNMENT EQUIPMENT, TOOLS AND MATERIALS.**

**1.18. RECEIPT OF CONTRACTOR'S MATERIALS**

- A. Contractors shall not have materials, equipment, tools, or supplies shipped to them care of the VA Medical Center as they will be rejected and returned.

**1.19. INFECTION PREVENTION MEASURES**

- A. Implement the requirements of VAMC's Infection Control Risk Assessment (ICRA) team. ICRA Group may monitor dust in the vicinity of the construction work and require the Contractor to take corrective action immediately if the safe levels are exceeded.
- B. Establish and maintain a dust control program as part of the contractor's infection preventive measures in accordance with the guidelines provided by ICRA Group in this specification section. Prior to start of work, prepare a plan detailing project-specific dust protection measures, including periodic status reports, and submit to VA COTR and Facility ICRA team for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
  - 1. All personnel involved in the construction or renovation activity shall be educated and trained in infection prevention measures established by the medical center.
- C. Medical center Infection Control personnel shall monitor for airborne disease (e.g. aspergillosis) as appropriate during construction. A baseline of conditions may be established by the medical center prior to the start of work and periodically during the construction stage to determine impact of construction activities on indoor air quality. In addition:
  - 1. The VA COTR and VAMC Infection Control personnel shall review pressure differential monitoring documentation to verify that pressure differentials in the construction zone and in the patient-care rooms are appropriate for their settings. The requirement for negative air pressure in the construction zone shall depend on the location and type of activity. Upon notification, the contractor shall implement corrective measures to restore proper pressure differentials as needed.
  - 2. In case of any problem, the medical center, along with assistance from the contractor, shall conduct an environmental assessment to find and eliminate the source.

- D. In general, following preventive measures shall be adopted during construction to keep down dust and prevent mold.
1. Dampen debris to keep down dust and provide temporary construction partitions in existing structures where directed by VA COTR. Blank off ducts and diffusers to prevent circulation of dust into occupied areas during construction.
  2. Do not perform dust producing tasks within occupied areas without the approval of the VA COTR. For construction in any areas that will remain jointly occupied by the medical Center and Contractor's workers, the Contractor shall:
    - i. Provide dust proof fire-rated temporary drywall construction barriers to completely separate construction from the operational areas of the hospital in order to contain dirt debris and dust. Barriers shall be sealed and made presentable on hospital occupied side. Install a self-closing rated door in a metal frame, commensurate with the partition, to allow worker access. Maintain negative air at all times. A fire retardant polystyrene, 6-mil thick or greater plastic barrier meeting local fire codes may be used where dust control is the only hazard, and an agreement is reached with the VA COTR and Medical Center.
    - ii. HEPA filtration is required where the exhaust dust may reenter the breathing zone. Contractor shall verify that construction exhaust to exterior is not reintroduced to the medical center through intake vents, or building openings. Install HEPA (High Efficiency Particulate Accumulator) filter vacuum system rated at 95% capture of 0.3 microns including pollen, mold spores and dust particles. Insure continuous negative air pressures occurring within the work area. HEPA filters should have ASHRAE 85 or other prefilter to extend the useful life of the HEPA. Provide both primary and secondary filtrations units. Exhaust hoses shall be heavy duty, flexible steel reinforced and exhausted so that dust is not reintroduced to the medical center.
    - iii. Adhesive Walk-off/Carpet Walk-off Mats, minimum 600mm x 900mm (24" x 36"), shall be used at all interior transitions from the construction area to occupied medical center area. These mats shall be changed as often

as required to maintain clean work areas directly outside construction area at all times.

- iv. Vacuum and wet mop all transition areas from construction to the occupied medical center at the end of each workday. Vacuum shall utilize HEPA filtration. Maintain surrounding area frequently. Remove debris as they are created. Transport these outside the construction area in containers with tightly fitting lids.
  - v. The contractor shall not haul debris through patient-care areas without prior approval of the VA COTR and the Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape. No sharp objects should be allowed to cut through the plastic. Wipe down the exterior of the containers with a damp rag to remove dust. All equipment, tools, material, etc. transported through occupied areas shall be made free from dust and moisture by vacuuming and wipe down.
  - vi. Using a HEPA vacuum, clean inside the barrier and vacuum ceiling tile prior to replacement. Any ceiling access panels opened for investigation beyond sealed areas shall be sealed immediately when unattended.
  - vii. There shall be no standing water during construction. This includes water in equipment drip pans and open containers within the construction areas. All accidental spills must be cleaned up and dried within 12 hours. Remove and dispose of porous materials that remain damp for more than 72 hours.
- E. At completion, remove construction barriers and ceiling protection carefully, outside of normal work hours. Vacuum and clean all surfaces free of dust after the removal.
- F. Final Cleanup:
- 1. Upon completion of project, or as work progresses, remove all construction debris from above ceiling, vertical shafts and utility chases that have been part of the construction.
  - 2. Perform HEPA vacuum cleaning of all surfaces in the construction area. This includes walls, ceilings, cabinets, furniture (built-in or free standing), partitions, flooring, etc.
  - 3. All new air ducts shall be cleaned prior to final inspection.

#### **1.20. DISPOSAL AND RETENTION**

- A. Materials and equipment accruing from work removed and from demolition operations shall be disposed of as follows:
1. The Government shall have the right to selectively salvage equipment or component parts thereof. If the government should determine it has no interest in salvaging any materials, they shall become the property of the contractor for disposal by him. Items not reserved shall become property of the Contractor and be removed by Contractor from Medical Center.
  2. Reserved items which are to remain property of the Government are identified by attached tags as items to be stored. Items that remain property of the Government shall be removed or dislodged from present locations in such a manner as to prevent damage which would be detrimental to re-installation and reuse. Store such items where directed by Saginaw VAMC COTR.
  3. Items not reserved shall become property of the Contractor and be removed by Contractor from Medical Center.

**1.21. PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS**

- A. The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.
- B. The Contractor shall protect from damage all existing improvements and utilities at or near the work site and on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.
- C. Refer to Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS, for additional requirements on protecting vegetation, soils and the environment. Refer to Articles, "Alterations", "Restoration", and

"Operations and Storage Areas" for additional instructions concerning repair of damage to structures and site improvements.

**1.22. RESTORATION**

- A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified, do not cut, alter or remove any structural work, and do not disturb any ducts, plumbing, steam, gas, or electric work without approval of the VA COTR. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the VA COTR before it is disturbed. Materials and workmanship used in restoring work, shall conform in type and quality to that of original existing construction, except as otherwise shown or specified.
- B. Upon completion of contract, deliver work complete and undamaged. Existing work (walls, ceilings, partitions, floors, mechanical and electrical work, lawns, paving, roads, walks, etc.) disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled, or replaced with new work, and refinished and left in as good condition as existed before commencing work.
- C. At Contractor's own expense, Contractor shall immediately restore to service and repair any damage caused by Contractor's workmen to existing piping and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems (including telephone) which are indicated on drawings and which are not scheduled for discontinuance or abandonment.

**1.23. AS-BUILT DRAWINGS**

- A. The contractor shall maintain two full size sets of as-built drawings which will be kept current during construction of the project, to include all contract changes, modifications and clarifications.
- B. All variations shall be shown in the same general detail as used in the contract drawings. To insure compliance, as-built drawings shall be made available for the VA COTR's review, as often as requested.
- C. Contractor shall deliver two approved completed sets of as-built drawings to the VA COTR within 15 calendar days after each completed phase.
- D. After the acceptance of the project by the VA COTR, contractor shall provide two sets (hard copy) of "as-built" drawings. Contractor shall also provide to VA COTR a CD containing electronic copies of all "as-built" drawings. VA COTR shall review the "as-built" drawings and electronic CADD files to verify all work is in accordance with the

contract documents. Scanned drawings converted to AutoCAD dwg files are unacceptable. All files shall be vector format.

- E. Electronic CADD files shall be delivered to VA COTR in AutoCAD version 2010 or a previous release drawing format. All CADD files shall be completed in accordance with Aleda E. Lutz CAD standards.
- F. The "as-built" drawings shall indicate the following and their accurate location: Walls, Doors, Windows, Ceilings, Equipment, Ductwork, Piping, Fixtures, Sensors, Piping diagrams, Conduits, Receptacles, Circuit Identification, Ceiling Mounted Items, Data, Switches, Lighting, Panels, Utilities, Roads, Buildings, Structures, Structural Members, and System Accessories as installed / modified under this project.
- G. Paragraphs A, through F shall also apply to all shop drawings.

**1.24. USE OF ROADWAYS**

- A. For hauling, use only established public roads and roads on Medical Center property and, when authorized by the Saginaw VAMC COTR, such temporary roads which are necessary in the performance of contract work. Temporary roads shall be constructed by the Contractor at Contractor's expense. When necessary to cross curbing, sidewalks, or similar construction, they must be protected by well constructed bridges.

**1.25. TEMPORARY USE OF MECHANICAL AND ELECTRICAL EQUIPMENT**

- A. Use of new installed mechanical and electrical equipment to provide heat, ventilation, plumbing, light and power will be permitted subject to compliance with the following provisions:
  - 1. Permission to use each unit or system must be given by VA COTR. If the equipment is not installed and maintained in accordance with the following provisions, the VA COTR will withdraw permission for use of the equipment.
  - 2. Electrical installations used by the equipment shall be completed in accordance with the drawings and specifications to prevent damage to the equipment and the electrical systems, i.e. transformers, relays, circuit breakers, fuses, conductors, motor controllers and their overload elements shall be properly sized, coordinated and adjusted. Voltage supplied to each item of equipment shall be verified to be correct and it shall be determined that motors are not overloaded. The electrical equipment shall be thoroughly cleaned before using it and again immediately before final inspection including vacuum cleaning and wiping clean interior and exterior surfaces.

3. Units shall be properly lubricated, balanced, and aligned. Vibrations must be eliminated.
  4. Automatic temperature control systems for preheat coils shall function properly and all safety controls shall function to prevent coil freeze-up damage.
  5. The air filtering system utilized shall be that which is designed for the system when complete, and all filter elements shall be replaced at completion of construction and prior to testing and balancing of system.
  6. All components of heat production and distribution system, metering equipment, condensate returns, and other auxiliary facilities used in temporary service shall be cleaned prior to use; maintained to prevent corrosion internally and externally during use; and cleaned, maintained and inspected prior to acceptance by the Government.
- B. Prior to final inspection, the equipment or parts used which show wear and tear beyond normal, shall be replaced with identical replacements, at no additional cost to the Government.
- C. This paragraph shall not reduce the requirements of the mechanical and electrical specifications sections.

**1.26. TEMPORARY USE OF EXISTING ELEVATORS**

- A. Use of existing Service Elevator, in Building No.1, for handling building materials and Contractor's personnel shall be permitted subject to following provisions: Contractor makes all arrangements with the Saginaw VAMC COTR for use of elevator. The Saginaw VAMC COTR will ascertain that elevator is in proper condition. Contractor shall use the service elevator in Building No.1 for daily use between the hours of (6:00 A.M. to 7:00A.M.), (8:00A.M. to 11:00 A.M.), (12:45P.M. to 4:30P.M.) and (5:30P.M. to 6:00A.M.).
- B. Contractor covers and provides maximum protection of following elevator components:
1. Entrance jambs, heads soffits and threshold plates.
  2. Entrance columns, canopy, return panels and inside surfaces of car enclosure walls.
  3. Finish flooring.

**1.27. AVAILABILITY AND USE OF UTILITY SERVICES**

- A. The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. The Contractor shall carefully conserve any utilities furnished without charge.

- B. The Contractor, at Contractor's expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of electricity used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.
- C. Water (for Construction and Testing): Furnish temporary water service.
  - 1. Obtain water by connecting to the Medical Center water distribution system. Provide reduced pressure backflow preventer at each connection. Water is available at no cost to the Contractor.
  - 2. Maintain connections, pipe, fittings and fixtures and conserve water-use so none is wasted. Failure to stop leakage or other wastes will be cause for revocation (at Saginaw VAMC COTR's discretion) of use of water from Medical Center's system.
- D. Electricity (for Construction and Testing): Furnish all temporary electric services.
  - 1. Obtain electricity by connecting to the Medical Center electrical distribution system. The Contractor shall meter and pay for electricity required for electric cranes and hoisting devices, electrical welding devices and any electrical heating devices providing temporary heat. Electricity for all other uses is available at no cost to the Contractor.

**1.28. TESTS**

- A. Pre-test mechanical and electrical equipment and systems and make corrections required for proper operation of such systems before requesting final tests. Final test will not be conducted unless pre-tested.
- B. Conduct final tests required in various sections of specifications in presence of an authorized representative of the Contracting Officer. Contractor shall furnish all labor, materials, equipment, instruments, and forms, to conduct and record such tests.
- C. Mechanical and electrical systems shall be balanced, controlled and coordinated. A system is defined as the entire complex which must be coordinated to work together during normal operation to produce results for which the system is designed. For example, air conditioning supply air is only one part of entire system which provides comfort conditions for a building. Other related components

are return air, exhaust air, steam, chilled water, refrigerant, hot water, controls and electricity, etc. Another example of a complex which involves several components of different disciplines is a boiler installation. Efficient and acceptable boiler operation depends upon the coordination and proper operation of fuel, combustion air, controls, steam, feedwater, condensate and other related components.

- D. All related components as defined above shall be functioning when any system component is tested. Tests shall be completed within a reasonably short period of time during which operating and environmental conditions remain reasonably constant.
- E. Individual test result of any component, where required, will only be accepted when submitted with the test results of related components and of the entire system.

**1.29. INSTRUCTIONS**

- A. Contractor shall furnish Maintenance and Operating manuals and verbal instructions when required by the various sections of the specifications and as hereinafter specified.
- B. Manuals: Maintenance and operating manuals (four copies each) for each separate piece of equipment shall be delivered to the VA COTR coincidental with the delivery of the equipment to the job site. Manuals shall be complete, detailed guides for the maintenance and operation of equipment. They shall include complete information necessary for starting, adjusting, maintaining in continuous operation for long periods of time and dismantling and reassembling of the complete units and sub-assembly components. Manuals shall include an index covering all component parts clearly cross-referenced to diagrams and illustrations. Illustrations shall include "exploded" views showing and identifying each separate item. Emphasis shall be placed on the use of special tools and instruments. The function of each piece of equipment, component, accessory and control shall be clearly and thoroughly explained. All necessary precautions for the operation of the equipment and the reason for each precaution shall be clearly set forth. Manuals must reference the exact model, style and size of the piece of equipment and system being furnished. Manuals referencing equipment similar to but of a different model, style, and size than that furnished will not be accepted.
- C. Instructions: Contractor shall provide qualified, factory-trained manufacturers' representatives to give detailed instructions to assigned Department of Veterans Affairs personnel in the operation

and complete maintenance for each piece of equipment. All such training will be at the job site. These requirements are more specifically detailed in the various technical sections. Instructions for different items of equipment that are component parts of a complete system, shall be given in an integrated, progressive manner. All instructors for every piece of component equipment in a system shall be available until instructions for all items included in the system have been completed. This is to assure proper instruction in the operation of inter-related systems. All instruction periods shall be at such times as scheduled by the VA COTR and shall be considered concluded only when the VA COTR is satisfied in regard to complete and thorough coverage. The Department of Veterans Affairs reserves the right to request the removal of, and substitution for, any instructor who, in the opinion of the VA COTR, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.

**1.30. RELOCATED EQUIPMENT AND ITEMS**

- A. Contractor shall disconnect, dismantle as necessary, remove and reinstall in new location, all existing equipment and items indicated by symbol "R" or otherwise shown to be relocated by the Contractor.
- B. Perform relocation of such equipment or items at such times and in such a manner as directed by the Saginaw VAMC COTR.
- C. Suitably cap existing service lines, such as steam, condensate return, water, drain, gas, air, vacuum and/or electrical, whenever such lines are disconnected from equipment to be relocated. Remove abandoned lines in finished areas and cap as specified herein before under paragraph "Abandoned Lines".
- D. Provide all mechanical and electrical service connections, fittings, fastenings and any other materials necessary for assembly and installation of relocated equipment; and leave such equipment in proper operating condition.

**1.31. TB SCREENING PROGRAM FOR CONTRACTORS**

- A. The contractor shall have a medical program that addresses tuberculosis and certifies that their employees are "TB free". The medical program shall include written assurance that each employee has no active tuberculosis. All contract employees assigned to the work site shall have a pre-placement tuberculin screening within 90 days prior to assignment to the worksite as recommended by the Center for Disease Control (CDC). This can be the CDC two-step skin testing or a Food and Drug Administration (FDA) approved blood test. Employees manifesting positive screening reactions to the tuberculin

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shall be examined per current CDC guidelines prior to working on VHA property. If the employee is found without evidence of active (infectious) pulmonary tuberculosis (TB), a statement documenting examination by a physician must be on file with the employer (construction contractor), noting that the employee with a positive tuberculin screening test is without evidence of active (infectious) pulmonary TB. If the employee is found with evidence of active (infectious) pulmonary TB, the employee would require treatment with a subsequent statement as outlined above before being allowed to return to work on VHA property.

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**SECTION 01 33 23**  
**SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES**

- 1-1. Refer to Articles titled SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91), in GENERAL CONDITIONS.
- 1-2. For the purposes of this contract, samples, test reports, certificates, and manufacturers' literature and data shall also be subject to the previously referenced requirements. The following text refers to all items collectively as SUBMITTALS.
- 1-3. Submit for approval, all of the items specifically mentioned under the separate sections of the specification, with information sufficient to evidence full compliance with contract requirements. Materials, fabricated articles and the like to be installed in permanent work shall equal those of approved submittals. After an item has been approved, no change in brand or make will be permitted unless:
  - A. Satisfactory written evidence is presented to, and approved by Contracting Officer, that manufacturer cannot make scheduled delivery of approved item or;
  - B. Item delivered has been rejected and substitution of a suitable item is an urgent necessity or;
  - C. Other conditions become apparent which indicates approval of such substitute item to be in best interest of the Government.
- 1-4. Forward submittals in sufficient time to permit proper consideration and approval action by Government. Time submission to assure adequate lead time for procurement of contract - required items. Delays attributable to untimely and rejected submittals will not serve as a basis for extending contract time for completion.
- 1-5. Submittals will be reviewed for compliance with contract requirements by VAMC Saginaw COTR, and action thereon will be taken by VAMC Saginaw COTR on behalf of the Contracting Officer.
- 1-6. Upon receipt of submittals, VAMC Saginaw COTR will assign a file number thereto. Contractor, in any subsequent correspondence, shall refer to this file and identification number to expedite replies relative to previously approved or disapproved submittals.
- 1-7. The Government reserves the right to require additional submittals whether or not particularly mentioned in this contract. If additional submittals beyond those required by the contract are requested by the Contracting Officer, prior to furnishing any requested submittals,

negotiation any adjustment in contract price and/or time and consummation of any negotiated adjustment via contract modification is required in accordance with contract clause FAR 52.243-4 CHANGES and VAAR 852.236-88 CHANGES - SUPPLEMENT. Any additional submittals requested by parties other than the Contracting Officer or provided by the Contractor without an official request made by the Contracting Officer will not receive any adjustment in contract price and/or time notwithstanding the filing of a claim via the Disputes clause of the contract.

- 1-8. Schedules called for in specifications and shown on shop drawings shall be submitted for use and information of Department of Veterans Affairs and VAMC Saginaw COTR. However, the Contractor shall assume responsibility for coordinating and verifying schedules. The Contracting Officer and VAMC Saginaw COTR assumes no responsibility for checking schedules or layout drawings for exact sizes, exact numbers and detailed positioning of items.
- 1-9. Submittals must be submitted by Contractor only and shipped prepaid. Contracting Officer assumes no responsibility for checking quantities or exact numbers included in such submittals.
  - A. Submit samples in single units unless otherwise specified. Submit shop drawings, schedules, manufacturers' literature and data, and certificates in quadruplicate, except where a greater number is specified.
  - B. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter shall be sent via first class mail and shall contain the list of items, name of Medical Center, name of Contractor, contract number, applicable specification paragraph numbers, applicable drawing numbers (and other information required for exact identification of location for each item), manufacturer and brand, ASTM or Federal Specification Number (if any) and such additional information as may be required by specifications for particular item being furnished. In addition, catalogs shall be marked to indicate specific items submitted for approval.
    1. A copy of letter must be enclosed with items, and any items received without identification letter will be considered "unclaimed goods" and held for a limited time only.
    2. Each sample, certificate, manufacturers' literature and data shall be labeled to indicate the name and location of the Medical Center, name of Contractor, manufacturer, brand, contract number and ASTM or

- Federal Specification Number as applicable and location(s) on project.
3. Required certificates shall be signed by an authorized representative of manufacturer or supplier of material, and by Contractor.
- C. If submittal samples have been disapproved, resubmit new samples as soon as possible after notification of disapproval. Such new samples shall be marked "Resubmitted Sample" in addition to containing other previously specified information required on label and in transmittal letter.
- D. Approved samples will be kept on file by the VAMC Saginaw COTR at the site until completion of contract, at which time such samples will be delivered to Contractor as Contractor's property. Where noted in technical sections of specifications, approved samples in good condition may be used in their proper locations in contract work. At completion of contract, samples that are not approved will be returned to Contractor only upon request and at Contractor's expense. Such request shall be made prior to completion of the contract. Disapproved samples that are not requested for return by Contractor will be discarded after completion of contract.
- E. Submittal drawings (shop, erection or setting drawings) and schedules, required for work of various trades, shall be checked before submission by technically qualified employees of Contractor for accuracy, completeness and compliance with contract requirements. These drawings and schedules shall be stamped and signed by Contractor certifying to such check.
1. For each drawing required, submit one legible photographic paper or vellum reproducible.
  2. Reproducible shall be full size.
  3. Each drawing shall have marked thereon, proper descriptive title, including Medical Center location, project number, manufacturer's number, reference to contract drawing number, detail Section Number, and Specification Section Number.
  4. A space 120 mm by 125 mm (4-3/4 by 5 inches) shall be reserved on each drawing to accommodate approval or disapproval stamp.
  5. Submit drawings, ROLLED WITHIN A MAILING TUBE, fully protected for shipment.
  6. One reproducible print of approved or disapproved shop drawings will be forwarded to Contractor.
  7. When work is directly related and involves more than one trade, shop drawings shall be submitted to VAMC Saginaw COTR under one cover.
- 1-10. Samples, shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to

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**SECTION 01 57 19**  
**TEMPORARY ENVIRONMENTAL CONTROLS**

**EP-1. DESCRIPTION**

- A. This section specifies the control of environmental pollution and damage that the Contractor shall consider for air, water, and land resources. It includes management of visual aesthetics, noise, solid waste, radiant energy, and radioactive materials, as well as other pollutants and resources encountered or generated by the Contractor. The Contractor is obligated to consider specified control measures with the costs included within the various contract items of work.
- B. Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which:
1. Adversely effect human health or welfare,
  2. Unfavorably alter ecological balances of importance to human life,
  3. Effect other species of importance to humankind, or;
  4. Degrade the utility of the environment for aesthetic, cultural, and historical purposes.
- C. Definitions of Pollutants:
1. Chemical Waste: Petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.
  2. Debris: Combustible and noncombustible wastes, such as leaves, tree trimmings, ashes, and waste materials resulting from construction or maintenance and repair work.
  3. Sediment: Soil and other debris that has been eroded and transported by runoff water.
  4. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from industrial, commercial, and agricultural operations and from community activities.
  5. Surface Discharge: The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "water of the United States" and would require a permit to discharge water from the governing agency.
  6. Rubbish: Combustible and noncombustible wastes such as paper, boxes, glass and crockery, metal and lumber scrap, tin cans, and bones.

7. Sanitary Wastes:

- a. Sewage: Domestic sanitary sewage and human and animal waste.
- b. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

**EP-2. QUALITY CONTROL**

- A. Establish and maintain quality control for the environmental protection of all items set forth herein.
- B. Record on daily reports any problems in complying with laws, regulations, and ordinances. Note any corrective action taken.

**EP-3. REFERENCES**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. U.S. National Archives and Records Administration (NARA):  
33 CFR 328.....Definitions

**EP-4. PROTECTION OF ENVIRONMENTAL RESOURCES**

- A. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this contract. Confine activities to areas defined by the specifications and drawings.
- B. Protection of Land Resources: Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without permission from the VAMC Saginaw COTR. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or where special emergency use is permitted.
  - 1. Work Area Limits: Prior to any construction, mark the areas that require work to be performed under this contract. Mark or fence isolated areas within the general work area that are to be saved and protected. Protect monuments, works of art, and markers before construction operations begin. Convey to all personnel the purpose of marking and protecting all necessary objects.
  - 2. Protection of Landscape: Protect trees, shrubs, vines, grasses, land forms, and other landscape features shown on the drawings to be preserved by marking, fencing, or using any other approved techniques.

- a. Box and protect from damage existing trees and shrubs to remain on the construction site.
  - b. Immediately repair all damage to existing trees and shrubs by trimming, cleaning, and painting with antiseptic tree paint.
  - c. Do not store building materials or perform construction activities closer to existing trees or shrubs than the farthest extension of their limbs.
3. Handle and dispose of solid wastes in such a manner that will prevent contamination of the environment. Place solid wastes (excluding clearing debris) in containers that are emptied on a regular schedule. Transport all solid waste off Government property and dispose of waste in compliance with Federal, State, and local requirements.
  4. Store chemical waste away from the work areas in corrosion resistant containers and dispose of waste in accordance with Federal, State, and local regulations.
  5. Handle discarded materials other than those included in the solid waste category as directed by the VAMC Saginaw COTR.
- C. Protection of Water Resources: Keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters and sewer systems. Implement management techniques to control water pollution by the listed construction activities that are included in this contract.
1. Washing and Curing Water: Do not allow wastewater directly derived from construction activities to enter water areas. Collect and place wastewater in retention ponds allowing the suspended material to settle, the pollutants to separate, or the water to evaporate.
  2. Control movement of materials and equipment at stream crossings during construction to prevent violation of water pollution control standards of the Federal, State, or local government.
  3. Monitor water areas affected by construction.
- D. Protection of Air Resources: Keep construction activities under surveillance, management, and control to minimize pollution of air resources. Burning is not permitted on the job site. Keep activities, equipment, processes, and work operated or performed, in strict accordance with the State of Michigan Clean Air Acts and Federal emission and performance laws and standards. Maintain ambient air

quality standards set by the Environmental Protection Agency, for those construction operations and activities specified.

1. Particulates: Control dust particles, aerosols, and gaseous by-products from all construction activities, processing, and preparation of materials (such as from asphaltic batch plants) at all times, including weekends, holidays, and hours when work is not in progress.
  2. Particulates Control: Maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause a hazard or a nuisance. Sprinklering, chemical treatment of an approved type, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators, or other methods are permitted to control particulates in the work area.
  3. Hydrocarbons and Carbon Monoxide: Control monoxide emissions from equipment to Federal and State allowable limits.
  4. Odors: Control odors of construction activities and prevent obnoxious odors from occurring.
- E. Reduction of Noise: Minimize noise using every action possible. Perform noise-producing work in less sensitive hours of the day or week as directed by the VAMC Saginaw COTR. Maintain noise-produced work at or below the decibel levels and within the time periods specified.
1. Perform construction activities involving repetitive, high-level impact noise only between 8:00 a.m. and 5:00 p.m. unless otherwise permitted by local ordinance or the VAMC Saginaw COTR. Repetitive impact noise on the property shall not exceed the following dB limitations:

Time Duration of Impact Noise	Sound Level in dB
More than 12 minutes in any hour	70
Less than 30 seconds of any hour	85
Less than three minutes of any hour	80
Less than 12 minutes of any hour	75

2. Provide sound-deadening devices on equipment and take noise abatement measures that are necessary to comply with the

requirements of this contract, consisting of, but not limited to, the following:

- a. Maintain maximum permissible construction equipment noise levels at 15 m (50 feet) (dBA):

EARTHMOVING		MATERIALS HANDLING	
FRONT LOADERS	75	CONCRETE MIXERS	75
BACKHOES	75	CONCRETE PUMPS	75
DOZERS	75	CRANES	75
TRACTORS	75	DERRICKS IMPACT	75
SCAPERS	80	PILE DRIVERS	95
GRADERS	75	JACK HAMMERS	75
TRUCKS	75	ROCK DRILLS	80
PAVERS, STATIONARY	80	PNEUMATIC TOOLS	80
PUMPS	75	SAWS	75
GENERATORS	75	VIBRATORS	75
COMPRESSORS	75		

- b. Use shields or other physical barriers to restrict noise transmission.
- c. Provide soundproof housings or enclosures for noise-producing machinery.
- d. Use efficient silencers on equipment air intakes.
- e. Use efficient intake and exhaust mufflers on internal combustion engines that are maintained so equipment performs below noise levels specified.
- f. Line hoppers and storage bins with sound deadening material.
- g. Conduct truck loading, unloading, and hauling operations so that noise is kept to a minimum.
3. Measure sound level for noise exposure due to the construction at least once every five successive working days while work is being performed above 55 dB(A) noise level. Measure noise exposure at the property line or 15 m (50 feet) from the noise source, whichever is greater. Measure the sound levels on the A weighing network of a General Purpose sound level meter at slow response. To minimize the effect of reflective sound waves at buildings, take measurements at 900 to 1800 mm (three to six feet) in front of any building face.

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Submit the recorded information to the VAMC Saginaw COTR noting any problems and the alternatives for mitigating actions.

- F. Restoration of Damaged Property: If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the Contractor shall restore the damaged property to a condition equal to that existing before the damage at no additional cost to the Government. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.
- G. Final Clean-up: On completion of project and after removal of all debris, rubbish, and temporary construction, Contractor shall leave the construction area in a clean condition satisfactory to the VAMC Saginaw COTR. Cleaning shall include off the station disposal of all items and materials not required to be salvaged, as well as all debris and rubbish resulting from demolition and new work operations.

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**SECTION 01 74 19**  
**CONSTRUCTION WASTE MANAGEMENT**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the requirements for the management of non-hazardous building construction and demolition waste.
- B. Waste disposal in landfills shall be minimized to the greatest extent possible. Of the inevitable waste that is generated, as much of the waste material as economically feasible shall be salvaged, recycled or reused.
- C. Contractor shall use all reasonable means to divert construction and demolition waste from landfills and incinerators, and facilitate their salvage and recycle not limited to the following:
  - 1. Waste Management Plan development and implementation.
  - 2. Techniques to minimize waste generation.
  - 3. Sorting and separating of waste materials.
  - 4. Salvage of existing materials and items for reuse or resale.
  - 5. Recycling of materials that cannot be reused or sold.
- D. At a minimum the following waste categories shall be diverted from landfills:
  - 1. Soil & Inerts (eg, concrete, masonry and asphalt).
  - 2. Green waste (biodegradable landscaping materials).
  - 3. Clean dimensional wood and palette wood & Engineered wood products (plywood, particle board and I-joists, etc).
  - 4. Metal products (eg, steel, wire, beverage containers, etc).
  - 5. Cardboard, paper and packaging.
  - 6. Bitumen roofing materials.
  - 7. Plastics (eg, ABS, PVC).
  - 8. Carpet and/or pad.
  - 9. Gypsum board.
  - 10. Insulation.
  - 11. Paint.

**1.2 RELATED WORK**

- A. Section 02 41 00, DEMOLITION.
- B. Section 01 00 00, GENERAL REQUIREMENTS.

**1.3 QUALITY ASSURANCE**

- A. Contractor shall practice efficient waste management when sizing, cutting and installing building products. Processes shall be employed

to ensure the generation of as little waste as possible. Construction /Demolition waste includes products of the following:

1. Excess or unusable construction materials.
  2. Packaging used for construction products.
  3. Poor planning and/or layout.
  4. Construction error.
  5. Over ordering.
  6. Weather damage.
  7. Contamination.
  8. Mishandling.
  9. Breakage.
- B. Establish and maintain the management of non-hazardous building construction and demolition waste set forth herein. Conduct a site assessment to estimate the types of materials that will be generated by demolition and construction.
- C. Contractor shall develop and implement procedures to reuse and recycle new materials to a minimum of 50 percent.
- D. Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling. Any revenues or savings obtained from salvage or recycling shall accrue to the contractor.
- E. Contractor shall provide all demolition, removal and legal disposal of materials. Contractor shall ensure that facilities used for recycling, reuse and disposal shall be permitted for the intended use to the extent required by local, state, federal regulations. The Whole Building Design Guide website <http://www.wbdg.org> provides a Construction Waste Management Database that contains information on companies that haul, collect, and process recyclable debris from construction projects.
- F. Contractor shall assign a specific area to facilitate separation of materials for reuse, salvage, recycling, and return. Such areas shall be kept neat and clean and clearly marked in order to avoid contamination or mixing of materials.
- G. Contractor shall provide on-site instructions and supervision of separation, handling, salvaging, recycling, reuse and return methods to be used by all parties during waste generating stages.
- H. Record on daily reports any problems in complying with laws, regulations and ordinances with corrective action taken.

#### 1.4 TERMINOLOGY

- A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial and industrial waste resulting from construction, remodeling, repair and demolition operations.
- B. Clean: Untreated and unpainted; uncontaminated with adhesives, oils, solvents, mastics and like products.
- C. Construction and Demolition Waste: Includes all non-hazardous resources resulting from construction, remodeling, alterations, repair and demolition operations.
- D. Dismantle: The process of parting out a building in such a way as to preserve the usefulness of its materials and components.
- E. Disposal: Acceptance of solid wastes at a legally operating facility for the purpose of land filling (includes Class III landfills and inert fills).
- F. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring or other soil engineering operation.
- G. Inert Fill: A facility that can legally accept inert waste, such as asphalt and concrete exclusively for the purpose of disposal.
- H. Inert Solids/Inert Waste: Non-liquid solid resources including, but not limited to, soil and concrete that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board, and does not contain significant quantities of decomposable solid resources.
- I. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
- J. Mixed Debris Recycling Facility: A solid resource processing facility that accepts loads of mixed construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing non-recyclable materials.
- K. Permitted Waste Hauler: A company that holds a valid permit to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal.
- L. Recycling: The process of sorting, cleansing, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.

1. On-site Recycling - Materials that are sorted and processed on site for use in an altered state in the work, i.e. concrete crushed for use as a sub-base in paving.
  2. Off-site Recycling - Materials hauled to a location and used in an altered form in the manufacture of new products.
- M. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of new products. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a solid waste facilities permit or be regulated by the local enforcement agency.
- N. Reuse: Materials that are recovered for use in the same form, on-site or off-site.
- O. Return: To give back reusable items or unused products to vendors for credit.
- P. Salvage: To remove waste materials from the site for resale or re-use by a third party.
- Q. Source-Separated Materials: Materials that are sorted by type at the site for the purpose of reuse and recycling.
- R. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.
- S. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for re-use or recycling.

#### **1.5 SUBMITTALS**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES, furnish the following:
- B. Prepare and submit to the Saginaw VAMC COTR a written demolition debris management plan. The plan shall include, at a minimum, the following information:
  1. Procedures to be used for debris management.
  2. Techniques to be used to minimize waste generation.
  3. Analysis of the estimated job site waste to be generated:
    - a. List of each material and quantity to be salvaged, reused, recycled.
    - b. List of each material and quantity proposed to be taken to a landfill.

4. Detailed description of the Means/Methods to be used for material handling.
  - a. On site: Material separation, storage, protection where applicable.
  - b. Off site: Transportation means and destination. Include list of materials.
    - 1) Description of materials to be site-separated and self-hauled to designated facilities.
    - 2) Description of mixed materials to be collected by designated waste haulers and removed from the site.
  - c. The names and locations of mixed debris reuse and recycling facilities or sites.
  - d. The names and locations of trash disposal landfill facilities or sites.
  - e. Documentation that the facilities or sites are approved to receive the materials.
- C. Designated Manager responsible for instructing personnel, supervising, documenting and administer over meetings relevant to the Waste Management Plan.
- D. Monthly summary of construction and demolition debris diversion and disposal, quantifying all materials generated at the work site and disposed of or diverted from disposal through recycling.

#### **1.6 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced by the basic designation only. In the event that criteria requirements conflict, the most stringent requirements shall be met.
- B. U.S. Green Building Council (USGBC):  
LEED Green Building Rating System for New Construction

#### **1.7 RECORDS**

- A. Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Records shall be kept in accordance with the LEED Reference Guide and LEED Template.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. List of each material and quantity to be salvaged, recycled, reused.
- B. List of each material and quantity proposed to be taken to a landfill.

- C. Material tracking data: Receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices, net total costs or savings.

**PART 3 - EXECUTION**

**3.1 COLLECTION**

- A. Provide all necessary containers, bins and storage areas to facilitate effective waste management.
- B. Clearly identify containers, bins and storage areas so that recyclable materials are separated from trash and can be transported to respective recycling facility for processing.
- C. Hazardous wastes shall be separated, stored, disposed of according to local, state, federal regulations.

**3.2 DISPOSAL**

- A. Contractor shall be responsible for transporting and disposing of materials that cannot be delivered to a source-separated or mixed materials recycling facility to a transfer station or disposal facility that can accept the materials in accordance with state and federal regulations.
- B. Construction or demolition materials with no practical reuse or that cannot be salvaged or recycled shall be disposed of at a landfill or incinerator.

**3.3 REPORT**

- A. With each application for progress payment, submit a summary of construction and demolition debris diversion and disposal including beginning and ending dates of period covered.
- B. Quantify all materials diverted from landfill disposal through salvage or recycling during the period with the receiving parties, dates removed, transportation costs, weight tickets, manifests, invoices. Include the net total costs or savings for each salvaged or recycled material.
- C. Quantify all materials disposed of during the period with the receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices. Include the net total costs for each disposal.

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**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.

**1.2 RELATED WORK:**

- A. Disconnecting utility services prior to demolition: Section 01 00 00, GENERAL REQUIREMENTS.
- B. Reserved items that are to remain the property of the Government: Section 01 00 00, GENERAL REQUIREMENTS.
- C. Environmental Protection: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

**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 1.20 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. 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.
2. 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 Aleda E. Lutz Medical Center; any damaged items shall be repaired or replaced as approved by the Saginaw VAMC COTR. The work shall comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- H. The work shall comply with the requirements of Section 01 00 00, GENERAL REQUIREMENTS, Article 1.7 INFECTION CONTROL MEASURES.

**PART 2 - EXECUTION**

**2.1 DEMOLITION:**

- A. Completely demolish and remove roofing, including all appurtenances related or connected thereto, as noted below:
1. All roof materials associated with the replacement of roofing material including: sheet membrane, insulation, debris on roof, piping, drains and supports.
- B. Debris, roofing material, insulation, concrete, metals and similar materials shall become property of Contractor and shall be disposed of by him daily, off of the Aleda E. Lutz Medical Center Property to avoid accumulation at the demolition site. Contractor shall remove stone ballasts and place on VA property for VA ownership as specified by Saginaw VAMC COTR. Materials that cannot be removed daily shall be stored in areas specified by the Saginaw VAMC COTR. Contractor shall dispose debris in compliance with applicable federal, state or local permits, rules and/or regulations.
- C. 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.
- D. 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 Saginaw VAMC COTR. When Utility lines are encountered that are not indicated on the

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drawings, the Saginaw VAMC COTR shall be notified prior to further work  
in that area.

**2.2 CLEAN-UP:**

On completion of work of this section and after removal of all debris,  
leave site in clean condition satisfactory to Saginaw VAMC COTR.  
Clean-up shall include off the Aleda E. Lutz Medical Center Property  
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 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. Ladders
  - 2. Railings

**1.2 RELATED WORK**

- A. Colors, finishes, and textures: Refer to sec. 2.4 Fabrication General Part(F) subpart(2) item(a).
- B. Prime and finish painting: Refer to sec. 2.4 Fabrication General part(F) subpart(2) item(a).

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. 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.
- C. Manufacturer's Certificates:
  - 1. Live load designs as specified.
- D. Design Calculations for specified live loads including dead loads.
- E. 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.

**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):
  - B18.2.2-87(R2005).....Square and Hex Nuts
- C. American Society for Testing and Materials (ASTM):
  - A36/A36M-08.....Structural Steel
  - 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
  - A269-10.....Seamless and Welded Austenitic Stainless Steel Tubing for General Service
  - A307-10.....Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
  - A653/A653M-10.....Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
  - C1107-08.....Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
  - F436-10.....Hardened Steel Washers
  - F593-02(R2008).....Stainless Steel Bolts, Hex Cap Screws, and Studs
  - F1667-11.....Driven Fasteners: Nails, Spikes and Staples
- D. American Welding Society (AWS):
  - D1.1-10.....Structural Welding Code Steel
  - D1.3-08.....Structural Welding Code Sheet Steel
- E. National Association of Architectural Metal Manufacturers (NAAMM)
  - AMP 521-01.....Pipe Railing Manual
  - AMP 500-06.....Metal Finishes Manual
  - MBG 531-09.....Metal Bar Grating Manual
  - MBG 532-09.....Heavy Duty Metal Bar Grating Manual
- F. Structural Steel Painting Council (SSPC)/Society of Protective Coatings:
  - SP 1-04.....No. 1, Solvent Cleaning
  - SP 2-04.....No. 2, Hand Tool Cleaning
  - SP 3-04.....No. 3, Power Tool Cleaning
- G. Federal Specifications (Fed. Spec):
  - RR-T-650E.....Treads, Metallic and Nonmetallic, Non-skid

## **PART 2 - PRODUCTS**

### **2.1 DESIGN CRITERIA**

- A. In addition to the dead loads, design fabrications to support the following live loads unless otherwise specified.
- B. Ladders and Rungs: 120 kg (250 pounds) at any point.
- C. Railings and Handrails: 900 N (200 pounds) in any direction at any point.

### **2.2 MATERIALS**

- A. Structural Steel: ASTM A36.
- B. Steel Pipe: ASTM A53.
  - 1. Galvanized for exterior locations.
  - 2. Type S, Grade A unless specified otherwise.
  - 3. NPS (inside diameter) as shown.
- C. 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 Mansard brown enamel coating to match building finish. Channels fabricated of ASTM A525, G90 galvanized steel. 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.

### **2.3 HARDWARE**

- A. Rough Hardware:
  - 1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; Use G90 galvanized coating on ferrous metal for exterior work unless 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.
  - 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.

## 2.4 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 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, 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 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 member's 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 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 built into masonry use factory recommended anchoring hardware

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 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. Steel and Iron: NAAMM AMP 504.
  - a. Zinc coated (Galvanized) with Factory coated Mansard brown enamel coating to match building finish: 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.

G. Protection:

- 1. 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.

**2.5 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.

**2.6 LADDERS**

A. Steel Ladders:

- 1. Fixed-rail type with steel rungs shouldered and headed into and welded to rails.
- 2. Fabricate angle brackets of 50 mm (2 inch) wide by 13 mm (1/2 inch) thick steel; brackets spaced maximum of 1200 mm (4 feet) apart and of length to hold ladder 175 mm (7 inches) from wall to center of rungs. Provide turned ends or clips for anchoring.

3. Provide holes for anchoring with expansion bolts through turned ends and brackets.
4. Where shown, fabricate side rails curved, twisted and formed into a gooseneck.
5. Galvanize exterior ladders after fabrication, ASTM A123, G-90.

B. Ladder Rungs:

1. Fabricate from 25 mm (one inch) diameter steel bars.
2. Fabricate so that rungs will extend at least 100 mm (4 inches) into wall with ends turned 50 mm (2 inches), project out from wall 175 mm (7 inches), be 400 mm (16 inches) wide and be designed so that foot cannot slide off end.
3. Galvanized after fabrication, ASTM A123, G-90 rungs for exterior use and for access to pits.

C. Ships Ladder:

1. Fabricate from heavy duty bar grating stair treads, walk-thru handrail, Factory welded handrails of 1 1/2" x 14 ga. square tubing, 10" structural channel stringers, factory coated Mansard brown enamel finish to match building finish, 24" wide treads, 27" overall stair width, with a tread depth is 6".

D. Fixed steel ladder:

1. Must be a fixed steel ladder with walk-thru handrails at the top landing surface and safety cage, to meet or exceed ANSI A14.3, OSHA 1910.27 and 1926.1053 standards, factory coated Mansard brown enamel finish to match building finish. A 6' length ladder guard mounted directly over the ladder climbing rungs to prevent unauthorized use. The guard will have a one piece piano type hinge, and be furnished with lock-open and lock-closed hasps

## 2.7 RAILINGS

- A. In addition to the dead load design railing assembly to support live load specified.

B. Fabrication General:

1. Provide continuous welded joints, dressed smooth and flush.
2. Standard flush fittings, designed to be welded, may be used.
3. Exposed threads will not be approved.
4. Form handrail brackets to size and design shown.

C. Handrails:

1. Close free ends of rail with flush metal caps welded in place except where flanges for securing to walls with bolts are shown.
2. Make provisions for attaching handrail brackets to wall, ladder frame and handrail as shown.

### **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. Items set into concrete or masonry.
  - 1. If required provide temporary bracing for such items until concrete or masonry is set.
  - 2. Place in accordance with setting drawings and instructions.
- 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. Touch-up all abraded and damaged areas of zinc coating as specified and all abraded and damaged areas with same kind of factory coating.
- F. 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.

#### **3.3 LADDERS**

- A. Anchor ladders to walls and floors with expansion bolts through turned lugs or angle clips or brackets.
- B. Ladder Rungs:
  - 1. Build ladder rungs into masonry as the work progresses.
  - 2. Set step portion of rung 150 mm (6 inches) from wall.
  - 3. Space rungs approximately 300 mm (12 inches) on centers.
  - 4. Where only one rung is required, locate it 400 mm (16 inches) above the floor.

### 3.4 RAILINGS

#### A. Steel Posts:

1. Secure fixed posts to concrete with expansion bolts through flanged fittings except where sleeves are shown with pourable grout.
2. Install sleeves in concrete formwork.
3. Set post in sleeve and pour grout to surface. Apply beveled bead of urethane sealant at perimeter of post or under flange fitting.
4. Secure removable posts to concrete with either machine screw through flanged fittings which are secured to inverted flanges embedded in and set flush with finished floor, or set posts in close fitting pipe sleeves without grout.
5. Secure sliding flanged fittings to posts at base with set screws.
6. Secure fixed flanged fittings to concrete with expansion bolts.
7. Secure posts to steel with welds.

#### B. Anchor to Walls:

1. Anchor rails to concrete or solid masonry with machine screws through flanged fitting to steel plate.
  - a. Anchor steel plate to concrete or solid masonry with expansion bolts.
  - b. Anchor steel plate to hollow masonry with toggle bolts.
2. Anchor flanged fitting with toggle bolt to steel support in frame walls.

### 3.5 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.

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**SECTION 07 01 50.19  
PREPARATION FOR RE-ROOFING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Roof re-cover preparation on existing construction in preparation to receive new roofing membrane.

**1.2 RELATED WORK**

- A. Use of the premises and phasing requirements: Section 01 00 00 GENERAL REQUIREMENTS.
- B. Temporary construction and environmental-protection measures for reroofing preparation: Section 01 00 00 GENERAL REQUIREMENTS
- C. HVAC equipment removal and reinstallation.
- D. Electrical equipment disconnection and reconnection.
- E. Siloxane Water Repellant: Section 07 19 23.

**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. American National Standards Institute/Single-Ply Roofing Institute (ANSI/SPRI):
  - ANSI/SPRI FX-1-01(R2006) Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners.
- C. ASTM International (ASTM):
  - C208-08.....Cellulosic Fiber Insulating Board
  - C728-05.....Perlite Thermal Insulation Board
  - C1177/C1177M-08.....Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
  - C1278/C1278M-07.....Standard Specification for Fiber-Reinforced Gypsum Panel
  - D1079-09.....Standard Terminology Relating to Roofing and Waterproofing
- D. FM Approvals: RoofNav Approved Roofing Assemblies and Products.
  - 4470-10.....Approved Standard for Class 1 Roof Coverings
  - 1-28-09.....Loss Prevention Data Sheet: Design Wind Loads.

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1-29-09.....Loss Prevention Data Sheet: Above-Deck Roof  
Components

1-49-09.....Loss Prevention Data Sheet: Perimeter Flashing

E. National Roofing Contractors Association: Roofing and Waterproofing  
Manual

**1.4 MATERIALS OWNERSHIP**

A. Assume ownership of demolished materials and remove from Project site and dispose of legally, unless indicated to be reused, reinstalled, or otherwise to remain Owner's property.

**1.5 DEFINITIONS**

A. Refer to ASTM D1079 and NRCA "The NRCA Roofing and Waterproofing Manual" for definition of terms.

**1.6 QUALITY CONTROL**

A. Requirements of Division 07 roofing section for qualifications of roofing system and roofing insulation Installer; work of this section shall be performed by same Installer.

B. Regulatory Requirements: Comply with governing EPA notification regulations. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Reroofing Conference: Conduct conference at Project site.

1. Meet with Owner; Architect-Engineer; testing and inspecting agency representative; roofing system manufacturer's representative; roofing Installer including project manager, superintendent, and foreman; and installers whose work interfaces with or affects reroofing.

2. Review methods and procedures related to roofing system tear-off and replacement

**1.7 SUBMITTALS**

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

C. List of proposed infill materials.

D. List of proposed temporary roofing materials.

E. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a licensed landfill facility.

**1.8 PROJECT CONDITIONS**

A. Owner will occupy portions of building below reroofing area. Conduct reroofing so Owner's operations will not be disrupted.

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1. Coordinate work activities daily with Owner.
  2. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.
- B. Protect building and landscaping from damage.
- C. Maintain access to existing walkways and adjacent occupied facilities.
- D. Weather Limitations: Proceed with reroofing preparation only when weather conditions permit Work to proceed without water entering existing roofing system or building.
- E. Hazardous Materials: It is not expected that Contractor shall encounter hazardous materials such as asbestos-containing materials.
1. Do not disturb materials suspected of containing hazardous materials. Notify Architect-Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.

## **PART 2 - PRODUCTS**

### **2.1 TEMPORARY ROOFING MATERIALS**

- A. Design of temporary roofing and selection of materials are responsibilities of Contractor.

### **2.2 RECOVER BOARDS**

- A. Insulation Serving as Recover Board: Requirements are specified in Section 07 22 00 ROOF AND DECK INSULATION.

### **2.3 AUXILIARY REROOFING MATERIALS**

- A. General: Auxiliary reroofing preparation materials recommended by roofing system manufacturer and compatible with components of existing and new membrane roofing system.
- B. Base Sheet Fasteners: Capped head, factory-coated steel fasteners, listed in FM Approval's "RoofNav."

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
1. Comply with Owner's requirements for maintaining fire watch when temporarily disabling smoke detectors.
- B. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

C. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

1. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding.

D. Verify that rooftop utilities and service piping have been shut off before beginning the Work.

### **3.2 ROOF TEAR-OFF**

A. General: Notify Owner each day of extent of roof tear-off proposed for that day and obtain authorization to proceed.

B. Remove loose aggregate from aggregate-surfaced built-up caused by previous application of bituminous roofing using a power broom.

C. Roof Tear-Off: Remove existing roofing membrane and other membrane roofing system components down to the deck.

1. Remove all fasteners from deck prior to installing new roof membrane.

### **3.3 DECK PREPARATION**

A. Inspect deck after tear-off or partial tear-off of membrane roofing system.

B. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263. Do not proceed with roofing work if moisture condenses under the plastic sheet.

C. If broken or loose fasteners that secure deck panels to one another or to structure are observed or if deck appears or feels inadequately attached, immediately notify Architect-Engineer. Do not proceed with installation until directed by Architect-Engineer.

D. If deck surface is not suitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect-Engineer. Do not proceed with installation until directed by Architect-Engineer.

E. Provide additional deck securement as indicated on Drawings.

### **3.4 TEMPORARY ROOFING MEMBRANE**

- A. Install approved temporary roofing membrane over area to be reroofed.
- B. Remove temporary roofing membrane before installing new roofing membrane.

### **3.5 ROOF RE-COVER PREPARATION**

- A. Remove any substrate irregularities that inhibit new roofing membrane from conforming to substrate.
  - 1. Remove loose aggregate from aggregate-surfaced built-up bituminous roofing with a power broom.
  - 2. Broom clean existing substrate.
  - 3. Coordinate with Owner's inspector to schedule times for tests and inspections.
  - 4. Remove all materials.
  - 5. Power vacuum the existing roof surface. If recommended by manufacturer, prime dried surface at recommended rate with recommended primer.
  - 6. Seal concrete substrate and all roof perimeter walls with no less than three coats of Siloxane water repellants before application of new roofing membrane. See specification section 07 19 23 for requirements of repellant.
  - 7. Seal concrete roof substrate and with no less than two coats of Epoxy coating before application of new roofing membrane. See specification section 07 54 19 for requirements.

### **3.6 EXISTING BASE FLASHINGS**

- A. Remove (as required) existing base flashings around parapets, curbs, walls, and penetrations.
  - 1. Clean substrates of contaminants such as asphalt, sheet materials, dirt, and debris.
  - 2. Tuck-point / caulk flashing at all locations to eliminate holes / cracks at surface.
- B. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal in accordance with roofing manufacturer's recommendations.

### **3.7 DISPOSAL**

- A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

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1. Storage or sale of demolished items or materials on-site is not permitted.
- B. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION

**Section 07 19 23**  
**Siloxane Water Repellants**

**Part 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes: Siloxane Water Repellents for sealing masonry as specified in this documents and the drawings.

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM E-514 Standard Test Method for Water Penetration and Leakage Through Masonry
- B. National Cooperative Highway Research Program (NCHRP)
  - 1. NCHRP Report 244 Reduction of Chloride Ion Uptake

**1.03 SUBMITTALS**

- A. General: Submit Listed Submittals in accordance with Conditions of the Contract and Section 01 33 23, Shop Drawings, Product Data and Samples.
- B. Product Data: Submit manufacturer's product data and installation instructions.
- C. Quality Assurance/Control Submittals: Submit the following:
  - 1. Certificates: Submit certificate that applicator complies with the requirements of this section.

**1.04 QUALITY ASSURANCE**

- A. Applicator Qualifications: Utilize an applicator trained and approved by waterproofing manufacturer.

**1.05 DELIVERY, STORAGE, & HANDLING**

- A. General: Comply with Division 1 Product Requirement Section
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

#### **1.06 PROJECT/SITE CONDITIONS**

- A. Environmental Requirements: Comply with application temperature range 40- 95<sup>0</sup>F
- B. Substrate shall be rain free 24 hours prior to application and 24 hours after application.

#### **1.07 WARRANTY**

- A. Waterproofing Warranty: Product has a five (5) year material warranty. Manufacturer's warranty shall be independent from any other warranties made by the Contractor under requirements of the Contract Documents and may run concurrent with said warranties. Should the product fail to perform as specified the manufacturer shall reimburse the purchase price of the material used or supply new material for replacement.

### **PART 2 - PRODUCTS**

#### **2.01 SILOXANE WATER REPELLENT**

- A. Siloxane Water Repellants include the following:
  - 1. A-Tech Masonry & Brick Sealer
    - a. Material: Water-based emulsion siloxane water repellent
    - b. Siloxane Content: 7-10%
    - c. Application Method: [Brush] [Roller] [Sprayer]
    - d. Color: Milky white, dries clear
    - e. Active Content: 100%
    - f. Freeze Point: 32<sup>0</sup>F
    - g. Coverage Rate: 1 gallon/100 ft<sup>2</sup>
    - h. Water Penetration and Leakage: (ASTM E-514): 83% average reduction
    - i. Chloride Ion Uptake: (NCHRP Report 244): 77% reduction

#### **2.02 LIMITATIONS**

- A. Will not prevent water through cracks, defects or open joints
- B. Mortar and concrete shall be cured for 28 days prior to use

### **2.03 TESTING**

- A. Test a minimum 3' x 3' area on each type of masonry. Use the manufacturer's application instructions. Let test area cure before inspection. Keep test panels available for comparison throughout application procedure.

### **Part 3 - EXECUTION**

#### **3.01 MANUFACTURER'S INSTRUCTIONS**

- A. Comply with the most current written installation instructions and recommendations of the waterproofing manufacturer.

#### **3.02 EXAMINATION**

- A. Site Verification of Condition:
  - 1. Verify that conditions are acceptable for application of the waterproofing system.
  - 2. Do not proceed with the application until unacceptable conditions are corrected.
    - a. Substrate must not have rain for 24 hours prior to and after application.
    - b. Site temperatures must be above 40<sup>0</sup>F during and after application.

#### **3.03 PREPARATION**

- A. Surface Preparation:
  - 1. Ensure that surfaces to be coated are structurally sound and free of moisture, dust, loose materials, frost, loose mortar or any materials or obstructions that would be detrimental to the penetration of the sealer.

#### **3.04 APPLICATION**

- A. Stir before use. Do not dilute. So not apply in high winds. Protect glass and metal from coverage. Wash off with soap and water.
  - 1. Vertical Application: Brush or roll sealer onto substrate starting at bottom of area. Maintain 6-8" run down of sealer. Protect coated areas for 24 hours from rain.
  - 2. Horizontal Application: Brush or roll sealer onto substrate. Maintain even coating and spread out any ponding that may occur prior to curing. Protect coated areas for 24 hours from rain

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**3.05 CLEAN UP**

- A. Clean any over application of sealer off glass and metal with soap and water before drying.

END OF SECTION

**SECTION 07 22 00  
ROOF AND DECK INSULATION**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Installation of Roof and deck insulation, vapor retarder, on existing construction, after preparation to receive roofing or waterproofing membrane.

**1.2 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. American Society of Heating, Refrigeration and Air Conditioning (ASHRAE):
- 90.1-07.....Energy Standard for Buildings Except Low-Rise Residential Buildings
- C. ASTM International (ASTM):
- C208-08.....Cellulosic Fiber Insulating Board
  - C552-07.....Cellular Glass Thermal Insulation
  - C726-05.....Mineral Fiber Roof Insulation Board
  - C728-05.....Perlite Thermal Insulation Board
  - C1177/C1177M-08.....Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
  - C1278/C1278M-07.....Standard Specification for Fiber-Reinforced Gypsum Panel
  - C1289-10.....Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
  - C1396/C1396M-09.....Standard Specification for Gypsum Board
  - D41-05.....Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
  - D312-06.....Asphalt Used in Roofing
  - D1970-09.....Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection

- D2178-04.....Asphalt Glass Felt Used in Roofing and  
Waterproofing
- D2822-05.....Asphalt Roof Cement
- D4586-07.....Standard Specification for Asphalt Roof Cement,  
Asbestos-Free
- E84-09.....Standard Test Method for Surface Burning  
Characteristics of Building Material
- F1667-05.....Driven Fasteners: Nails, Spikes, and Staples
- D. FM Approvals: RoofNav Approved Roofing Assemblies and Products.
  - 4450-89.....Approved Standard for Class 1 Insulated Steel  
Deck Roofs
  - 4470-10.....Approved Standard for Class 1 Roof Coverings
  - 1-28-09.....Loss Prevention Data Sheet: Design Wind Loads.
  - 1-29-09.....Loss Prevention Data Sheet: Above-Deck Roof  
Components
  - 1-49-09.....Loss Prevention Data Sheet: Perimeter Flashing
- E. National Roofing Contractors Association: Roofing and Waterproofing  
Manual
- F. U.S. Department of Agriculture (USDA): USDA BioPreferred Catalog,  
[www.biopreferred.gov](http://www.biopreferred.gov)
- G. Underwriters Laboratories, Inc. (UL): Fire Resistance Directory (2009)
- H. U.S. Department of Commerce National Institute of Standards and  
Technology (NIST):
  - DOC PS 1-09.....U.S. Product Standard for Construction and  
Industrial Plywood
  - DOC PS 2-04.....Performance Standard for Wood-Based Structural-  
Use Panels.

### 1.3 PERFORMANCE REQUIREMENTS

- A. Thermal Performance: Provide roof insulation meeting minimum overall  
average R-value of 33, with minimum R-value at any location of 10.
- B. FM Approvals: Provide roof insulation complying with requirements in  
FM Approvals 4450 and 4470 as part of specified roofing system, listed  
in FM Approvals "RoofNav" as part of roofing system meeting  
Fire/Windstorm Classification in Division 07 roofing section.

#### 1.4 QUALITY CONTROL

- A. Requirements of Division 07 roofing section for qualifications of roofing system insulation Installer; Work of this Section shall be performed by same Installer.
- B. Requirements of Division 07 roofing section for inspection of Work of this Section and qualifications of Inspector.
- C. Unless specified otherwise, comply with the recommendations of the NRCA "Roofing and Waterproofing Manual" applicable to insulation for storage, handling, and application.
- D. Requirements of roofing system uplift pressure design for specified roofing system.
- E. Requirements of applicable FM Approval for specified roofing system insulation attachment.

#### 1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data:
  - 1. Adhesive materials, each type.
  - 2. Roofing cement, each type.
  - 3. Roof insulation, each type.
  - 4. Fastening requirements.
- C. Shop Drawings: Include plans, sections, details, and attachments.
  - 1. Nailers, cants, and terminations.
  - 2. Layout of insulation showing slopes, tapers, penetration, and edge conditions.
- D. Samples:
  - 1. Roof insulation, each type.
  - 2. Nails and fasteners, each type.
- E. Certificates:
  - 1. Indicating type, thermal conductance, and minimum and average thickness of insulation.
  - 2. Indicating materials and method of application of insulation system meet the requirements of FM Approvals for specified roofing system.
- F. Laboratory Test Reports: Thermal values of insulation products.
- G. Layout of tapered roof system showing units required.
- H. Documentation of supervisors' and inspectors' qualifications.

#### **1.6 DELIVERY, STORAGE AND MARKING**

- A. Comply with the recommendations of the NRCA "Roofing and Waterproofing Manual" applicable to built-up roofing for storage, handling and installation requirements. Deliver 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 materials dry, and store in dry, weather tight facilities or under canvas tarps. Use of polyethylene or plastic tarps to cover materials is not permitted. Store above ground, or deck level on wood pallets. Cover ground under stored materials with plastic tarp.
  - 1. Store rolled materials (felts, base sheets, paper) on end. Do not store materials on top of rolled material.
  - 2. Store foam insulation away from areas where welding is being performed and where contact with open flames is possible.
- C. Protect from damage from handling, weather and construction operations before, during, and after installation.

#### **1.7 QUALITY ASSURANCE:**

- A. Roof insulation shall have a flame spread rating not greater than 75 and a smoke developed rating not greater than 150, exclusive of covering, when tested in accordance with ASTM E84, or shall have successfully passed FM Approvals 4450.
  - 1. Insulation bearing the UL label and listed in the UL Building Materials Directory as meeting the flame spread and smoke developed ratings will be accepted in-lieu-of copies of test reports.
  - 2. Compliance with flame spread and smoke developed ratings will not be required when insulation has been tested as part of a roof construction assembly of the particular type used for this project and the construction is listed as fire-classified in the UL Building Materials Directory or listed as Class I roof deck construction in the FM Approvals "RoofNav."
  - 3. Insulation tested as part of a roof construction assembly shall bear UL or FM labels attesting to the ratings specified herein.

## **PART 2 - PRODUCTS**

### **2.1 ADHESIVE MATERIALS**

- A. Adhesive Materials, General: Adhesive and sealant materials recommended by roofing system manufacturer for intended use, identical to materials utilized in approved listed roofing system, and compatible with roofing membrane.

### **2.2 ROOF AND DECK INSULATION**

- A. Roof and Deck Insulation, General: Preformed roof insulation boards approved by roofing manufacturer and listed as component of FM Approvals-approved roofing system.
- B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
- C. Tapered Roof Insulation System:
1. Fabricate of polyisocyanurate. Use only one insulation material for tapered sections. Use only factory-tapered insulation.
  2. Cut to provide high and low points with crickets and slopes as shown.
  3. Minimum thickness of tapered sections; 38 mm (1-1/2 inch).
  4. Minimum slope 1:96 (1/8 inch per 12 inches).

### **2.3 INSULATION ACCESSORIES**

- A. Vapor Retarder:
1. Self-Adhering Sheet Vapor Retarder: ASTM D1970, minimum of 1.0-mm- (40-mil-) thick, polyethylene film laminated to layer of rubberized asphalt adhesive, or 0.76- to 1.0-mm- (30- to 40-mil-) thick, polyethylene film laminated to layer of butyl rubber adhesive; maximum permeance rating of 6 ng/Pa x s x sq. m (0.1 perm).

### **2.4 FASTENERS**

- A. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with FM Approvals 4470, designed for fastening substrate board to roof deck.
- B. Staples and Nails: ASTM F1667. Type as designated for item anchored and for substrate.
- C. Concrete has been hardness tested to approx. 5,000 psi.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

A. Comply with requirements of Division 07 roofing section.

**3.2 PREPARATION**

A. Comply with requirements of Division 07 roofing section.

**3.3 VAPOR RETARDER INSTALLATION**

A. General:

1. Install continuous vapor retarder on entire roof deck.
2. At vertical surfaces, turn up vapor retarder to base flashing.
3. At all pipes, walls, and similar penetrations through vapor retarder, seal openings with roof cement to prevent moisture entry from below.
4. Seal penetrations with roof cement.

B. Cast in Place Concrete Decks, Except Insulating Concrete:

1. Prime deck as specified.

**3.4 RIGID INSULATION INSTALLATION**

A. Insulation Installation, General:

1. Install roof insulation in accordance with roofing system manufacturer's written instructions.
2. Install roof insulation in accordance with requirements of FM Approval's Listing for specified roofing system.
3. Base Sheet: Where required by roofing system, install one lapped base sheet specified in Division 07 roofing section by mechanically fastening to roofing substrate prior to installation of insulation.
4. Cant Strips: Install preformed insulation cant strips at junctures of roofing system with vertical construction.

B. Insulation Thickness:

1. Thickness of roof insulation shown on drawings is nominal. Actual thickness shall provide the average thermal resistance "R" value of not less than that specified in Performance Requirements Article.
2. When thickness of insulation to be used is more or less than that shown on the drawings, make adjustments in the alignment and location of roof drains, flashing, gravel stops, fascias and similar items at no additional cost to the Government.

3. Where tapered insulation is used, the thickness of the insulation at high points and roof edges shall be as shown on the drawings; the thickness at the low point (drains) shall be not less than 38 mm (1-1/2 inches).
  4. Use not less than two layers of insulation when insulation is 68 mm (2.7 inch) or more in thickness unless specified otherwise. Stagger joints minimum 150 mm (6 inches).
- C. Lay insulating units with close joints, in regular courses and with cross joints broken. When laid in more than one layer, break joints of succeeding layers of roof insulation with those in preceding layer.
- D. Lay units with long dimension perpendicular to the rolled (longitudinal) direction of the roofing felt.
- E. Cut to fit tight against blocking or penetrations.
- F. Cover all insulation installed on the same day; comply with temporary protection requirements of Division 07 roofing section.
- G. Installation Method:
1. Adhered Insulation:
    - a. Use manufacturer's recommendation.
    - b. Prime substrate as required.
    - c. Set each layer of insulation firmly in uniform application of full-spread insulation adhesive.

- - - E N D - - -

**SECTION 07 54 19  
POLYVINYL-CHLORIDE (PVC) ROOFING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Polyvinyl Chloride (PVC) sheet roofing adhered to roof deck. With a membrane that is comprised of a polyvinyl chloride polymer blend, which is reinforced with a high strength, 18x14 threads per inch pattern, weft-inserted polyester scrim. The membrane must contain a combination of UV stabilizers, UV absorbents, plasticizers, heat stabilizers, flame retardant, lubricants and biocides. Must be .060 inches thick and have a system weight of approximately 0.35 lb/ft<sup>2</sup>.

**1.2 RELATED WORK**

- A. Roof Insulation: Section 07 22 00, ROOF AND DECK INSULATION.

**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. 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.
- C. American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI):  
ASCE/SEI-7-10.....Minimum Design Loads for Buildings and Other Structures
- D. ASTM International (ASTM):  
C67-09.....Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile  
C140-09.....Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units  
C1371-04.....Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers  
C1549-04.....Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer

- D2240-05.....Rubber Property - Durometer Hardness
- D4263-83(2005).....Standard Test Method for Indicating Moisture in  
Concrete by the Plastic Sheet Method
- D4434-06.....Poly (Vinyl Chloride) Sheet Roofing
- E96-00.....Water Vapor Transmission of Materials
- E108-10.....Standard Test Methods for Fire Tests of Roof  
Coverings
- E408-71(R2008).....Standard Test Methods for Total Normal Emittance  
of Surfaces Using Inspection-Meter Techniques
- E1918-06.....Standard Test Method for Measuring Solar  
Reflectance of Horizontal and Low-Sloped  
Surfaces in the Field
- E1980-01.....Standard Test Method for Measuring Solar  
Reflectance of Horizontal and Low-Sloped  
Surfaces in the Field
- G21-09.....Resistance of Synthetic Polymeric Materials to  
Fungi
- E. American Society of Heating, Refrigeration, and Air Conditioning  
Engineers (ASHRAE)  
ASHRAE 90.1-2007.....Energy Standard for Buildings Except Low-Rise  
Residential Buildings, Appendix f.
- F. Cool Roof Rating Council:  
CRRC-1.....Product Rating Program, [www.coolroofs.org](http://www.coolroofs.org)
- G. FM Approvals: RoofNav Approved Roofing Assemblies and Products.  
4470-10.....Approved Standard for Class 1 Roof Coverings  
1-28-09.....Loss Prevention Data Sheet: Design Wind Loads.  
1-29-09.....Loss Prevention Data Sheet: Above-Deck Roof  
Components  
1-49-09.....Loss Prevention Data Sheet: Perimeter Flashing
- H. National Roofing Contractors Association: Roofing and Waterproofing  
Manual
- I. U.S. Department of Agriculture (USDA): USDA BioPreferred Catalog,  
[www.biopreferred.gov](http://www.biopreferred.gov)
- J. U.S. Department of Energy (DoE): Roof Products Qualified Product List,  
[www.energystar.gov](http://www.energystar.gov)

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

- B. Roofing System Energy Performance Requirements: Provide a roofing system identical to components that that have been successfully tested by a qualified independent testing and inspecting agency to meet the following requirements:
1. Energy Performance, Energy Star: Provide roofing system that is listed on DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
  2. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E1980 based on testing identical products by a qualified testing agency.

### 1.5 QUALITY CONTROL

- A. Installer Qualifications:
1. Licensed or approved in writing by manufacturer to perform work under warranty requirements of this Section.
  2. Employ full-time supervisors knowledgeable and experienced in roofing of similar types and scopes, and able to communicate with owner and workers.
- B. Inspector Qualifications: Inspection of work by third-party technical inspector or technical representative of manufacturer experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
1. An authorized full-time technical employee of the manufacturer not engaged in the sale of products.
  2. An independent party certified as a Registered Roof Observer by the Roof Consultants Institute (RCI), retained by the Contractor or the Manufacturer and approved by the Manufacturer.
- C. Product/Material Requirements:
1. Obtain products from single manufacturer or from sources recommended by manufacturer for use with roofing system and incorporated in manufacturer's warranty.
- D. Roofing system design standard requirements:
1. Recommendations of the NRCA "Roofing and Waterproofing Manual" applicable to modified bituminous sheet roofing for storage, handling and application.
  2. Recommendations of FM Approvals 1-49 Loss Prevention Data Sheet for Perimeter Flashings.

3. Recommendations of ANSI/SPRI ES-1 for roof edge design.
4. FM Approvals Listing: Provide roofing membrane, base flashing, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a roofing system and that are listed in FM Approvals "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.
  - a. Fire/Windstorm Classification: Class 1A-90.
  - b. Hail Resistance: MH (moderate hail).

E. Pre-Roofing Meeting:

1. Upon completion of roof deck installation and prior to any roofing application, hold a pre-roofing meeting arranged by the Contractor and attended by the Roofing Inspector, Material Manufacturers Technical Representative, Roofing Applicator, Contractor, and COR.
2. Discuss specific expectations and responsibilities, construction procedures, specification requirements, application, environmental conditions, job and surface readiness, material storage, and protection.
3. Inspect roof deck at this time to:
  - a. Verify that work of other trades which penetrates roof deck is completed.
  - b. Determine adequacy of deck anchorage, presence of foreign material, moisture and unlevel surfaces, or other conditions that would prevent application of roofing system from commencing or cause a roof failure.
  - c. Examine samples and installation instructions of manufacturer.

**1.6 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, SAMPLES.
- B. Product Data:
  1. Adhesive materials.
  2. Membrane sheet roofing and flashing membrane.
  3. Roofing cement.
  4. Roof walkway.
  5. Fastening requirements.
  6. Application instructions.
- C. LEED Submittals:
  1. Product Test Reports for Credit SS 7.2: For roof materials, indicating that roof materials comply with Solar Reflectance Index requirement.

2. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing system, documentation including printed statement of VOC content.

D. Samples:

1. Nails and fasteners, each type.

E. Shop Drawings: Include plans, sections, details, and attachments.

1. Base flashings and terminations.

F. Certificates:

1. Indicating materials and method of application of roofing system meets requirements of FM Approvals "RoofNav" for specified fire/windstorm classification.

G. Temporary protection plan. Include list of proposed temporary materials.

H. Contract Close-out Submittals:

1. Maintenance Manuals.
2. Warranty signed by installer and manufacturer.

#### **1.7 DELIVERY, STORAGE AND HANDLING**

- A. Deliver, store, and handle materials as specified by manufacturer.
- B. Store volatile materials separate from other materials with separation to prevent fire from damaging the work or other materials.

#### **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.

#### **1.9 WARRANTY**

- A. Roofing work subject to the terms of the Article "Warranty of Construction," FAR clause 52.246-21, except extend the warranty period to 15 years.  
Manufacturer shall honor a no cost full replacement, non-prorated warranty for 15 years.

**PART 2 - PRODUCTS**

**2.1 PVC SHEET ROOFING**

- A. Conform to ASTM D4434,
  - 1. Type III, fabric reinforced, for adhered system
- B. Thickness:
  - 2. Minimum 1.5 mm (50 or 60 mils) thick.
- C. Color:
  - 3. White.
- D. Additional Properties:

PROPERTY	TEST METHOD	REQUIREMENT
Shore A Hardness	ASTM D2240-97	70 to 85 Durometer
Water Vapor Permeance	ASTM E96-95	Minimum 0.14 perms (Water Method)
Fungi Resistance (For ballasted System)	ASTM G21-96	After 21 days, no sustained growth or discoloration.
Fire Resistance	ASTM E108	Class A - No Combustion Beyond Flame/Heat Source

**2.2 ACCESSORIES:**

- A. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.
- B. Bonding Adhesive: Manufacturer's standard, water based.
- C. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 25 by 3 mm (1 by 1/8 inch) thick; with anchors.
- D. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 25 mm wide by 1.3 mm (1 inch wide by 0.05 inch) thick, pre-punched.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with FM Approvals 4470, designed for fastening membrane to substrate.
- F. Miscellaneous Accessories: Provide sealers, preformed flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories acceptable to manufacturer.

### 2.3 ADHESIVE AND SEALANT MATERIALS:

- A. General: Adhesive and sealant materials recommended by roofing system manufacturer for intended use, identical to materials utilized in approved listed roofing system, and compatible with roofing membrane.
1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
  2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. Plastic Foam Adhesives: 50 g/L.
    - b. Fiberglass Adhesives: 80 g/L.
    - c. Other Adhesives: 250 g/L.
    - d. PVC Welding Compounds: 510 g/L.
    - e. Adhesive Primer for Plastic: 650 g/L
    - f. Single-Ply Roof Membrane Sealants: 450 g/L.
    - g. Non-membrane Roof Sealants: 300 g/L.
    - h. Sealant Primers for Nonporous Substrates: 250 g/L.
    - i. Sealant Primers for Porous Substrates: 775 g/L.
  3. Seal concrete substrate and all roof perimeter walls with no less than three coats of Siloxane water repellants before application of new roofing membrane. See specification section 07 19 23 for requirements of repellant.
  4. Seal concrete roof substrate and with no less than two coats of Epoxy coating before application of new roofing membrane. See specification section 07 19 50.19 for requirements.

### 2.4 PVC WALKWAYS

- A. New walkway shall be Duro-Last Roof Trak 2 Walkway Pad (Gray) or approved alternative.

Salient Characteristics: Testing Method ASTM D751

1. Fastening tabs shall be heat-welded (hot-air) to the field membrane.
2. PVC roof membrane with oriented strand polyester reinforcement.
3. Must be 5' in length, and 30" wide spaced 3" apart or manufacturer suggestion.
4. Thickness: 0.135 in
5. Weight 12.66 oz/sqft
6. Breaking Strength(md): 516 lbs
7. Breaking Strength(cmd): 489 lbs

8. Elongation(md): 50%
9. Elongation(cmd): 64%
10. Tear Strength(md): 45 lbs
11. Tear Strength(cmd): 71 lbs

Note: md = machine direction

- B. Heat weld or solvent weld walkway sheet to roof sheet at edges. Weld area 50 mm (two inches) wide by the entire length of the walkway sheet.
- C. Finish edges of laps with sealants as specified.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION:**

- A. Examine substrates and conditions with roofing Installer and roofing inspector to verify compliance with project requirements and suitability to accept subsequent roofing work. Correct unsatisfactory conditions before proceeding with roofing work.
- B. Do not apply roofing if roof surface will be used for subsequent work platform, storage of materials, or staging or scaffolding will be erected thereon unless protection provided to distribute loads less than one half compression resistance of roofing system materials:
  1. Curbs, blocking, edge strips, and other components to which roofing and base flashing is attached to in place ready to receive insulation and roofing.
  2. Coordinate roof operations with sheets metal work and roof insulation work so that insulation and flashings are installed concurrently to permit continuous roofing operations.
  3. Complete installation of flashing, insulation, and roofing in the same day except for the area where temporary protection is required when work is stopped.
- C. 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.
- D. Dry out surfaces that become wet from any cause during progress of the work before roofing work is resumed.
- E. Apply materials only to dry substrates.
- F. Except for temporary protection specified, do not apply materials during damp or rainy weather, during excessive wind conditions, nor while moisture (dew, snow, fog, ice, or frost) is present in any amount in or on the materials or when temperature is below 2° C (35 °F).

1. Do not apply materials to substrate having temperature of 2° C (35 °F) or less or when materials applied with the roof require higher application temperature.
2. Do not apply materials when the temperature is below 2°C (35°F).

G. Temporary Protection:

1. Install temporary protection consisting of a temporary seal and water cut-offs at the end of each day's work and when work is halted for an indefinite period or work is stopped when precipitation is imminent.
2. Temporarily seal exposed surfaces of insulation within the roofing membrane.
3. Do not leave insulation surfaces or edges exposed.
4. Use polyethylene film to separate roof sheet from bituminous materials.
5. Apply the temporary seal and water cut off by extending the roof membrane beyond the insulation and securely embedding the edge of the roof membrane in 150 mm (6 inch) wide strip of asphalt roofing cement, ASTM D4586, and weight edge with sandbags to prevent displacement; space sandbags not over 2400 mm (eight foot) centers.
6. Cover bituminous residue with four-mil polyethylene.
7. Before the work resumes, cut off and discard portions of the roof membrane embedded in roof cement or in contact with roof cement or bituminous materials. Cut not less than 150 mm (six inches) back from bituminous coated edges.
8. Remove and discard sandbags contaminated with bituminous products.
9. For roof areas that are to remain intact and that are subject to foot traffic and damage, provide temporary wood walkways with notches in sleepers to permit free drainage.
10. Provide six-mil polyethylene sheeting or building paper cover over roofing membrane under temporary wood walkways and adjacent areas. Round all edges and corners of wood bearing on roof surface.

### 3.2 PREPARATION

- A. Test pull out resistance of fasteners in the presence of the Saginaw VAMC COTR in deck before starting roofing work. Tests are not required for wood.
1. Test applicable fastener type in applicable deck.
  2. Install fastener through a sample of the insulation, if any is to be used, into the structural deck.
  3. Test the pull out resistance with a pull out tester.
  4. Test one fastener in each deck level and one for every 230m<sup>2</sup> (2500 square feet) of deck type and level.

5. Test at locations designated by Saginaw VAMC COTR.
6. Do not proceed with the roofing work if the pull out resistance of the fasteners is less than specified.
7. Test results:
  - a. Repeat tests using other type fasteners or use additional fasteners to stay within the pullout load resistance criteria.
  - b. Patch cementitious deck to repair areas of fastener tests holes.
- B. Remove dirt, debris, and surface moisture. Cover or fill voids greater than 6 mm (1/4) inch wide to provide solid support for roof membrane.
- C. Install separation sheet over deck surfaces lapping edges and ends 150 mm (six-inches), or as recommended by roof membrane manufacturer. Do not precede installation of separation sheet beyond what can be covered by roofing membrane each day. Use polyethylene film or building paper that will be compatible with seaming method.
  1. Insure separation sheet completely isolates bituminous materials from PVC roofing membrane.
  2. Turn up at penetrations or other surfaces where bituminous materials occur, to cover bituminous product.
  3. Turn down over edges of blocking at insulation perimeters covering blocking.
- D. Complete roof deck construction prior to commencing roofing work:
  1. Install curbs, blocking, edge strips, nailers, cants, and other components where insulation, roofing, and base flashing is attached to, in place ready to receive insulation and roofing.
  2. Complete deck and insulation to provide designed drainage to working roof drains.
  3. Document installation of related materials to be concealed prior to installing roofing work.
- E. Dry out all surfaces that become wet from any cause during progress of the work before roofing work is resumed. Apply materials to dry substrates.
- F. Sweep decks to broom clean condition. Remove all dust, dirt or debris.
- G. Remove projections that might damage materials.
- H. Concrete Decks, except Insulating Concrete:
  1. Test concrete decks for moisture prior to application of roofing materials. Test for capillary moisture by plastic sheet method according to ASTM D4263.
  2. Prime concrete decks, including precast units, with primer as specified. Keep primer back four inches from joints in precast units.
  3. Allow primer to dry before application of bitumen.

I. Insulating Concrete Decks:

1. Allow to dry out for at least five days after installation before the placement of materials.
2. If rain occurs during or at end of drying period or during installation of roofing, allow additional drying time before the placement of the roofing materials.
3. At modified bituminous base flashing to be repaired, either bend up cap flashing or temporarily remove cap flashing. Brush and scrape away all deteriorated sheets or surface material of base flashing.

**3.3 TEMPORARY PROTECTION**

- A. Install temporary protection at the end of day's work and when work is halted for an indefinite period or work is stopped when precipitation is imminent. Comply with approved temporary protection plan.
- B. Install temporary cap flashing over the top of base flashings where permanent flashings are not in place to provide protection against moisture entering the roof system through or behind the base flashing. Securely anchor in place to prevent blow off and damage by construction activities.
- C. Provide for removal of water or drainage of water away from the work.
- D. Provide temporary protection over installed roofing by means of duckboard walkways, plywood platforms, or other materials, as approved by Resident Engineer, for roof areas that are to remain intact, and that are subject to foot traffic and damage. Provide notches in sleepers to permit free drainage.

**3.4 INSTALLATION, GENERAL**

- A. FM Approvals Installation Standard: Install roofing membrane, base flashings, wood cants, blocking, curbs, and nailers, and component materials in compliance with requirements in FM 4450 and FM 4470 as part of a membrane roofing system as listed in FM Approval's "RoofNav" for fire/windstorm classification indicated. Comply with recommendations in FM Approvals' Loss Prevention Data Sheet 1-49, including requirements for wood nailers and cants.
- B. NRCA Installation Standard: Install roofing system in accordance with applicable NRCA Manual Plates and NRCA recommendations.
- C. Manufacturer Recommendations: Comply with roofing system manufacturer's written installation recommendations.
- D. Coordination with related work: Coordinate roof operations with roof insulation and sheet metal work so that insulation and flashings are installed concurrently to permit continuous roofing operations.

E. Installation Conditions:

1. Apply dry roofing materials. Apply roofing work over dry substrates and materials.
2. Apply materials within temperature range and surface and ambient conditions recommended by manufacturer.
3. Except for temporary protection, do not apply materials during damp or rainy weather, during excessive wind conditions, nor while moisture (dew, snow, ice, fog or frost) is present in any amount in or on the materials to be covered or installed:
  - a. Do not apply materials when the temperature is below 4 deg. C (40 deg. F).
  - b. Do not apply materials to substrate having temperature of 4 deg. C (40 deg. F) or less.

**3.5 INSTALLATION OF PVC ROOFING**

- A. Do not allow the membrane to come in contact with surfaces contaminated with asphalt, coal tar, oil, grease, or other substances which are not compatible with PVC.
- B. Install the membrane so the sheets run perpendicular to the long dimension of the insulation boards.
- C. Commence installation at the low point of the roof and work towards the high point. Lap the sheets so the flow of water is not against the edges of the sheet. Coordinate with roof insulation installation.
- D. Position the membrane so it is free of buckles and wrinkles.
- E. Roll sheet out on deck; inspect for defects as being rolled out and remove defective areas. Allow for relaxing before proceeding.
  1. Lap edges and ends of sheets 50 mm (two inches) or more as recommended by the manufacturer.
  2. Heat weld or solvent weld laps. Apply pressure as required. Seam strength of laps as required by ASTM D4434.
  3. Check seams to ensure continuous adhesion and correct defects.
  4. Finish edges of laps with a continuous beveled bead of sealant to sheet edges to provide smooth transition.
  5. Finish seams as the membrane is being installed (same day).
  6. Anchor perimeter to deck or wall as specified.
- F. Repair areas of welded seams where samples have been taken or marginal welds, bond voids, or skips occurs.
- G. Repair fishmouths and wrinkles by cutting to lay flat and installing patch over cut area extending 100 mm (four-inches) beyond cut.
- H. Membrane Perimeter Anchorage:

1. Install metal fastening strip at the perimeter of each roof level, curb flashing, expansion joints and similar penetrations as indicated and in accordance with membrane manufacturer's instructions on top of roof membrane to deck or wall.
2. Mechanically Fastened Metal Fastening Strip:
  - a. Set top of mechanical fastener set flush with top surface of the metal fastening strip. Space mechanical fasteners a maximum 300 mm (12 inches) on center starting 25 mm (one inch) from the end of the nailing strip.
  - b. When strips are cut, round corners and eliminate sharp corners.
  - c. After mechanically fastening, strip cover and seal strip with a 6-inch wide roof membrane strip; heat or solvent weld to roof membrane and seal edges.
  - d. At parapet walls, intersecting building walls and curbs, secure the membrane to the structural deck with fasteners 300 mm (12 inches) on centers or as shown on NRCA manual.

I. Adhered System:

1. Apply adhesive in quantities required by roof membrane manufacturer.
2. Fold sheet back on itself after rolling out and coat the bottom side of the membrane and the top of the deck with adhesive. Do not coat the lap joint area.
3. After adhesive has set according to adhesive manufacturer's application instruction, roll the membrane into the adhesive in a manner that minimizes voids and wrinkles.
4. Repeat for other half of sheet. Cut voids and wrinkles to lay flat and clean for repair patch over cut area.

### 3.6 INSTALLATION OF FLASHING

- A. Install flashings as the membrane is being installed (same day). If the flashing can not be completely installed in one day, complete the installation until the flashing is in a watertight condition and provide temporary covers or seals.
- B. Flashing Roof Drains:
  1. Install roof drain flashing as recommended by the membrane manufacturer, generally as follows:
    - a. Coordinate to set the metal drain flashing in asphalt roof cement, holding cement back from the edge of the metal flange.
    - b. Do not allow the roof cement to come in contact with the PVC roof membrane.
    - c. Adhere the PVC roof membrane to the metal flashing with the membrane manufacturer's recommended adhesive.

2. Turn down the metal drain flashing and PVC roof membrane into the drain body and install clamping ring and strainer.
- C. Installing PVC Base Flashing and Pipe Flashing:
1. Install PVC flashing membranes to pipes, wall or curbs to a height not less than eight-inches above roof surfaces and 100 mm (four inches) on roof membrane.
    - a. Adhere flashing to pipe, wall or curb with adhesive.
    - b. Form inside and outside corners of PVC flashing membrane in accordance with NRCA manual. Form pipe flashing in accordance with NRCA manual use pipe boot.
    - c. Lap ends not less than 100 mm (four inches).
    - d. Heat weld flashing membranes together and flashing membranes to roof membranes. Finish exposed edges with sealant as specified.
    - e. Install flashing membranes in accordance with NRCA manual.
  2. Anchor top of flashing to walls or curbs with fasteners spaced not over 200 mm (eight inches) on centers. Use fastening strip on ducts. Use pipe clamps on pipes or other round penetrations.
  3. Apply sealant to top edge of flashing.
- D. Installing Building Expansion Joints:
1. Install base flashing on curbs as specified.
  2. Install flexible tubing 1-1/2 times width of joint over joint. Cover tubing with PVC flashing strip adhered to base flashing and lapping base flashing 100 mm (four inches). Finish edges of laps with sealants as specified.
- E. Repairs to membrane and flashings:
1. Remove sections of PVC sheet roofing or flashing that is creased wrinkled or fishmouthed.
  2. Cover removed areas, cuts and damaged areas with a patch extending 100 mm (four inches) beyond damaged, cut, or removed area. Heat weld or solvent weld to roof membrane or flashing. Finish edge of lap with sealant as specified.

### **3.7 PVC WALKWAYS**

- A. Walkway Pad
1. Fastening tabs shall be heat-welded (hot-air) to the field membrane.
- B. Heat weld or solvent weld walkway sheet to roof sheet at edges. Weld area 50 mm (two inches) wide by the entire length of the walkway sheet.
- C. Finish edges of laps with sealants as specified.

**3.8 FIELD QUALITY CONTROL:**

- A. Roofing Inspector: Contractor shall engage a qualified roofing inspector for a minimum of 7 full-time days on site to perform roof tests and inspections and to prepare start up, interim, and final reports.
  - 1. Examine and probe seams in the membrane and flashing in the presence of Resident Engineer and Membrane Manufacturer's Inspector.
  - 2. Probe edge of welded seams with a blunt tipped instrument. Use sufficient hand pressure to detect marginal welds, voids, skips, and fishmouths.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
  - 1. Notify Architect and Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of roofing work where test results or inspections indicate that they do not comply with specified requirements.
  - 1. Additional testing and inspecting, at Contractor's expense, shall be performed to determine if replaced or additional work complies with specified requirements.

**3.9 PROTECTING AND CLEANING**

- A. Protect membrane roofing system from damage and wear during remainder of construction period.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of acceptance by Owner.
- C. Clean overspray and spillage from adjacent construction. Clean membrane and restore surface to like-new condition meeting solar reflectance requirements.

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**SECTION 07 72 00  
ROOF ACCESSORIES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section specifies copings, fascias, and expansion joints.

**1.2 RELATED WORK**

- A. Sealant material and installation: Section 07 92 00, JOINT SEALANTS.
- B. Rigid insulations for roofing: Section 07 22 00, ROOF AND DECK 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 extend referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Material (ASTM):
  - B209/209M-07.....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

Aleda E. Lutz  
Saginaw, Michigan  
11-1-11

Roof Replacement BLDG. 1  
655-11-128

D1187-97 (R2002).....Asphalt-Base Emulsions for Use as Protective  
Coatings for Metal

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

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Aluminum, Extruded: ASTM B221/B221M.
- B. Aluminum Sheet: ASTM B209/B209M.
- C. Insulation: ASTM C612, Class 1 or 2.

### **2.2 EXTRUDED ALUMINUM ROOF EXPANSION JOINT COVERS**

- A. Fabricate in 3000 mm (10 foot) lengths with fastener openings slotting for expansion not over 600 mm (24 inch) centers.
- B. Provide four-way expansion, for joint widths shown.
- C. Mill finish on aluminum.
- D. Form waterstop or moisture seals of continuous sheets of neoprene, not less than 0.8 mm (0.032 inch) thick.
- E. Fabricate corners as one piece assembly with mitered and welded joint and least dimension legs not less than 300 mm (12 inches) long.
- F. Factory fabricates end caps and transitions to insure waterproof assembly.
- G. Three piece assembly:
  - 1. Roof expansion joint cover system consists of an extruded aluminum cover, extruded frame or curb vertical section, galvanized steel cant, and aluminum compression clamp counter flashing, complete with moisture seals. Form cover and vertical section from extruded aluminum, 2 mm (0.080 inch) minimum thickness with spring stainless steel tension or pivot bar.
  - 2. Form cant from galvanized steel not less than 0.8 (0.029 inch) thick formed to profile shown.
  - 3. Form splice plates of not less than 0.8 mm (0.032 inch) thick aluminum sheet.
  - 4. Form counter flashing member of 1.3 mm (0.050 inch) thick sheet aluminum, secured with screws to the top edge of the vertical section and providing compression clamp over base flashing.
  - 5. Provide compression gasket separating cover from curb bearing.
- H. Two piece assembly:
  - 1. Roof expansion joint system consists of an extruded aluminum cover combination extruded aluminum frame or curb with integral adjustable counter flashing flange, and moisture seals.

2. Form cover from extruded aluminum 2 mm (0.078 inch) minimum thickness.
  3. Form a cover anchor system of stainless steel pivot bar.
  4. Form a frame assembly of not less than 2 mm (0.076 inch) aluminum except for flashing portion.
  5. Provide compression gasket separating cover from curb at bearing.
- I. Insure expansion joints are installed on curbs providing not less than 200 mm (8 inch) high base flashing.

### **2.3 SCUPPER ASSEMBLIE SYSTEM**

- A. Factory fabricated scupper assemblies:
1. Fabricate scupper assembly with extended plates to match fascia-cant in 500 mm (20 inch) minimum lengths, add a PVC insert (liner) that is to be heat welded to PVC roof.
  2. Extend outlet opening not less than 50 mm (two inches) with drip edge.
  3. Fabricate with stainless steel cores or sleeve to drain water from toe of cant and flash in to built-up roofing with 100 mm (4 inch) wide flange.

### **2.4 FINISH**

- A. Aluminum, Clear Finish: AA-C22A41 medium matte, clear anodic coating.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install roof accessories where shown and/or recommended by roofing manufacturer.
- B. Secure with fasteners in accordance with manufacture's printed installation instructions and approved shop drawings unless shown otherwise.
- C. Coordinate to install insulation where shown; see Section 07 22 00, ROOF AND DECK INSULATION.
- D. Comply with section 07 92 00, JOINT SEALANTS to install sealants where manufactures installation instructions require sealant.
- E. Coordinate with roofing work for installation of items in sequence to prevent water infiltration.
- F. Expansion Joint Covers:
1. Install to terminate base flashing 200 mm (8 inches) above roof.
  2. Install moisture seals to drain water to outlets that do not permit water to enter buildings construction.
  3. Use stainless steel screws when exposed.

4. Three piece assembly:

- a. Install curb section with screws to wood blocking, allowing 6 mm (1/4 inch) at butt joints between sections with splice plate at joint.
- b. Install cant to wood blocking by nailing along horizontal flange every 150 mm (6 inches), with galvanized roofing nails 25 mm (one inch) long.
- c. After completion of base flashing install cap flashing and compression clamp and fasten to the curb or metal cant with stainless steel self-tapping screws with neoprene washers under head spaced approximately 450 mm (18 inches) on center.
- d. Install expansion joint cover with a 6 mm (1/4 inch) wide end joints.
- e. Install over end joint a cover plate complete with concealed aluminum flashing, centered under each joint. Fabricate flashing to lap cover not less than four inches.

5. Two piece assembly:

- a. Install curb section with screws allowing 6 mm (1/4 inch) space at end joints with splice plate at joint.
- 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 is to lap cover not less than 100 mm (4 inches).

**3.2 PROTECTION OF ALUMINUM**

- A. Provide protection for aluminum against galvanic action wherever dissimilar materials are in contact, 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 ADJUSTING**

Adjust expansion joints to close tightly and be watertight; insuring maximum allowance for building movement.

**3.4 PROTECTION**

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

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**SECTION 07 92 00**  
**JOINT SEALANTS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

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

**1.2 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. VOC: Acrylic latex and Silicon sealants shall have less than 50g/l VOC content.

**1.3 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. 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.

**1.4 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.

**1.5 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).

**1.6 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.

**1.7 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.

**1.8 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.
  - C717-10.....Standard Terminology of Building Seals and Sealants.
  - C834-10.....Latex Sealants.

- C919-08.....Use of Sealants in Acoustical Applications.
- C920-10.....Elastomeric Joint Sealants.
- C1021-08.....Laboratories Engaged in Testing of Building Sealants.
- C1193-09.....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.
- E84-09.....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: BASF NP 1 or equivalent
  - 1. ASTM C920, polyurethane.
  - 2. Type S.
  - 3. Class 25.
  - 4. Grade NS.
  - 5. Shore A hardness of 25-35

**2.2 COLOR:**

- A. Sealants used with exposed masonry shall match color of mortar joints.
- B. Caulking shall be white, unless specified otherwise.

**2.3 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.

**2.4 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.

**2.5 PRIMER:**

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

**2.6 CLEANERS-NON POUROUS SURFACES:**

- A. 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.

- B. For application of sealants, follow requirements of ASTM C1193 unless specified otherwise.

### **3.6 FIELD QUALITY CONTROL:**

- A. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements.

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**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.

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**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
- B. Type of Finish, Color, and Gloss Level of Finish Coat: refer to paragraph 3.6 paint color.

**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. One strip located on one set of stairs, showing not less than 50 mm (2 inch) wide strips of undercoats and 100 mm (4 inch) wide strip of finish coat.
- D. Manufacturers' Certificates indicating compliance with specified requirements:
  - 1. Manufacturer's paint substituted for Federal Specification paints meets or exceeds performance of paint specified.
  - 2. Epoxy 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 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-2008.....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. American Society for Testing and Materials (ASTM):  
D260-86.....Boiled Linseed Oil
- E. Master Painters Institute (MPI):  
No. 11-07.....Exterior Latex, Semi-Gloss (AE)  
No. 18-07.....Organic Zinc Rich Primer  
No. 26-07.....Cementitious Galvanized Metal Primer  
No. 77-07.....Epoxy Cold Cured, Gloss (EC)  
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. 135-07.....Non-Cementitious Galvanized Primer
- F. 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. Exterior Latex, Semi-Gloss (AE): MPI 11.
- B. Organic Zinc rich Coating (HR): MPI 22.
- C. Cementitious Galvanized Metal Primer: MPI 26.
- D. Epoxy Cold Cured, Gloss (EC): MPI 77.
- E. Fast Drying Metal Primer: MPI 95.
- F. High Build Epoxy Coating: MPI 98.
- G. Epoxy Anti-Corrosive Metal Primer: MPI 101.
- H. Waterborne Galvanized Primer: MPI 134.
- I. Non-Cementitious Galvanized Primer: MPI 135.

### **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 and Department of Housing and Urban Development.
  - 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 latex acrylic paints in place of alkyd paints.
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. Do no exterior painting when it is windy and dusty.
  3. Do not paint in direct sunlight or on surfaces that the sun will soon warm.
  4. 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.

#### **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. Zinc-Coated (Galvanized) Metal:
1. Clean surfaces to remove grease, oil and other deterrents to paint adhesion with an alkaline solution with a ph level from 11 to 12 but not more than 13 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.

### **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 applications 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, no spray painting, except as otherwise specified.
- G. Do not spray paint in existing occupied spaces unless approved by Resident Engineer.

### **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 steel.
- E. Metals except boilers, incinerator stacks, and engine exhaust pipes:
  - 1. Zinc-coated steel and iron: MPI 135 (Non-Cementitious Galvanized Primer).

### **3.6 PAINT COLOR**

- A. Color and gloss of finish; Epoxy polyamide, Semi gloss (Mansard brown)
- B. For additional requirements regarding color see COTR.
- 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.

### **3.7 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 existing work including colors and gloss of finish selected refer to paragraph 3.6 paint color.
  - 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.

### **3.8 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.

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**SECTION 22 14 00  
FACILITY STORM DRAINAGE**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

Replacement of roof drains and 5 feet of associated piping as specified in drawings.

**1.2 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Piping.
  - 2. Roof Drains.
  - 3. All items listed in Part 2- Products.
- C. Detailed shop drawing of clamping device and extensions when required in connection with the waterproofing membrane.

**1.3 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 National Standards Institute (ANSI).
- C. American Society of Mechanical Engineers (ASME): (Copyrighted Society)
  - A112.21.2m-83.....Roof Drains
  - A13.1-07.....Scheme for Identification of Piping Systems
- D. American Society for Testing and Materials (ASTM):
  - A74-06.....Standard Specification for Cast Iron Soil Pipe and Fittings
  - A536-84(R 2004).....Standard Specification for Ductile Iron Castings
  - C564-06a.....Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings
  - D2000-08.....Standard Classification System for Rubber Products in Automotive Applications
  - D4101-07.....Standard Specification for Propylene Plastic Injection and Extrusion Materials
- E. Factory Mutual (FM):
  - a. Coupling Used in Hubless Cast Iron Systems for Drains, Waste and Vent Systems.

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- F. International Code Council (ICC):  
IPC-06.....International Plumbing Code
- G. Cast Iron Soil Pipe Institute (CISPI):  
310-04.....Couplings for Use in Connection with Hubless  
Cast Iron Soil and Fittings for Sanitary and  
Storm Drain, Waste, and Vent Piping  
Applications

**PART 2 - PRODUCTS**

**2.1 STORM WATER DRAIN PIPING AND VENT PIPING**

- A. Cast Iron Storm Pipe and Fittings: Schedule 40.
  - 1. Cast iron storm pipe and fittings shall be used for the following applications:
    - c. Interior storm piping above grade.
  - 2. The cast iron storm Pipe shall be bell and spigot, or hubless (plain end or no-hub)to connect to existing piping.
  - 3. The material for all pipe and fittings shall be cast iron soil pipe and fittings and shall conform to the requirements of CISPI Standard 301, ASTM A-888, or ASTM A-74.
  - 4. Joints for hubless pipe and fittings shall conform to the manufacturer's installation instructions. Couplings for hubless joints shall conform to CISPI 310. Joints for hub and spigot pipe shall be installed with compression gaskets conforming to the requirements of ASTM Standard C-564 or be installed with leak and oakum.

**2.2 ROOF DRAINS AND CONNECTIONS**

- A. Roof Drains: Roof Drain: JOSAM 22010 Series, medium sump Beehive Dome or approved equal.  
Salient Characteristics:
  - a. Coated Cast Iron
  - b. Non-puncturing clamp ring with integral gravel stop.
  - c. Medium sump with roof flange and bottom outlet
  - d. 12 in diameter
  - e. Integral no-hub, soil pipe gasket
  - f. Adjustable drainage collar, which can be raised or lowered to meet required insulation heights.
  - g. Replace all roof sump pans
  - h. Pipe diameter as indicated on drawings.

- B. Expansion Joints: Expansions joints shall be heavy cast iron with cast brass or copper expansion sleeve having smooth bearing surface working freely against a packing ring held in place and under pressure of a bolted gland ring, forming a water and air tight flexible joint. Asbestos packing is prohibited.
- C. Interior Downspouts: An expansion joint shall be provided, specified above, at top of run on straight, vertical runs of downspout piping 12 m (40 feet) long or more.
- D. Downspout Nozzle: The downspout nozzle fitting shall be of brass, unfinished, with internal pipe thread for connection to downspout.

**PART 3 - EXECUTION**

**3.1 PIPE INSTALLATION**

- A. The pipe installation shall comply with the requirements of the International code and these specifications.
- B. Pipe shall be round and straight. Cutting shall be done with proper tools. Pipe shall be reamed to full size after cutting.
- C. All pipe runs shall be laid out to avoid interference with other work.
- D. Penetrations:
  - 1. Water proofing: At floor penetrations, Clearances around the pipe shall be completely sealed and made watertight with sealant as specified in Section 07 92 00, JOINT SEALANTS.
  - 2. All replaced piping shall be reinsulated to match existing insulation. Any fireproofing removed shall be replaced to match existing.
- E. Piping shall conform to the following:
  - 1. Storm Water Drain and Vent Drain to main stacks:

Pipe Size	Minimum Pitch
80 mm (3 inches) and smaller	2%
100 mm (4 inches) (4 inches) and larger	1%

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