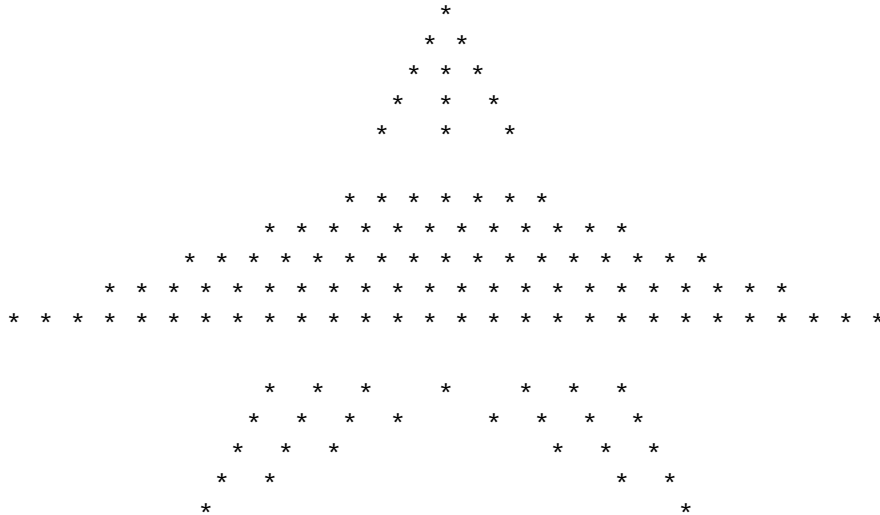


Star Building Systems
Specifications

Section 13122
Release 7.3 Date 8/15/95
Revised 5/21/99



These specifications are organized in accordance with the recommended format of the Construction Specifications Institute. They should be reviewed and modified for each project and the in applicable sections deleted as required.

The file information stored on the disk is of standard ASCII file format and can be loaded into any text editor or word processor for use. For loading instructions see your software instruction manual.

ONCE THE DOCUMENT IS CONVERTED TO WORK WITH YOUR PARTICULAR WORD PROCESSING PROGRAM, IT WILL BE NECESSARY TO CHANGE THE FONT TO COURIER FOR THE DOCUMENT PAGES TO BE PROPERLY FORMATTED.

It is suggested that the file be copied for each project and the copy be used for specific modification.

These specifications are copyrighted under the laws of the State of Oklahoma. They are subject to change without notice after the date of release.

SECTION 1312
METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Pre-engineered metal building, complete with structural framing (columns, rafters, struts, purlins, girts); prefinished roofing, siding; roof and wall insulation; building canopies; metal flashings; trim; gutters and downspouts; diagonal bracing; fasteners; and roof and wall accessories and other components and material required for a complete installation.
- B. Steel joists and bridging.

1.02 DESCRIPTIONS

- A. Building Type: Multispan gabled or single slope rigid frame structure with uniform or variable depth column and uniform or variable depth rafter sections of shop welded steel plates or open web rafter sections, supported by intermediate steel pipe or square tube columns or intermediate uniform depth columns. Interior column (supports) spacing: As shown on drawings.

OR

Building Type: Clear span gabled rigid frame with variable depth column and rafter sections of shop welded steel plates.

OR

Building Type: Clear span gabled or single slope rigid frame with uniform depth column and tapered rafter sections of shop welded steel plates.

OR

Building Type: Clear span single slope width expansion with uniform depth column and tapered or uniform depth simple span rafters of shop welded steel plates. Width expansion to be attached to the main building frame with high strength bolts to transfer vertical and horizontal reactions.

- B. Roof Slope: (_____)
- C. Column Spacing at Exterior Walls: As shown on drawings and compatible with placement of openings and other requirements.
- D. Minimum Eave Height: (_____) low side, measured vertically from top of eave strut at sidewall steel line to base of sidewall frame column. The maximum vertical clearance from finished floor to underneath the rigid frame rafter at the sidewall is (_____) or (not critical.) Intermediate columns with multispan structures will be recessed 5" below finished floor, or (_____) (above) or (below) finished floor.

E. Grouting under columns is not required.

1.03 QUALITY ASSURANCE

A. Codes and Standards:

1. Use following where applicable in building design:

a. AWS D1.1 "Structural Welding Code-Steel"

OR (For Canada)

CSA W59, "Welded Steel Construction (Metal Arc Welding)"

b. MBMA "Low-Rise Building Systems Manual,"
_____ Edition.

c. AISI "Specifications for the Design of Cold Formed Steel Structural Members," _____ Edition.

OR (For Canada)

CAN/CSA-S136, "Cold Formed Steel Structural Members"

d. AISC "Steel Construction Manual" and "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings."

OR (For Canada)

CAN/CSA-S16.1, "Limit States Design of Steel Structures"

e. Metal building manufacturer shall be certified in accordance with American Institute of Steel Construction (AISC) quality certification program category MB for metal buildings. This certification is to cover areas of general management, engineering and drafting, procurement, operations and quality control.

Upon request the manufacturer shall provide proof of certification.

f. AAMA "Aluminum Construction Manual."

g. SJI "Standard Specifications, Load Tables and Weight Tables."

h. AISC "Specification for Structural Joints"

Using ASTM A325 or A307 bolts."

- i. SDI "Steel Roof Deck Design Manual."
 - j. U.S. Army Corps of Engineers - Standing Seam Metal Roof (SSMR) specification CEGS416 (for StarShield Roofs) and/or ASTM E-1592-94.
2. Use the following where applicable in other phases of design:
- a. Building Code and regulations of other governing authorities having jurisdiction at project site.
 - b. Federal (Fed. Spec.), Military (MIL) and Commercial (CS) Standards and Specifications, as referenced herein.
 - c. American Society for Testing and Materials (ASTM), Standards as referenced herein.
 - d. Ratings by:
 - (1) Underwriters' Laboratories, Inc. (UL Classification _____).
 - (2) Factory Mutual Research. Class 1 Panel Roofs. FMRC Standard #4471

B. Design Criteria:

1. Building Code: _____ (BOCA, UBC, SBC, etc.)
 Code Year: _____
 Use Group Classification: _____
 Building Classification: _____
 Occupancy: _____
2. Roof Design Dead Load: _____ psf
 Roof Collateral Load: _____ psf
 Built-Up Roof: _____ psf
 Sprinkler: _____ psf
 Ceiling: _____ psf
 Lights: _____ psf
3. Ground Snow Load: _____ psf
 Snow Site Exposure Factor: _____
 Thermal Factor: _____
 Roof Snow Load: _____ psf
 Slope Factor: _____
 Sloped Roof Snow: _____
 Design Live Load Required: _____ psf
 Frame Reduction Allowed: _____ psf

4. Wind Design Velocity: _____ mph
 Wind Site Exposure: _____
 Wind Category: _____
5. Seismic Zone: _____
 Acceleration Coefficient: _____
 Velocity Coefficient: _____
- OR (For Canada)
- Accelerated Zone: _____
 Velocity Zone: _____
6. Service Equipment (may or may not apply)
 Crane Type: _____ (TRE, UHE, or Monorail)
 Crane Capacity: _____ tons
 Bridge Weight: _____ lbs.
 Hoist and Trolley Weight: _____ lbs.
 Wheel Base: _____
 HVAC Unit Weight: _____
 Mezzanine Loading: _____ psf
 Floor Live Load: _____ psf
 Floor Dead Load: _____ psf
 Under Floor Collateral Loads: _____ psf
7. Vertical (Gravity) Design Loads
 Purlins (Joists): _____ psf
 Rigid Frames: _____ psf
 Post and Beam Endwalls: _____ psf
8. Deflections: (derivative of BOCA 93, BOCA 96 or AISC)
- BOCA 93:
- Purlins: L/180 for greater than 3:12
 L/240
 L/360 for plaster ceilings
- Rafters: L/180 for greater than 3:12
 L/240
 L/360 for plaster ceilings
- Girts: L/240
 Sidesway: L/240
- OR
- BOCA 96:
- Purlins: L/150 no ceiling
 L/240 for ceilings
 L/360 for plaster ceilings
- Rafters: L/150 no ceiling
 L/240 for ceilings
 L/360 for plaster ceilings
- Girts: L/120 w/metal siding or material
 designed for deflection
 L/240 all other cases

OR

AISC (Star Standard):

Purlins: L/150
 L/240 for ceilings
 L/360 for plaster ceilings
Rafters: L/180
Girts: L/90
Sidesway: L/90 wind
 L/120 gravity
 L/120 with crane lateral loads (TRE)

9. Load Combinations: As required per the Building Code specified. Minimum Load Combinations Considered:

- a. DL + LL
- b. DL + SNOW
- c. DL + A
- d. DL + WL
- e. DL + EQ
- f. DL + SNOW + A
- g. DL + SNOW + EQ
- h. DL + 1/2 WL + A
- i. DL + 1/2 EQ + A
- j. DL + SNOW + 1/2 WL
- k. DL + 1/2 SNOW + WL

where,

DL = Roof dead load
LL = Roof live load
SNOW = Roof snow load
WL = Lateral primary wind load
EQ = Lateral seismic load
A = Auxiliary load

NOTES:

- (1) For multistory buildings, or buildings with mezzanines, floor live loads shall be combined with the dead loads including specified collateral loads or with loading combinations (a) through (k), if the result is more severe.
- (2) Roof snow loads in loading combination (f) shall be: Zero when the roof snow loads are less than or equal to 13 PSF; .5S when it is greater than 13 PSF, but less than 31 PSF; .75S when it is equal to or greater than 31 PSF.
- (3) Roof snow loads in loading combination (g) shall be: Zero when roof snow loads are less than 31 PSF; .25S when it is equal to or greater than 31 PSF.

- (4) For the load combination (i) in the case DL + 1.0EQ + A, the Auxiliary Crane Loads shall include only the total weight of crane including bridge with end trucks and hoist with trolley.

- C. Building System Reference Standard: To establish quality by which metal building systems by other manufacturers will be judged, bidders are advised that this specification is based upon metal building system produced by STAR BUILDING SYSTEMS, Oklahoma City, Oklahoma.

1.04 SUBMITTALS

- A. General: To comply with general conditions.
- B. Shop Drawings and Calculations:
 1. Design Calculations and Erection Drawings: Prepared by, or under direct supervision of, Registered Professional Engineer, licensed to practice in State of _____ with all drawings and calculations bearing engineer's seal.
 2. Show each type structural building frame required and their locations within structure; details of anchor bolt settings; sidewall, endwall, and roof framing; diagonal bracing and location within structure; metal floor deck and joist types; wall and roof insulation and types; longitudinal and transverse cross sections; details of curbs, roof jacks, and items penetrating roof; canopy framing and details; trim, gutters, downspouts, liner panels, wall and roof coverings, and all accessory items; materials; finishes; construction and installation details; and other pertinent information required for proper and complete fabrication, assembly and erection of watertight metal building system.
- C. Material and Color Samples:
 1. For each specific material sample requested by architect, submit in size, form, and number directed.
 2. Submit duplicate color sample sets showing full color range available, for selection purposes.
- D. Product Data: Two (2) copies of manufacturer's specifications and descriptive literature.
- E. Certification: Two (2) copies of written certification, prepared and signed by Registered Professional Engineer licensed to practice in State of _____, attesting that building design meets

specified loading requirements, requirements of codes and authorities having jurisdiction at project site, and other requirements specified.

- F. Metal building manufacturer shall submit certification of design to the architect to be an approved manufacturer and that the roof system shall qualify for UL Class 90 and state construction number. Metal building manufacturer will furnish to the architect certification that he is a member of the Metal Building Manufacturers' Association and has been certified by the American Society of Testing Materials under Category ASTM-MB.

1.05 PRODUCT HANDLING, DELIVERY AND STORAGE

- A. Deliver and store prefabricated components, sheets, panels, and other manufactured items so they will not be damaged or deformed.
- B. Stack materials on platforms or pallets above grade or on concrete slab, covered with opaque tarpaulins or other approved weather-resistant ventilated covering.
- C. Store metal sheets and panels if subjected to water accumulation in such a manner so they will drain freely. Do not store sheets and panels in contact with other materials which might cause staining.
- D. Damaged material must be reported to determine if replacement is required.
- E. Inspect panels to prevent moisture between panels, and secure as required.

1.06 WARRANTIES

- A. All Components: Manufacturer's standard one (1) year workmanship warranty.
- B. Roof Panels Including Any Canopy Roof Panels: Manufacturer's standard _____ (____) year paint finish warranty and/or manufacturer's standard twenty (20) year no-perforation warranty.
- C. Wall Panels: Manufacturer's standard _____ (____) year paint finish warranty.
- D. Roof and wall panels with full 70% polyvinylidene fluoride (Kynar) finish: Ultra Premium 20-year warranty.

PART 2 - PRODUCTS AND FABRICATION

2.01 STRUCTURAL STEEL

- A. Materials:

1. Structural Plate or Bar Stock: Minimum yield strength (Fy) of 50,000 PSI.
2. Cold Formed Structural Steel: Minimum yield strength (Fy) of 55,000 PSI.
3. Primary Structural Bolts and Nuts: ASTM A325; size and quantity required by metal building system manufacturer.
4. Prime Coat Paint: Primary structural shall be Alkyd red oxide metal rust inhibitive primer equal to Federal Standard #30111. Dry film thickness to be 1.0 mil. Secondary framing shall be red oxide rust inhibitive primer applied by vacuum coated process to 0.7-0.9 mil dry film thickness equal to Federal Standard #30111.
5. Steel Joists:
 - a. Type and Size: Open web type in series and sizes shown on drawing, with and without extended ends or bottom chords as shown, designed to support loadings shown on drawings or specified.
 - b. Accessories: Provide wall anchors, bearing plates, ceiling extensions, beam bolts, and other accessories necessary or required for complete installation.
 - c. Prime Coat Paint: Manufacturer's standard.

B. Fabrication:

1. Primary Framing: Rigid frames of shop-welded steel plate columns and rafters, both tapered and uniform depth sections as required by drawings, complete with all necessary stiffeners, connection plates and holes for field-bolted assembly.
 - a. Columns and Rafters: Fabricated with holes in web and/or flanges for attachment of secondary members.
 - b. Splice Plates: Factory fabricated for precision for all rafter-to-rafter and/or column-to-rafter connections, complete with connection bolt holes.
 - c. Base Plates, Cap Plates, Splice Plates and Stiffeners: Fabricate to sizes required, complete with all holes for connection of primary and secondary structural members. Factory weld into place.
 - d. Join flanges and webs of structural members

- fabricated of plate or bar stock together by continuous automatic submerged arc welding process with all welding performed under the supervision of certified welders in accordance with standard practices of AWS D1.1.
- e. Make all primary rigid frame field-bolted connections with A325 high-strength bolts of size required by building system manufacturer.
 - f. Clean all components of oil, dirt, loose scale, and foreign matters. Factory paint with one (1) coat of manufacturer's standard primer.
2. Endwall Framing: Precision cold-formed and/or shop-welded steel plate members consisting of rafters and columns fabricated for field-bolted assembly.
- a. Columns, Rafters, Splice Plates, Clips, Angles and Channels: Factory fabricate to size required.
 - b. Plate Stock Endwall Framing Members: Join flanges and webs by continuous automatic submerged arc welding process, under the supervision of welders certified in accordance with standard practices of AWS D1.1.
 - c. Clean components of oil, dirt, loose scale and foreign matter and apply one (1) coat of manufacturer's standard primer.
3. Secondary Framing, (Purlins, Girts, Struts, Flange Braces, Base Angles, as required):
- a. Purlins: Manufacturer's standard 8 1/2" Z sections, roll formed from minimum (Fy) 55,000 PSI steel, punched for attachment.
 - b. Girts: 8 1/2" Z or channel sections of roll formed Fy 55,000 PSI steel, punched for attachment with 1/2" diameter bolts.
 - c. Eave Struts: 8 1/2" x 3 1/4" sections of cold formed minimum Fy 55,000 PSI steel, with vertical web to receive sidewall panels and four (4) A325 1/2" diameter bolt attachments to rigid frame in factory-punched holes in column or bracket.
 - d. Roof Struts: Provide as required, detailed and shown on final shop drawings, as required

by design analysis, with attachment to top flange or rigid frame rafters by two (2) 1/2" minimum size diameter bolts at each end of strut.

- e. Flange Braces: Steel angles attached to purlin or girt, to stiffen rigid frame flanges as dictated by design and noted on final shop drawings.
- f. Cast-In-Place Base Tubes for Wall Panels: Base tube shall normally be 1 1/8" x 1 1/8" roll formed tube of 18-gauge galvanized material and shall be cast in the foundation perimeter to serve as an attachment for single skin wall systems.

OR

Optional Base Angle for Wall Panels: 3" x 2" x 0.071" angle of commercial grade steel, for field attachment to foundation with approved type drive anchors.

- g. Clean secondary framing components to be free from oil, dirt, loose scale and foreign matter and apply one (1) coat of manufacturer's standard primer.
4. Steel Joists:
- a. Fabricate in accordance with SJI Standard Specifications, except modify design as required to allow compression loads to be carried in top chord and diagonals. The design is also modified to accommodate wind uplift. Verify dimensions and job conditions prior to starting fabrication.
 - b. Moderate camber acceptable to accommodate for dead load deflection.
 - c. Provide extended top or bottom chords where indicated on drawings.
 - d. Clean, prepare and shop prime joists.
 - e. Joists to be (field welded) (bolted) in place.

2.02 ROOFING & SIDING

A. Roofing and Siding Panels:

1. Roof Panels:

- a. (1) Description: StarShield standing seam roof

panels are roll-formed 24- or 22-gauge (0.0336 in., 0.85 mm) aluminum-zinc alloy-coated (55 ksi) steel panels joined together by an interlocking seam and secured to the structure with an interlocking clip. The panels are produced from steel having a minimum yield strength of 50 ksi (345 N/sq.mm.). The panels are 24 in. (610 mm) wide and a maximum of 44 ft. 6 in. (13.6 m) long. Each side of the panel has a 2 in. (51 mm) high box rib plus a 7/8 in. (22 mm) high seam, forming a 2 7/8 in. (73 mm) overall panel height. When adjacent panels are interlocked at the seam, the sides of the adjoining panels form an elevated trapezoidal section 2 7/8 in. (73 mm) high by 4 1/4 in. (108 mm) wide measured at the panel flat. The panel flat is embossed with 3/32 in. (2.4 mm) deep cross ribs at 6 in. (152 mm) o.c. The adjacent panels are interlocked with a roof seaming apparatus. The finished seam includes the StarShield clips.

- (2) StarShield clip consists of a 12-gauge (0.1084 in., 2.8 mm) steel base with an interlocking 22-gauge (0.0336 in., 0.093 mm) steel tab. The base is produced from galvanized or Galvalume steel having a min. yield strength of 50 ksi (345 N/sq.mm.). The base is 5 in. (127 mm) long by 3 in. (76 mm) high, or 5 in. (127 mm) wide by 2 in. (51 mm) high for a nonstand-off roof, or 6 « in. (165 mm) by 3 in. (76 mm) high for roof planes wider than 120 feet, or 5 in. (127 mm) long by 3 3/4 in. (95 mm) high for additional stand-off for insulation over 4 in. (102 mm) thick. The tab is 4 in. (102 mm) long and is formed at the top to fit between adjacent panel side laps. The base of the clip is secured to min. 16-gauge (0.0598 in., 1.51 mm) steel supporting members with one or two 1/4 in. - 14 x 1 1/2 in. self-drilling fasteners with a hex head per clip.

The 1/4 in. - 14 x 1 1/2 in. self-drilling fastener is a 1/4 - 14 thread, Teks/2 point Type 1022 stainless steel screw with a flared hex head. The screw is coated with cadmium at a thickness of 0.0003 in. (0.008 mm).

For Factory Mutual approved roofs, each clip shall require two 1/4 in. - 14 x 1 1/2 in. self-drilling fasteners per clip.

- (3) The 22-gauge panel assembly is approved for Factory Mutual Class 1 panel roofs, Class #4471.

The proprietary design drawings and materials specifications are on file at FMRC.

- (4) Marking: The manufacturer shall mark each panel or packing container with the manufacturer's name and product trade name. In addition, the panel or container must be marked with the FMRC Approval Mark and the words "Subject to the conditions of Approval as a Class 1 Panel Roof when installed as described in the current edition of the FMRC Approval Guide."
- (5) Markings denoting FMRC Approval shall be applied by the manufacturer only within and on the premises of manufacturing locations that are under FMRC's Facilities and Procedures Audit Program.
- (6) The manufacturer agrees that use of the FMRC name or Approval Mark is subject to the conditions and limitations of the FMRC Approval. Such conditions and limitations must be included in all references to FMRC Approval.

OR

- b. Description: The ribbed roof panel shall be precision roll-formed to provide 36" net coverage from 26- or 24-gauge, 80,000 PSI minimum yield steel. The panels shall have 1 1/8" high major ribs at 12" o.c. with two minor ribs symmetrically spaced between the major ribs. Panel sidelaps shall be formed by lapping major ribs at the panel edges. The underlapping rib shall have full bearing legs to support the sidelap. Panel end splices shall be over a structural member and shall be a 6" minimum lap. Panels shall be longest length possible to minimize endlaps. Perimeter trim, ridge panel and transition flashing will be provided as required to complete the roof assembly. Closures, sealants and fasteners will be provided as required for a weathertight installation. Fastener spacing and type to be determined by manufacturer's standard offering. Product/Manufacturer. Equal to "Dura-Rib" roof panels produced by STAR BUILDING SYSTEMS, Oklahoma City, Oklahoma.

OR

- c. Description: The twin ribbed roof panel shall be precision roll-formed to provide 36" net coverage from 26- or 24-gauge, 37 KSI minimum yield steel. The panels shall have 1" deep major rib pairs at

12" centers with a minor stiffening rib placed symmetrically between major rib pairs. Panel sidelaps shall be formed by lapping major ribs at the panel edges. The underlapping rib shall have full bearing legs to support the sidelap. Panel end splices shall be over a structural member and shall be a ____" minimum lap. Panels shall be longest possible length to minimize endlaps. Perimeter trim, ridge panel and transition flashing will be provided as required to complete the roof assembly. Closures, sealants and fasteners will be provided as required for a weathertight installation. Fastener spacing and type to be determined by manufacturer's standard offering. Product/Manufacturer. Equal to twin rib roof panels produced by STAR BUILDING SYSTEMS, Oklahoma City, Oklahoma.

OR

- d. Description: The factory-insulated roof panel shall be manufactured to provide 40" wide net coverage and shall be ____" (1" 1.5" 2" 2.5" 3" 4" 5") thick. The panel shall be a composite of 26-gauge, stucco embossed metal skins bonded to a rigid polyurethane foam insulation core. The exterior face shall have 1" high ribs on 13" centers and have a stucco embossed finish. The liner face shall have shallow "V" grooves on 2 1/2" centers. The liner material shall be hot dipped galvanized (G-90) steel with Imperial White siliconized polyester finish. Panels will have an interlocking design with a repeating rib pattern to conceal the side joint. Product/Manufacturer. Equal to "StarTherm III HR-900" roof panels produced by STAR BUILDING SYSTEMS, Oklahoma City, Oklahoma.

- (1) The insulation properties of the insulated panel shall be ____ U-factor in accordance with ASTM C236.

Thickness	R-Value	U-Factor
1"	10.2	0.099
1.5"	14.2	0.070
2"	18.2	0.055
2.5"	22.2	0.045

3"	26.2	0.038
4"	34.2	0.029
5"	42.2	0.024

- (2) The roof panel is provided with an optional batten cap and saddle clip over the sidelap joint, where concealed fastener aesthetics are important.

2. Wall Panels:

- a. Description: The ribbed wall panel shall be precision roll-formed to provide 36" net coverage from 26- or 24-gauge, 50,000 PSI minimum yield steel. The panels shall have 1 1/8" high major ribs 12" o.c. with two minor ribs symmetrically spaced between the major ribs. Panel sidelaps shall be formed by lapping major ribs at the panel edges. The underlapping rib shall have full bearing legs to support the sidelap. Panels shall be longest length possible (32'- 0" maximum) to minimize endlaps. Panel end splices (when required) shall be over a structural member and shall be a 4" minimum lap. Corner trim, base trim and transition flashings shall be provided as required to complete the wall assembly. Closures and fasteners shall be provided as required for a weathertight installation. Fastener spacing and type to be determined by manufacturer's standard offering. Product/Manufacturer. Equal to "Dura-Rib" wall panels produced by STAR BUILDING SYSTEMS, Oklahoma City, Oklahoma.

OR

- b. Description: The semi-concealed fastener wall panel shall be precision roll-formed to provide 36" net coverage from 26- or 24-gauge, 50,000 PSI minimum yield steel. The panels shall have an architectural profile consisting of trapezoidal ribs on either side of a steep 1" deep valley at 12" o.c. with a broad 1" deep valley between the ribs. Panel sidelaps shall occur at the steep valleys to semi-conceal the fasteners. The overlapping panel edge shall be hemmed to eliminate exposed raw edges. The panels shall be of the longest length possible (32'-0" maximum) to minimize end splices. Panel end splices (when required) shall be over a structural member and shall be a 4" minimum lap. Corner trim, base trim and transition

flashings will be provided as required to complete the wall assembly. Closures and fasteners will be provided as required to provide a weathertight installation. Fastener spacing and type to be determined by manufacturer's standard offering. Product/Manufacturer. Equal to "StarMark" wall panels produced by STAR BUILDING SYSTEMS, Oklahoma City, Oklahoma.

OR

- c. Description: The factory-insulated wall panel shall be manufactured to provide a 42" wide net coverage. The panel shall be a composite of 26-gauge, embossed metal skins bonded to a rigid foamed-in-place polyurethane foam insulation core. Joint weathertightness shall be provided by tongue and groove edge profile with field applied butyl caulk for vapor and condensation control. Maximum panel length is transportation controlled. Panels shall be attached to the supporting structurals at each panel joint (42" centers) with concealed clip and fasteners. The liner panel shall have shallow "V" grooves on 2 " centers. Material shall be hot dipped galvanized G-90 with Imperial White siliconized polyester finish. The insulation properties of the insulated wall panels shall be ___ U Factor in accordance with ASTM C-236.

Thickness	R-Value	U-Factor
2"	17.10	0.058
2.5"	20.83	0.048
3"	24.55	0.041
4"	32.00	0.031
5"	39.45	0.025
6"	46.90	0.021

- (1) The panel shall be a composite of a 26-gauge ribbed exterior, embossed surface with continuous rib pattern on 8 1-2" centers to conceal the panel sidelap, bonded to a rigid foam core. The panel shall be ___" (2", 2.5", 3", 4", 5", 6") thick. Product/Manufacturer. Equal to "StarTherm III AW-200" wall panels produced by STAR BUILDING SYSTEMS, Oklahoma City, Oklahoma.
- (2) The panel shall be a composite of a 26-gauge ribbed exterior, embossed surface with

shallow "V" stretch ribs on 2" centers to conceal the panel sidelap, bonded to a rigid foam core. The panel shall be ____" (2", 2.5", 3", 4", 5") thick. Product/Manufacturer. Equal to "StarTherm III AW-300" wall panels produced by STAR BUILDING SYSTEMS, Oklahoma City, Oklahoma.

OR

- d. Description: The concealed fastener wall panel shall be a precision roll-formed 3" deep x 16" wide box section of stucco embossed 24- or 22-gauge, 50,000 PSI minimum yield steel. The panel face shall consist of a 5 1/2" wide x 1 1/2" deep flats centered between 5 1/4" wide flats. Panel edges shall be formed to provide an interlocking weathertight and concealed fastener joint and shall provide a 1" wide flat flange at 16" o.c. for attachment of interior finish material. Panels shall be of the longest length possible (40'-0" maximum) to minimize end splices. The panels shall be factory-punched for attachment to a factory-punched base angle and shall be factory-punched with an exterior access hole for attachment to eave or gable structurals. A 16-gauge interlocking clip shall be provided to receive the attachment fasteners and die-formed top and bottom fillers shall be provided for panel rigidity and diaphragm action (when applicable). Corner trim, base trim, transition flashings and factory-punched base angle will be provided as required to complete the wall assembly. Closures and fasteners will be provided as required for a weathertight installation. Fastener type and spacing to be determined by manufacturer's standard offering. Product/Manufacturer. Equal to "StarCFW II" concealed fastener wall panels produced by STAR BUILDING SYSTEMS, Oklahoma City, Oklahoma.

3. Panel Finishes:

- a. Standing Seam Roof Panel:

Manufacturer's standard 0.5 oz. per sq. ft.
aluminum-zinc alloy-coating

OR

Manufacturer's standard 0.5 oz. per sq. ft.
aluminum-zinc alloy-coating with _____ color
full 70% polyvinylidene fluoride (Kynar) finish

OR

Manufacturer's standard 0.5 oz. per sq. ft.
aluminum-zinc alloy-coating with manufacturer's

standard white polyester finish.

b. Ribbed Roof Panel:

Manufacturer's standard 0.5 oz. per sq. ft.
aluminum-zinc alloy-coating

OR

Manufacturer's standard 0.5 oz. per sq. ft.
aluminum-zinc alloy-coating with _____ color
full 70% polyvinylidene fluoride (Kynar) finish

OR

Manufacturer's standard 0.5 oz. per sq. ft.
aluminum-zinc alloy-coating with manufacturer's
standard white polyester finish.

c. Architectural Wall Panels:

Manufacturer's standard 0.5 oz. per sq. ft.
aluminum-zinc alloy-coating with manufacturer's
standard _____ color siliconized polyester
finish.

OR

Manufacturer's standard 0.5 oz. per sq. ft.
aluminum-zinc alloy-coating with _____ color
full 70% polyvinylidene fluoride (Kynar) finish.

d. Ribbed Wall Panel:

Manufacturer's standard 0.5 oz. per sq. ft.
aluminum-zinc alloy-coating

OR

Manufacturer's standard 0.5 oz. per sq. ft.
aluminum-zinc alloy-coating with _____ color
full 70% polyvinylidene fluoride (Kynar) finish.

OR

Manufacturer's standard 0.5 oz. per sq. ft.
aluminum-zinc alloy-coating with manufacturer's
standard _____ color siliconized polyester
finish.

4. Fasteners:

- a. Wall Panels: Manufacturer's standard long-life
coated #12 x 7/8" self-drilling carbon steel
screws for liner panels and/or exterior single

skin wall panels and #12-14 x 1 1/4" self-drilling carbon steel screws for exterior single skin wall panels utilizing blanket insulation up to 4" thick. Manufacturer's standard #14 x 1 3/4" stainless self-tapping screws for factory insulated panels. All exposed fastener heads will be factory colored to match color of panels.

b. Standing Seam Roof Panels:

(1) Panel Clips: Manufacturer's standard sliding design to allow for unrestrained expansion and contraction movement of panels. Provide complete with one or two 1/4-14 x 1 1/2" plated self-drilling fasteners at each clip.

(2) Exposed Fasteners for Eave, End Splice, Ridge Cover and Flashings: Manufacturer's standard #12-14 x 1 1/4" self-drilling screw with sealing washer. Cap head and washer backer with 0.008" thick Type 302 stainless steel caps or zinc/aluminum alloy head. Painted or unpainted.

c. Single Skin Ribbed Roof Panels: Manufacturer's standard #12 -14 x 1 1/4" self-drilling screws, long-life coated, unpainted or painted with sealing washer, or #12-14 x 1 1/4" carbon steel self-drilling screws, with stainless steel cap or zinc/aluminum alloy head and sealing washer.

d. Factory-Insulated Roof Panels:

(1) Structural (Clip) Screw: Manufacturer's standard #14 x 1 3/4" stainless self-tapping screws.

e. Trim Fasteners: Manufacturer's standard plated and finish painted #8 x 5/8" self-drilling screws with 1/4" hex washer head.

4. Standing Seam Sealant: Approved type nonshrinking, nondrying butyl-based sealant specifically formulated for factory application in standing seams and to allow roof panel assembly at temperatures from minus 10 degrees F to 140 degrees F and shall be in accordance with United States Federal Spec TT-C-1796A (Type II, Class B).

5. Ribbed Roof Panel Sealant: Approved type, non-shrinking, nondrying butyl-based sealant, specifically formulated for roof application at temperatures from 20 degrees F to 120 degrees F and shall be in accordance with United States Federal Spec TT-C-1796A (Type II, Class B).

2.03 WIND BRACING

- A. Commercial grade steel rod bracing or portal frames located as determined by manufacturer on the final shop drawings. Where applicable, DuraRib and StarMark roof and/or wall panels may utilize diaphragm action bracing in lieu of steel rods.
 - 1. Steel Rod Bracing: Provide complete with necessary slope washers, flat washers and adjusting nuts at each end.
- B. Clean components free of oil, dirt, loose scale and foreign matter.

2.04 WALL AND ROOF INSULATION

- A. Wall and Roof Fiber Glass Insulation (for nonfactory-insulated roof/wall panels):
 - 1. Manufacturer's standard noncombustible fiber glass blanket insulation with vapor barrier providing no more than 0.02 PERMS moisture vapor transmission (ASTM-E-96 Method A), _____" thick with Thermal Resistance (R) value of not less than _____ for all areas, unless shown otherwise on drawings.
 - 2. Provide insulation and facing (as a composite material) carrying UL fire hazard (UL 723) rating indicating a flame spread rating of 25 or less; or FM classification as Class 1 material when rating is applied to each individual component if field assembled, or to composite unit if supplied factory assembled.
- B. Wall and Roof Rigid Foamboard Insulation (for nonfactory-insulated roof/wall panels):
 - 1. Insulation: (Thermax Insulation Board) FS HH-I-1972/1, Class 2, closed cell glass fiber reinforced polyisocyanurate insulation board; factory-applied facers of aluminum foil, reflective (ASTM E 408) on one or both faces; square edges.
 - 2. Aged Thermal Resistance: $R=(\text{_____})$ at (_____) on full sized products inches nominal thickness at (_____) degrees F mean temperature in accordance with ASTM C 236 aged 68 months. Roof thickness = _____, Wall thickness = _____.
 - 3. Fire Performance:
 - a. Exposed Application approval by FM 4880, FM 4870, FM 4411, UL 1715, UL 1040, and UL 723.

- b. Surface Burning Characteristics:
Flame Spread Rating of finished board (including facers) not to exceed 25 when tested in accordance with ASTM E 84 or UL 723.
Smoke Development Rating of finished board (including facers) not to exceed 450 when tested in accordance with ASTM E 84 or UL 723.
(These numerical ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions.)
 - c. Fire Resistance Designs:
Thermax Insulation Board, Type A, may be used in specific 1 and 2 hour rated construction in accordance with ASTM E 119. See manufacturer product literature for application details.
 - d. Ignition properties--flash ignition and self ignition minimum 850 degrees F (ASTM D 1929).
4. Physical Properties:
- a. Product Density (ASTM 1622, Nominal 2 pcf).
 - b. Water Vapor Transmission as Permeance, In PERMS (ASTM E 96 [Desiccant Method]; Less than .03).
 - c. Liquid Water Absorption As Percent Increase Volume Basis: ASTM C 272 (24 hour result reported as per HH-I-524, Table 1); 0.3% max.
 - d. Compressive Strength (ASTM D 1621; 25).
 - e. Operating Temp Range (-100 to +250 degrees F).
5. Exposed Finishes
- a. Finish Type A: Plain factory finish foil.
 - b. Finish Type B: Stain finish, white tinted foil.
 - c. Finish Type C: Embossed finish, white coated embossed foil.
 - d. Finish Type D: Heavy duty embossed finish, white coated 4 mil embossed aluminum sheet.
 - e. Finish Type E: Thermax plus liner panel, white coated embossed aluminum sheet.
 - f. Finish Type F: Metal building board, plain embossed foil.
6. Accessories

- a. PVC clip strips (Standard of insulation manufacturer): (_____).
- b. Tapes: Aluminum foil and Thermax tape, standard.

2.05 ACCESSORIES

A. Gutters and Downspouts

1. Gutters for standing seam roof shall be suspended box sections of 26-gauge galvanized steel formed to match the configuration of the gable trim. Gutters shall be independent of the roof seal and shall be attached to the eave strut adapter by means of a gutter hanger.

Gutter hangers shall be spaced at 4'-0" centers and attached to inside face of gutter and eave adapter by #12 self-drilling screws and to outer face of gutter by trim fasteners.

Gutter sections shall be lapped 2" and sealed with sealant and then fastened with fasteners as specified on manufacturer's drawings.

Gutter end closures shall be sealed with sealant and fastened with pop rivets as specified on manufacturer's drawings.

2. Gutters for ribbed roof (single-skin and factory-insulated) shall be suspended box sections of 26-gauge galvanized factory-colored steel formed to match the configuration of the gable trim and shall have a minimum cross section of 36 square inches. Gutter shall be attached to the roof panel using standard fasteners as specified on manufacturer's drawings. Gutter sections shall be lapped and all splices and end closures shall be sealed with aluminized sealant and then fastened with trim fasteners as specified on manufacturer's drawings.
3. Downspouts shall be 29-gauge galvanized factory-colored steel with a minimum cross section of 12 or 20 square inches.

Downspouts shall be located according to design requirements as specified.

Downspouts shall be field attached to the gutter. Downspouts shall be attached to the wall panel using 26-gauge galvanized factory-colored steel straps on 10'-0" centers. A 75-degree elbow shall be provided at the base of all downspouts to direct the water flow away from the building.

4. Finish: Manufacturer's standard siliconized

polyester system finish or full 70% polyvinylidene fluoride (Kynar) finish in color as selected by architect.

B. Walk Doors, Leafs, Frames and Hardware:

1. Frames: Manufacturer's standard self-flashing, self-trimming style, fabricated from 16-gauge steel with G-60 galvanized coating, with 5 3/4" deep frame profile. Provide complete with 18-gauge sill channel, 22-gauge adapter angles, galvanized reinforcements and preparations required for finish hardware, and factory-applied bronze colored prime coat finish.
2. Leafs: Manufacturer's standard in size shown on drawings, not less than 1 3/4" thick, of flush panel design. Fabricate from minimum 20-gauge steel with G-60 galvanized coating for the honeycomb core leaf, 22-gauge steel with G-60 galvanized coating for the foam core door leaf. Provide complete with internal reinforcements, stiffeners, sound deadening core material, preparation required for finish hardware, and factory-applied bronze colored rust inhibitive prime coat finish.
3. Finish Hardware: Except for finish hardware provided as part of work of SECTION 08710, provide following in quantity required for operational installation of doors.
 - a. Hinges: Three manufacturer's standard, regular weight, full mortise type per door leaf.
 - b. Weatherstripping: Manufacturer's standard type for attachment to door frames.
 - c. Thresholds: Aluminum type, factory-notched at each end for tight fit to jamb frames.
 - d. Mortise Locks: Heavy duty type with dull chrome finish 26D, Series 8700, with CO knob and lever handle, conforming to ANSI A156.13, and Federal Specifications FF-H-106/2, UL listed.
 - e. Cylinder Locks: Dull chrome finish 26D with 2 3/4" backset, Government No. 160 or approved equal.
 - f. Closers:
 - (1) For KD doors, surface mounted, conforming to Federal Specifications FF-H-121-C, Type 3009, and to Federal Specifications FF-H-121D/BHMA 301/ANSI A156.4, UL listed.

- (2) For pre-assembled doors, Grade 1 and Grade 3, surface mounted, conforming to ANSI A156.4, BHMA Federal Specifications FF-H-121D or FF-H-121-C, UL listed.

C. CANOPIES

1. Structural canopy located at building eave or below eave shall consist of plate rafter sections which support 8 1/2" deep zee purlins and are cantilevered from the building columns.
 - a. Rafter sections shall be welded units complete with all holes for connection to other primary and secondary structural members.
 - b. Roof covering of structural canopy shall be an extension of the building roof covering except when canopy is located below eave height. Panel shall lap roof panels uphill from the eave strut when lap is required.
2. Slimline canopy at eave shall consist of plate rafters cantilevered from the building columns, providing an extended roof line appearance at the sidewall; and be designed to accommodate soffit (optional) fascia and gable flashing and gutter of the same profile as the main building.
 - a. Rafter sections shall be welded units complete with all holes for connection to other primary and secondary structural members.
 - b. Roof covering of slimline canopy shall be an extension of the building roof covering and shall lap, when needed, uphill from eave strut.
3. Gable overhang shall be of cold-formed zee and cee sections which are continuous span extensions of the main building endbay purlins and eave struts.
 - a. Endlaps shall be of a continuous design as specified.
 - b. Overhangs shall be sheeted on the roof in such a manner as to create the appearance of an extended roof at the gable and be supplied with soffit panel.

D. Facade Systems:

1. Vertical facades shall be single-plane constructed, consisting of single skin ribbed panels attached to structural supporting framework so the face of the facade is vertical.
2. Sloped facades shall be single plane constructed,

consisting of single skin ribbed panels attached to structural supporting framework. The base of the facade shall extend 1'-0" further from the steel line than the top.

3. All facades may also utilize conventional materials such as plywood and batten or shake shingles, not to exceed 17.5 pounds per linear foot of facade frame.
4. Facades shall extend 2'-2" below eave height and above the highest point of the roof, creating a flat roof appearance.

E. Windows:

1. Commercial grade HS-C25 (horizontal slider), P-C30 (project-in vent) or F-HC40 (fixed) shall be extruded sections from 6063-T5 aluminum alloy with a bronze or white baked-on acrylic finish, with head, sill and jamb fins of the configuration required for self-flashing design compatible with wall panel configuration. Horizontal and project-in windows have screens.
 - a. Windows shall be available in 14 nominal sizes based on manufacturer's standard.
 - b. Insulated glass shall have an "A" level rating with a five (5) year warranty against seal failure. Glass sealant shall be polysulfide. Glass unit overall thickness shall not be less than 5/8". Glass shall be SSB (2mm) or DSB (3mm) clear, tinted, obscure and/or tempered as required.
2. Narrowlite windows (fixed type) shall be of a self-flashing design compatible with wall panel configuration. The frame profile shall be of a self-trimming and wraparound type fabricated from a minimum 16-gauge material with a G-60 galvanized coating.
 - a. Frames will be knock-down type with dividing members to be field assembled and have a bronze color primer.
 - b. Optional glazing beads to be provided for field glazing of glass up to and including 1/2" thick. Glass or composite material by others.
 - c. Frames are available in nominal 2'-0" x 7'-0", 3'-0" x 7'-0", and optional 12'-0" heights.

F. Overhead Doors and Sliding Doors:

1. Framed opening for overhead door shall consist of

8 1/2" x 3 1/4" .074" thick minimum G-90 galvanized cold-roll-formed steel channel jambs and header or or 8 1/2" x 3 1/4" .057" thick red oxide primer painted material as specified by design.

- a. Framed opening jambs shall extend above the header to allow trim and hardware to be applied.
 - b. Openings shall be trimmed to accept wall panels according to manufacturer's standard profile.
2. Sliding doors (for single-skin ribbed wall panels only) shall be single and/or double sliding doors constructed of cold-formed structural steel sheeted with panel with a maximum opening of 24'-0" wide x 20'-0" height.
- a. Door systems shall be provided with all tracks, trolleys, covering, trim, flashing, closures, locks, astragal plates and base guides necessary for field assembly of the door system.
 - b. Sliding door sections shall be suspended by four-wheeled trolleys at each end sliding inside a track mounted on the exterior wall.
 - c. Any structurals exposed when door is closed shall be galvanized steel fastened with plated fasteners. The jambs and header of the door opening shall be painted one shop coat of red oxide primer.

G. Light Transmitting Panels:

1. Roof light transmitting panels shall be of a nominal 8 oz., one-piece, flexible, translucent, fiber glass reinforced plastic panel and conform to the configuration of the roof panels. The panels shall be uniform white with heat transmission of 25% and light transmission of 55%.
2. Insulating roof light transmitting panel shall be one-piece rigid, translucent, fiber glass reinforced resins, precision formed to create a 1" insulating dead air space when used in conjunction with the roof light transmitting panel (LTP).

Material shall be a .055" nominal thickness, 6 oz. per square foot nominal weight and be furnished in 5'-0" lengths for Dura-Rib and 10'-0" lengths for StarShield. Insulites shall have a minimum light transmission of 45% and a maximum heat transmission of 23% when used with white LTPs.

3. Wall light transmitting panels shall conform to the

wall panel configurations and be of a nominal 8 oz., one-piece, flexible, translucent, plastic panel reinforced with glass fibers. The panels shall be uniform white with heat transmission of 25% and light transmission of 55%.

H. Ventilators, Louvers, Roof Jacks and Pipe Flashing:

1. Continuous ridge ventilator (univent) shall be a 10'-0" long vent with 9" throat complete with all weather guards, rain caps, and with operable damper, factory assembled to form a weathertight unit when installed according to the manufacturer's instructions.
 - a. Ridge ventilators shall be fabricated from 26-gauge minimum .05 oz./sq.ft. alum-zinc alloy-coated material with manufacturer's standard Shell White siliconized polyester finish.
 - b. Ridge ventilator shall be provided including factory installed ends. Vents require no modification for continuous runs.
 - c. Dampers shall be one-piece construction designed to lift vertically.
 - d. Provide damper operator kits for cable operation to include operating lever, 40 linear feet of cable, pulleys and hardware per kit.
 - e. Preformed rubber filler strips to match the configuration of the roof panel shall provide a weathertight seal at the base when installed according to the manufacturer's drawings.
2. Monovent round ridge ventilator shall be a 20" diameter ventilator with damper fabricated from 26-gauge .05 oz./sq. ft. alum-zinc alloy factory painted manufacturer's standard Shell White siliconized polyester finish.
 - a. Ventilators will be field installed on a base assembly fabricated to specified roof slope and panel configuration and may be located on or off the building ridge.
 - b. Vents will be furnished with a single 10' long pull chain for damper operation. Remote operation may be achieved by use of operator cable and pulleys.
3. Roof jack for Dura-Rib roof shall be a 26-gauge, Shell White steel cone factory installed and sealed to roof panel. Cone shall be made of same material.

- a. Stack or pipe penetration shall be at the centerline of a major corrugation of the roof panel.
4. Pipe flashing shall consist of a molded rubber cone with an aluminum ring bonded to the base. Pipe flashing shall accommodate pipe diameter as specified and be capable of flashing penetration at any location of the roof panel. Flashing shall be sealed and fastened in accordance with manufacturer's drawings.
5. Wall louvers shall be nominal 48" x 48" self-flashing unit with frame construction of 18-gauge galvanized steel and 20-gauge galvanized steel adjustable blades, factory painted bronze, factory assembled with screen, hardware and operator.
 - a. Panels for louvers shall be field cut and located.

PART 3 - EXECUTION

3.01 ERECTION

A. General:

1. Erection shall be accomplished by a trained, competent erector having experience in erecting metal buildings.
2. Install all metal building system components in strict compliance with manufacturer's instructions shown on final shop drawings.
3. Handle and store all materials to avoid damage and replace any damaged materials.
4. Erector shall observe and follow recommendations of the Metal Building Manufacturers Association (MBMA), the American Institute of Steel Construction (AISC), and the Occupational Safety and Health Administration (OSHA) practices, procedures and safety standards where applicable.
5. Do not field cut or alter structural members without approval from manufacturer.

B. Structural Frames:

1. Erect true to line, level and plumb, brace and secure with temporary bracing in all directions as required.
2. Level base plates and secure to anchor bolts to level plane with full bearing to foundation

supporting structures.

C. Steel Joists:

1. Place and secure in accordance with requirements of SJI Specifications and final shop drawings.
2. Place on supporting work, adjust and align in accurate locations and spacing before permanently bolting or welding in final location.
3. Install bridging and flange braces simultaneously with joist erection before any construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at wall or beams. Install bridging, connections and anchor to ensure lateral stability during construction.

D. Bracing:

1. Install all permanent diagonal rod or angle bracing in roof and sidewalls as approved by manufacturer.
2. Properly tighten rods to avoid excessive sag.

E. Framed Openings:

1. Securely attach to building structural framing members, square and plumb.

F. Roofing and Siding Panels:

1. General:
 - a. Install roof and canopy panels in such a manner to permit drainage to eaves of building, with panel ends square to eave.
 - b. Install wall panels with vertical edges plumb.
 - c. Arrange and nest sidelap joints away from prevailing winds when possible.
 - d. Apply panels and associated items for neat and weathertight enclosure.
 - e. Avoid "panel creep" or application not true to grid lines.
 - f. Protect factory finishes from mechanical damage or abrasions.
 - g. Install approved type closures to exclude weather.

- (1) Install weather seal under ridge cap.
Flash and seal roof panels at eave, gable and perimeter of all openings through roof and elsewhere as required or shown on drawings.
 - (2) Flash and/or seal wall and liner panels at perimeter of all openings, under eaves and gable trims, along lower panel edges, and elsewhere as required or shown on drawings, as applicable.
- h. Remove all fastener or cutting shavings from roof and wall as erection is completed.
2. Standing Seam Roof Panels: (StarShield Only)
- a. Install panels with positive interlock between installation clips and standing seams in manner that will allow panels to support erection loads prior to closing of seams with seamer.
 - b. Install concealed panel clips (of sliding design to allow for expansion and contraction movement of panels) over top of roofing insulation along each standing seam at location and spacing determined by metal building manufacturer.
 - c. Where panel end splices occur, nest panels with 3" end laps and install interlocking clamping plates and sealant. Make splice independent of structure to allow for free expansion and contraction movement of panels without stress on splice.
 - d. Crimp standing seams with approved type motorized seamer tool to assure complete sealant engagement and to assure structural integrity of panel-to-panel and panel-to-clip connections.
 - e. Use fasteners penetrating roof panel only at eaves and end splices (when required). At these conditions, use fasteners in conjunction with clamping plates (with factory-punched holes to assure correct fastener placement) and approved type butyl sealant to assure positive watertight seals.
 - f. Install ridge cover units of approved expansion joint design to accommodate expansion and contraction movement of roof panels without ponding at end splices.
 - g. Coordinate installation of accessories and items to be mounted on metal roofing.

- h. Maintain proper panel coverage of 2'-0" per panel.
3. Wall Panels:
- a. Install wall panels on exterior side of metal framing with liner panels installed on building interior in locations shown on drawings.
 - b. Align bottoms of panels to proper coverage and fasten with manufacturer's recommended and supplied fasteners.
 - c. Cut and fasten flashing and trims with approved type fasteners.
 - d. Install all fasteners with power tool having adequate torque and proper r.p.m. adjusted to seat fastener without damage to heads, washers or panels.
 - e. Install panel sidelap away from prevailing wind or view direction when possible, maintaining proper lap without fastener dimpling or excessive overlap.
- G. Accessories: Install gutters, downspouts, flashings, trim, ridge covers, roof curbs, pipe flashings, closure strips, roof jacks, and other accessories and sheet metal items in accordance with manufacturer's recommendations for positive attachment to building and provide a weathertight mounting.
- H. Swing Doors and Frames: Install doors and frames straight, plumb, and level. Securely anchor frames to building structure. Set units with 1/8" maximum clearance between door and frame at jambs and head, and 3/4" maximum between door leaf and floor. Adjust for proper operation.
- I. Louvers:
- 1. Install plumb and level, in compliance with requirements of final shop drawings. Anchor securely in final location with perimeter sealed with approved sealant used for trim and flash or roof panels. Adjust louver blades to operate smoothly and easily, without binding, and to be weathertight when in closed position.
- J. Thermal Insulation:
- 1. Install in accordance with manufacturer's recommended procedure, performed concurrently with installation of wall and roof panels.
 - 2. Roof and Wall Insulation: Install blankets straight

and true. Fasten tabs together or lap and glue to provide complete vapor barrier. Place insulation with facing exposed to interior of building unless recommended otherwise.

3.02 PAINTING

- A. Touch-up all abrasions, scratches, field welds or other damages in shop-primed or factory-finished painted surfaces consistent with shop primer or factory-finished painting.
- B. Apply finish paint coats to factory-primed items.
 - 1. Provide finish coats which are compatible with metal building manufacturer's prime coat paints.
 - 2. Provide approved type barrier coats over incompatible primers where required.
 - 3. Notify architect in writing of anticipated problems using specified coatings with substrates primed by others.
 - 4. All finish coats by others should be solvent base or approved by Star.
 - 5. Protect hardware and accessories and similar items in place and not to be finish-painted.
 - 6. Finish exterior swing doors on tops, bottoms and edges same as exterior faces, unless otherwise indicated.

3.03 TOLERANCES

- A. All framing members shall be erected plumb, level or aligned not to exceed a deviation 1:300.

END OF SECTION