



**U.S. DEPARTMENT OF STATE
OBO FACILITIES MANAGEMENT DIVISION STATEMENT
OF WORK**

FOR

GATE 129 RESIDENCE ROOF

REPLACEMENT

MBABANE, ESWATINI

March 13, 2020



**UNITED STATES DEPARTMENT OF STATE GATE
129 ROOF REPLACEMENT MBABANE,
ESWATINI**



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OBO/CFSM/FAC Roof & Facade Management Program

SECTION 01020 - SUMMARY OF ROOF WORK

PART ONE - GENERAL 1.01

SUMMARY:

- A. Roof replacement and roof related repairs of the existing residence located at Gate 129 in Mbabane, Eswatini. The work includes, but is not limited to, the following:
- B. Design Base Roof Systems:

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1. "Klip-lok" Metal Roof System:
 - a. Removal and disposal of existing Harvey Tile roof panels and flashings to structural framing.
 - b. Repair and replacement of damaged wood fascia and joists.
 - c. Installation of new reflective foil insulation/underlayment.
 - d. Installation of new metal roof panels.
 - e. Installation of new flashings at penetrations, valleys, ridges, chimneys, and perimeters.
 - f. Installation of new aluminum gutters and downspouts.
 - g. Redirect vent pipe to outside of fascia board.
 - h. Touch up painting of exterior wood fascia and trim.

1.02 SUBMITTALS:

- A. Detailed project schedule showing work phasing and proposed daily progress.
- B. Applicator's License Certificate: Roofing material manufacturer's agreement indicating date application was approved and expiration date.
- C. Shop Drawings of all specific waterproofing details.
- D. Material manufacturer's product data sheets, written approval/acceptance of specified tests for project, fastener pattern layout, details, insulation, and all related materials based upon existing site conditions.
- E. Manufacturer's warranties that are to be issued upon project completion.

1.03 SUBSTITUTIONS AND PRODUCT OPTIONS:

- A. Contractor's Representation: Request for substitution constitutes a representation that Contractor:
 1. Has investigated proposed product and determined that it is equal to or superior in all respects to that specified.
 2. Shall provide same warranties for substitution as for product specified.
 3. Shall coordinate installation of accepted substitution into Work and make such other changes as may be required for Work to be complete in all respects.
 4. Waives all claims for additional costs, under his responsibility, related to substitution which subsequently becomes apparent.
 5. If substitution is not approved or accepted, Contractor shall furnish specified product.

1.04 QUALITY CONTROL:

- A. OBO has the right to inspect and test all services, to the extent practicable at all times and places during the work. OBO may perform full time quality assurance inspections [QAI] and tests during construction to confirm the work is installed according to the Contract Documents.
- B. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.
- C. Contractor shall be approved by manufacturer to perform the work for the specified guarantee period.

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- D. The Contractor shall be responsible for the following construction inspections and tests:
 - 1. Membrane Seam Adhesion Test
 - 2. Manufacturer's Warranty Inspection

1.05 STORAGE OF MATERIALS:

- A. Proper storage of materials is the sole responsibility of Contractor. Protect all materials susceptible to moisture including, but not limited to, all roll goods, insulation, cant strip, wood, and plywood in dry, above ground, watertight storage. Keep all labels intact and legible, clearly showing the product, manufacturer, and other pertinent information.
- B. Store materials on site. Cover and protect materials subject to damage by weather, including during transit. Stored materials shall be available for inspection.
- C. Store flammable and volatile liquids in sealed containers located a minimum of 20 feet from existing buildings.
- D. Liquid products shall be delivered sealed, in original containers. Store roll goods in an upright position.
- E. Distribute material, debris, and equipment over the roof deck to avoid damage to the structural deck. Place materials and equipment to be stored on the roof as nearly direct over structural members as can be determined. Secure equipment, material, and debris on the roof to prevent movement by wind or other elements.

1.07 PROJECT PROCEDURES:

- A. Cooperate with Facility Representative in all construction operations to minimize conflict.
- B. Contractor shall take precautions to avoid excessive noise or vibration that would disturb neighbor residences.
- C. Contractor shall take all necessary precautions to assure a watertight condition in the operation portion of the building during construction.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

3.01 PERIOD OF PERFORMANCE:

- A. Award of Contract:
- B. Pre Construction Submittals: Within 30 days of contract award
- C. OBO Submittal Review 30 Days
- D. Material Procurement: 30 days
- E. Construction:
 - 1. Main House On-Site Construction 30 days on-site
- F. Final Cleanup Begins: 5 days prior to completion
- G. **Total Period of Performance: 120 days**
- H. Rainy Season: November-April

END OF SECTION

SUMMARY OF ROOF WORK

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SECTION 01535 – ROOF CONSTRUCTION SAFETY

PART ONE - GENERAL

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1.01 SUMMARY

- A. The Contractor is responsible and shall continue management and implementation of a safety and health program throughout construction.
- B. The Contracting Officer and the Post Occupational Safety and Health Officer [POSHO] reserve the right to suspend work when and where Contractor's safety and health program is considered to be operating in an inadequate or non-complying manner.

1.02 REGULATIONS AND STANDARDS

- A. Governing regulations: Latest edition of U.S. Army Corps of Engineers (COE) *Safety and Health Requirements Manual*, EM 385-1-1

1.03 SUBMITTALS

- A. Construction Accident Prevention Plan (CAPP) is a job site specific safety and health policy and program management document. Submit a CAPP to ensure safety of all persons at the site in event of an emergency.
- B. Management Commitment: Provide introductory policy statement signed by senior officers of design/build firm stating that implementation and management of the CAPP has full cooperation and support of management. C. The CAPP shall include the following:
 - 1. Statement of safety and health policy.
 - 2. Administrative responsibilities for implementing the plan.
 - 3. Identification of personnel responsible for accident prevention.
 - 4. Plans for hazard communication, and continued safety and health training.
 - 5. Provisions for inspections of work sites, materials, and equipment.
 - 6. Emergency response capabilities to minimize consequences of accidents.
 - 7. Public safety requirements.

1.04 QUALITY ASSURANCE

- A. Safety and Health Program Manager:
 - 1. Appoint a manager whose duties shall include effective implementation, coordination, and enforcement of CAPP.
 - 2. The manager shall be qualified to anticipate, identify, evaluate, and implement corrective action in relation to potential safety and health hazards and dangerous exposures for accident prevention.
 - 3. The manager shall meet with the POSHO and Owner's representative to discuss site specific safety and health issues.
- B. Inspections:
 - 1. Provide for frequent safety, health, and housekeeping inspections conducted by the Safety and Health Program Manager, temporary structures, fabrication shops, material, machinery and equipment.
 - 2. Quality Assurance Inspectors, as part of their QA responsibilities, shall conduct and document daily safety, health, and housekeeping inspections; and impose fines on the Safety and Health Program Manager.

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- C. Tool Box Meetings: Hold safety meetings once each week. Require attendance by all laborer, and supervisors; include those of separate contractors. Contractor shall consider the following check-list:
1. Who is trained in CPR
 2. Level of local hospital services
 3. Do local doctors speak English
 4. Type of emergency vehicles and distances
 5. Are cell phones or radios available
 6. Level of embassy doctor or nurse services
 7. Family contact names and telephone numbers for all crew

PART TWO - PRODUCTS

2.01 TOOLS, EQUIPMENT, AND MACHINERY

- A. Quality: Hand tools, power tools, equipment, machinery, materials, and personal protective apparatus shall be of manufacture listed by U.S. or internationally recognized testing laboratory for specific application for which they are to be used. They shall be quality products recognized for professional construction use, applications, and work practices.
- B. Scaffolding: Shall be a standard tubular frame and clamp system manufactured and tested according to international standards. The Scaffold system shall include the scaffold manufacturers integrated access stairway sections, handrails, toe boards and walking platforms.
- C. Safe Clearance Procedure: Prior to initial use, and periodically thereafter at times of continued use, provide inspections of construction tools, equipment, and machinery. Do not permit continued use of tools, equipment, and machinery that are not in good condition.
- D. Fall Protection: On unprotected sides of the building edge provide workers with warning lines, guardrail, safety net or personal fall arrest systems or a combination of safety monitoring systems.
- C. Hazardous work shall be brought to the attention of the QAI and POSHO prior to commencing the work.
1. Hot Work: Includes all work that results in open flame such as welding, cutting, brazing, and burning. The Contractor shall provide effective fire protection and prevention at all times during such operations.
 2. Confined Space: Work in enclosed areas such as sewers, vaults, vessels, manholes, pits, etc.
 3. Internal Combustion: The use of cranes, forklifts, hoists, or generators powered by petroleum fuel when used on or near the building.
 4. Explosive Actuated Tools: These include powder charged tools used for fastening purposes.

PART THREE - EXECUTION

Not Used

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END OF SECTION

SUMMARY OF WORK

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SECTION 01700 - CONTRACT CLOSEOUT

PART ONE - GENERAL

1.01 GENERAL:

A. Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the Work.

1.02 SUBSTANTIAL COMPLETION:

A. Contractor shall submit written request to the Contracting Officer's Representative [COR] stating the proposed date of Substantial Completion and schedule Final Inspection. B. Written certification shall include:

1. Contract Documents have been reviewed.
2. Project has been inspected for compliance with Contract Documents.
3. Work has been completed in accordance with Contract Documents.
4. Equipment and systems have been tested in presence of Owner's Representative and are operational.
5. Project is complete and ready for final inspection.

C. Quality Assurance Inspector or post Facilities Manager will make a pre-inspection after notification. Should the work not be complete, they will issue an inspection list to Contractor with noted items requiring further consideration.

1.03 FINAL INSPECTION:

- A. Contracting Officer's Representative will make final inspection after notification from Contractor.
- B. Should COR consider Work complete in accordance with requirements of Contract Documents, he will request Contractor to begin Final Clean-up and Project Closeout submittals.
- C. Should COR consider Work not complete:
1. Contractor shall take immediate steps to remedy the stated deficiencies and submit initialed inspection list to the COR certifying Work is complete.
 2. COR will reinspect Work.

1.04 REINSPECTING COSTS:

A. Should the Contracting Officer's Representative be required to perform subsequent inspections of the Work due to the failure of the Contractor to correct deficient work, the additional services will be deducted from the final payment to Contractor.

1.05 WARRANTY/GUARANTEE:

A. Submit original and duplicate copies of both Contractor's Warranty and Manufacturer's Guarantee for review. After review, Contracting Officer's Representative shall approve final pay application upon receipt of both Contractor's Warranty and Manufacturer's Guarantee.

1.06 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS: A.

Contractor's Release and Waiver of Liens:

1. Contractor's Waiver of Liens.
2. Separate waivers of liens for subcontractors, suppliers, and others with lien rights against property of Owner, together with complete list of those parties.
3. Consent of Surety

B. All submittals shall be notarized and sealed before delivery to the COR.

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1.08 FINAL ADJUSTMENT OF ACCOUNTS:

- A. Submit final statement of accounting to the COR.
- B. Statement shall reflect all adjustments.
 - 1. Original Contract Sum.
 - 2. Additions and Deductions resulting from:
 - a. Previous Change Orders.
 - b. Deductions for uncorrected Work.
 - c. Deductions for Reinspection Payments.
 - 3. Total Contract Sum, as adjusted.
 - 4. Previous payments.
 - 5. Sum remaining due.

1.09 FINAL APPLICATION FOR PAYMENT:

- A. The Contractor shall submit one copy of all payment invoices, with the appropriate backup documents to the COR. The Contractor shall submit receipts for all allowance costs and reimbursable expenses incurred. The COR also will determine if billed services have been satisfactorily performed and if expenses billed are correct. If it is determined that the amount billed is incorrect, the COR will within seven days, request the Contractor to submit a revised invoice.
- B. Final payment will not be approved or released until receipt of proper close-out documents.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION

CONTRACTOR'S RELEASE

PROJECT _____
CONTRACT NO. _____ DATED _____ BY _____
CONTRACT SUM \$ _____ DOLLARS
CONTRACTOR NAME _____
ADDRESS _____ CITY _____ STATE _____ ZIP _____ COUNTRY _____

Contractor hereby certifies that there are no outstanding obligations of the undersigned, the contracting firm, corporation, employee, dealer, subcontractor, or any others who would have standing against the property of the Government of the United States of America ("Government") under this contract.

In consideration of the sum stated above, upon payment of said sum to undersigned Contractor or assignees, the Government, its officers, agents, and employees are fully released and discharged of all obligations, liabilities, claims, and demands made under and arising from the contract, except:

- 1. Specified claims in stated or estimated amounts where the amounts are not susceptible of exact statement by the Contractor. If none, check this box ; if yes, please check this box and itemize on reverse.

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2. Claims, together with reasonable expenses incidental thereto, based upon the liabilities of the Contractor to third parties arising out of the performance of said contract, which are not known to the Contractor on the date of the execution of this release and of which the Contractor gives notice in writing to the Contracting Officer within the period specified in said contract.
3. Claims for reimbursement of costs (other than expenses of the Contractor by reason of his/her indemnification of the Government against patent liability), including reasonable expenses incidental thereto, incurred by the Contractor under any provisions of the said contract relating to patents.

Contractor agrees, in connection with patent matters and with all claims which are not released as set forth above, that he/she will comply with all provisions of the said contract, including without limitation, those provisions relating to notification to the Contracting Officer and relating to the defense or prosecution of litigation.

Subscribed and sworn to before me on this ____ day of _____, 20____.

Notary Public: _____

CONTRACTOR

BY _____

TITLE _____

My Commission Expires: _____

NOTE: In the case of a corporation as Contractor, Notarization is not required, but the certification below must be completed.

CERTIFICATE

I, _____, certify that I am the _____ secretary of the corporation named as Contractor in the foregoing release; that _____ who signed said release on behalf of the Contractor was then _____ of said corporation, that said release was duly signed for and on behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

CONSENT OF SURETY

PROJECT _____

CONTRACT NO. _____ DATED _____ BY _____

CONTRACT SUM \$ _____ IN _____ DOLLARS

CONTRACTOR NAME _____

ADDRESS _____ CITY _____ STATE _____ ZIP _____ COUNTRY _____

The Surety (Co-sureties) consent/s to the foregoing contract modification and agree/s that its/their bond/s shall apply and extend to the contract as modified or amended.

INDIVIDUAL PRINCIPAL	NAME & ADDRESS OF PRINCIPAL	SIGNATURE		<i>(Affix Seal)</i>
			NAME TITLE DATE	
CORPORATE PRINCIPAL	NAME & ADDRESS OF PRINCIPAL	SIGNATURE		<i>(Affix Seal)</i>
			NAME TITLE DATE	

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		CORPORATE / INDIVIDUAL SURETY (CO-SURETIES)	
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The Principal or authorized representative shall execute this consent of surety with the modification to which it pertains. If the representative (e.g. attorney-in-fact) that signs the consent is not a member of the partnership, or joint venture, or an officer of the corporation involved, a Power-of-Attorney or a Certificate of Corporate Principal must accompany the consent.

	CORPORATE/INDIVIDUAL SURETY'S NAME & ADDRESS	PERSON EXECUTING	CONSENT (SIGNATURE)	
A				<i>(Affix Seal)</i>
			NAME	
			TITLE	
			DATE	
B				<i>(Affix Seal)</i>
			NAME	
			TITLE	
			DATE	
C				<i>(Affix Seal)</i>
			NAME	
			TITLE	
			Date	

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SECTION 02072 – ROOF REMOVALS AND RENOVATION WORK

PART ONE - GENERAL

1.01 SECTION INCLUDES: A.

General:

1. Removal of existing roofing, abandoned equipment, flashing, and sheet metal to included gutters and downspouts.
2. Modification of existing roof penetrations, equipment supports or curbs, pitch pans, reglets, piping, and electrical service to provide proper flashing height and flashing detail.

1.02 PROJECT CONDITIONS:

A. Environmental Requirements:

1. Do not remove existing roofing and flashing in inclement weather or when rain is predicted with 30 percent possibility.
2. When ambient temperature is below 15 degrees Celsius (60 degrees Fahrenheit), expose only enough cement and adhesive required within four hour period.

B. Emergency Equipment: Maintain on-site materials necessary to apply emergency temporary seal in event of sudden storms or inclement weather.

1.03 SEQUENCING AND SCHEDULING:

A. Sequence removals and renovation with sequence of new work to maintain facility in dry, watertight condition.

B. Coordinate roof work so that no more existing items are removed in one day than can be replaced with new roofing work in same day.

PART TWO - PRODUCTS

2.01 MATERIALS:

A. Wood Treatment: Pressure preservative treated in accordance with AWPA C2, C9 standards, using Chromated Copper Arsenate (CCA) at 0.1kg per 0.03cm (0.40 pounds per cubic foot) wood. Preservatives shall be compatible with roof membrane. B. Lumber (Members, Nailers, and Blocking):

1. Standard Grade Fir or No. 2 Southern Yellow Pine bearing UL label. Size shall be appropriate for application, minimum 50mm (2-inch) (nominal) thickness.
2. Moisture Content: 19 percent maximum at time of installation.

C. Fasteners:

1. Wood Substrate:

- a. Securement of metal flanged items shall be nails, No. 10 gauge, galvanized steel wire with 10mm (13/32-inch) diameter head and ring shank such as No. 3255 by Dickson Weatherproof Nail Co.
- b. Securement of wood to wood shall be nails, No. 9 gauge, galvanized steel wire nail with ring shank and 8mm (5/16-inch) diameter head such as No. 3055 by Dickson Weatherproof Nail Co. (800/572-9351); length required to provide 25mm (1-inch) penetration minimum into substrate.
- c. Securement of exposed items to wood substrate shall be nails, No. 10 gauge, galvanized steel wire nail with 9mm (3/8-inch) diameter head, ring shank, and EPDM rubber washer such as No. 955 by Dickson

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- Weatherproof Nail Co. (800/572-9351); length required to provide 25mm (1-inch) penetration minimum into substrate.
- d. Fasteners for securing minimum roofing materials to wood substrate shall be a hardened steel nail with a 25mm (1-inch) diameter round head and ring shank; length to provide 25mm (1-inch) penetration into substrate, as manufactured by Simplex Nail Co.
 - e. Fasteners for securing steel to wood substrate shall be steel wood screw with steel washer and integral rubber seal.
2. Masonry Substrate (Chimney):
- a. Fasteners for securing wood to solid masonry shall be galvanized steel expansion anchor, 9mm (3/8-inch) diameter (minimum), with 19mm (3/4inch) diameter steel washer such as "Countersunk Kwik Bolt II" by Hilti.
 - b. Fasteners for securing wood to hollow base masonry shall be 9mm (3/8-inch) diameter (minimum), threaded rod, with 9mm (3/4-inch) diameter washer, nut, and screen tube such as "HIT C-20 Adhesive Anchor" by Hilti.
 - a. Fasteners for securing sheet metal items to concrete substrate shall be a pre-assembled drive anchor with a stainless steel drive screw, a lead/zinc alloy expansion anchor body (6mm [1/4-inch] diameter, 38mm [1-1/2-inch] length) and a stainless steel washer with integral rubber seal (1-1/8-inch diameter) such as "Zamac Hammer-Screw" as manufactured by Powers Rawl. **PART THREE - EXECUTION**

3.01 EXAMINATION:

- A. Examine existing building and existing roofing to determine existing physical conditions that affect removal of existing roofing and installation of new roofing.
- B. Verify that required barricades and other protective measures are in place.

3.02 PREPARATION:

- A. Take measures to maintain watertight conditions during term of Contract.
- B. Install interior protection and dust partitions where deck penetrations shall be removed or replaced.
- C. Protect adjacent surfaces.

3.03 REMOVAL OPERATIONS:

- A. Execute demolition in careful and orderly manner with least possible disturbance or damage to adjoining surfaces and structure.
- B. Avoid excessive vibrations in demolition procedures that would be transmitted through existing structure and finish materials.
- C. Roof Removal:
 1. Demolish and remove existing construction to the extent required by the project.
 2. Locate selective removal equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 3. Remove existing roofing and flashings; abandoned and obsolete equipment; pitch pans, vents, curbs, and other such items; and sheet metal down to roof rafters.
 4. Do not stockpile debris on roof surface. Promptly dispose of obsolete equipment and debris at authorized disposal site each day. Use chutes to transfer debris from roof surface to dumpsters.
 5. Provide protective method, such as plywood set on minimum 25mm (1-inch) EPS insulation, when hauling debris over existing roof.

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3.04 RENOVATION WORK:

- A. Prepare substrates in accordance with roofing manufacturer's recommendations.
- B. Wood Rafters:
 - 1. All construction shall be in accordance with the latest edition of the "timber construction manual" and latest supplements.
 - 2. Comply with PS 1 "U.S. product standard for construction and industrial plywood" for plywood panels, and policies for structural-use panels" Form no. E445.
 - 3. Contractor shall measure existing wood framing members to provide matching replacement members.
 - 4. Rough carpentry: 1500 psi minimum fiber stress structural grade lumber, double headers at all openings, metal tie strap all rafters, Simpson or equal
- C. Nailers:
 - 1. Replace damaged or deteriorated wood nailers and curbs with new nailers and curbs as required.
 - 2. Install additional nailers as required as part of Base Bid price.
 - 3. Clean and prepare existing surfaces to receive wood nailers and curbs.
 - 4. Install wood nailers and curbs continuously with 6mm (1/4-inch) gap between each section. Set level and true. Pre-drill nailers prior to attachment.
 - 5. Securely fasten to structure with appropriate fasteners to resist minimum 780N per 300mm (175 pounds per linear foot) force in any direction. Use of powderactuated fasteners is prohibited. Place a fastener within 75mm (3-inches) of each end of each section of wood blocking.
 - 6. Secure nailers to wood substrate using nails 600mm (24-inches) on-center, staggered. Install nails on an angle.
 - 7. If attaching wood nailer to vertical masonry wall, utilize appropriate anchors spaced 300mm (12-inches) on-center.
 - 8. Reduce fastener spacing 50 percent at a distance of 3m (10 feet) from each corner.
- D. Plumbing Vents:
 - 1. Extend plumbing vents or modify as necessary to accommodate new roof installation.
 - 2. Provide pipe extensions and couplings where necessary to achieve minimum 200mm eight above top of newly finished roof surface.
 - 3. Utilize same material type and size as existing for new extension.

3.05 CLEANING:

- A. Materials, equipment, and debris resulting from demolition operations shall become property of Contractor. Remove and dispose of demolition debris in accordance with applicable city, state, and federal laws at authorized disposal site. B. Leave substrate clean and dry, ready to receive roofing system.

END OF SECTION

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SECTION 07410: METAL ROOF PANELS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Provide labor, materials, tools, and equipment for installation of metal roofing panels, associated trim, and flashings.
- B. Related components, transitions, and accessories.

1.02 RELATED SECTIONS:

- A. 06120 - Roofing Rough Carpentry
- B. 07620 - Sheet Metal Flashing and Trim.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. Federal Specifications (FS).
- C. Underwriters Laboratories (UL).
- D. Sheet Metal and Air Conditioning: Contractor's National Association, Inc. (SMACNA) Architectural Sheet Metal Manual.
- E. National Roofing Contractor's Association: NRCA Roofing and Waterproofing Manual.
- F. Metal Building Manufacturer's Association (MBMA).

1.04 SUBMITTALS:

- A. Shop Drawings:
 - 1. Submit complete shop drawings and details for review.
 - 2. Shop drawings show methods of installation and plans of roof panels, sections and details, flashings, roof curbs, vents, interfaces with materials, and proposed identification of component parts and their finishes.
- B. Samples: Submit samples for proposed material. Submit one 300 mm (12-inch) long sample of proposed material.

1.05 QUALITY ASSURANCE:

- A. Applicator:
 - 1. Approved by manufacturer of accepted roof system.
 - 2. A single applicator with a minimum of five years previous successful experience in installations of similar systems.
- B. Regulatory Requirements:
 - 1. System shall be classified by Underwriter's Laboratories, Inc. as a Class A roof covering.
 - 2. Follow local, state, and federal requirements, safety standards, and codes.
- C. Refer to applicable building codes for roofing system load design requirements. When a conflict exists, the more restrictive document will govern.
- D. Installation:
 - 1. Install in accordance with manufacturer's current published application procedures and the general recommendations of the American Metal Roofing Association. Follow Underwriter's Laboratories requirements acceptable for use with specified products or systems.
 - 2. All roofing shall be as described in this Section and shall be provided and/or approved by the roof system manufacturer. Any materials not manufactured or provided by manufacturer shall have written approval from the manufacturer stating that the materials are acceptable and are compatible with the other materials and systems required.

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- E. Perform entire work of this Section in accordance with the best standards of practice relating to trades involved.

- F. Field Measurements: Where possible, prior to fabrication of prefabricated panels, take field measurements of structural or substrate to receive panel system. Allow for trimming panel units where final dimensions cannot be established prior to fabrication.
- G. Single-Source: Utilize coil/sheet produced by one manufacturer. Provide roof panels, flashing, and gutter profiles fabricated from material of a single manufacturer. Provide secondary materials which are acceptable to the manufacturer and panel fabricator.
- H. Mock-Up: Contractor to provide mock-up for roof panel installation. Incorporate materials and methods of fabrication and installation identical with project requirements. Install mockup at roof area location directed by Architect. Retain accepted mock-ups as quality standard for acceptance of completed metal roofing. As appropriate, mock-up may be incorporated as part of final metal roofing work.

1.06 APPLICABLE STANDARDS:

- A. UL580, "Tests for Uplift Resistance of Roof Assemblies;" Class 90.
- B. ASTM E 1680, "Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel System".
- C. ASTM E 1646, "Standard Test Method for Water Penetration Through Exterior Metal Roof Panel Systems"; no uncontrolled water infiltration..

1.07 PROJECT CONDITIONS: A.

Protection:

- 1. Provide protection or limit traffic on the existing roof.
- 2. Provide protection of finish on metal panels during storage, installation, and construction.
- B. Store and handle in strict compliance with manufacturer's instructions and recommendations.
 - 1. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight ventilated covering. Slope cover to shed moisture. Allow for free air flow around covered material to exchange outside air.
 - 2. Require all personnel to wear clean white cotton gloves when handling and installing panels and accessories when no strippable film is present.
 - 3. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.
 - 4. Store all panels and flashings so that they will not accumulate water.

1.08 WARRANTY:

- A. Upon final acceptance for project, metal panel manufacturer to furnish a warranty covering bare metal against rupture, structural failure, and perforation due to normal atmospheric corrosion exposure for a period of twenty years.
- B. Provide warranty covering panel finish against cracking, checking, blistering, peeling, flaking, chipping, chalking, and fading for a period of twenty years.
- C. Provide twenty year no-dollar-limit manufacturer's weathertightness warranty that the manufactured roof panels, flashing, and related items used to attach the roof panels and flashing to the roof structure will not allow water infiltration through the metal roof system into the building envelope.

PART TWO - PRODUCTS

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2.01 METAL PANEL MANUFACTURERS:

- A. Design based on Klip-lok 700 or approved equivalent.

2.02 PRIMARY MATERIALS: A.

Steel Underlayment:

1. Sisalation Reflective Foil Underlayment by Fletcher Insulation. Or approved equivalent. B.

Roof Panels:

1. Panel Style: Klip-Lok 700 Hi-Strength
 2. Panel Profile: Nominal 43 mm (2-inch) high standing seam by 700 mm (28-inch) width.
 3. Steel Grade: G550
 4. Texture: Colorbond Metallic Steel C. Fasteners:
 1. Exposed fasteners shall be self-tapping stainless steel screws with steel backed neoprene washers and pre-finished heads, color to match panel.
 2. Clip-to-Wood Substrate: Wood screw suitable for penetrating through substrate minimum 19 mm (3/4-inch), as approved by manufacturer. D. Accessories:
 1. Accessories (e.g. ventilators, skylights, gutter, fascia) shall be as standard with the system manufacturer.
 2. Material used in flashing and transition parts and furnished as standard by manufacturer may or may not match the roof panel material. Parts shall be compatible and shall not cause a corrosive condition. Do not use copper and/or lead materials with coated panels.
 3. Perpendicular and Parallel Wall Flashings: Fabricate flashing from material matching existing.
 4. Tape Sealants: 25 mm (1-inch) wide pressure sensitive, 100 percent solid, butyl sealing tape with a release paper backing.
- E. Required Performances: Fabricate panels and other components of roof system for the following installed-as-indicated performances:
1. Roof Loading: 1,916 N/m² (40 pounds per square foot) inward; 719 N/m² (15 pounds per square foot) outward.
 2. Water Penetration: No significant, uncontrolled leakage at 192 N/m² (4 pounds per square foot) pressure with spray test.
 3. Air Infiltration: 0.02 cfm per square foot for gross roof areas, with 192 N/m² (4 pounds per square foot) differential pressure.

2.03 FABRICATION:

- A. Roll form panels in continuous lengths, full length of detailed runs from ridge to eave.
- B. Provide continuous maximum panel length to suit project conditions to eliminate or minimize panel end lap splices.
- C. Fabricate trim, flashing, and accessories to detailed profiles.
- D. Fabricate trim and flashing from same material as roof panel. **PART THREE - EXECUTION**

3.01 GENERAL:

- A. Perform entire work of this Section in accordance with the best standards of practice relating to trades involved.
- B. Follow local, state, and federal regulations, safety standards, and codes. When a conflict exists, the more restrictive document shall govern.
- C. Comply with roof panel fabricator's and material manufacturer's instructions and recommendations for installation as applicable to project conditions and supporting substrates. Anchor panels and other components of the work securely in place, with provisions for thermal/structural movement.

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- D. Fabricate sheet metal roofing panels to allow for expansion in running work sufficient to prevent leakage, damage, and deterioration of the Work. Form exposed sheet metal work to

fit substrates without excessive oil canning, buckling, and tool marks, true to line and levels indicated, and with exposed edges folded back to form hems.

1. Form and fabricate sheets, seams, strips, cleats, edge treatments, integral flashing, and other components of metal roofing to profiles, patterns, and drainage arrangements shown and as required to resist Water Infiltration without excessive use of sealants (dry joints) while also allowing any water infiltration behind the roof panels to weep out.
- E. Install work to be truly straight and square or conform to curvilinear geometry indicated on drawings.
1. Fabricate and install work with lines and corners of exposed units true and accurate.
 2. Form exposed faces free of buckles, excessive waves, and avoidable tool marks considering temper and reflectivity of metal.
 3. Shim and align panel units within installed tolerance of 6 mm (1/4-inch) in 6 m (20 feet).
 4. All seams shall be of uniform appearance and dimensions, straight and level with minimum exposure of solder and sealant.
 5. Except as otherwise shown, fold back sheet metal to form a hem on concealed side of exposed edges.
 6. Form all seams to be weatherproof, leaving room for expansion and contraction with specified and required tolerances.
 7. Comply with manufacturer's installation instructions and SMACNA Architectural Sheet Metal Manual for flashings and sheet metal work.
- F. Conceal fasteners and expansion provision where possible in exposed work, and locate so as to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- G. To avoid material tearing, provide cuts with rounded notching tool or cut to pre-drilled hole. Only use smooth edge (non-serrated) shears and snips for cutting.
- H. Provide indirect attachment of exposed with concealed "keeper" whenever possible. Avoid exposed and direct fastening especially at lap locations to allow movement.

3.02 INSTALLATION:

A. Reflective Roof Underlayment: Lay foil facing perpendicular to the roof slope and lap edges 150mm, fasten with top edge underneath laps. B. Roof Panels:

1. Clip Installation:
 - a. Secure clip into deck substrate using appropriate fastener; two per clip.
 - b. Space clips in accordance with manufacturer's requirements to achieve specified wind uplift resistance.
2. Panel Installation:
 - a. Attach panels to clips and install panels so they are weathertight, without waves, warps, buckles, fastening stresses, or distortion. Allow for expansion and contraction of materials.
 - b. Install panels plumb, in plane, and straight with joints parallel to one another and the building line. Panel plane shall be true to 6 mm (1/4-inch) in 6 m (20 feet), shim substrate surface as required.
 - c. Mechanically secure panels at designated anchorage points as required by manufacturer.
 - d. Apply continuous double-bead of sealant between panel laps.
3. Flashings:

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- a. Provide pre-fabricated sheet metal flashings and components at ridges, eaves, rake edges, head/side walls, and roof curbs.
- b. Secure flashings to panels utilizing concealed clips, Z-closures, and grommetted screw fasteners.
- c. Install Z-closures in continuous bead of sealant or tape sealant and secure in place. Apply sealant between closure and standing seam and tool to provide seal.
- d. Install flashings in accordance with manufacturer's requirements to provide the weathertightness warranty.
- e. Install sheet metal base flashings at round penetrations in field of panel. Secure flange of metal base to panel with pop rivets spaced 25 mm (1-inch) on-center. Fully solder sheet metal base to metal roof panels. Apply sealant along top edge of base. Install sheet metal bonnet to penetrating element to conceal top edge of sheet metal base.

3.03 INSTALLATION TOLERANCE:

- A. Shim and align units within installed tolerance of 6 mm (1/4-inch) in 6 m (20 feet) on level/plumb/slope and location/line, and within 3 mm (1/8-inch) offset of adjoining faces and of alignment of matching profiles.

3.04 JOINT SEALERS:

- A. Install gaskets, joint fillers, and sealants where required for weatherproof performance of panel systems. Provide types of gaskets and sealants/fillers recommended by manufacturer.

3.05 EXPANSION/CONTRACTION:

- A. Roof shall provide thermal expansion/contraction without detrimental effect on the roof panel when there is a +/- 100 degree temperature difference between the inside structural framework of the building and the temperature of the roof panels, thus allowing a full 62.5 mm (2-1/2-inches) of roof movement.
- B. All end wall trim and roof transition flashing shall allow the roof panel to move relative to the wall panels as the roof expands and contracts with temperature change.

3.06 CLEANING AND PROTECTION:

- A. Remove temporary protective coverings and strippable films (if any) as each panel is installed. Upon completion of panel installation, clean finish surfaces as recommended by manufacturer. Maintain in a clean condition throughout construction.
- B. Touch up minor scratches and abrasions.
- C. Replace all damaged panels and other components of the work which have been damaged or have deteriorated beyond successful repair by means of finish, touch up, or similar minor repair procedures.

END OF SECTION 07410

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SECTION 07620: SHEET METAL FLASHING AND TRIM

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Shop or field-formed sheet metal work for moisture protection.
- B. Types of work specified in this Section include:
 - 1. Receivers and counterflashings.
 - 2. Drip edge/eave flashing.
 - 3. Flashing aprons.
 - 4. Valley flashing.
 - 5. Ridge flashing.
 - 6. Gutters and downspouts.
 - 7. Miscellaneous sheet metal accessories.

1.02 RELATED SECTIONS:

- A. 02072 - Minor Demolition and Renovation Work.
- B. 07410 - Standing Seam Metal Roof Panels.
- C. 07525 - Modified Bitumen Membrane Roofing.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. Federal Specifications (FS).
- C. National Roofing Contractor's Association (NRCA): NRCA Roofing and Waterproofing Manual.
- D. Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA): Architectural Sheet Metal Manual.

1.04 WARRANTY:

- A. Contractor's Warranty: Provide Owner a written warranty which shall warrant sheet metal work to be free of leaks and defects in materials and workmanship for two years after date of final acceptance by Owner.

PART TWO - PRODUCTS

2.01 SHEET METAL MATERIAL:

- A. Prepainted, Metallic-Coated Steel Sheet: Galvanized sheet steel (G90); prepainted by coil coating process, ASTM A 755; provide with manufacturer's strippable plastic film. Exposed finishes:
 - 1. High-Performance Organic Finish: Two-coat thermocured system containing not less than 70 percent polyvinylidene fluoride (Kynar/Hylar) resin by weight; complying with AAMA 2604. Color as selected by Owner from standard colors.

2.02 FASTENERS:

- A. Fasteners shall be same metal as flashing and sheet metal being joined.
- B. Exposed fasteners shall be self-sealing or gasketed for watertight installation.
- C. Heads of fasteners, including but not limited to, rivets, screws, and bolts, that are exposed or visible shall have same manufactured finishes as item being secured; color to match when applicable.
- D. Mechanical Fasteners:
 - 1. Refer to Section 02072 – Minor Demolition and Renovation Work.
 - 2. Washers: Steel washers with bonded rubber sealing gasket.

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3. Screws: Self-tapping sheet metal type compatible with material fastened.

4. Rivets: Stainless steel and copper material for the head and stem, closed end; type and color to match sheet metal items being adjoined.

2.03 RELATED MATERIALS:

- A. Solder: 50-50 tin/lead solder, ASTM B 32
- B. Flux: Rosin flux
- C. Soldering Bit: Hammer-shaped soldering bit weighing minimum 350 g to 500 g (0.75-pound to 1.1-pounds).
- D. Metal Accessories: Sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gauge required for performance.
- E. Sealant: Single component, non-sag elastomeric polyurethane sealant, as recommended or supplied by membrane manufacturer for use in making airtight and watertight seals such as Dynatrol I by Pecora Corp.

2.04 FABRICATION - GENERAL:

- A. Fabricate work in accordance with SMACNA Architectural Sheet Metal Manual and other recognized industry practices and reviewed shop drawings.
- B. Comply with material manufacturer's instructions and recommendations for forming material.
- C. Shop fabricate work to greatest extent possible. Fabricate inside and outside corners for metal edges, counterflashing, and coping caps. Fabricate corners with equal length legs, minimum 1.2 m (2 feet).
- D. Fabricate for waterproof and weather resistant performance with expansion provisions for running work sufficient to permanently prevent leakage, damage, or deterioration of work. Form work to fit substrates.
- E. Make angle bends and folds for interlocking metal with full regard for expansion and contraction to avoid buckling or fullness in metal after installation.
- F. Form materials with straight lines, sharp angles, smooth curves, and true levels. Avoid tool marks, buckling, and oil canning.
- G. Fold back edges on concealed side of exposed edge to form hem.
- H. Lap joints 25 mm (1-inch) minimum. Rivet and solder joints on parts that are to be permanently and rigidly assembled. Install rivets, spaced 25 mm (1-inch) on-center and apply solder to secure and seal exposed edge of sheet metal in a uniform continuous bead with smooth top finish. Clean residue upon completion of soldering process. Fabricate sheet metal assemblies so that adjoining sections are nested to achieve continuous metal-to-metal contact.
- I. Seams: Fabricate non-moving seams in sheet metal with flat-lock and soldered seams. Tin edges to be seamed, form seams, and solder. Refer to Section 07410 for soldering procedures.
- J. Expansion Provisions: Where lapped or bayonet type expansion provisions in work cannot be used or would not be sufficiently waterproof or weatherproof, form expansion joints of intermeshing hooked flanges, not less than 25 mm (1-inch) deep, filled with mastic sealant concealed within joints.
- K. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant in compliance with SMACNA standards.

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2.05 FABRICATED ITEMS:

- A. Receivers and Counter flashings: Minimum 24 gauge formed in maximum 3 m (10 foot) lengths; fabricate "S"-shaped receiver to engage counterflashing a minimum of 25 mm (1-inch); fabricate counterflashing with broken fascia of length to extend over top edge of base flashing a minimum of 100 mm (4-inches) with 13 mm (1/2-inch) hemmed drip edge.
- B. Drip Edge/Clip: Minimum 24 gauge formed in maximum 3 m (10 foot) lengths, with 100 mm (4-inch) horizontal flange and 100 mm (4-inch) fascia with 13 mm (1-2-inch) hemmed kick-out.
- C. Cleats/Clips: 24 gauge, continuous strips, same fascia profile as adjacent metal item.
- D. Apron Flashing: 24 gauge sheet metal.
- E. Crickets: 24 gauge sheet metal.
- F. Valley Cleat: 24 gauge sheet metal, 50 mm (2-inch) wide, length to engage a minimum of 25 mm (1-inch).
- G. Valley Metal Flashing: 24 gauge sheet metal, 550 mm (22-inches) wide with one 25 mm (1-inch) high water diverter rib at centerline and 25 mm (1-inch) wide returns at sides for cleat attachment.
- H. Gutters & Downspouts: .8 mm thick aluminum sheet metal with 25 mm (1-inch) wide double hemmed spacer. **PART THREE - EXECUTION**

3.01 EXAMINATION:

- A. Verify that substrates are smooth and clean to extent needed for sheet metal work.
- B. Verify that reglets, nails, cants, and blocking to receive sheet metal are installed and free of concrete and soil.
- C. Do not start sheet metal work until conditions are satisfactory.

3.02 INSTALLATION:

- A. Install sheet metal with lines, arises, and angles sharp and true, and plane surfaces free from objectionable wave, warp, or buckle. Exposed edges of sheet metal shall be folded back to form 6 mm (1/4-inch) hem on concealed side from view. Finished work shall be free from water retention and leakage under all weather conditions. Install prefabricated corners or transitions at changes in direction, elevation or plane, and at intersections. Locate field joints not less than 300 mm (12-inches), nor more than 1 m (3 feet) from actual corner. Laps for all metals shall be 25 mm (1-inch) wide, fastened with rivets spaced 25 mm (1-inch) on-center and soldered.
- B. Anchor units of work securely in place to prevent damage or distortion from wind or buckling. Provide for thermal expansion of metal units; conceal fasteners where possible; and set units true to line and level as indicated. Install work with laps, joints, and seams permanently watertight and weatherproof.
- C. Install fabricated sheet metal items in accordance with manufacturer's installation instructions and recommendations and with SMACNA Architectural Sheet Metal Manual.
- D. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by installing self-adhering underlayment sheet or other permanent separation at locations of contact as recommended by manufacturer or fabricator. Do not use materials incompatible with roofing system.
- E. Continuous Cleat/Clips: Attach continuous cleats/clips at 150 mm (6-inches) on-center with appropriate fasteners positioned on the vertical face. At a distance of 3 m (10 feet) from each direction of corner, install fasteners 75 mm (3-inches) on-center. Install cleat so fascia extends a minimum of 25 mm (1-inch) below top of exterior wall finish. F. Counterflashings:

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2. Install sheet metal clips and closures on tops of panel ends.
 3. Apply sealant along perimeter of closure intersecting metal roof panel and panel seams. Apply continuous tape sealant along top edge of closures.
 4. Install ridge cap engaging hemmed returns onto closures and secure with grommetted fasteners spaced 300 mm (12-inches) on-center.
 5. Overlap adjacent sections of ridge cap a minimum of 150 mm (6-inches), sandwich tape sealant in lap, and secure lap with grommetted screws spaced 75 mm (3-inches) on-center.
- 3.03 CLEANING:**
- A. Remove flux and residual acid immediately by neutralizing with baking soda and washing with clean water. Leave work clean and free of stains, scrap, and debris.
 - B. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration/damage of finishes. Replace sheet metal items when damaged finish can not be repaired to an acceptable condition.
 - C. Prime soldered area of phosphatized metal after cleaning to prevent rusting.

END OF SECTION 07620

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SECTION 09920 - EXTERIOR PAINTING

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Work includes surface preparation and painting of exterior metals, food fascia, soffit and masonry installed or modified as part of the roof replacement.

1.02 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical information, including paint label analysis and application instructions for each material proposed for use.
- B. Samples:
 - 1. Use representative colors when preparing samples for review.
 - 2. Submit samples for review of color and texture only.
 - 3. Provide listing of material and application for each coat of each finish sample.
 - 4. On 300 mm by 300 mm (12-inch by 12-inch) hardboard, provide two samples of each color and material, with texture to simulate actual conditions. Resubmit samples as requested by Project Inspector until acceptable sheen, color, and texture are achieved.
 - 5. On actual wall surfaces and other exterior building components, duplicate painted finishes of prepared samples. Provide full-coat finish samples on surface, as directed, until required sheen, color, and texture are obtained. Simulate finished lighting conditions for review of in-place work.
- C. Final acceptance of colors will be from samples applied on job.

1.03 QUALITY ASSURANCE:

- A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer and use only within recommended limits.

PART TWO - PRODUCTS

2.01 MANUFACTURERS:

- A. Acceptable Manufacturers:
 - 1. Rust-Oleum Industrial.
 - 2. Benjamin Moore and Co.
 - 3. PPG Industries, Pittsburgh Paints.
 - 4. AkzoNobel.

2.02 MATERIALS:

- A. Material Quality: Provide best quality grade of various types of coatings as regularly
- B. manufactured by acceptable paint materials manufacturers. Materials not displaying C. manufacturer's identification as a standard, best-grade product will not be acceptable.
- D. Proprietary names used to designate colors or materials are not intended to imply that
- E. products of named manufacturers are required to exclusion of equivalent products of
- F. other manufacturers.
- G. Federal Specifications establish minimum acceptable quality for paint materials. Provide
- H. written certification from paint manufacturer that materials provided meet or exceed
- I. these minimums.

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- J. Manufacturer's products which comply with coating qualitative requirements of
- K. applicable Federal Specifications, yet differ in quantitative requirements, may be
- L. considered for use when acceptable to Owner. Furnish material data and

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- M. manufacturer's certificate of performance to Owner for any proposed substitutions.
 - N. Color Pigments:
 - a. Pure, non-fading, applicable types to suit substrates and service indicated.
 - b. Lead content in pigment, if any, is limited to contain not more than 0.06 percent lead, as lead metal based on total non-volatile (dry-film) of paint by weight.
 - O. lead, as lead metal based on total non-volatile (dry-film) of paint by weight.
- 2.02 **MIXING:**
- A. Mix and prepare painting materials in accordance with manufacturer's directions.
 - B. Maintain containers used in mixing and application of paint in clean condition, free of foreign materials and residue.
 - C. Stir materials before application to produce mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

PART THREE - EXECUTION

3.01 EXAMINATION:

- A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 SURFACE PREPARATION:

- A. Seal joints, openings, and laps in existing sheet metal fabrications to watertight condition prior to painting.
- B. Remove hardware, hardware accessories, machined surfaces, plates, lighting protection, and similar items in place and not to be finish-painted.
- C. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Patch cracks.
- D. Ferrous Metals: Clean ferrous surfaces that are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
- F. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

3.04 APPLICATION:

- A. Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
- B. Provide finish coats which are compatible with prime paints used.
- C. Apply additional coats when undercoats, stains, or other conditions show through final coat of paint, until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
- D. Prime Coats:

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1. Apply prime coat of material which is required to be painted or finished and which has not been prime coated by others.
2. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat to ensure finish coat with no burn-through or other defects due to insufficient sealing.

3.05 PROTECTION:

- A. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

END OF SECTION

EXTERIOR PAINTING

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SECTION 17000 - TEMPORARY ELECTROMECHANICAL DISCONNECTS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Temporarily disconnect all rooftop electrical equipment or circuits including fans, rooftop circuits, light fixtures, and HVAC units as needed, but excluding wiring and cabling for communications equipment.
- B. Pre-testing of mechanical units, temporary raising, and disconnects of mechanical units including disconnects, reinstallation of units as shown on the drawings, and re-testing and correction of deficiencies caused by the Work.
- C. Contractor shall install new non-penetrating pipe and cable supports and cable trays.
- D. No piece of communication equipment shall be moved or disconnected without prior written authorization. Communications equipment shall be disconnected, moved out of the way of construction activities, and reinstalled by Contractor.
- E. Contractor shall coordinate work to ensure a minimum disruption to the Communications equipment.

1.02 QUALITY ASSURANCE:

- A. The Contractor shall employ mechanics proficient and licensed in the trades involved.
- B. The Contractor shall disconnect equipment only as scheduled in the approved construction schedule and when performing roofing work in the immediate area of the equipment.
- C. Each unit shall be fully operational immediately after reinstallation. Shut-down time for each unit shall be limited to a four hour period unless otherwise agreed in writing.
- D. Prior to commencing any disconnections, the Contractor shall be given forty-eight hours notice.

1.03 TESTING:

- A. Prior to commencing roofing work, the Contractor shall test all equipment.
- B. All deficiencies in operation including unusual noises will be noted in writing and shall become a matter of records.
- C. Upon completion of the reinstallation of each unit, it shall be retested by the Contractor
- D. Any deficiencies which were not noted in the initial testing shall be corrected by the Contractor at his expense.

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2.01 MATERIALS:

- A. Any replacement parts or additional materials needed due to changes in curb or sleeper heights shall be as recommended by the manufacturers of the mechanical unit or as required by governing codes, and shall match the existing materials as to type, size, thickness, and quality.

PART THREE - EXECUTION

3.01 DISCONNECTION:

- A. Circuits shall be placed under a controlled tagging and log procedure. Prior to disconnection, all sources of power to the panel or equipment shall be verified. Deenergized power circuits shall be tagged out.

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- B. Prior to removing equipment or panels, conductors, cables, conductors and terminals terminating in the equipment shall be uniquely identified. This information shall be recorded on a terminal connection schedule prepared for each piece of equipment.
- C. Disconnected cable ends and conductors shall be protected from moisture and rain.
- D. After disconnection, move equipment and materials a sufficient distance to permit the installation of roofing and flashing materials.

3.01 RE-INSTALLATION:

- A. After disconnection, move units sufficient distance to permit the installation of the new supports or curbs, where indicated on drawings, and new roofing and flashing materials.
- B. Provide plywood traffic ways for moving units, including under equipment used for moving units, for its full route of movement.
- C. Under no circumstances shall any equipment be stored on completed sections of the new roof or any adjoining roofs not included in this contract.
- D. After installation of equipment support (if required), the unit shall be reset on the support. Reconnecting of pipe, conduit, wiring, and reactivation of the unit to its original condition shall be provided by Contractor. All conduit modifications, extension of ductwork, etc., shall be provided by Contractor at no additional cost to Owner.
- E. Units shall be installed level, plumb, and free of vibration and in accordance with unit manufacturer's original installation practices.

3.03 ACCEPTANCE

- A. Prior to declaring equipment "in service", the equipment and controls shall be tested for proper operation. This shall require the equipment to be exercised through three complete cycles. Any deficiencies occurring during this test shall be corrected and the equipment re-tested until it operates successfully through three complete cycles. Following this test, the equipment shall be declared operational and "in service".

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END OF SECTION