

S P E C I F I C A T I O N S

VA Medical Center
Replace Roof on Building 40 and Connecting Link
Fargo, North Dakota



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VAMC Project No. 437-11-RO2
IMAGE Group Project No. 1013.06

IMAGE Group Architecture & Interiors

DEPARTMENT OF VETERANS AFFAIRS
VHA MASTER SPECIFICATIONS

TABLE OF CONTENTS
Section 00 01 10

	DIVISION 00 - SPECIAL SECTIONS	DATE
00 01 15	List of Drawing Sheets	09-11
	DIVISION 01 - GENERAL REQUIREMENTS	
01 00 00	General Requirements	06-11
01 33 23	Shop Drawings, Product Data, and Samples	11-08
01 74 19	Construction Waste Management	09-10
	DIVISION 02 - EXISTING CONDITIONS	
02 41 00	Demolition	06-10
	DIVISION 07 - THERMAL AND MOISTURE PROTECTION	
07 53 23	Ethylene-Propylene-Diene-Monomer Roofing	10-11
07 60 00	Flashing and Sheet Metal	10-10
07 92 00	Joint Sealants	02-11

SECTION 00 01 15
LIST OF DRAWING SHEETS

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

<u>Drawing No.</u>	<u>Title</u>
	<u>GENERAL</u>
X1	Cover Sheet
	<u>ARCHITECTURAL</u>
A1	Roof Demolition Plan
A2	Roof Plan and Details
	- - - END - - -

SECTION 01 00 00
GENERAL REQUIREMENTS

TABLE OF CONTENTS

1.1 General Intention 1

1.2 Statement Of Bid Item(S) 1

1.3 Specifications And Drawings For Contractor 2

1.4 Construction Security Requirements 2

1.5 Fire Safety 2

1.6 Operations And Storage Areas 4

1.7 Alterations 5

1.8 Disposal And Retention 6

1.9 Protection Of Existing Vegetation, Structures, Equipment, Utilities, And
Improvements 6

1.10 Restoration 7

1.11 As-Built Drawings 7

1.12 Use Of Roadways 7

1.13 Temporary Toilets 7

1.14 Availability And Use Of Utility Services 8

1.15 Local Fargo VA Healthcare System Construction Contractor Orientation And
Policies 8

**SECTION 01 00 00
GENERAL REQUIREMENTS**

1.1 GENERAL INTENTION

- A. Contractor shall completely prepare site for reroofing operations, including demolition and removal of existing, and furnish labor and materials to perform work for VA Medical Center Replace Roof on Building 40 and Connecting Link, Project No. 437-11-R02 as required by drawings and specifications.
- B. Visits to the site by Bidders may be made only by appointment with the Medical Center Engineering Officer.
- C. Offices of Image Group, Inc., as Architect-Engineers, will render certain technical services during construction. Such services shall be considered as advisory to the Government and shall not be construed as expressing or implying a contractual act of the Government without affirmations by Contracting Officer or his duly authorized representative.
- D. All employees of general contractor and subcontractors shall comply with VA security management program and obtain I.D. badges from the VA.
- E. Prior to commencing work, general contractor shall provide proof that a 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.
- F. Training:
 - 1. All employees of general contractor or subcontractors shall have the 10-hour (non supervisory employees), or 30-hour (Supervisory Employees) OSHA certified Construction Safety course and or other relevant competency training, as determined by VA.
 - 2. Submit training records or copies of their cards/certificates of all such employees for approval before the start of work.

1.2 STATEMENT OF BID ITEM(S)

- A. ITEM I, GENERAL CONSTRUCTION: Work includes demolition, general construction, alterations, roofing, mechanical and electrical work, and necessary removal of existing construction and certain other items.
- B. ITEM II: State the amount for all work in the Base Bid, less deductions under Alternate Bid No. 1.
- C. ITEM III: State the amount for all work in the Base Bid less deductions under Alternate Bids No. 1 and No. 2.
- D. ALTERNATE BIDS:
 - 1. ALTERNATE BID NO. 1: Delete connecting link roofing work east of Building 40 as defined on the drawings.

2. ALTERNATE BID NO. 2: Revise thickness of EPDM Sheet Roofing from 1.5 mm (0.060 inch) to 1.14 mm (0.045 inch).

1.3 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR

- A. AFTER AWARD OF CONTRACT, 0 sets of specifications and drawings will be furnished.
- B. Additional sets of drawings may be made by the Contractor, at Contractor's expense, from reproducible sepia prints furnished by Issuing Office. Such sepia prints shall be returned to the Issuing Office immediately after printing is completed.

1.4 CONSTRUCTION SECURITY REQUIREMENTS

A. Security Procedures:

1. General Contractor's employees shall not 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 notice can be provided for the VA employees.
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 an emergency. The General Contractor may return to the site only with the written approval of the Contracting Officer.

B. Document Control:

1. The General Contractor is 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.
2. These security documents shall not be removed or transmitted from the project site without the written approval of Contracting Officer.
3. All paper waste or electronic media such as CD's and diskettes shall be shredded and destroyed in a manner acceptable to the VA.

1.5 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):
E84-2009 Surface Burning Characteristics of Building
Materials

2. National Fire Protection Association (NFPA):
- 10-2010 Standard for Portable Fire Extinguishers
 - 30-2008 Flammable and Combustible Liquids Code
 - 51B-2009 Standard for Fire Prevention During Welding,
Cutting and Other Hot Work
 - 70-2011 National Electrical Code
 - 241-2009 Standard for Safeguarding Construction,
Alteration, and Demolition Operations
3. Occupational Safety and Health Administration (OSHA):
- 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 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, etc. Documentation shall be provided to the Project Engineer 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. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with Project Engineer.
- F. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily.
- G. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- H. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- I. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Project Engineer. Obtain permits from facility Project Engineer in advance.
- J. Fire Hazard Prevention: Inspect entire construction areas daily, and correct potential fire hazard situations.

- K. Smoking: Smoking is prohibited except in designated smoking rest areas.
- L. Dispose of waste and debris in accordance with NFPA 241. Remove from site daily.
- M. Perform other construction, alteration and demolition operations in accordance with 29 CFR 1926.

1.6 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. The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. 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.
- C. Working space and space available for storing materials shall be as determined by the Project Engineer.
- D. Workmen are subject to rules of Medical Center applicable to their conduct.
- E. Execute work so as to interfere as little as possible with normal functioning of Medical Center as a whole. 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 Project Engineer.
 - 1. Do not store materials and equipment in other than assigned areas.
- F. Phasing: To insure such executions, Contractor shall furnish the Project Engineer with a schedule of approximate dates on which the Contractor intends to accomplish work. In addition, Contractor shall notify the Project Engineer two weeks in advance of the proposed date of starting work. Arrange such dates to insure accomplishment of this work mutually agreeable to Project Engineer and Contractor.
- G. All building(s) will be occupied during performance of work.

1. Contractor shall take all measures and provide all material necessary for protecting existing property in areas of construction, so that 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. Coordinate work so that Medical Center operations will continue during the construction period.
- H. Construction Fence: Contractor shall provide a construction fence, around the material staging, crane and construction area. Orange snow/safety fence is acceptable. Provide an access as required. Fasten fence fabric to terminal posts with tension bands and to line posts and top and bottom rails with tie wires spaced at maximum 375mm (15 inches). Bottom of fences shall extend to 25mm (one inch) above grade. Remove the fence when directed by Project Engineer.
- I. 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.
- J. Coordinate the work for this contract as directed by Project Engineer. This includes the scheduling of traffic and the use of roadways, as specified in Article, USE OF ROADWAYS.

1.7 ALTERATIONS

- A. Survey: Before any work is started, the Contractor shall make a thorough survey with the Project Engineer of the areas to be reroofed and surrounding building and grounds. He shall take photographs and furnish photographs, and a report, signed by both, to the Contracting Officer. This report shall list:
 1. Existing condition of doors, windows, walls and other exterior building surfaces not required to be altered throughout affected areas of building.
 2. Shall note any discrepancies between drawings and existing conditions at site.
 3. Shall designate areas for working space, materials storage and routes of access to areas construction which have been agreed upon by Contractor and Project Engineer.
- B. Re-Survey: Thirty days before expected partial or final inspection date, the Contractor and Project Engineer together shall make a thorough re-survey of the areas of buildings involved. They shall furnish a report on conditions then existing, of Grounds Building, 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 surfaces, despite protection measures; and, will 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.
- C. 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.

1.8 DISPOSAL AND RETENTION

- A. Materials and equipment accruing from work removed and from demolition, shall be disposed of as follows:
1. Items not reserved shall become property of the Contractor and be removed by Contractor from Medical Center.

1.9 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. The Contractor shall avoid damaging vegetation. 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.

1.10 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 mechanical or electrical work without approval of the Project Engineer. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the Project Engineer 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 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 services or systems.

1.11 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 Project Engineer's review, as often as requested.
- C. Contractor shall deliver two approved completed sets of as-built drawings to the Project Engineer within 15 calendar days after each completed phase and after the acceptance of the project by the Project Engineer.
- D. Paragraphs A, B, & C shall also apply to all shop drawings.

1.12 USE OF ROADWAYS

- A. For hauling, use only established public roads and roads on Medical Center property.

1.13 TEMPORARY TOILETS

- A. Provide where directed, (for use of all Contractor's workmen) ample suitable dry closets where directed. Keep such places clean and free from flies, and they are to be removed prior to completion of contract, and premises left perfectly clean.

1.14 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. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, and associated paraphernalia.
- C. Electricity (for Construction and Testing): Furnish all temporary electric services.
 - 1. Obtain electricity by connecting to the Medical Center electrical distribution system. Electricity is available at no cost to the Contractor.

1.15 LOCAL FARGO VA HEALTHCARE SYSTEM CONSTRUCTION CONTRACTOR ORIENTATION AND POLICIES

- A. Contracts: The following staff or resource people will be working with you at the Fargo VA Health Care System. Please feel free to contact these individuals with any questions:
 - 1. Contracting Officer: Darryl Moon (701) 239-3700, ext. 9-3326
 - 2. Chief Engineer: Dennis Langevin (701) 239-3700, ext. 93365 or 239-3760
 - 3. Project Engineer: Dennis Langevin (701) 239-3700, ext. 93365 or 239-3760
 - 4. Engineering Technician: David Busching (701) 239-3700, ext. 93222 or 239-3760
- B. Vehicle Traffic Rules: All construction contractors shall park their vehicles in areas assigned by the Contracting Officer or Engineering Service representatives. All persons coming on the premises of the Fargo VA Health Care System must obey the posted traffic and parking rules. Police Service will issue tickets to contractor vehicles parked in areas other than those assigned.
- C. Keys/ID Badges: VA ID badges must be worn while you are on Medical Center premises. Contact Engineering Service to obtain an ID badge and any necessary keys. Contract staff are responsible for the security of keys and ID badges issued to them and may be charged for replacement cost. You must notify Engineering (ext. 3361) personnel in Building 3 immediately to report any loss, theft or suspected reproduction of a Medical Center key or access card.

- D. Smoking: Smoking is prohibited except in designated smoking shelters or areas.
- E. Use of Government Telephones and Fax Machines
1. Government telephones are for official Government business use. Contract staff may use telephones, for local calls only, to contact your place of employment or to address unforeseen events such as injury on the job, work schedule changes etc.
 2. The Government fax machine located in the M&R Foreman's Office, Building 38, may be used for local faxes with the approval of Engineering Office staff.
- F. Housekeeping
1. All construction sites shall be kept clean, orderly and in sanitary condition.
 2. All rags/cloth and rubbish soaked with flammable and/or combustible material shall be placed in a covered metal receptacle until being disposed.
 3. A clear and unobstructed path must be maintained to all portable fire extinguishers, hose cabinets, pull stations, fire exits and electrical panels.
 4. All trash containers over 20 gallons will be constructed of non-combustible materials and be covered or have a self-extinguishing cover.
- G. Storage
1. Any commodities that may be hazardous in combination with each other must be stored so they cannot come in contact with each other.
 2. Store flammable and combustible liquids and gasses in approved storage containers.
 3. Items stored in tiers will be stacked, blocked, interlocked and limited in height to prevent sliding or collapse.
 4. Storage areas will be kept free from accumulation of materials that constitute hazards.
- H. Hazardous Materials
1. Discovery of any suspected asbestos containing material shall result in the contractor stopping work in the area and reporting the discovery immediately to the Engineering Office (ext. 3361) in Building 3 or one of the contact persons indicated above. Engineering Service shall then evaluate the suspect material and if it contains asbestos shall arrange for the removal of the asbestos.
 2. Contractors shall maintain and provide upon request MSDS's for products used during construction which shall explain the labeling system and all other required information. Report any discovery of

an existing hazardous material to Engineering Service, Building 3 (ext. 3361).

I. Construction Safety

1. The Medical Center policy is to provide an environment for patients, visitors and staff that is free from danger. Within the Medical Center, the NFPA Life Safety Code is followed. Interim life safety measures (ILSM's) are applied to all construction projects as necessary and are defined in construction contracts. Minimum ILSM's are:
 2. Exits - provide free and unobstructed egress.
 3. Free and unobstructed access to emergency department/service for emergency forces.
 4. Smoking is permitted in designated areas only.
 5. Storage, housekeeping and debris removal policies and procedures that reduce the flammable and combustible fire load are enforced.
 6. Hazard surveillance is increased in construction areas.

J. Fire Safety

1. In the event of a fire alarm, "CODE 5" and the location of a fire will be communicated by an overhead announcement. The "all clear" is authorized by the Fargo Fire Department or by the personnel conducting the fire drill and will be communicated by an overhead announcement. If a fire or fire drill is located in or adjacent to the construction area, construction contractor staff shall be responsible for the following:
 - a. Be alert to the Code 5 announcement.
 - b. Participate in fire drills.
 - c. Follow the RACE Plan (Rescue, Alarm, Contain, Extinguish) if fire is discovered by a construction contractor.
 - d. Close all corridor doors within the construction area.
 - e. Evacuate the immediate area.

K. Utilities

1. Engineering (ext. 3361) is responsible for all utilities within the Medical Center. If there are problems or failures of the utilities, call extension 3361 during normal business hours (Monday through Friday, 8:00 a.m. to 4:30 p.m.). After hours and on weekends, contact the Police Service at ext. 3251 to report problems and failures. A utilities failure and its type/location will be communicated by a "Code 2 - Utility Failure" overhead announcement.
2. All utility service connections shall be reviewed with and approved by Engineering Service just prior to the connection being made with the existing utility. This condition shall apply to both temporary

and permanent connections. This final utility system connection check is meant to ensure the following:

- a. The Medical Center is prepared for the connection.
- b. The contractor is prepared for the connection work, which shall include but not be limited to, all safety measures have been taken or are in place, backflow preventers are in place, hot work permits have been issued, fire watch is in place, fire alarm initiation devices have been disabled if necessary, etc.

L. Emergencies

1. Disasters ("Code 6"): The Medical Center has initiated a process that provides an "all-hazard" approach to disaster management. Construction contractor staff shall ensure corridors are free of obstructions and a foreman or representative shall report to the Engineering Service office for further instructions.
2. Hostage Situations - Immediately report to Police Service (ext. 3251), any incident in which the safety of any person is threatened by another.
3. Bomb Threats ("Code 7") - React calmly and evacuate. Notify Police Service (ext. 3251) if the threat poses immediate danger to a person or destruction of property. If you discover a suspicious object, do not touch or move the object
4. Severe Weather - In the event of a "Code 8 -Take Cover" overhead announcement, all personnel are expected to take cover in windowless interior corridors that are not on the top floor of the building.
5. "Code Black" - React calmly and evacuate. Avoid area(s) where it has been indicated an armed assailant is in the building or on the ground.

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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 Architect-Engineer, and action thereon will be taken by Architect-Engineer on behalf of the Contracting Officer.
- 1-6. Upon receipt of submittals, Architect-Engineer 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 furnished pursuant to request therefor by Contracting Officer, adjustment in contract price

and time will be made in accordance with Articles titled CHANGES (FAR 52.243-4) and CHANGES - SUPPLEMENT (VAAR 852.236-88) of the GENERAL CONDITIONS.

- 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 Architect-Engineer. However, the Contractor shall assume responsibility for coordinating and verifying schedules. The Contracting Officer and Architect-Engineer 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 material and finish samples in quadruplicate. Submit other samples in single units unless otherwise specified. Submit seven (7) copies of shop drawings, schedules, manufacturers' literature and data, and certificates, 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 or Courier and shall contain the list of items, name of Medical Center, VA Project Number, VA Project Title, name of Contractor, VA 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, VA Project Number, VA Project Title, name of Contractor, manufacturer, brand, VA 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 Project Engineer at the site until 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 and electronic .pdf. Omit all special characters in electronic file names (i.e.: #, %, &, *, :, <, >, ?, /).
 2. Reproducible shall be full size.
 3. Each drawing shall have marked thereon, proper descriptive title, including Medical Center location, VA project number, VA Project Title, VA Contract 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. When work is directly related and involves more than one trade, shop drawings shall be submitted to Architect-Engineer under one cover.
- 1-10. Samples shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to Image Group, Inc., 403 Center Avenue, Suite 300, Moorhead, MN 56560.
- 1-11. At the time of transmittal to the Architect-Engineer, the Contractor shall also send a copy of the complete submittal directly to the Project Engineer. Fargo VA Medical Center, Attn: Engineering Service (138) 2101 Elm Street, Fargo, ND 58102

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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. Inerts
 - 2. Clean dimensional wood and palette wood.
 - 3. Green waste (biodegradable materials).
 - 4. Engineered wood products (plywood, particle board and I-joists, etc).
 - 5. Metal products (eg, steel, wire, beverage containers, copper, etc).
 - 6. Cardboard, paper and packaging.
 - 7. Roofing materials.
 - 8. Plastics (eg, ABS, PVC).
 - 9. Insulation.

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 25 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 are to 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 Project Engineer a written demolition debris management plan. The plan shall include, but not be limited to, 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:

- A. This section specifies demolition and removal of portions of buildings and debris.

1.2 RELATED WORK:

- A. Safety Requirements: GENERAL CONDITIONS Article, ACCIDENT PREVENTION.
- B. Construction Waste Management: Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT.

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, and other similar items that are required for protection of all personnel during demolition and removal operations. Comply with requirements of Section 01 00 00, GENERAL REQUIREMENTS, Article PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES AND IMPROVEMENTS.
- C. Provide enclosed dust chutes with control gates 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.
- D. 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.
- E. 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.
- F. Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent

of the work. The contractor shall take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the Medical Center; any damaged items shall be repaired or replaced as approved by the Project Engineer. The Contractor shall coordinate the work of this section with all other work. The Contractor shall ensure that structural elements are not overloaded. Repairs, or replacement must have Project Engineer's approval.

- G. The work shall comply with the requirements of Section 01 00 00, GENERAL REQUIREMENTS.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 DEMOLITION:

- A. Completely remove roofing as required for reroofing.
- B. Debris, shall become property of Contractor and shall be disposed of by him daily, off the Medical Center to avoid accumulation at the demolition site. 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. 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.

3.2 CLEAN-UP:

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

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SECTION 07 53 23
ETHYLENE-PROPYLENE-DIENE-MONOMER ROOFING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Ethylene Propylene Diene Monomer (EPDM) sheet roofing adhered and mechanically fastened to roof deck.
- B. Fire rated roof system.

1.2 RELATED WORK

- A. Metal flashings: Section 07 60 00, FLASHING AND SHEET METAL.

1.3 QUALITY ASSURANCE

- A. Approved applicator by the membrane roofing system manufacturer, and certified by the manufacturer as having the necessary expertise to install the specific system.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Applicators approval certification by manufacturer.
- C. Shop Drawings:
 - 1. Sheet membrane layout.
 - 2. Fastener pattern, layout, and spacing requirements.
 - 3. Termination details.
- D. Manufacturers installation instructions revised for project.
- E. Samples:
 - 1. Sheet membrane: One 150 mm (6 inch) square piece.
 - 2. Sheet flashing: One 150 mm (6 inch) square piece.
 - 3. Fasteners: Two, each type.
 - 4. Welded seam: Two 300 mm (12 inch) square samples of welded seams to represent quality of field welded seams.

1.5 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.

1.6 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 five years.

1.7 APPLICABLE PUBLICATIONS

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

- B. American Society for Testing and Materials (ASTM):
 - A167-99(R2009) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
 - B209-07 Aluminum and Aluminum-Alloy Sheet and Plate
 - D751-06 Coated Fabrics
 - D2103-10 Polyethylene Film and Sheeting
 - D2240-05(R2010) Rubber Property - Durometer Hardness
 - D3884-09 Abrasive Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)
 - D4637-10 EPDM Sheet Used in Single-Ply Roof Membrane
 - D4586-07 Asphalt Roof Cement, Asbestos Free
 - E96-10 Water Vapor Transmission of Materials
 - E108-10 Fire Tests of Roof Coverings
 - G21-09 Resistance of Synthetic Polymeric Materials to Fungi
- C. National Roofing Contractors Association (NRCA):
 - Fifth Edition - 05 The NRCA Roofing and Waterproofing Manual.
- D. Federal Specifications (Fed. Spec.)
 - FF-S-107C(2) Screws, Tapping and Drive
 - FF-S-111D(1) Screw, Wood
 - UU-B-790A Building Paper, Vegetable Fiber (Kraft, Waterproofed, Water Repellent and Fire Resistant)
- E. Factory Mutual Engineering and Research Corporation (FM):
 - Annual Issue Approval Guide Building Materials
- F. Underwriters Laboratories, Inc (UL):
 - Annual Issue Building Materials Directory
 - Annual Issue Fire Resistance Directory
- G. Warnock Hersey (WH):
 - Annual Issue Certification Listings

PART 2 - PRODUCTS

2.1 EPDM SHEET ROOFING

- A. Conform to ASTM D4637, Type I, Grade 1, black color.
- B. Additional Properties:

PROPERTY	TEST METHOD	REQUIREMENT
Shore A Hardness	ASTM D2240	55 to 75 Durometer
Water Vapor Permeance	ASTM E96	Minimum 0.14 perms Water Method
Fungi Resistance	ASTM G21	After 21 days, no sustained growth or discoloration.

Fire Resistance	ASTM E108 Class A	No Combustion Beyond Flame/Heat Source
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C. Thickness:

1. Use 1.5 mm (0.060-inch) thick sheet for adhered and mechanically anchored system.

D. Pipe Boots:

1. Molded EPDM designed for flashing of round penetrations, 200 mm (8 inch) minimum height.
2. Color same as roof membrane.

2.2 EPDM FLASHING SHEET

- A. Conform to ASTM D4637, Type I, Grade 1, Class U, unreinforced, color, same as roof membrane modified as specified for flashing.
- B. Self curing EPDM flashing, adaptable to irregular shapes and surfaces.
- C. Minimum thickness 1.5 mm (0.060-inch).

2.3 MISCELLANEOUS ROOFING MEMBRANE MATERIALS

- A. Sheet roofing manufacturers specified products.
- B. Splice Adhesive: For roofing and flashing sheet.
- C. Lap Sealant: Liquid EPDM rubber for roofing sheet exposed lap edge.
- D. Bonding Adhesives: Neoprene, compatible with roofing membrane, flashing membrane, insulation, metals, concrete, and masonry for bonding roofing and flashing sheet to substrate.
- E. Fastener Sealer: One part elastomeric adhesive sealant.
- F. Temporary Closure Sealers (Night Sealant): Polyurethane two part sealer.
- G. Primers, Splice Tapes, Cleaners, and Butyl Rubber Seals: As specified by roof membrane manufacturer.
- H. Asphalt Roof Cement: ASTM D4586.

2.4 FASTENERS

- A. Fasteners and washers required for securing sheet roofing to deck:
 1. Steel stress plate washers as required by sheet roofing manufacturer:
 - a. Coated against corrosion.
 - b. Separate or attached to fastener.
 - c. Approximately 50 mm (2 inch) diameter or 40 mm x 65 mm (1-1/2 by 2-1/2 inches) rectangular plate with rounded corners, minimum thickness 0.6 mm (0.023-inch).
 2. Fastening strip or batten strip for securing roof membrane to deck:
 - a. Stainless steel strip: ASTM A167 type 302 or 304, minimum 0.5 mm (0.018-inch) thick.
 - b. Aluminum strip: ASTM B209, minimum 2.4 mm (0.094-inch) thick.
 - c. Rounded corners on strips.

- d. Form strips 38 mm (1-1/2 inches) wide, 3000 mm (10 feet) maximum length with 6 mm x 10 mm (1/4 by 3/8 inch) punched slotted holes at 100 mm (4 inch) centers; centered on width of strip. Punch holes 2 mm (1/16 inch) larger than fastener shank when shank is larger than 5 mm (3/16 inch).
- 3. Steel decks: Screws; Fed Spec FF-S-107, hardened nylon screw or steel screw coated to resist corrosion, self drilling, anti-backout thread design. Minimum pullout resistance of 135 Kg (300 pounds), minimum thread penetration of 13 mm (1/2 inch).
- 4. Concrete and Masonry Wall Surfaces:
 - a. Nail penetration 13 mm (1/2 inch).
- 5. Wood:
 - a. Screws; Fed. Spec. FF-S-111, Type I, Style 2.5, coated to resist corrosion, length to provide 19 mm (3/4 inch) minimum penetration.
 - b. Nails: Barbed shank, galvanized.
- 6. Washers: Neoprene backed metal washer 28 mm (1-1/8 inch) minimum diameter.
- 7. To Sheet Metal: Self tapping screw; Fed. Spec. FF-S-107, 2 mm (No. 14), sheet metal screw, minimum thread penetration of 6 mm (1/4 inch); stainless steel.
- B. Pipe Compression Clamp or Drawband:
 - 1. Stainless steel or cadmium plated steel drawband.
 - 2. Worm drive clamp device.
- C. Surface mounted base flashing clamp strip:
 - 1. Stainless steel strip, ASTM A167, type 302 or 304, dead soft temper, minimum 0.5 mm (0.018-inch) thick.
 - 2. Aluminum strip: ASTM B209 24 mm (.094-inch) thick.
 - 3. For exposed location, form strips with 6 mm (1/4 inch) wide top edge bent out 45 degrees (for sealant) from 40 mm (1-1/2 inch) wide material; 2400 mm (8 feet) maximum length with slotted 6 mm x 10 mm (1/4 by 3/8-inch) holes punched at 200 mm (8 inch) centers, centered between bend and bottom edges.
 - 4. For locations covered by cap flashings, form strips 30 mm (1-1/4 inch) wide, 2400 mm (8 feet) maximum length with slotted holes 6 mm x 10 mm (1/4 by 3/8 inch) punched at 200 mm (8 inch) centers, centered on strip width.

2.5 VAPOR RETARDER OR SEPARATION SHEETS

- A. Polyethylene film: ASTM D2103, 0.2 mm (6 mils) thick.
- B. Building Paper: Fed. Spec. UU-B-790.
 - 1. Water vapor resistance: Type I, Grade A, Style 4, reinforced.
 - 2. Water vapor permeable: Type I, Grade D, Style 4, reinforced.

2.6 FLEXIBLE TUBING

- A. Closed cell neoprene, butyl polyethylene, vinyl, or polyethylene tube or rod.
- B. Diameter approximately 1-1/2 times joint width.

2.7 WALKWAY PADS

- A. Rubber walkway pad approximately 450 mm x 450 mm (30 by 30 inches) square or manufacturers standard size with rounded corners.
- B. Approximately 13 mm (1/2 inch) thick.
- C. Ultraviolet light stabilized.

PART 3 - EXECUTION

3.1 GENERAL

- A. Do not apply if deck will be used for subsequent work platform, storage of materials, or staging or scaffolding will be erected thereon 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 ready to receive insulation and, roofing.
 - 2. Coordinate roof operation with sheet metal work so that flashing is installed concurrently to permit continuous roofing operations.
 - 3. Complete installation of flashing, and roofing in the same day except for the area where temporary protection is required when work is stopped.
- B. Phased construction is not permitted. The complete installation of roofing system is required in the same day except for area where temporary protection is required when work is stopped.
- C. Dry out surfaces that become wet from any cause during progress of the work before roofing work is resumed.
- D. Apply materials only to dry substrates.
- E. 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.
 - 1. Do not apply materials to substrate having temperature of 4°C (40 degrees F) or less, or when materials applied with the roof require higher application temperature.
 - 2. Do not apply materials when the temperature is below 4°C (40 degrees F).
- F. 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 or building paper 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 6 mm (1/4 inch) thick by 50 mm (2 inches) wide strip of temporary closure sealant (night sealant) and weight edge with sandbags, to prevent displacement; space sandbags not over 2400 mm (8 foot) centers. Check daily to insure temporary seal remains watertight. Reseal open areas and weight down.
6. Before the work resumes, cut off and discard portions of the roof membrane in contact with roof cement or bituminous materials.
 - a. Cut not less than 150 mm (6 inches) back from bituminous coated edges or surfaces.
 - b. Remove temporary polyethylene film or building paper.
7. Remove and discard sandbags contaminated with bituminous products.
8. 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.
9. Provide 2 mm (6 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 deck in the presence of the Project Engineer before starting roofing work. Tests are not required for wood.
 1. Test applicable fastener type in applicable deck.
 2. Install fasteners 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 230 m² (2500 square feet) of deck type and level.
 5. Test at locations designated by Project Engineer.
 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 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 bituminous material on deck surface lapping edges and ends 150 mm (6 inches) or as recommended by roof membrane manufacturer.
 - 1. Do not install separation sheet beyond what can be covered by roofing membrane each day.
 - 2. Use polyethylene, or building paper, that will be compatible with seaming method.
 - 3. Insure separation sheet completely isolates bituminous materials from EPDM roofing membrane.
 - 4. Turn up at penetrations, or other surfaces where bituminous materials occur, to cover bituminous product.
 - 5. Turn down over edges of blocking at perimeters to cover blocking.

3.3 INSTALLATION OF ROOFING AND FLASHING

- 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 EPDM roofing membrane.
- B. If possible, install the membrane so the sheets run perpendicular to the long dimension of the insulation boards.
- C. If possible, start 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.
- D. Position the membrane so it is free of buckles and wrinkles.
- E. Roll sheet out on deck; inspect for defects as sheet is being rolled out and remove defective areas:
 - 1. Allow 30 minutes for relaxing before proceeding.
 - 2. Lap edges and ends of sheets 75 mm (3 inches) or more as recommended by the manufacturer. Clean lap surfaces as specified by manufacturer.
 - 3. Adhesively splice laps. Apply pressure as required. Seam strength of laps as required by ASTM D4637.
 - 4. Check seams to ensure continuous adhesion and correct defects.
 - 5. Finish edges of laps with a continuous beveled bead of lap sealant to sheet edges to provide smooth transition as specified by manufacturer.
 - 6. Finish seams as the membrane is being installed (same day).
 - 7. Anchor perimeter to deck or wall as specified.
- F. Membrane Perimeter Anchorage:

1. Install batten strip or steel stress plate with fasteners at the perimeter of each roof level, curb flashing, expansion joints and similar penetrations as indicated in accordance with membrane manufacturer's instructions on top of roof membrane to wall or deck.
 2. Mechanically fastened as follows:
 - a. Top of mechanical fastener set flush with top surface of the nailing strip or stress plate.
 - b. Space mechanical fasteners a maximum 300 mm (12 inches) on center.
 - c. Start 25 mm (1 inch) from the end of the nailing strip when used.
 - d. When strip is cut round edge and corners before installing.
 - e. Set fasteners in lap sealant and cover fastener head with fastener sealer including batten strip or stress plate.
 - f. Stop fastening strip where the use of the nailing strip interferes with the flow of the surface water, separate by a 150 mm (6 inch) space, then start again.
 - g. After mechanically fastening cover and seal with a 225 mm (9 inch) wide strip of flashing sheet. Use splice adhesive on all laps and finish edge with sealant as specified.
 - h. At fascia-cants turn the membrane down over the front edge of the blocking, cant, or the nailer to below blocking. Secure the membrane to the vertical portion of the nailer; with fasteners spaced not over 150 mm (6 inches) on centers.
 - i. At parapet walls intersecting building walls and curbs, secure the membrane to the structural deck with fasteners 150 mm (6 inches) on center or as shown in NRCA manual (Fifth Edition)
- G. Adhered System:
1. Apply bonding adhesive in quantities required by roof membrane manufacturer.
 2. Fold sheet back on itself, clean 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 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.
- H. Mechanical Anchorage:
1. Secure the membrane to the structural deck with fasteners through stress plate or batten strips spaced and patterned in accordance with the membrane manufacturer's instructions to achieve a Factory Mutual 1-90 Wind Uplift rating.

2. When fasteners are installed within the laps of adjoining sheets, position the fastener so that the stress plates are a minimum 13 mm (1/2 inch) from the edge of the sheets.
 3. Apply lap sealant under stress plate or batten strip and anchor to deck while lap sealant is still fluid. Cover fastener head with fastener sealer.
 4. Where fasteners are installed over the membrane after the seams have been welded, cover the fasteners with a minimum 200 mm (8 inch) wide round EPDM membrane cap centered over the fastener stress plate. If batten strips are used cover the strip with a minimum 200 mm (8 inch) wide EPDM strip centered over the batten. Splice covers to roof membrane and finish edges with sealant as specified.
 5. Before installing fasteners into cast in place concrete, pre-drill the correct size hole into the deck. Drill the hole 10 mm (3/8 inch) deeper than the fastener penetration.
- I. Install flashings as the membrane is being installed (same day). If the flashing cannot be completely installed in one day, complete the installation until the flashing is in a watertight condition and provide temporary covers or seals.
- J. 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 EPDM roof membrane.
 - c. Adhere the EPDM roof membrane to the metal flashing with the membrane manufacturer's recommended bonding adhesive.
 2. Turn down the metal drain flashing and EPDM roof membrane into the drain body and install clamping ring and stainer.
- K. Installing EPDM Base Flashing and Pipe Flashing:
1. Install EPDM flashing membranes to pipes, walls or curbs to a height not less than 200 mm (8 inches) above roof surfaces and 100 mm (4 inches) on roof membranes. Install in accordance with NRCA manual:
 - a. Adhere flashing to pipe, wall or curb with bonding adhesive.
 - b. Form inside and outside corners of EPDM flashing membrane in accordance with NRCA manual (Fifth Edition). Form pipe flashing in accordance with NRCA manual (Fifth Edition).
 - c. Lap ends not less than 100 mm (4 inches).

- d. Adhesively splice flashing membranes together and flashing membranes to roof membranes. Finish exposed edges with sealant as specified.
- 2. Anchor top of flashing to walls or curbs with fasteners spaced not over 150 mm (6 inches) on center. Use surface mounted fastening strip with sealant on ducts. Use pipe clamps on pipes or other round penetrations.
- 3. Apply sealant to top edge of flashing.
- L. Installing Building Expansion Joints:
 - 1. Install base flashing on curbs as specified.
 - 2. Coordinate installation with metal expansion joint cover or roof expansion joint system.
 - 3. Install flexible tubing 1-1/2 times width of joint over joint. Cover tubing with EPDM cover strip adhered to base flashing and lapping base flashing 100 mm (4 inches). Finish edges of laps with sealants as specified.
- M. Repairs to membrane and flashings:
 - 1. Remove sections of EPDM sheet roofing or flashing that is creased wrinkled or fishmouthed.
 - 2. Cover removed areas, cuts and damaged areas with a patch extending 100 mm (4 inches) beyond damaged, cut, or removed area. Adhesively splice to roof membrane or flashing. Finish edge of lap with sealant as specified.

3.4 WALKWAY PADS

- A. Clean membrane where pads are applied.
- B. Adhere pads to membrane with splicing cement.
- C. Allow not less than 1 inch break between pads and 2 inch maximum break.

3.5 FIELD QUALITY CONTROL

- A. Examine and probe seams in the membrane and flashing in the presence of the Project Engineer and Membrane Manufacturer's Inspector.
- B. Probe the edges of welded seams with a blunt tipped instrument. Use sufficient hand pressure to detect marginal bonds, voids, skips, and fishmouths.
- C. Cut 100 mm (4 inch) wide by 300 mm (12 inch) long samples through the seams where directed by the Project Engineer.
 - 1. Cut one sample for every 450 m (1500 linear feet) of seams.
 - 2. Cut the samples perpendicular to the longitudinal direction of the seams.
 - 3. Failure of the samples to maintain the standard of quality within a reasonable tolerance of the approved samples will be cause for rejection of the work.

- D. Repair areas of welded seams where samples have been taken or marginal bond voids or skips occur.
- E. Repair fishmouths and wrinkles by cutting to lay flat and installing patch over cut area extending 100 mm (4 inches) beyond cut.

3.6 TEMPORARY ROOF

- A. Install temporary roof when sequences of work or weather does not permit installation of a completed permanent roof system or roof would be subject to phasing of roof work.
- B. Use of 1.15 mm (0.045-inch) thick non-reinforced EPDM membrane or other temporary membrane as approved.
- C. Secure membrane to deck with mechanical fasteners or temporary ballast not exceeding deck dead load capacity.
- D. Repair cuts, tears, and punctures with patches to keep system watertight.
- E. Provide 10 Year Warranty Certificate to VA Project Engineer.

- - - E N D - - -

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

PART 1 - GENERAL

1.1 DESCRIPTION

A. Formed sheet metal work for flashing is specified in this section.

1.2 RELATED WORK

A. Single-ply Base Flashing System: Section 07 53 23 ETHYLENE-PROPYLENE-DIENE-MONOMER ROOFING.

B. Joint Sealants: Section 07 92 00, JOINT SEALANTS.

1.3 APPLICABLE PUBLICATIONS

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

B. Aluminum Association (AA):

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

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

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

C. American National Standards Institute/Single-Ply Roofing Institute (ANSI/SPRI):

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

D. American Architectural Manufacturers Association (AAMA):

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

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

E. ASTM International (ASTM):

- A167-99(R2009) Stainless and Heat-Resisting Chromium-Nickel
Steel Plate, Sheet, and Strip
- A653/A653M-09 Steel Sheet Zinc-Coated (Galvanized) or Zinc
Alloy Coated (Galvanized) by the Hot- Dip
Process
- B32-08 Solder Metal
- B209-07 Aluminum and Aluminum-Alloy Sheet and Plate
- B370-09 Copper Sheet and Strip for Building
Construction
- D173-03 Bitumen-Saturated Cotton Fabrics Used in
Roofing and Waterproofing
- D412-06 Vulcanized Rubber and Thermoplastic Elastomers-
Tension
- D1187-97(R2002) Asphalt Base Emulsions for Use as Protective
Coatings for Metal
- D1784-08 Rigid Poly (Vinyl Chloride) (PVC) Compounds and
Chlorinated Poly (Vinyl Chloride) (CPVC)
Compounds
- D3656-07 Insect Screening and Louver Cloth Woven from
Vinyl-Coated Glass Yarns
- D4586-07 Asphalt Roof Cement, Asbestos Free
- F. Sheet Metal and Air Conditioning Contractors National Association
(SMACNA): Architectural Sheet Metal Manual.
- G. National Association of Architectural Metal Manufacturers (NAAMM):
AMP 500-06 Metal Finishes Manual
- H. Federal Specification (Fed. Spec):
A-A-1925A Shield, Expansion; (Nail Anchors)
UU-B-790A Building Paper, Vegetable Fiber
- I. International Code Commission (ICC): International Building Code,
Current Edition

1.4 PERFORMANCE REQUIREMENTS

- A. Wind Uplift Forces: Resist the following forces per FM Approvals 1-49:
1. Wind Zone 2: 1.48 to 2.15 kPa (31 to 45 lbf/sq. ft.): 4.31-kPa
(90-lbf/sq. ft.) perimeter uplift force, 5.74-kPa (120-lbf/sq. ft.)
corner uplift force, and 2.15-kPa (45-lbf/sq. ft.) outward force.
- B. Wind Design Standard: Fabricate and install copings and roof-edge
flashings tested per ANSI/SPRI ES-1 to resist wind zone 2 design
pressure.

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings:
 - 1. All Flashing Items.
- C. Manufacturer's Literature and Data: For all flashing items.
- D. Certificates: Indicating compliance with specified finishing requirements, from applicator and contractor.

PART 2 - PRODUCTS

2.1 FLASHING AND SHEET METAL MATERIALS

- A. Prefinished 24 gauge Galvanized Sheet: ASTM, A653. Color: Dark Bronze to match existing.

2.2 FLASHING ACCESSORIES

- A. Solder: ASTM B32; flux type and alloy composition as required for use with metals to be soldered.
- B. Rosin Paper: Fed-Spec. UU-B-790, Type I, Grade D, Style 1b, Rosin-sized sheathing paper, weighing approximately 3 Kg/10 m² (6 lbs/100 sf).
- C. Bituminous Paint: ASTM D1187, Type I.
- D. Fasteners:
 - 1. Use galvanized steel or stainless steel for galvanized steel.
 - 2. Nails:
 - a. Minimum diameter for copper nails: 3 mm (0.109 inch).
 - b. Minimum diameter for aluminum nails 3 mm (0.105 inch).
 - c. Minimum diameter for stainless steel nails: 2 mm (0.095 inch) and annular threaded.
 - d. Length to provide not less than 22 mm (7/8 inch) penetration into anchorage.
 - 3. Rivets: Not less than 3 mm (1/8 inch) diameter.
 - 4. Expansion Shields: Fed Spec A-A-1925A.
- E. Sealant: As specified in Section 07 92 00, JOINT SEALANTS for exterior locations.
- F. Roof Cement: ASTM D4586.

2.3 SHEET METAL THICKNESS

- A. Except as otherwise shown or specified use thickness or weight of sheet metal as follows:
- B. Exposed Locations:
 - 1. Prefinished Galvanized Steel: 24 gauge, Color: Dark Bronze to match existing.

2.4 FABRICATION, GENERAL

A. Jointing:

1. Joints shall conform to following requirements:
 - a. Flat-lock joints shall finish not less than 19 mm (3/4 inch) wide.
 - b. Unsoldered lap joints shall finish not less than 100 mm (4 inches) wide.
2. Flat and lap joints shall be made in direction of flow.

B. Expansion and Contraction Joints:

1. Fabricate in accordance with the Architectural Sheet Metal Manual recommendations for expansion and contraction of sheet metal work in continuous runs.
2. Space joints as shown or as specified.
3. Space expansion and contraction joints at intervals not exceeding 7200 mm (24 feet).
4. Fabricate slip-type or loose locked joints and fill with sealant unless otherwise specified.
5. Fabricate joint covers of same thickness material as sheet metal served.

C. Cleats:

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

D. Edge Strips or Continuous Cleats:

1. Fabricate continuous edge strips where shown and specified to secure loose edges of the sheet metal work.
2. Use same material as sheet metal to be secured by the edge strip.
3. Fabricate in 3000 mm (10 feet) maximum lengths with not less than 19 mm (3/4 inch) loose lock into metal secured by edge strip.

4. Fabricate Strips for fascia anchorage to extend below the supporting wood construction to form a drip and to allow the flashing to be hooked over the lower edge at least 19 mm (3/4-inch).
5. Fabricate anchor edge maximum width of 75 mm (3 inches) or of sufficient width to provide adequate bearing area to insure a rigid installation.

E. Drips:

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

F. Edges:

1. Finish exposed edges of flashing with a 6 mm (1/4 inch) hem formed by folding edge of flashing back on itself when not hooked to edge strip or cleat.
2. All metal roof edges shall meet requirements of IBC, current edition.

2.5 FINISHES

- A. Use same finish on adjacent metal or components and exposed metal surfaces unless specified or shown otherwise.
- B. In accordance with NAAMM Metal Finishes Manual AMP 500, unless otherwise specified.
- C. Finish exposed metal surfaces as follows, unless specified otherwise:
 1. Galvanized Steel:
 - a. Manufacturer's finish:
 - 1) Fluorocarbon Finish: AAMA 621, high performance organic coating. Color: Dark Bronze to match existing.

2.6 COUNTERFLASHING (CAP FLASHING OR HOODS)

- A. Prefinished Galvanized Steel: 24 gauge, unless specified otherwise, color: Dark Bronze to match existing.
- B. Fabricate to lap base flashing a minimum of 100 mm (4 inches) with drip:
 1. Form lock seams for outside corners. Allow for lap joints at ends and inside corners.
 2. In general, form flashing in lengths not less than 2400 mm (8 feet) and not more than 3000 mm (10 feet).

3. Two-piece, lock in type flashing may be used in-lieu-of one piece counter-flashing.
 4. Manufactured assemblies may be used.
 5. Where counterflashing is installed at new work use an integral flange at the top designed to be extended into the masonry joint or reglet in concrete.
 6. Where counterflashing is installed at existing work use surface applied type, formed to provide a space for the application of sealant at the top edge.
- C. Surface Mounted Counterflashing; one or two piece:
1. Use at existing surfaces where flashing can not be inserted in vertical surface.
 2. One piece fabricate upper edge folded double for 65 mm (2 1/2 inches) with top 19 mm (3/4 inch) bent out to form "V" joint sealant pocket with vertical surface. Perforate flat double area against vertical surface with horizontally slotted fastener holes at 400 mm (16 inch) centers between end holes. Option: One piece surface mounted counter-flashing (cap flashing) may be used. Fabricate as detailed on Plate 51 of SMACNA Architectural Sheet Metal Manual.
 3. Two pieces: Fabricate upper edge to lock into surface mounted receiver. Fabricate receiver joint sealant pocket on upper edge and lower edge to receive counterflashing, with slotted fastener holes at 400 mm (16 inch) centers between upper and lower edge.
- D. Pipe Counterflashing:
1. Form flashing for water-tight umbrella with upper portion against pipe to receive a draw band and upper edge to form a "V" joint sealant receiver approximately 19 mm (3/4 inch) deep.
 2. Fabricate 100 mm (4 inch) over lap at end.
 3. Fabricate draw band of same metal as counter flashing. Use 0.6 Kg (24 oz) copper or 0.33 mm (0.013 inch) thick stainless steel or copper coated stainless steel.
 4. Use stainless steel bolt on draw band tightening assembly.
 5. Vent pipe counter flashing may be fabricated to omit draw band and turn down 25 mm (one inch) inside vent pipe.
- E. Where vented edge decks intersect vertical surfaces, form in one piece, shape to slope down to a point level with and in front of edge-set notched plank; then, down vertically, overlapping base flashing.

2.7 FASCIAS

A. General:

1. Fabricate in lengths not less than 2400 mm (8 feet) long and maximum of 3000 mm (10 feet).
2. Fabricate internal and external corners as one-piece with legs not less than 600 mm (2 feet) or more than 1200 mm (4 feet) long.
3. Fabricate roof flange not less than 100 mm (4 inches) wide.
4. Fabricate top edge to extend above roof not less than 25 mm (one inch).
5. Fabricate lower edge outward at an angle of 45 degrees to form drip.

B. Formed Flat Sheet Fascia:

1. Fabricate as shown of 24 gauge Prefinish Galvanized Steel, Color: Dark Bronze to match existing.
2. At joint between ends of sheets, provide a concealed clip soldered or welded near one end of each sheet to hold the adjoining sheet in lapped position. The clip shall be approximately 100 mm (4 inches) wide and shall be the full depth of the fascia less 25 mm (one inch) at top and bottom. Clip shall be of the same thickness as the fascia.
3. Provide edge strip as specified with lower hooked edge bent outward at an angle of 45 degrees.

2.8 COLLECTOR BOX

- A. Fabricate of same material as conductor and fascia.
- B. Fabricate collector box to not less than 250 mm (10 inch) wide by 200 mm (8 inch) deep by 200 mm (8 inches) from front to back.
- C. Form front and side edges channel shape not less than 13 mm (1/2 inch) wide flanges with edge hemmed.
- D. Slope bottom to sleeve to conductor or downspout.
- E. Extend wall edge not less than 25 mm (one inch) above front edge.
- F. Solder joints for water tight assembly.
- G. Fabricate outlet tube or sleeve at bottom not less than 50 mm (2 inches) long to insert into conductor.

2.9 SCUPPERS

- A. Fabricate scuppers with minimum of 100 mm (4 inch) wide flange.
- B. Provide flange at top on through wall scupper to extend to top of base flashing.
- C. Fabricate exterior wall side to project not less than 13 mm (1/2 inch) beyond face of wall with drip at bottom outlet edge.

- D. Fabricate interior wall side not less than 100 mm (4 inch) wide flange to lap behind base flashing.
- E. Fabricate exterior wall flange for through wall scupper not less than 25 mm (one inch) wide on top and sides with edges hemmed.
- F. Fabricate scupper not less than 200 mm (8 inch) wide and not less than 125 mm (5 inch) high for through wall scupper.
- G. Solder joints watertight.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install flashing and sheet metal items as shown in Sheet Metal and Air Conditioning Contractors National Association, Inc., publication, ARCHITECTURAL SHEET METAL MANUAL, except as otherwise shown or specified.
2. Apply Sealant as specified in Section 07 92 00, JOINT SEALANTS.
3. Apply sheet metal and other flashing material to surfaces which are smooth, sound, clean, dry and free from defects that might affect the application.
4. Remove projections which would puncture the materials and fill holes and depressions with material compatible with the substrate. Cover holes or cracks in wood wider than 6 mm (1/4 inch) with sheet metal compatible with the roofing and flashing material used.
5. Confine direct nailing of sheet metal to strips 300 mm (12 inch) or less wide. Nail flashing along one edge only. Space nail not over 100 mm (4 inches) on center unless specified otherwise.
6. Install bolts, rivets, and screws where indicated, specified, or required in accordance with the SMACNA Sheet Metal Manual. Space rivets at 75 mm (3 inch) on centers in two rows in a staggered position. Use neoprene washers under fastener heads when fastener head is exposed.
7. Nail continuous cleats on 75 mm (3 inch) on centers in two rows in a staggered position.
8. Nail individual cleats with two nails and bend end tab over nail heads. Lock other end of cleat into hemmed edge.
9. Install flashings in conjunction with other trades so that flashings are inserted in other materials and joined together to provide a water tight installation.

10. Where required to prevent galvanic action between dissimilar metal isolate the contact areas of dissimilar metal with sheet lead, waterproof building paper, or a coat of bituminous paint.

3.2 COUNTERFLASHING (CAP FLASHING OR HOODS)

A. General:

1. Install counterflashing over and in conjunction with installation of base flashings, except as otherwise specified or shown.
2. Install counterflashing to lap base flashings not less than 100 mm (4 inch).
3. Install upper edge or top of counterflashing not less than 225 mm (9 inch) above top of the roofing.
4. Lap joints not less than 100 mm (4 inch). Stagger joints with relation to metal base flashing joints.
5. Use surface applied counterflashing on existing surfaces and new work where not possible to integrate into item.
6. When fastening to concrete or masonry, use screws driven in expansion shields set in concrete or masonry. Use screws to wood and sheet metal. Set fasteners in mortar joints of masonry work.

B. One Piece Counterflashing:

1. Where flashing is surface mounted on flat surfaces.
 - a. When top edge is double folded anchor flat portion below sealant "V" joint with fasteners spaced not over 400 mm (16 inch) on center:
 - 1) Locate fasteners in masonry mortar joints.
 - 2) Use screws to sheet metal or wood.
 - b. Fill joint at top with sealant.
2. Where flashing or hood is mounted on pipe.
 - a. Secure with draw band tight against pipe.
 - b. Set hood and secure to pipe with a one by 25 mm x 3 mm (1 x 1/8 inch) bolt on stainless steel draw band type clamp, or a stainless worm gear type clamp.
 - c. Completely fill joint at top with sealant.

C. Two-Piece Counterflashing:

1. Surface applied type receiver:
 - a. Secure to face construction in accordance, with manufacturers instructions.
 - b. Completely fill space at the top edge of receiver with sealant.

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

3.3 FASCIAS

A. General:

1. Install fascias with allowance for expansion at each joint; minimum of 6 mm (1/4 inch).
2. Extend roof flange of fascia and splice plates not less than four inches out over roofing and nail or screw to wood nailers. Space fasteners on 75 mm (3 inch) centers in staggered pattern.
3. Install continuous cleat for fascia drip edge. Secure with fasteners as close to lower edge as possible on 75 mm (3 inch) centers.
4. Where ends of fascias abut a vertical wall, provide a watertight, flashed and sealant filled joint.
5. Edge securement for low-slope roofs: Low-slope membrane roof systems metal edge securement, shall be designed in accordance with ANSI/SPRI ES-1, except the basic wind speed shall be determined from Figure 1609, of IBC 2003.

B. Sheet metal fascia:

1. Install with end joints of splice plates sheets lapped three inches.
2. Hook the lower edge of fascia into a continuous edge strip.
3. Lock top section to bottom section for two piece fascia.

C. Scuppers:

1. Install scupper with flange behind fascia; leave 6 mm (1/4 inch) joint to fascia.
2. Set scupper at roof water line and fasten to wood blocking.
3. Use sealant to seal joint with fascia at ends.
4. Coordinate to lap over conductor head and to discharge water into conductor head.

3.4 COPINGS

A. General:

1. On walls topped with a wood plank, install a continuous edge strip on the front and rear edge of the plank. Lock the coping to the edge strip with a 19 mm (3/4 inch) loose lock seam.

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

B. Prefinished Galvanized Steel Copings:

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

3.5 DOWNSPOUTS

- A. Where scuppers discharge into downspouts install new collector box to receive discharge with back edge up behind drip edge of scupper. Fasten and seal joint. Sleeve reused existing downspouts to collector box outlet tubes and fasten joint and joints between sections.
- B. Reinstall existing downspouts and anchor straps.

- - - E N D - - -

**SECTION 07 92 00
JOINT SEALANTS**

PART 1 - GENERAL

1.1 DESCRIPTION:

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

1.2 RELATED WORK:

- A. Roofing: Section 07 53 23, ETHYLENE-PROPYLENE-DIENE-MONOMER ROOFING.
B. Flashing: Section 07 60 00, FLASHING AND SHEET METAL.

1.3 QUALITY CONTROL:

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design and extent to those indicated for this project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.4 SUBMITTALS:

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

1.5 PROJECT CONDITIONS:

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

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

C. Joint-Substrate Conditions:

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

1.6 DELIVERY, HANDLING, AND STORAGE:

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

1.7 DEFINITIONS:

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

1.8 WARRANTY:

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

1.9 APPLICABLE PUBLICATIONS:

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

- C717-10 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-6:

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

2.2 COLOR:

- A. Sealants used with exposed prefinished steel flashings shall match color of flashings.
- B. Sealants used with unpainted concrete shall match color of adjacent concrete.
- C. Color of sealants for other locations shall be light gray or aluminum, 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.

2.4 PRIMER:

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

2.5 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 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:
 - 3. 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.
- C. Do not cut or damage joint edges.
- D. Apply masking tape to face of surfaces adjacent to joints before applying primers, 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 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.

3.4 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 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. Apply compounds with nozzle size to fit joint width.
 - 9. 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.

3.5 CLEANING:

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

3.6 LOCATIONS:

A. Metal Flashings:

1. Flashings to Wall: Type S-6
2. Metal to Metal: Type S-6

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