

2 ½" SSR Metal Roofing Specification

PART 1: GENERAL

1.01 SUMMARY

- A. Section includes: all material, labor, and equipment to complete installation of 2½" SSR roofing as shown on the drawings and herein specified. Include all copings, gutters, and flashings contiguous with the panels.
- B. Related Sections
 - 1. Metal decking
 - 2. Rough carpentry, plywood, and underlayment
 - 3. Insulation
 - 4. Membrane roofing
 - 5. Flashing and sheet metal
 - 6. Joint sealers: sealants and caulk
 - 7. Structural framing.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM A 653: Steel Sheet, Zinc-Coated by the Hot Dip Process.
 - 2. ASTM A 792: Steel Sheet, Aluminum-Zinc Alloy Coated by the Hot Dip Process.
 - 3. ASTM B 209: Aluminum and Aluminum Alloy Sheet and Plate.
- B. Underwriters Laboratories
 - 1. UL580 wind uplift test (Class 90).
- C. Sheet Metal and Air Condition Contractors National Association, Inc. (SMACNA)
 - 1. SMACNA Architectural Sheet Metal Manual, 1993 Edition.
- D. American Iron and Steel Institute (AISI)
 - 1. AISI Cold Formed Steel Design Manual
- E. Aluminum Association
 - 1. Aluminum Design Manual
- F. Metal Construction Association (MCA)
 - 1. Preformed Metal Wall Guidelines
- G. Code references
 - 1. ASCE, Minimum Loads for Buildings and Other Structures
 - 2. BOCA National Building Code
 - 3. UBC Uniform Building Code
 - 4. SBC Standard Building Code

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide factory formed, prefinished, snap-together, concealed clip, structural standing seam metal roof system, that has been pretested and certified by manufacturer to comply with specified requirements under installed conditions.
 - 1. The metal roofing system including required trim members shall meet the

specified requirements for snow loads, wind loads, air infiltration, and water penetration.

2. The panels shall have a 2½" high finished joint, 18" o.c. including a factory-caulked, snap-on cap. Mechanical crimping or sealing of the standing seam joint or cap is prohibited.
 3. The anchorage system shall be concealed. The panels' clips shall permit the panel unlimited thermal movement.
 4. Roof panels shall be a maximum possible length to minimize endlaps but shall be limited to 45'.
 5. Exposed fasteners are not permitted except at eaves, gables, valleys, and roof panel endlaps.
 6. The 2½" SSR panel system shall carry a UL Wind Uplift Class 90 rating to insure structural integrity and possible reduction in insurance rates.
 7. The 2½" SSR panels shall have no air infiltration when tested in accordance with ASTM E 1680 with an air pressure difference of 6.24 psf and 0.02 cfm/ft.² of leakage at 12.0 or 20.0 psf.
 8. The 2½" SSR panels shall have no air exfiltration when tested in accordance ASTM E 1680 with an air pressure difference of 4.0 psf, 0.02 cfm/ft.² leakage at 6.24 psf, 0.04 cfm/ft.² leakage at 12.0 psf, and 0.08 cfm/ft.² leakage at 20.0 psf.
 9. The 2½" SSR panels shall have no water leakage when tested in accordance with ASTM E 1646 with 20.0 psf pressure differential and 5 gal./hr. spray.
- B. Structural Requirements: Engineer panels for structural properties in accordance with latest edition of American Iron and Steel Institute's *Cold Formed Steel Design Manual* using "effective width" concept and Aluminum Association's *Aluminum Design Manual*.

1.04 SUBMITTALS

- A. Product Data: submit manufacturer's specifications, standard profile sheet, product data brochure and finish warranty.
- B. Shop Drawings: shop drawings showing roof plan with layout of panels, screws, underlayment and sections of each flashing/trim condition shall be submitted for approval prior to fabrication. Drawings shall contain material type, metal thickness and finish. Drawings shall distinguish between factory and field fabrication.
- C. Samples:
 1. Submit sample 12" long x full width panel, showing proposed metal gauge, seam profile and specified finish.
 2. Submit manufacturers standard colors for Architect's selection.
- D. Certification: Submit manufacturer's certification that materials and finishes meet specification requirements.

1.05 QUALITY ASSURANCE

- A. Panel manufacturer shall have a minimum of ten (10) years of experience in manufacturing architectural roofing in a permanent stationary indoor facility.

- B. Panel installer shall have a minimum of 5 years experience in installation of metal roofing of similar size and scope.

1.06 DELIVERY, STORAGE, and HANDLING

- A. Panels and flashings shall be protected and properly packaged to protect against transportation damage in transit to the jobsite.
- B. Upon delivery, exercise care in unloading, stacking, moving, storing, and erecting panels and flashings to prevent twisting, bending, scratching, or denting.
- C. Store panels and flashings in a safe, dry environment under a waterproof covering to prevent water damage. Allow for adequate ventilation to prevent condensation. Panels and flashings with strippable film shall not be stored in direct sunlight.
- D. Upon installation immediately remove strippable film from panels and flashings. Protect panels and flashings from foot traffic and from all other trades.

1.07 PROJECT CONDITIONS

- A. Field dimensions shall be taken prior to fabrication to verify jobsite conditions.
- B. Minimum recommended pitch for this panel is ½:12.

1.08 WARRANTIES

- A. Panel manufacturer shall provide a twenty (20) year warranty on the paint finish covering chalking, cracking, checking, chipping, blistering, peeling, flaking, and fading.
- B. Applicator shall furnish written warranty for a two (2) year period from date of substantial completion of building covering repairs required to maintain roof and flashings in watertight conditions.

Part 2 PRODUCTS

2.01 PRODUCT DESCRIPTION

- A. 2½" SSR structural standing seam roof system as manufactured by Fabral, 3449 Hempland Road, Lancaster, PA 17601, ph.: 717-397-2741; fax: 717-397-1040.
- B. The 2½" SSR panel shall have a coverage of 18". Seams shall be 2½" tall.
- C. Panels shall be attached to the substrate with one-piece concealed clips that permit unlimited thermal movement.
- D. The panels shall use snap-on batten caps that will be manufactured in 16'-10" lengths. Caps shall be roll-formed to a width of 2¼" and a depth of 1 1/16". The top surface shall be curved to provide a spring-back action when installed. Caps shall be furnished with two beads of factory-applied caulk on the interior side.
- E. There shall be four small stiffening beads in the flat of the panel.
- F. Inside and outside closures will be supplied and used as recommended in Fabral's details.

2.02 PRODUCT SUBSTITUTIONS

- A. Requests to use alternate systems shall be submitted in writing to the project designer at least ten (10) days prior to bid date. Requests shall demonstrate proposed substitution meets or exceeds specified performance requirements. Certified statements, samples and descriptive data shall be included in this submittal request.
- B. Manufacturers listed in this section are prequalified manufacturers. Substitution of manufacturer's products for those specified shall not be allowed at anytime during construction.

2.03 MATERIALS AND FINISHES

- A. Panel materials
 - 1. 26, 24, 22, 20, or 18 gauge, Grade 40 (40 ksi yield strength) structural steel with G90 (0.90 oz./ft.²) hot dipped galvanized coating, both conforming to ASTM A 653.
 - 2. 26, 24, 22, 20, or 18 gauge, Grade 40 (40 ksi yield strength) structural steel with AZ50 (0.50 oz./ft.²) aluminum-zinc alloy coating, both conforming to ASTM A 792.
 - 3. 0.032, 0.040, or 0.050", 3004-H36 or equivalent (28 ksi yield strength) aluminum alloy conforming to ASTM B 209.
- B. Cap materials
 - 1. 26 or 24 gauge, Grade 40 (40 ksi yield strength) structural steel with G90 (0.90 oz./ft.²) hot dipped galvanized coating, both conforming to ASTM A 653 (used with panels made of thicker metal).
 - 2. 26 or 24 gauge, Grade 40 (40 ksi yield strength) structural steel with AZ50 (0.50 oz./ft.²) aluminum-zinc alloy coating, both conforming to ASTM A 792 (used with panels made of thicker metal).
 - 3. 0.032", 3004-H36 or equivalent (28 ksi yield strength) aluminum alloy conforming to ASTM B 209 (used with panels made of thicker metal).
- C. Texture: panels shall be smooth.
- D. Finish: refer to manufacturer's standard color card to determine appropriate finish and color. All panels shall receive a factory-applied (siliconized polyester) (Kynar[®] 500/Hylar[®] 5000*) (vinyl plastisol) conforming to the following:
 - 1. Metal preparation: all metal shall have the surfaces carefully prepared for painting on a continuous process coil coating line by alkali cleaning, hot water rinsing, application of chemical conversion coating, cold water rinsing, sealing with an acid rinse, and thorough drying.
 - 2. Prime coating: a base coat of epoxy paint, specifically formulated to interact with the top-coat, shall be applied to the prepared surfaces by roll coating to a dry film thickness of 0.20 ± 0.05 mils. This prime coat shall be oven cured prior to application of finish coat.
 - 3. Exterior coating: a finish coating (see above) shall be applied over the primer by roll coating to a dry film thickness of 0.80 ± 0.05 mils (3.80 ± 0.05 mils for vinyl plastisol) for a total dry film thickness of 1.00 ± 0.10 mils

- (4.00 ± 0.10 mils for vinyl plastisol). This finish coating shall be oven-cured.
4. Interior coating: a washcoat shall be applied on the reverse side over the primer by roll coating to a dry film thickness of 0.30 ± 0.05 mils for a total dry film thickness of 0.50 ± 0.10 mils. The washcoat shall be oven-cured.
 5. Color: the color of the exterior finish shall be _____ as chosen from the manufacturer's standard color chart.
 6. Physical properties: the coating shall conform to the manufacturer's standard performance criteria as listed by certified test reports for fade, chalk, abrasion, humidity, adhesion, pollution resistance, and others as required and standard within the industry.

2.04 ACCESSORIES

A. Screws

1. All exposed fasteners shall have combination metal and neoprene washers. For prepainted roof panels, all exposed fasteners shall be prepainted to match the roof panel.
2. All fasteners shall be concealed except as shown on the drawings.
3. Fasteners for the following locations shall be:
 - a. Clips to purlins: zinc plated (#12-14 x 1½" self-drilling, self-tapping screws) (#14 HHB x 1" self-tapping screws).
 - b. Roof panels to eave support: (zinc plated) (305 stainless steel) (#12-14 x 1½" or 2½" self-drilling, self-tapping screws) (#14 HHB x 1" or 2" self-tapping screws).
 - c. Roof panel endlaps: (zinc plated) (305 stainless steel) #14 x 1¼" self-drilling, self-tapping screws.
 - d. Subgirts to roof panel ribs and flashings to subgirts: zinc plated (#12-14 x 1" self-drilling, self-tapping screws) (#14 HHA x ¾" sheetmetal screws).
 - e. Flashings to roof panel ribs: (zinc plated) (305 stainless steel) (zinc-aluminum alloy plated) (#14 HHA x ¾" sheet metal screws) (#14 millpoint x 1" self-drilling stitch screws).
 - g. Screws for flashings and sidelaps shall be #14 HHA x ¾" sheet metal stitch screws. All accessories, flashings, and sidelaps shall be fastened 12" o.c.
- B. Back-up plates shall be die-punched from 18 gauge zinc-aluminum alloy coated steel and used to stiffen the panels at endlaps. The plates shall have two guide lances to align and hold the panels during installation.
- C. Clips shall be die punched and shall have both a purlin bearing flange and two (2) roof panel support flanges. The purlin bearing flange shall be prepunched for two (2) #12-14 self-drilling, self-tapping screws. Clips shall provide (¼") (1¼") clearance between the purlin bearing flange and the roof panel support flanges. Clip material shall be 18 gauge zinc-aluminum alloy coated steel.
- D. Insulation shall be glass-fiber blanket with a density of (0.6) (0.75) pcf and a maximum thickness of 4". The insulation shall be faced on one side only with

- an approved vapor barrier having sealing tabs. Insulation shall be supplied in rolls of sufficient length to permit a taut application from ridge to eave. When installed, the assembled system shall provide a minimum "U" value of 0.09 with 4" of insulation and a "U" value of 0.08 with 4" of insulation and 1" thermal blocks.
- E. Thermal blocks shall be 1" thick by at least 3" wide by 17 15/16" long styrofoam or approved equal applied over the blanket insulation at each purlin under each roof panel.
 - F. Closures
 - 1. Polyethylene closures shall be pre-molded to match the assembled panel system and in lengths as supplied by the panel manufacturer.
 - 2. Metal closures shall be 26 or 24 gauge (G90 galvanized steel per ASTM A 653) (AZ50 zinc-aluminum alloy coated steel per ASTM A 792) or 0.032" (thick aluminum alloy 3004 or equivalent per ASTM B 209) to match the assembled panel system and in lengths as supplied by the panel manufacturer.
 - G. Flashings shall be shop fabricated by the panel manufacturer from material that is the same thickness and finish as the panels to which they are attached. Where practical, flashings shall be furnished in maximum 10' lengths. Exposed flashings shall be lapped 6".
 - H. Subgirts shall be used under all flashings that span from rib to rib of the 2½" SSR panels. Subgirts shall be rollformed from 18 ga. G90 galvanized steel and shall be hat-shaped sections ½" deep x 3" wide with ¾" wide flanges. Subgirts shall be furnished in 20' lengths.
 - I. Sealant tape used at roof panel endlaps shall be a butyl type roll as supplied by the manufacturer.
 - J. Caulking shall be a polyurethane where it is exposed and there is no thermal movement. All caulking or sealing shall be done in a neat manner with excess caulking or sealant removed from exposed surfaces.
 - K. Caulking shall be non-skinning, non-hardening gun grade butyl sealant or butyl sealant tape with a minimum thickness of ⅛" where it is concealed and where thermal movement must be accommodated. All caulking or sealing shall be done in a neat manner with excess caulking or sealant removed from exposed surfaces.
 - L. Flashings shall be shop-fabricated from material that is the same thickness and finish as the 2½" SSR panels to which they are attached. Where practicable, flashings shall be furnished in maximum 10' lengths. Exposed flashings shall be lapped 6".

2.05 RELATED MATERIALS

- A. Refer to other sections listed in Related Sections paragraph for related materials.

2.06 FABRICATION

- A. Endlaps will be allowed though swaging is required. Contact factory for details.

- B. Panels shall be roll formed on a stationary industrial type rolling mill to gradually shape the sheet metal. Portable rollformers, rented or owned by the installer, are not acceptable.
- C. Fabricate flashings from the same material as the roof system.

2.07 SOURCE QUALITY

- A. Source quality: obtain metal panels and accessories from a single manufacturer.
- B. Fabrication tolerances
 - 1. Rib height: $2\frac{1}{2}'' \pm .01''$.
 - 2. Panel shearing length: $\pm \frac{1}{4}''$ maximum.
 - 3. Follow tolerances in MCA's Preformed Metal Wall Guidelines.
- C. Tests and inspections
- D. Verification of performance

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product cartons for installation.

3.02 EXAMINATION

- A. Installer shall:
 - 1. Inspect purlins or deck to verify that it complies with shop drawing and is smooth, even, sound, and free of depressions.
 - 2. Report variations and potential problems in writing to the architect.

3.03 INSTALLATION

- A. Conform to the standard set forth in the SMACNA architectural sheet metal manuals and the approved shop drawings detailed for the project.
- B. Install panels plumb, level, and straight with the seams parallel, conforming to the design as indicated.
- C. Install panel system so it is watertight, without waves, warps, buckles or distortions, and allow for thermal movement considerations.
- D. Abrasive devices shall not be used to cut on or near roof panel system.
- E. Apply sealant tape or caulking as necessary at flashing and panel joints to prevent water penetration.
- F. Remove any strippable film immediately upon installation.
- G. Vapor retarder: The joints, perimeter, and all openings shall be sealed per the manufacturer's instructions to provide a continuous vapor retarder.
- H. Underlayment (solid substrate):
 - 1. Provide one layer of 30# felt with horizontal overlaps and endlaps staggered between layers.
 - 2. Provide ice and water shield membrane at all valley and eave conditions as well as any area at less than a 3:12 slope.

3.04 CLEANING

- A. Dispose of excess materials and debris from jobsite.
- B. Remove filings, grease, stains, marks, or excess sealants from roof panel system to prevent staining.
- C. Protect work from damage from other trades until final acceptance.

* Kynar[®] 500 is a registered trademark of Elf Atochem North America, Inc.
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