

412 Richmond St. East Taunton, Ma 02718 Phone: 508-823-7777 Fax: 508-823-2222

SPECIFICATIONS

SECTION I -- GENERAL

- 1. GENERAL
- 1.1 Scope

1.1.1 These specifications delineate the design criteria, material quality, and fabrication processes used in metal building systems furnished by Space Bldgs, (herein referred to as Space.)

1.1.2 These specifications are intended for use as an outline of the performance requirements for the various materials used within Space metal building systems. They are further intended to insure that architects, engineers, builders, and owners understand the basis for design, manufacture, and application of these materials.

1.1.3 Engineering and mechanical properties of materials utilized by Space in its product line are provided or referenced within these specifications, as are industry specification standards, where applicable.

1.1.4 Space utilizes those standards, specifications and/or interpretations and recommendations of professionally recognized groups and agencies, such as MBMA, AISC, AISI, AWS, ASTM, etc. as the basis in establishing its own design, fabrication and quality criteria, standards, practices, methods, and tolerances. For convenience, certain provisions of a specification and/or recommendation of one of these groups or agencies (i.e. AISC, AISI, etc.) may be referenced, where appropriate, in Space documents. In all cases however, unless stipulated otherwise in the contract documents, Space's design, fabrication and quality criteria, standards, practices, methods, and tolerances will govern the work.

1.1.5 Due to Space's policy of continuous product development and improvement, and also due to possible changes in material availability, these specifications are subject to change without notice.

1.2 Materials Included

1.2.1 Standard material furnished for Space metal building systems shall include primary and secondary structural framing members, bracing, metal panels for roofing and siding, flashings, fasteners, sealants, accessories, and all other miscellaneous component parts required for a complete building (with the exception of anchor bolts and other embedded items, which are excluded). Insulation and other specific items beyond the scope of standard material shall also be furnished if shown or called for by the contract documents.

1.3 Drawings and Calculations

1.3.1 Space Bldgs shall provide erection information and drawings as required to assemble all parts, components, and accessories furnished by Space. Drawings shall include anchor bolt setting plans, roof framing plan, wall framing elevations, cross-sections, etc., and shall also be furnished if shown or called for by contract documents. Page 1 of 13

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1.3.2 Anchor bolt setting plans shall include column reactions for use in designing foundations for the building. However, Space shall not be responsible for the design or the adequacy of the foundation if such is not part of the construction contract.

1.3.3 If required by the contract documents, Space will furnish design calculations or a letter of design certification for the structural framing and covering panels of the metal building system. A letter of certification will be signed and sealed by a registered professional engineer who is licensed in the home state of the Space Regional Manufacturing Facility where the building is designed and fabricated. At the discretion of Space, design calculations may be computer-generated or prepared manually and may also include Space test reports.

1.4 Building Nomenclature

1.4.1 The building width shall be measured from side wall "steel line" to the opposite side wall "steel line." The building length shall be measured from end wall "steel line" to the opposite end wall "steel line."

1.4.2 The building eave height shall be measured from finished floor to top of the eave strut. The top of the eave strut is the point of intersection between the side wall "steel line" and the roof "steel line."

1.4.3 The bay spacing shall be measured as follows:a. Interior bays from center-line to center-line of interior frames.b. End bays from inside of end wall sheets "steel line" to center-line of first interior frame.

1.5 Building Description

1.5.1 Space Buildings are designed to meet customers' exact requirements; therefore, the following information must be included in the contract documents in order to fully specify the building:

a. Size (width, length, eave height) specified to nearest 1/16 ".

b. Primary frame type (see below).

c. Expandable or non-expandable end walls. Also end frame type (see below) if non-expandable.

d. Roof slope specified to nearest 1/16".

e. Side wall girt type (see Primary Frame types) and end wall girt type (see End Frame types).

f. Bay spacing for interior bay and end bays specified to nearest $1/16^{\prime\prime}.$

g. Building location including state and county.

- h. Building code to be used.
- i. Design loads
- ° Live
- ° Collateral
- ° Roof or Ground Snow Load as applicable and exposure
- $^{\circ}$ Wind speed and exposure
- ° Seismic
- ° Occupancy category
- ° Crane data, if applicable, including crane class
- j. Information on attached and adjacent structures.
- k. Serviceability requirements.
- 1.5.2 Primary Frame Types:

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(RF) Rigid Frame Clear Span: Primary frames shall be welded rigid frame design, clear span type, with single gable roof and pin base columns. Columns shall be either tapered or straight as specified. Girts shall be by-pass, inset or flush type. Column bases may be fixed if required. (RF_*) Rigid Frame Multi-Span: Primary frames shall be welded rigid frame design, multi-span type(*use numerical digit to denote number of spans to be furnished), with single gable roof, pin base side wall columns, and rafter supported at intervals by interior pipe columns. Side wall columns shall be either tapered or straight as specified. Girts shall be by-pass, inset or flush type. Column bases may be fixed if required.

(FW) Flush Wall Clear Span: Primary frames shall be welded rigid frame design, clear span type, with single gable roof and pin base columns. Straight columns shall be used and depth shall be limited to contain the column entirely within the girt space. Girts shall be inset or flush type.

(FW_*) Flush Wall Multi-Span: Primary frames shall be welded rigid frame design, multi-span type (*use numerical digit to denote number of spans to be furnished), with single gable roof, pin base side wall columns, and rafter supported at intervals by interior pipe columns. Side wall columns shall be straight, and depth shall be limited to contain the column entirely within the girt space. Girts shall be inset or flush type.

(TB) Tapered Beam Straight Column: Primary frames shall be welded rigid frame design, clear span type, with single gable roof and pin base columns. Columns shall be straight sections with no depth limitation. Rafter shall be a tapered beam with bottom flange horizontal and top flanges sloping with roof pitch. Girts shall be By-pass, Inset or flush type.

(SS) Single Slope Clear Span: Primary frames shall be a welded rigid frame design, clear span type, with single slope roof and pin base columns. Columns shall be either tapered or straight as specified. Girts shall be by-pass, inset or flush type. Column bases may be fixed if required.

(SS_*) Single Slope Multi-Span: Primary frames shall be a welded rigid frame design, multi-span type (*use numerical digit to denote number of spans to be furnished), with single slope roof, pin base side wall columns, and rafter supported at intervals by interior pipe columns. Side wall columns shall be either tapered or straight as specified. Girts shall be by-pass, inset or flush type. Column bases may be fixed if required.

(LT) Lean-to: Primary frames shall be a post and beam design with high side of frame connected to and supported by the main building. Frame shall be a clear span type with single slope roof. When connected at ea lean-to shall match roof slope of main building. Columns and rafters are pinned at both ends. Columns shall be straight sections. Rafter shall be either a tapered beam or beam with parallel flanges as required by design. Girts shall be by-pass or inset type. 1.5.3 End Frame Types a. Bearing End Frame - Hot Rolled (BF):

This type end frame shall be a post and beam design with rafter pin c corner post but continuous over, and supported by, end posts spaced at intervals along the end wall. Corner posts and end posts shall be designed as pinned both ends. Rafter, corner posts, and end posts shall be hot-rolled mill sections or welded-up "H" shaped, straight sections. Girts shall be by-pass or inset type. b. Bearing End Frame - Post and Beam (PB): This type end frame shall be a post and beam design with rafter pin connected at corner and end posts with end posts spaced at intervals along the end wall. Corner posts and end posts shall be designed as pinned both ends. Rafters shall be roll formed cee sections (single or double) or H sections either mill shape or welded-up. Corner posts and end posts shall be roll formed cee sections (single or double) or "H" shaped, straight sections either mill shape or welded-up depending on loading. Girts shall be Inset type. c. Rigid End Frame (Full Load): End frames shall be welded rigid frame of same type and design as primary frames in building. End posts shall be furnished to provide support for girts if a sheeted end wall is specified. End posts shall be hot-rolled mill sections or welded-up "H" shaped, straight sections. Girts shall be by-pass, inset or flush type. d. Rigid End Frame (Half Load): End Frames shall be a welded rigid frame design of same type as primary frames in building, but shall be designed for only half-bay loading. End posts shall be furnished to provide support for girts if portions of end wall sheeted. End posts shall be either hot-rolled mill sections or welded-up "H" shaped, straight sections. Girts shall be by-pass, inset or flush type

SECTION II -- DESIGN SECTION III -- STRUCTURAL FRAMING

2. DESIGN

2.1 General

2.1.1 All structural steel mill sections and welded plate members shall be designed in accordance with the applicable sections, relating to design requirements and allowable stresses, of the American Institute of Steel Construction (AISC) "Specification for Structural Steel Buildings, Allowable Stress Design and Plastic Design."

2.1.2 All light-gauge, cold formed, structural members and covering shall be designed in accordance with the applicable sections, relating to design requirements and allowable stresses, of the American Iron and Steel Institute

(AISI) "Specification for the Design of Cold Formed Steel Structural Members."

2.2 Design Loads

2.2.1 Design load requirements shall be determined by local conditions, applicable codes, building end use, etc. Magnitude of design loads shall be specified by the contract documents.

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Application of design loads shall be in accordance with the Design Practices sections of the Metal Building Manufacturers Association (MBMA) 2002 "Low Rise Building Systems Manual" unless specified otherwise.

2.2.2 Loads to be considered are defined as follows:

a. Dead Load: The weight of the building system materials.
b. Collateral Loads: The weight of additional permanent
materials, other than the building system, such as sprinklers,
mechanical and/or electrical systems, partitions, and ceilings.
c. Roof Live Loads: Loads that are produced 1) during maintenance
by workers, equipment, and materials, and 2) during the life of
the structure by movable objects. Live loads do not include snow,
wind, seismic, or collateral loads.

d. Roof Snow Loads: The vertical load induced by the weight of snow, assumed to act on the horizontal projection of the roof of the structure (assumed to be 0.7 of ground snow unless otherwise specified).

e. Wind Loads: The load caused by wind blowing from any horizontal direction.

f. Seismic Loads: The lateral load due to the action of an earthquake acting on the structure in any horizontal direction. g. Auxiliary loads: Dynamic live loads such as those induced by cranes and material handling systems.

h. Floor Live Loads: Those loads induced on a floor system by the use and occupancy of the building.

2.2.3 Unless otherwise specified, load combinations shall be those listed in the Design Practices section of the MBMA 2002 "Low Rise Building Systems Manual."

3. STRUCTURAL FRAMING

3.1 General

3.1.1 All framing members shall be cleaned to remove loose rust and mill scale, and given one shop coat of primer. Primer shall be formulated to equal or exceed performance, under laboratory conditions, requirements of the Society for Protective Coatings (SSPC) paint spec. 15. The primer coat thickness shall be an average of one mil. At Space's option, secondary structural framing may be cold-formed using prepainted coil stock which eliminates the need for a shop coat of primer. In which case base metal shall be thoroughly cleaned then treated with iron phosphate solution to enhance paint adherence before coil is coated with a red oxide polyester paint. Paint dry film thickness shall be 0.5 mil on both sides.

3.1.2 In compliance with the 2001 ASTM Standards for Metal Building Systems all references in the Product Manual to ASTM A-570 and ASTM A-607 should be regarded as references to ASTM A-1011-SS and ASTM A-1011-HSLAS respectively. 3.2 Primary Members Page 5 of 13

3.2.1 Primary structural framing shall refer to the Primary Frames (transverse rigid frames and lean-to rafters/columns), expandable and non-expandable End Frames (rafters/corner posts/end posts). Wind/Seismic Bracing, and Crane Systems. a. Sheet, plate, strip mill plate, plate coils and flat bar stock used to fabricate welded up structural members shall conform to one of the following ASTM specifications as appropriate: ASTM A-572, Grade 50 Type (producer option); ASTM A-529, Grade50; ASTM A-1011-HSLAS, Grade 50 Class 1. b. Members fabricated from W shapes (hot-rolled structural sections) will conform to one of the following ASTM specifications: ASTM A-529, Gr. 50; ASTM A-572, Grade 50 Type (producer option) or ASTM A-992, Grade 50. c. Members fabricated from other hot-rolled structural sections (S shapes, American Standard channels, angles, rods for anchor bolts, and all other miscellaneous structural shapes) shall conform to ASTM A-529, Grade 50 or ASTM A-572, Grade 50 Type (producer option). d. Interior columns of multi-span frames will be fabricated from round pipe or tube column sections which have a minimum yield strength of 42,000 psi and 46,000 psi respectively and conform to physical specifications of ASTM A-500, Grade B (welded or seamless). e. Rods used for bracing will conform to the physical specifications of ASTM A529, Gr. 50 or ASTM A-572 Grade 50 Type (producer option). f. Cables used for bracing shall be zinc coated steel wire (7 strands), in conformance with ASTM A-475 EHS, Class A. q. Members fabricated by cold forming process shall conform to ASTM specification ASTM A-1011, Grade 55 or ASTM A-1011-HSLAS, Grade 55, Class 1. 3.3 Secondary Member 3.3.1 Secondary structural framing shall refer to purlins, girts, eave struts, base members, flange bracing, gable angles, clips and other miscellaneous structural parts a. Purlins, girts, eave struts, base members and gable angles shall be cold-formed from steel conforming to ASTM specification A-1011, SS, Grade 55 or ASTM A-1011-HSLAS, Grade 55, Class 1. 1. Purlins are roll formed "Z" sections, 8 1/2" or 10" deep. Each flange of these "Z"s has a stiffening lip formed at 50° to the flange. 2. Girts are either roll formed \Z'' sections, 8 1/2'' or 10" deep, or roll formed "C" sections, 8 1/2" deep. Each flange of these members as a stiffening lip formed at 50° to the flange on Z's and at 90° on "C″s. 3. Eave struts are roll formed or press broke "C" sections, 8 1/2 inch deep (roll formed) with 3 1/4" wide top and bottom flanges; or brake

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formed "C" sections 9 5/8" deep with 3 1/4 " wide top flange and 4 1/2 "wide bottom flange. Flanges are formed at angles other than 90 degrees to the web to accommodate various roof slopes. Each flange has a stiffening lip formed at 90 degrees to the flange. b. All other miscellaneous secondary members shall have a minimum yield strength of 50,000 psi. 3.4 Connections 3.4.1 All field connections shall be bolted (unless otherwise noted). a. All primary bolted connections, as shown on drawings, shall be furnished with high strength bolts conforming to ASTM specification ASTM A-325. b. All secondary bolted connections, as shown on drawings, will be furnished with high strength bolts conforming to ASTM specification ASTM A-325. c. The standard A325 bolts shall be uncoated. Special coatings in conformance with ASTM specifications are available by special order. d. Connections using high strength bolts in conformance with ASTM A-325 shall use nuts in conformance with ASTM specification ASTM A-563 Grade C Heavy Hex. e. All cast iron slope washers shall conform to ASTM specification A-148 Grade 80-50. f. Hardened Steel Washers in conformance with ASTM specification ASTM F-436, Type 1 carbon steel are available by special order. 3.4.2 All shop welding shall be by either the submerged arc, gas metal arc process. Complete Joint Penetration welds shall develop the full strength of the members connected. Welding shall conform to the applicable requirements of the American Welding Society "Structural Welding Code," AWS Dl.1-02 with ultrasonic test acceptance criteria. 3.4.3 Should unannounced ultrasonic testing be required for pieces already fabricated, Space will consider welding that conforms to AWS D1.1-02 and the "modified ultrasonic test acceptance criteria" (per Section 6.8) based on suitability for service criteria, to be adequate. The modified ultrasonic acceptance criteria are given in "Alternative Table 6.2 AWS D1.1-02" in the Space Building Systems Welding Manual. The documentation supporting the modified acceptance criteria is contained in the test report "Testing and Inspection of Welding Procedures" by Goodrich Testing and Engineering, Inc. of Nashville, Tennessee. This documentation is available on request from Space Building Systems.) 4.1 Roof and Wall Coverings - General 4.1.1 Standard covering for roofs or walls shall be a ribbed-type panel having 36 inch net coverage. These panels shall be 26 gauge, GALVALUME steel, with or without a color coating. At Space's option, substrate for color coated panels may be galvanized steel sheet in lieu of GALVALUME.

4.1.2 Premium covering for roofs shall be a standing seam panel having either 24" net coverage (CXP), 30" net coverage (CLP), or 16" net coverage (CRP16). These panels shall be 24 gauge, GALVALUME, (or acrylic coated galvalume for 24 gauge CXP) steel with or without a color coating. CXP may be 22 gauge if required.

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4.1.3 Premium covering for walls shall be a concealed fastener panel having 16-inch net

coverage (CWP16). These panels shall be 24 gauge, GALVALUME with a color coating. At Space's option, substrate for these panels may be galvanized steel sheet in lieu of GALVALUME.

4.1.4 All Panels, both standard and premium, shall be precision rollformed to the required configuration specified under Section 4.3, except for the MIP panel which may be brake-formed to the configuration specified under section 4.3.1.

4.1.5 Roof and wall panels of other materials and thicknesses are available upon request.

4.2 Panel Materials

4.2.1 Galvanize is a corrosion resistant zinc coating applied by a hot dip galvanization process. Galvanized panels shall conform to ASTM specification ASTM A-653, Grade 50 with coating weight G90. Grade 80 may be used as specified under item 4.3.3.

4.2.2 GALVALUME is a specialty steel sheet product with a patented coating of corrosion-resistant, aluminum-zinc alloy applied by a continuous hot dipping process. GALVALUME steel panels shall have a minimum yield strength of 50,000 psi unless otherwise specified under Item 4.3.3. (b) & (c). GALVALUME steel will conform to ASTM specification A-792, SS, Grade 50, Class 2, Fu=60 ksi, with coating weight AZ55 for bare GALVALUME and AZ50 for painted GALVALUME. Grade 80 may be used as specified under item 4.3.3.

4.2.3 Acrylic coated Galvalume (Also referred to as Galvalume Plus and Acrylume) is a bare galvalume sheet product with a thin, clear acrylic coating applied to both sides of the sheet. This panel conforms to ASTM specification A-792, SS, Grade 50 Class 2, Fu=60 ksi,. Acrylic coated galvalume resists fingerprinting and smudging during handling and installation.

4.2.4 Standard Paint, color coated panels shall have the exterior side finished with a silicone polyester coating system applied over GALVALUME or galvanized steel substrate. Surfaces shall be chemically cleaned, pretreated, primed, and coated, then ovenbaked to cure. Top coating system shall have a dry film thickness of 0.70 to 0.80 mils. Specular Gloss at 60° viewing angle shall be 25 to 40. The interior side of these panels shall be protected by a wash coat of primer. Panels shall be coated prior to roll forming.

4.2.5 Premium Paint, color coated panels shall have the exterior side finished with an extended life, fluoropolymer coating utilizing Kynar 500 Resin. This coating shall be applied over a GALVALUME or galvanized steel substrate. Surfaces shall be properly prepared and primed, then coated and oven-baked to cure. Top coating system shall have a dry film thickness of .75 -.90 mils on the exterior surface. Specular Gloss at 60° viewing angle shall be 35± 5%. The interior side of these panels shall be protected by a back coat system of .60 ± .05 mils thickness. Panels shall be coated prior to roll forming.

4.3 Panel Configurations and Finishes

4.3.1 Ribbed Wall Panels shall be as follows:

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MVW (Versatile Panel) shall have 1 1/8 " deep major ribs which taper in width from 1 3/4'' to 3 1/2'', and are spaced 12" on center. Between each major rib are two minor stiffening ribs. The "leading edge" rib has a bearing leg. Each panel shall provide 3 feet of lateral coverage. Panel finish shall be either GALVALUME or painted. Refer to color charts for Standard and Premium paint colors available. When supplied by the Midwest Region, the MVW panel may have 1 3/16 " deep major ribs which taper in width from 2" to 37/8", and are spaced 12" on center. MSP (Shadow-Lite Panel) shall have 1 1/4 " deep ribs which reverse taper in width from 2 3/4 `` to 3/4 ``, and are spaced 12" on center. Between each major rib, the panel is formed into a sculptured "valley" shape with six small "pencil" ribs in each "valley". Each panel shall provide 3 feet of lateral coverage. Panel finish shall be either GALVALUME or painted. Refer to color charts for Standard and Premium paint colors available. MAP (Architectural Panels) shall have 11/2" deep major ribs which taper in width from 2" to 3 13/16", and are spaced 12" on center. Between each major rib are two minor stiffening ribs, plus two small "pencil" ribs. The "leading edge" rib has a bearing leg. Each panel shall provide 3 feet of lateral coverage. Panel finish shall be either GALVALUME or painted. Refer to color charts for Standard and Premium paint colors available. MIP (Interior Panel) shall have 3/4'' deep major ribs which taper in width from nominally 1" to 2" and are spaced 6" on center. The "leading edge" rib has a bearing leg. Each panel shall provide 3 feet of lateral coverage. Panel finish shall be either GALVALUME or painted. Refer to color charts for Standard and Premium paint colors available. 4.3.2 Concealed Fastener Wall Panels shall be as follows: CWP16 (Concealed Fastener Wall Panel) shall be roll-formed with the face of the panel having an inset portion in the center third of the 16" width to provide a 6" wide, low face plane between two 5" wide, high face planes at edges, Panel is 3" deep at the high planes and 1 1/2 " deep at the low plane. Side laps shall be of interlocking flange design to form a rigid, permanently tight joint that will not open up or pull apart. Panels shall be connected to supporting structural members with fasteners that are concealed from exterior view. Factory applied sealant shall be provided in the interlocking side joint to provide weather tightness. Each panel shall provide 16" coverage. Entire face of panel shall be embossed to add texture, and finish shall be an extended life color coating in one of Space's Premium Paint colors. Refer to color charts for Premium paint colors available. 4.3.3 Ribbed roof panels shall be as follows: MAP (Architectural Panel) shall have 1 1/2 " deep major ribs which

MAP (Architectural Panel) shall have 1 1/2 " deep major ribs which taper in width from 2" to 3 15/16", and are spaced 12" on center. Between each major rib are two minor stiffening ribs plus two small "pencil" ribs. The "leading edge" rib has a bearing leg. Each panel shall provide 36" of lateral coverage. Panel finish shall be either GALVALUME or painted. Refer to color charts for Standard or Premium paint colors available. NOTE: MAP has achieved UL90 Listing.

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MVR (Versatile Panel) shall have 1 1/8" deep major ribs which taper in width from 1 3/4" to 3 1/2", and are spaced 12" on center. Between each major rib are two minor stiffening ribs. The "leading edge" rib has a bearing leg. Each panel shall provide 36" of lateral coverage. Panel finish shall be either GALVALUME or painted. Refer to color charts for Standard paint colors available. Steel sheet for these panels shall have a minimum yield strength of 80,000 psi. When supplied by Midwest Region the MVR panel may be 1 3/16 " deep and 3 7/8" wide at the base. NOTE: MVR has achieved UL90 Listing.

4.3.4 Standing Seam Roof Panels shall be as follows:

CXP (Standing Seam Roof Panel) shall be roll formed 24" wide. Each edge corrugation shall be one half of a major rib and shall have a standing leg on top of the half rib that

interlocks with the adjacent panel. Edge corrugation shall be 2" high (2 7/8 " including the standing leg). All major ribs shall taper in from 1" at top to 4 1/4 " at base. Interlocking standing legs at side laps shall be field seamed together into a Pittsburgh double fold, lock joint by use of an electric seaming machine obtained from Space. Factory applied sealant shall be provided in the overlapping standing seam leg to assure weather-tightness of the seamed joint. Concealed clips, which are seamed into the panel side lap, shall be furnished by Space to fasten panels to structural members.

Panels shall be factory pre-notched for correct make-up at end laps. Each panel shall provide 24" coverage. Panel finish shall be Acrylic Coated Galvalume (Also referred to as Galvalume Plus and Acrylume). 22 gauge may be Galvalume. Refer to color charts for Standard and Premium paint colors available.

NOTE: CXP has achieved UL90 Listing, has passed the American Society of Testing and Materials (ASTM) E1592 test and has been approved by Factory Mutual as a Class 1 roof panel.

CLP (Spacelok Standing Seam Panel) shall be roll-formed 30" wide with three major configurations (ribs) spaced 15" on center. Each edge corrugation shall be one-half of

a major rib and shall have a standing leg on top of the half rib that interlocks with the

adjacent panel. Edge corrugation shall be 2" high (2 7/8 " including standing leg). The middle corrugation on the panel shall be a full major rib, 2" high. All major ribs shall taper in width from 1 3/4 " at top to 5" at base. Three longitudinal, minor corrugations ("pencil" ribs) shall be provided in each flat area of the panel.

Interlocking standing legs at side laps shall be field seamed together into a Pittsburgh double-fold, lock joint by use of an electric seaming tool obtained from Space. Factory applied sealant shall be provided in the overlapping standing leg to assure weather tightness of the seamed joint. Concealed clips, which are seamed into the panel side lap, shall be furnished by Space to fasten panels to structural members. Panels shall be factory pre-notched for correct make-up at end laps. Each panel shall provide 30" coverage. Panel finish shall be either GALVALUME or painted. Refer to color charts for Standard and Premium paint colors available. NOTE: CLP has achieved UL90 Listing.

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CRP16 (Space Straight Rib Architectural Roof Panel) shall be rollformed 16 inches wide with a 2 inch deep straight rib at each edge. One edge rib shall have a "male" flange at its top and the other edge rib shall have a "female" flange. This design allows a friction interlock of "male/female" ribs on adjacent panels. At end laps the end of the overlapping panel shall be factory swaged to allow nesting with the bottom panel. Interlocking straight ribs at side laps shall be field crimped together by the use of an electric seaming tool obtained from Space. Factory applied sealant shall be provided in the overlapping "female" flange to assure weathertightness of the continuously crimped joint. Concealed clips, which are crimped into the panel side laps, shall be furnished by Space to fasten panels to structural members. Each panel shall provide 16 inches coverage. Surface texture of panel may be specified as smooth or embossed. Finish may be specified as either GALVALUME or painted. Refer to color charts for Standard and Premium paint colors available. NOTE: CRP has achieved UL90 Listing and passed the ASTM E1592 test. CCR (Space Composite Roof System) is a field assembled sandwich panel roof consisting of a metal liner panel, rigid board insulation, and a standing seam roof panel. The interior liner shall be a rib type panel that is attached directly to structural members with screw fasteners. This panel is available in GALVALUME or painted finish. Rigid board insulation is next laid on top of the liner panel. Insulation material and thickness shall be as required to obtain specified "R" value. The exterior roof panel shall be one of Space's standing seam panels (CLP, CXP, or CRP) as specified above. Standard concealed clips are used to attach the standing seam panels. A metal bearing plate is used under the base of each clip and clips are anchored by using long screw fasteners to penetrate through insulation and liner panel into the structural framing members.

4.4 Flashing, Trim & Closures

4.4.1 Flashing and/or trim shall be furnished at eaves, rake, corners, base, framed openings, and wherever necessary to seal against the weather and provide a finished appearance. Color shall be selected from Space's Standard paint colors except for trim. Standard colors for this item are "Glacier White" or "Burnished Slate" although other olors are available by special request. Profiles and dimensions of all flashing/trim will be Space's standards. Refer to color charts for

Space's Premium paint colors available for trim.

4.4.2 Eave gutters and downspouts may be specified as optional. Gutters are box-shaped with face profile shaped to match rake trim. Downspouts are rectangular-shaped (3 11/16" x 5 1/4"min. size) and shall have a 45 degree elbow at the bottom. Standard colors for eave gutters are "Glacier White" or "Burnished Slate" although other colors are available by special request. Color for downspouts shall be selected from Space's Regional Standard and Premium paint color charts. 4.4.3 Color coated, GALVALUME or galvanized steel for flashing, trim, metal closures, gutter and downspouts (29 gauge), and other miscellaneous uses shall be 26 gauge thickness of the same specification as the roof and wall covering material. 4.4.4 Material used for Base Angle/Trim members shall be color coated, 18 gauge, galvanized steel, 36,000 yield strength. Color shall be

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"Burnished Slate". 4.4.5 Preformed, closed cell, polyethylene closure strips matching the profile of the panel shall be installed along the eave and at other locations to provide weathertightness when shown on Space's erection drawings.

4.5 Fasteners

4.5.1 Wall Fasteners shall be self-drilling carbon steel screws with an integral 5/16 inch hex. washer head. Screws for "panel to structural" application shall be #12 diameter with a minimum length of 1 1/4 inches. "Stitch" screws shall be 1/4 inch diameter and 7/8 inches long. Panel to structural screws shall have a sealing washer (PVC or EPDM). Both "standard" and "optional" Wall Fasteners shall have carbon steel heads. Entire fastener (body and head) shall have 0.0005 inches minimum thickness zinc plating plus a polymer coating for long term corrosion resistance. Fastener head shall also be painted to match wall panel and/or trim color. 4.5.2 Roof Fasteners shall be self-drilling carbon steel screws with an integral 5/16" hex.washer head (washer face undercut to encapsulate a sealing washer). Screws for "panel to structural" application shall be #12 diameter with a minimum length of 1 ¼ inches. "Stitch" screws shall be 1/4 inch diameter and 7/8 inches long.

Standard Roof Fasteners shall be screws with carbon steel heads and shall have a sealing washer (PVC or EPDM). Entire fastener (body and head) shall have 0.0005 minimum thickness zinc plating plus a polymer coating or long term corrosion resistance. When used with color coated material, fastener head shall also be painted to match panel and/or trim color. Optional Roof Fasteners shall be screws with an "Extended Life" head and shall have a sealing washer (EPDM). "Extended Life" heads shall be either a zinc/aluminum/manganese alloy casting or a 300 series stainless steel cap: (customer's option). Body (shank) of fastener shall have 0.0005 inches minimum thickness zinc plating. When used with color coated material, fastener head shall be painted to match panel and/or trim color.

4.6 Sealants

4.6.1 Sealants for side laps, end laps, accessories, etc. shall be a preformed, butyl rubber based compound. The material shall be non-hardening, non-shrinking and noncorrosive and shall have excellent adhesion to metals, painted surfaces and plastics at temperatures from -30° F to 160° F. These sealants shall be in tape mastic form, of shape and size recommended by Space for various applications, and shall have paper backing for easy handling.

4.6.2 Tube sealants shall be used to supplement tape mastic sealants and shall be appliedin locations indicated by erection instructions. Tube sealant shall be a synthetic, elastomer-based material which becomes tack-free in less than 2 hours at 75°F but retains flexibility. 4.7 Installation of Wall and Roof Panels

4.7.1 Wall panels shall be continuous from base to eave. If panel lengths exceed manufacturing and shipping limitations, splice shall occur over a wall girt.

4.7.2 Roof panels shall be continuous from eave to ridge. If panel lengths exceed manufacturing and shipping limitations, splice end laps

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shall be installed per Space's erection details. Sealant shall be used in all roof panel end laps. 4.7.3 When specified, all ribbed, roof panel side laps shall be sealed with a field applied, continuous ribbon of tape mastic sealant. Eaves shall also be sealed when specified.

4.8 Underwriters Laboratories Uplift Ratings

4.8.1 For compliance with Underwriters Laboratories standard UL 580 class 90 (UL90) requirements, the following panels, installed in accordance with Space's standard erection instructions, shall be used. MAP with up to 6" blanket type insulation MVR with up to 6'' blanket type insulation CLP with up to 6" blanket type insulation CLP with up to 4" rigid board insulation CRP16 with up to 6" blanket type insulation CRP16 with up to 4 1/4 " rigid board insulation CXP with up to 4" rigid board insulation Composite with up to 4" rigid board insulation 4.9 Factory Mutual Uplift Ratings For compliance with Factory Mutual, Space has the following panels which are listed in the FM Approval Guide and can be designed to meet FM Loss Prevention Data Sheets 1-28, 1-31 and 1-54. Space CXP Roof System configurations meeting Factory Mutual Class 1 Ratings

Purlin Purlin Angles Purlin Joist

Type F CXP 24 gauge	M Rating 1-60 and 1-75	Spacing 5'-0"	Spacing 2'-6"	Spacing 1'-8"	Required No	Thick 0.059″	Thick 0.10"
CXP 22 gauge	1-90	5'-0"	2'-6"	1'-8"	No	0.059″	0.10″
CXP 22 gauge	1-105	2′-6″	1'-3"	0'-10"	No	0.059″	0.10″

FM Hail Rating: Class 1-SH ASTM E 108: Class C noncombustible deck at max 5 in 12 slope A minimum of two self drilling screws required per clip This table is based on prescriptive requirements of FM Data Sheet 1-31 (May 2002) and the FM Approval Guide (January 2002) listing.

PANEL