

SECTION 07 3113
ASPHALT SHINGLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Asphalt shingle roofing.
- B. Flexible sheet membranes for eave protection, underlayment, and valley protection.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Roof sheathing.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Edge flashings.

1.03 REFERENCE STANDARDS

- A. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2009.
- C. ASTM D 3161 - Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method); 2009.
- D. ASTM D 3462 - Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules; 2009a.
- E. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007.
- F. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings; 2010a.

1.04 SUBMITTALS

- A. Product Data: Provide data indicating material characteristics for each type of product indicated.
- B. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern; for color selection.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Maintenance Data: For each type of asphalt shingle to include in maintenance manuals.
- E. Warranties: Sample of special warranties.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in installing the products specified in this section with minimum five years documented experience.
- B. Source Limitations: Obtain ridge and hip cap shingles from shingle manufacturer. Obtain underlayment and self-adhering sheet underlayment from shingle manufacturer or approved equal.
- C. Exterior Fire-Test Exposure: Class A; ASTM E 108 or UL 790, for application and roof slopes indicated.
- D. Primary Roofing Materials Manufacturer Requirements
 - 1. Manufacture SBS Modified Shingles for a minimum ten (10) years
 - 2. Manufacturer shall be an associate member in good standing of either the National Roofing Contractor's Association (NRCA), Western States Roofing Contractors Association (WSRCA) or the Midwest Roofing Contractors Association (MRCA).
- E. Final Inspection: Following the completion of the work, a Final Inspection shall be scheduled by Owner's Representative. Any uncompleted work shall be noted on a Punch List. Final Payment made after Punch List completed.

1.06 FIELD CONDITIONS

- A. Do not install shingles or eave protection membrane when surface temperatures are below 45 degrees F (7 degrees C).

- B. Do not install shingles or eave protection membrane when surface temperatures are below manufacturer's installation temperature recommendations.
- C. Application of roofing materials shall not be performed when weather conditions interfere with good roofing practices.

1.07 PRE-CONSTRUCTION MEETINGS

- A. Prior to the start of the roofing project, the Owner will hold a job-site meeting and roof tour to review the work scope of work.
- B. Authorized representatives of the Owner, the Roofing Contractor (Project Superintendent), and other Subcontractors whose work complements, penetrates, or is mounted on the roof or will use the roof as a work platform, will be in attendance.
- C. The agenda for the meeting shall include:
 - 1. A review of the submittals.
 - 2. Distribution of approved submittals.
 - 3. A walkover inspection of the roof.
 - 4. Establishment of a schedule for the work.
 - 5. Selection of staging and storage locations.

1.08 WARRANTY

- A. SBS shingles subjected to terms and conditions of the standard Manufacturer's 50 Year Limited warranty. The 50 Year SBS Modified Laminated Shingle Warranty includes limited term resistance to wind up to 130 MPH. Wind warranty coverage is subject to the shingles being sealed.
- B. Coverage for wind damage as part of standard shingle warranty is dependent upon the tabs sealing either by the sealant strip activating or by hand sealing.
- C. Upon project completion and acceptance by Owner, the Roofing Contractor will promptly provide executed copies of the specified warranties.
- D. Furnish a list containing the names and contact telephone numbers of the Roofing Contractor's Service Manager, Superintendent, and Project Manager and the Roofing Contractor's current mailing address.

PART 2 PRODUCTS

2.01 SHINGLES

- A. Manufacturers:
 - 1. Malarky ; Product Legacy .
 - 2. Substitutions: None.
- B. Asphalt Shingles: Asphalt-coated glass felt, mineral granule surfaced, complying with ASTM D 3462; Class A fire resistance.
 - 1. Wind Resistance: 150 MPH, when tested in accordance with ASTM D 7158.
 - 2. Impact Resistance UL 2218, Class 4
 - 3. Granule Adhesion UL Max. .5 gram loss
 - 4. Algae Resistant.
 - 5. Weight: 275 lb/100 sq ft
 - 6. Color: As selected from manufacturer's standard colors.

2.02 SHEET MATERIALS

- A. Underlayment: Self-adhering fiberglass mat with SBS modified bitumen top coat complying with ASTM D 1970; 70 mil total thickness; with strippable treated release paper and polyethylene top surface.
 - 1. Manufacturers:
 - a. Asphalt Shingle Manufacturer.

- B. Flexible Flashing: Self-adhering polymer-modified asphalt sheet complying with ASTM D 1970; 40 mil (1 mm) total thickness; with strippable treated release paper and polyethylene sheet top surface.
 - 1. Manufacturers:
 - a. WR Grace ; Product Bituthene Ice/Water Shield.

2.03 ACCESSORIES

- A. Nails: Standard ring shank shingle type, hot-dipped zinc coated steel, 12 gage, 0.105 inch (2.67 mm) shank diameter, 3/8 inch (9.5 mm) minimum head diameter, of sufficient length to penetrate through roof sheathing or 3/4 inch (19 mm) into roof sheathing or decking.
- B. SBS Modified, 20 yr. Algae Resistant Hip and Ridge Strips
- C. Plastic Cement: ASTM D 4586, asphalt roof cement.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE, AND HANDLING

- A. New and dry roof materials delivered to the job site in containers unopened and undamaged. Manufacturer's products stamped with labels, names and run codes of manufacture and testing laboratory(s).
- B. Store underlayment materials on ends only. Discard rolls which may have been flattened, creased, or otherwise damaged. Place materials on pallets or wood sleepers. Do not stack palletized materials.
- C. Cover underlayment rolls with weatherproof materials secured to prevent materials from becoming exposed to moisture. Use breathable tarps.
- D. Disperse materials stored on the roof surface to avoid concentrated loading. Set larger concentrations over structural members.

3.02 EXAMINATION

- A. Verify existing conditions prior to beginning work.
- B. Verify that deck is of sufficient thickness to accept fasteners.
- C. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.
- D. Verify roof openings are correctly framed.
- E. Verify deck surfaces are dry, free of ridges, warps, or voids.

3.03 PREPARATION

- A. Seal roof deck joints wider than 1/16 inch (1.5 mm) with deck tape.
- B. At areas where eave protection membrane is to be adhered to substrate, fill knot holes and surface cracks with latex filler.
- C. Broom clean deck surfaces before installing underlayment or eave protection.

3.04 INSTALLATION - EAVE PROTECTION MEMBRANE

- A. Install eave protection membrane in accordance with manufacturer's instructions.

3.05 INSTALLATION - UNDERLAYMENT

- A. Items projecting through or mounted on roof: Weather lap and seal watertight with plastic cement.

3.06 INSTALLATION - VALLEY PROTECTION

- A. At Exposed Valleys: Install one layer of sheet metal flashing, minimum 24 inches (600 mm) wide, centered over open valley and crimped to guide water. Weather lap joints minimum 2 inch (50 mm) wide band of lap cement along each edge of first, press roll roofing into cement, and nail in place minimum 18 inches (450 mm) on center, 1 inch (25 mm) from edges.

3.07 INSTALLATION - METAL FLASHING AND ACCESSORIES

- A. Install flashings in accordance with NRCA requirements.

- B. Weather lap joints minimum 2 inches (50 mm) and seal weather tight with plastic cement.
- C. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight with plastic cement.
 - 1. Pipe Flashing: Apply a cant of roofing cement around the pipe, sealing it to the underlayment prior to installing the metal pipe flashing. Install and secure the metal jack so that the bottom flange laps over onto the shingles. Side and top flanges shall have shingles lapping onto the flange. Shingles that lap onto metal shall be laid into a bed of roof cement. A bead of urethane sealant shall be applied where the pipe penetrates the cone of the jack.
 - 2. Metal edging: Minimum 24 gauge rigid, pre-finished metal with no rise. Install the edging onto the underlayment along the rake edges and below the underlayment along the eave edges, secured by galvanized roofing nails four (4) inches O/C. (Metal edge with a 1/2 inch the underlayment overhanging drip built into the face is acceptable)

3.08 INSTALLATION - SHINGLES

- A. Install shingles in accordance with manufacturer's instructions.
 - 1. NAILING PATTERN: Use six (6) fasteners for each shingle. Nails must be placed with in the nailing zone, 1 inch in from each edge of the shingle, with the remaining four (4) nails fastened near the cut outs on the same line as the end nails. When fastening, butt shingle ends loosely to prevent buckling. Fasteners must not be overdriven to cut into the shingle or under driven. Fasteners must be seated flush to shingle as illustrated on shingle wrapper. Install nails perpendicular to the roof slope.
 - 2. All shingles will be installed by hand nailing unless agreed to in writing by the architect prior to the start of any roofing work. If pneumatic fastening is permitted each nail gun shall have an independently regulated air source.
- B. Place shingles in straight coursing pattern with 5 inch (125 mm) weather exposure to produce double thickness over full roof area. Provide double course of shingles at eaves.
- C. Project first course of shingles 3/4 inch (19 mm) beyond fascia boards.
- D. Extend shingles 1/2 inch (13 mm) beyond face of gable edge fascia boards. Trim off any material overhang in excess of 1/2".
- E. Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counterflashings.
- F. Complete installation to provide weather tight service.

3.09 PROTECTION

- A. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, and sheet metal roofing.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood nailers.
- B. Section 06 1000 - Rough Carpentry: Wood blocking for batten seams.
- C. Section 07 3113 - Asphalt Shingles: Flashings associated with shingle roofing.

1.03 REFERENCE STANDARDS

- A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2009a.
- B. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.
- C. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2006.
- D. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007.
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.06 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identification of material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 - 4. Details of connections to adjoining work.
 - 5. Detail formed flashing and trim at a scale of not less than 1-1/2 inches per 12 inches.

- D. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection in the form of manufacturer's color charts.
- E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Sheet Metal Flashing: 6 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
 - 2. Trim, Metal Closures, Joint Intersections, and Miscellaneous Fabrications: 6 inches long and in required profile. Include fasteners and other exposed accessories.
- F. Qualification Data: For qualified fabricator.
- G. Warranty: Sample of special warranty.

1.07 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.
- B. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1.
 - 1. Meet with Owner, Architect, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, and roof-mounted equipment.
 - 2. Review methods and procedures related to sheet metal flashing and trim.
 - 3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 - 4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry. Slope metal sheets to ensure drainage.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.09 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum .028 inch (____ mm) thick base metal.

- C. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; structural quality.
 - 2. Surface: Smooth, flat.
 - 3. Exposed Coil-Coated Finish: Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
 - 4. Color: As selected by the Architect from the manufacturer's full range. 24 color minimum.

2.02 ACCESSORIES

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. Exposed Fasteners: Stainless Steel, with soft neoprene washers. Heads matching color of sheet metal using plastic caps or factory-applied coating.
 - 2. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
- C. Underlayment: ASTM D 226, organic roofing felt, Type II ("No. 30").
- D. Slip Sheet: Rosin sized building paper.
- E. Primer: Zinc chromate type.
- F. Protective Backing Paint: Zinc molybdate alkyd.
- G. Sealants: Types as specified in Section 07 9005.
- H. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- I. Plastic Cement: ASTM D 4586, Type I.

2.03 FABRICATION

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.
- G. Form pieces in longest possible lengths.
- H. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- I. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- J. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.
- K. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- L. Do not use graphite pencils to mark metal surfaces.

2.04 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Exposed Fabrications: fabricate from the following materials:
 1. Prepainted Aluminum-Zinc Alloy-Coated Steel: Base metal 0.028 inch thick unless otherwise noted.
- B. Concealed Fabrications: Fabricate from the following materials:
 1. Aluminum-Zinc Alloy-Coated Steel: Base metal 0.0367 inch thick unless otherwise noted.
- C. Ridge Vent (Slope to Slope): Factory formed, metal ridge vent system. 22-ga. pre-finished galvanized steel snap-on cover and end caps. 20-ga. galvanized support brackets with .050" expanded metal support/insect screen. System to have pre-drilled slotted fastening holes and pre-fabricated miters. "Hi-Perf Ridge Vent System, Slope to Slope Shingled Version" by Metal-Era, Inc., Waukesah, WI or approved equal.
- D. Ridge Vent (Slope to Wall): Factory formed, metal ridge vent system. 22-ga. pre-finished galvanized steel snap-on cover and end caps. 20-ga. galvanized support brackets with .050" expanded metal support/insect screen. System to have pre-drilled slotted fastening holes and pre-fabricated miters. "Hi-Perf Ridge Vent System, Slope to High Wall Version" by Metal-Era, Inc., Waukesah, WI or approved equal.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.
- C. Verify compliance with requirements for installation tolerances of substrates.
- D. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- E. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
- F. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

3.03 INSTALLATION

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 - 5. Install sealant tape where indicated.
 - 6. Torch cutting of sheet metal flashing and trim is not permitted.
 - 7. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
 - 1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
- C. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 3/4 inch for wood screws metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- D. Seal joints as shown and as required for watertight construction.
 - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 - 2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- E. Rivets: Rivet joints in uncoated aluminum where indicated and where necessary for strength.
- F. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- G. Apply plastic cement compound between metal flashings and felt flashings.
- H. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

3.04 MISCELLANEOUS FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, roof edge manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

3.05 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

- B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.06 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION