



GENERAL SPECIFICATIONS

1. GENERAL

1.1 Scope

- 1.1.1 These specifications delineate the design criteria, material quality, and fabrication processes used in metal building systems designed, manufactured and furnished by Armor Steel Buildings, Inc. (herein referred to as Armor).
- 1.1.2 These specifications are intended for use as an outline of the performance requirements for the various materials used within Armor. They are further intended to ensure that architects, engineers, builders, and/or owners understand the basis for design, manufacture, and application of these materials.
- 1.1.3 Engineering and/or mechanical properties of materials utilized by Armor in its product line are provided and/or referenced within these specifications, as are industry specification standards, where applicable.

Application of various materials are covered under their pertinent section of these specifications.

- 1.1.4 Armor 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 Armor documents. In all cases however, unless stipulated otherwise in the contract documents, Armor's design, fabrication and quality criteria, standards, practices, methods, and tolerances will govern the work and other interpretations to the contrary notwithstanding.

- 1.1.5 **Due to Armor'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. All specifications will be per the specifications, terms and conditions of each individual contract unless specifically noted.**

1.2 Materials Included

- 1.2.1 Standard material furnished for Armor 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 contract documents.

1.3 Drawings and Calculations

- 1.3.1 Armor shall provide erection information and drawings as required to assemble all parts, components, and accessories furnished by Armor. Drawings shall include anchor bolt setting plans, roof framing plan, wall framing elevations, cross-sections, etc., and shall indicate piece marks of all major parts for easy field identifications. Calculations may be ordered at additional charge if required.
- 1.3.2 Anchor bolt setting plans will include column reactions for use in designing foundations for the building. Unless otherwise noted on the contract documents, Armor shall assume that the foundation, once complete, is level. However, Armor shall not be responsible for the design of or the adequacy of the foundation.
- 1.3.3 If required by the contract documents, Armor will furnish design calculations or a letter of design certification for the structural framing and covering panels of the metal building system. Letter of certification will be signed and sealed by a registered professional engineer who is licensed in the home state of the Armor Regional Manufacturing Facility where building is designed and fabricated. At the



discretion of Armor, design calculations may be computer-generated or prepared manually and may also include Armor test reports.

1.4 Building Nomenclature

- 1.4.1 The building “width” and “length” shall be measured from inside to inside of wall covering; or face of girts in the event there is no wall covering provided.
- 1.4.2 The building eave height shall be measured from bottom of primary frame base plate to top of the eave strut. The top of the eave strut is the point of intersection between the inside surfaces of the wall and roof covering.
- 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 to center-line of first interior frame.

1.5 Building Description

- 1.5.1 Armor 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, and eave height) specified to nearest 1/16 inch.
 - b. Primary frame type (see below).
 - c. Expandable, non-expandable or bearing frame end walls. Also end frame type (see below) if Rigid Frame.
 - d. Roof slope specified to nearest 1/16 inch.
 - e. Side wall girt type (see Primary Frame types) and end wall type (see End Frame types).
 - f. Bay spacing for interior bays and end bays specified to nearest 1/16 inch (Bays may be equal or mixed).
- 1.5.2 Primary Frame Types:
 - (RF) Rigid Frame Clear Span: Primary frame 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 or Flush type.
 - (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 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 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 or Flush type.



(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 or Flush type.

(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 eave line of main building, roof slope of 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 Flush type.

1.5.3 End Frame Types

- a. Bearing End Frame: End Frame shall be a post and beam design with rafter pin connected at 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 on both ends. Rafter, corner posts, and end posts shall be cold form C-section, hat-rolled mill sections or welded-up, "H" shaped, straight sections. Girts shall be By-pass or Flush type.
- b. Rigid End Frame (Full Load): End Frames shall be a 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 either hot-rolled mill sections or welded-up "H" shaped, straight sections. Girts shall be By-pass or Flush type.
- c. 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 are specified to be sheeted. End posts shall be either hat-rolled mill sections or welded-up "H" shaped, straight sections. Girts shall be By-pass or Flush type.



SECTION 2. DESIGN

2.1 General

- 2.1.1 All structural steel sections and welded plate members shall be designed in accordance with the applicable sections, relating to design requirements and allowable stresses, of the latest edition of the American Institute of Steel Construction (AISC) "Specification for the Design, Fabrication and Erection of the Structural Steel for Buildings".
- 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 latest edition 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. Application of design loads shall be in accordance with the Design Practices sections of the Metal Building Manufacturers Association (MBMA) 1986 "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. Roof snow shall be calculated from the Ground Snow Load specified with reductions as allowed by the building code specified.
 - e. Wind Loads: The load caused by wind blowing from any horizontal direction (wind load may be specified as mph or as psf).
 - 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.
- *Note: Building system shall be designed for the live load specified or the snow load specified whichever produces the most unfavorable effect. It is the dealer's responsibility to ensure that the loads specified for estimation and on the contract documents is adequate for the area and use of the building ordered.
- 2.2.3 Specified design loads shall be considered to act in various combinations so as to produce the most unfavorable effect on the building or structural member concerned. Unless otherwise specified, load combinations shall be those listed in the Design Practices section of the MBMA 1986 "Low Rise Building Systems Manual".

SECTION 3. STRUCTURAL FRAMING

3.1 General

- 3.1.1 All framing members shall be shop-fabricated for bolted field assembly unless otherwise noted on erection drawings.
- 3.1.2 All framing members shall be cleaned to remove loose rust and mill scale, and given one shop coat of red color primer (IL Plant) and grey primer (PA Plant). Primer shall be formulated to equal or exceed performance, under laboratory conditions, requirements of U.S. Federal Specification TTP-M. The primer coat thickness shall be an average of one mill.

At Armor's option, secondary structural framing may be cold-formed using galvanized coil stock, which eliminates the need for a shop coat of primer (standard for PA Plant).

3.2 Primary Members

- 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 poststend posts). Wind/Seismic Bracing, and Crane Systems.
- Members fabricated from plate, plate coils, strip mill plate or flat bar stock shall have flanges and webs joined on one side of the web by a continuous welding process. All material shall have minimum yield strength of 50,000 psi. Material will conform to physical specifications of the following ASTM specifications: plate (ASTM A-572 Gr 50); plate coils and strip mill plate (ASTM A-570, Gr. 50); and flat bar (ASTM A-36 Modified 50).
 - Members fabricated from W shapes (hot-rolled structural sections) will confirm to the physical specifications of ASTM A-36 except that steel shall have a minimum yield strength of 50,000 psi.
 - Members fabricated from other hot-rolled structural sections (S shapes/American Standard channels/angles/rods for anchor bolts/all other miscellaneous structural shapes) shall have a minimum yield strength of 36,000 psi and will conform to the physical specifications ASTM A-36.
 - Interior columns of multi-span frames will be fabricated from round pipe column sections, which have minimum yield strength of 36,000 psi.
 - Rods used for bracing will conform to the physical specifications of ASTM A-36 except that steel shall have minimum yield strength of 50,000 psi.
 - Cables used for bracing shall be zinc coated steel wire (7strands), extra high strength grade.
 - Members fabricated by cold forming process shall have minimum yield strength of 55,000 psi and will conform to the physical specifications of ASTM A-570.

3.3 Secondary Members:

- 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.
- Purlins, girts, eavestruts, base members and gable angles shall be cold formed from steel which has a minimum yield strength of 55,000 psi and will confirm to the physical specifications of ASTM A-570.
- Purlins are roll formed "Z" sections, 8 inches or 10 inches deep. Each flange of these "Zs" has a stiffening lip formed at 50° to the flange.

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1. Girts are either roll formed "Z" sections, 8 inches or 10 inches deep, or cold formed "C" sections, 8 inches or 10 inches deep. Each flange of these members has a stiffening lip formed at 50° to the flange on "Zs" and at 90° on "Cs".
 2. Eave struts are roll formed "C" sections, 8 inches deep with 4 inches wide top and bottom flanges or brake formed "C" sections 10 inches deep with 4 inches wide top flange and 4 inches bottom flange. Flanges are formed at angles other than 90° to the web to accommodate various roof slopes. Each flange has a stiffening lip formed at 90° to the flange.
- b. All other miscellaneous secondary members shall have minimum yield strength of 36,000 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 the physical specifications of ASTM A-325. All high strength bolts and nuts shall be plated and coated with a zinc chromate dip for extended life and for easy identification.
 - b. All secondary bolted connections, as shown on drawings, will be furnished with machine bolts conforming to the physical specifications of ASTM A-307 unless ASTM A-325 bolts are required by design. Bolts and nuts for secondary connections shall also be plated for extended life.
- 3.4.2 All shop connections shall be welded using either submerged arc or gas metal arc or shielded arc process, and welding shall be in accordance with the applicable sections, relating to design requirements and allowable stresses, of the latest editions of the American Weld Society "Structural Welding Code".



SECTION 4. ROOF AND WALL COVERING

4.1 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 Armor'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 standing seam panel. These panels shall be a 24 gauge trapezoidal panel, 24" wide Galvalume™ steel with or without a color coating.
- 4.1.3 Premium covering for walls shall be a concealed fastener panel having 18-inch net coverage. These panels shall be 24 gauge, Galvalume™ with a color coating. At Armor'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 roll-formed to the required configuration specified under Section 4.3.
- 4.1.5 Roof and wall panels of other materials and thickness are available upon request.

4.2 Panel Materials:

- 4.2.1 Galvalume™ is a specialty steel sheet product with a patented coating of corrosion resistant, aluminum-zinc alloy applied by a continuous hot dipping process. Typical coating weight is 0.5 oz. per square foot of coated sheet (both sides)-equivalent to approximately 0.8 mil thickness on each side. Galvalume™ steel panels shall have minimum yield strength of 80,000 psi unless otherwise specified under Item 4.3.3 (a), (b), & (c). Galvalume™ steel will conform to ASTM specification A-792.
- 4.2.2 Galvanize is a corrosion resist zinc coating applied by a hot dip galvanization process conforming to ASTM Specification A525 with a coating class of G-90, i.e. 0.90 oz. per square foot of coated sheet (both sides)-equivalent to approximately 0.85 mil thickness on each side. Base metal for galvanized panels shall have minimum yield strength of 80,000 psi, unless otherwise specified under Item 433 (a), (b) & (c), and will conform to the physical specifications of ASTM A-446.
- 4.2.3 Color coated panels shall have the exterior side finished with a siliconized polyester*, or Polyceray 3200 coating system applied over the Galvalume™ or galvanized substrate. Surfaces shall be chemically cleaned, pre-treated, primed, and coated, then oven-baked to cure. Total coating system shall have a one mil dry film thickness. Gloss rating for exterior coating shall be 20 to 35 except as specified under Item 4.3.2. The interior side of these panels shall be protected by a wash coat of primer applied at 0.5 mil dry film 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:

"R" Panel shall have 1¼ -inch deep major ribs, which taper in width from 1 inch to 3 1/16 inches, and are spaced 12 inches on center. Between each major rib is minor stiffening ribs. The "leading edge" rib has a bearing leg. Each panel shall provide 3 feet of lateral coverage. Panel finish shall be Galvalume™ or Armor's "Standard" color coating.

- 4.3.2 Ribbed roof panels shall be as follows:

"R" Panel shall have 1¼-inch deep major ribs which taper in width from 1 inch to 3 1/16 inches, and are spaced 12 inches 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 Galvalume™



“PBR” Panel shall have 1¼-inch deep major ribs which taper in width from 1 inch to 3 1/16 inches, and are spaced 12 inches 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 Galvalume™.

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 Armor’s standard panel. Profiles and dimensions of all flashing/trim will be Armor’s standards.
- 4.4.2 Eave gutters and downspouts may be specified as optional. Gutters are formed with face profile shaped to match rake trim. Downspouts are rectangular-shaped (4” x 5” min. size). Standard Gutters and Downspouts are available in Armor’s standard trim colors, although other colors may be available at additional cost. Unless otherwise specified, Gutters and Downspouts shall match the trim color selected.
- 4.4.3 Color coated, Galvalume™ or galvanized steel for flashing, trim, metal closures, gutter and downspouts, and other miscellaneous uses shall be 26 guage thickness of the same specification as the roof and wall covering material.
- 4.4.4 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 Armor’s erection drawings.

4.5 Fasteners

- 4.5.1 Standard wall fasteners shall be No. 12, self-drilling carbon steel screws with an integral, hex-washer head, and without a sealing washer. Minimum length of fasteners shall be 1¼ inches for “panel to structural” application and ¾ inches for “stitch” screws.
- 4.5.2 Standard roof fasteners shall be No. 12 self-tapping, carbon steel screws with an “extended life” hexagon head that is compatible with Galvalume™ or color coated panels. A sealing washer shall be provided. Minimum length of fasteners shall be 1 inch for both “panel to structural” applications and ¾ inches for “stitch” screws.

Optional roof fasteners shall be No. 12 self-tapping, carbon steel screws with an “extended life” hexagon head that is compatible with Galvalume™ or color coated panels. A sealing washer shall be provided. Minimum length of fasteners shall be 1¼ inch for both “panel to structural” and “stitch” applications.

“Extended life” heads will be either a zinc/aluminum/manganese alloy casting or a 302 stainless steel cap over the carbon steel head, at Armor’s option. When used with color coated material, fasteners 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 non-corrosive 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 Armor 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 applied in 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 shall occur at a roof purlin. 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.

4.7.4 Fastener population and pattern for both wall and roof panels shall be as shown on erection details.

4.8 Underwriters Laboratories Uplift Ratings

4.8.1 By increasing roof fastener population and changing installation pattern, certain Armor roof panels will obtain an Underwriters Laboratories wind uplift classification of Class 30, Class 60 or Class 90. UL uplift ratings may be specified on the following roof panels:

“PBR” with up to 6 inch blanket type insulation where purlin spaces do not exceed 4’-6”): UL 90.



SECTION 5. ACCESSORIES

5.1 Personnel Doors

- 5.1.1 Personnel (walk) door leaves shall be Armor, full flush hollow metal doors, 1¼ inches thick with 20 gauge, G-60 galvanized skins over a kraft honey-comb core (typical) or a urethane foam core (optional). Leaf shall be reversible to work with non-handed door frames.
- 5.1.2 Personnel (walk) door frames shall be Armor non-handed (reversible) frames, 4 inches deep with a 2 inch wide face, 16 gauge, G-60 galvanized steel with square cut, butted corners. Jambs and header are of knock-down type for field assembly through bolted connections. Door frame shall be an open "C" section to "wraparound" end of 8-inch girts.
- 5.1.3 Personnel door sizes shall be either 3070 (single), 4070 (single) or 6070 (double). In addition to size, doors shall be designated as M (solid leaf), G (half glass; 23" x 29" nominal size), or IV (long vision glass; 6" x 54" nominal size). Doors shall be factory glazed with clear glass.
- 5.1.4 Hardware furnished with all doors shall consist of 1½ pair of butts for each leaf (all hinges are plated and have a non-removable pin), a lockset in US26D or US32D finish, and an aluminum threshold (3 3/8 inches wide) with vinyl door sweep. An astragal will be furnished for active leaf of double doors as will head and foot bolts for inactive leaf.

Optional hardware that may be specified is:

- (a) Handicap (lever) handles, in lieu of knobs, on mortise locksets.
 - (b) Panic exit/entrance hardware for single doors or for active leaf only of double doors. Panic device will be touchbar type with cylindrical locks and pushbar type with mortise locks.
 - (c) Surface mounted door closers.
 - (d) Vinyl weatherstripping kit.
- 5.1.5 Steel metal trim shall be furnished with all doors to flash around door frame and provide a finished appearance.

5.2 Horizontal Sliding Windows

- 5.2.1 Aluminum windows shall be single slide (horizontal) types, with pre-glazed clear glass, removable half screens, latching device, and weather-stripping. Window extrusions shall have mounting fins for connecting to structural sub-framing.
- 5.2.2 Single windows shall be 3030, 4030, or 6030 nominal size. Double or multiple windows can be formed by joining the window jamb fins together, and adding a reinforcing mullion.
- 5.2.3 Window shall be glazed with clear glass using vinyl glazing beads and shall be backbedded. Screens for windows shall be fiberglass mesh (dark bronze color) in an aluminum frame (finish to match window finish).
- 5.2.4 All structural members shall be extruded aluminum, assembled with screws and sealed at junctions. Window construction shall conform to AAMA (American Aluminum Manufacturers Association) Specification A-1, Class II.
- 5.2.5 Structural sub-framing, consisting of angle sections (hot-rolled or cold formed), shall be furnished with each window. Sub-framing, consisting of cold formed channel sections in lieu of angles, may be specified as optional.



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- 5.2.6 Sheet metal trim shall be furnished with all windows to flashing around opening and provide a finished appearance.

5.3 Fixed Glass Windows

- 5.3.1 Aluminum strip windows shall be self-flashing type with mounting fins and snap-on trim. Frame members shall be extruded aluminum sections 2½ inches deep with .062-inch wall thickness. Unit shall have a burnished slate finish and shall be preglazed.
- 5.3.2 Strip window unit shall be 2 feet wide by 6 feet high, nominal size.
- 5.3.3 Window shall have fixed glass. Glazing will be 1/16 –inch double pane, insulating glass (clear). Aluminum snap-in glazing beads will be used and glass will be back-bedded.
- 5.3.4 Window unit shall be assembled with screws and sealed at junctions. Construction shall conform to AAMA (American Aluminum Manufacturers Association) Specification A-1, Class II.
- 5.3.5 Structural sub-framing, consisting of angle sections (hot-rolled or cold formed), shall be needed with each window. Sub-framing, consisting of cold formed channel sections in lieu of angles, may be specified as optional. Thermal break on windows for Midwestern Region.

5.4 Wall Louvers

- 5.4.1 Wall louvers shall be operable type, with pull-chain operator, weather-stripped blades, and removable insect screens. Mounting fins for connecting to structural sub-framing shall be provided.
- 5.4.2 Single louver size shall be 4040. Double or multiple louver banks can be formed by joining side fins together, and adding a reinforcing mullion.
- 5.4.3 Louver shall be made of galvanized steel. Frame shall be 18 gauge (min.) and blades shall be 20 gauge (min.) material. Frame joints will be welded. Blades will be overlapping type, providing maximum weather tightness when closed and allowing free air flow when open.
- 5.4.4 Structural sub-framing, consisting of angle sections (hot-rolled or cold formed), shall be furnished with each louver. Sub-framing, consisting of cold formed channel sections in lieu of angles, may be specified as optional.
- 5.4.5 Sheet metal trim shall be furnished to flash around louver and provide a finished appearance.

5.5 Powered Wall Exhauster

- 5.5.1 Powered wall exhausters shall consist of a belt-driven exhaust fan, a self-closing exterior louver, structural sub-framing to support the unit, and trim to flash around unit and provide a finished appearance.
- 5.5.2 Exhaust fan shall be 48 inches in diameter, four (or more) blades, belt-driven, complete with frame and mounting cage. Fan will be powered with a ¾ HP electric motor (110/220 volt, single phase, non-reversible, overload protection). Fan rating is 20,100 CFM at 0 static pressure. No wiring or controls are included.
- 5.5.3 Louver shall be automatic type which opens by action of exhaust air when fan is turned on and self-closes, by gavity action, when fan is shut off. Frame and blades (interlocking type) will be fabricated from mill finished aluminum extrusions.
- 5.5.4 Structural sub-framing, consisting of cold-formed channel sections, shall be furnished with each exhaust fan. Trim shall be Armor's standard to accommodate wall panel configuration.

5.6 Framed Openings



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- 5.6.1 Framed openings shall be furnished by Armor to accommodate Overhead Doors or Roll-up Doors supplied by others. Framed openings shall consist of structural framing to provide a large opening in a wall, along with necessary trim to flash around this opening and provide a finished appearance.
- 5.6.2 Size of opening shall be determined by size of door specified. Structural framing (jambs and header) shall consist of cold-formed, open "C" sections (8" or 10" deep) or hot-rolled channel sections, available in optional Galvanize, depending on structural requirements. Necessary clips and fasteners, for making connections for all members, shall be provided. Trim around opening shall be Armor's standard to accommodate wall panel configuration. (Door track supports by door supplier).
- 5.6.3 Color-coated trim to entirely cover shop-primed structural jambs and header may be specified as optional.

5.8 Translucent Panels (Walls)

- 5.8.1 Wall lights shall be General Purpose, type 1, translucent panels manufactured from polyester resin reinforced with chopped glass fibers. These panels shall have the same configuration as the ribbed wall panels specified.
- 5.8.2 Panels shall have a minimum weight of 6 ounces per square foot. Exterior face will have a pebble texture, and color will be white. Light transmittance is 60% ± 5%.
- 5.8.3 Each panel shall provide 3 feet of lateral coverage. Maximum length panel available is 5'8". Installation of translucent wall panels is similar to that of steel panels.
- 5.8.4 Insulated wall panels (lights) are not available.

5.9 Translucent Panels (Roof)

- 5.9.1 Roof lights shall be General Purpose, 1, translucent panels manufactured from polyester resin reinforced with a mesh of woven fiberglass cloth in addition to chopped glass fibers. These panels shall have the same configuration as the roof panels specified.
- 5.9.2 Panels shall have a minimum weight of 8 ounces per square foot. Exterior face will have a pebble texture, and color will be white. Light transmittance is 48% ± 5%.
- 5.9.3 Ribbed translucent panels shall provide 3 feet coverage. Maximum length of panel available is 11'0". Installation of translucent roof panels is similar to that of steel ribbed panels.
- 5.9.4 Insulated roof lights are also available in all roof panel configurations. Roof lights consist of an exterior panel as specified above, plus a clear, lightweight, translucent interior panel. These two panels are separated by a thin layer of foam insulation. Insulated roof panel (lights) have a thermal resistance factor.

5.10 Roof Ventilators (Ridge)

- 5.10.1 Ridge ventilators shall be gravity type with operable dampers, and shall be furnished with birdscreens. Ventilator shall have skirts suitable for mounting directly on ribbed panels and end caps that are adaptable, with slight field modification, for use on buildings with roof slopes ¼:12 minimum up to 6:12 maximum.
- 5.10.2 Single units shall be 10'0" long and shall have a 9-inch throat opening. Each ventilator shall have end caps, both ends which will allow the vent to be used, without modification, as a single unit or in a continuous run.
- 5.10.3 Ventilator shall be made 26-gauge lock forming quality; G-90 galvanized or Galvalume™ steel substrate with color coated white finish. Birdscreen shall be ½ -inch mesh, 19 gauge galvanized hardware cloth. Ventilators shall be shop assembled, and all connections shall be reveted and sealed to prevent leaking.



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- 5.10.4 Dampers shall be controlled from the floor by chains connected to the ventilator pull bar. Dampers are spring loaded to remain in the open position and are closed by pulling and locking the chain. Dampers have a positive wind-lock in any position to prevent damper flutter.
- 5.10.5 Operator kits are available to provide remote operation of dampers from almost any convenient location along the end wall or side wall. “Hook-up” kits are also available which allow dampers of up to 6 continuous vents to be tied together to operate by a single operator.
- 5.10.6 When used on buildings with an expansion ridge cap, the skirt of the ventilator shall be shop modified to mount on top of this ridge cap.

5.11 Roof Ventilators (Round)

- 5.11.1 Round roof ventilators shall be gravity type with operable dampers, and shall be furnished with birdscreens. Ventilator shall have a built-in base with a skirt suitable for mounting directly on ribbed panels. Roof slope must be specified so that base may be fabricated to match.
- 5.11.2 Round ventilators shall have a 20-inch diameter throat opening.
- 5.11.3 Ventilator shall be made of 26-gauge lockforming quality, G-90 galvanized or Galvalume™ substrate with color coated white finish. Birdscreen shall be ½ -inch mesh, 19 gauge galvanized hardware cloth. Ventilators shall be shop assembled and all connections shall be riveted and sealed to prevent leaking.
- 5.11.4 Dampers shall be controlled from the floor by chains connected to the ventilator pull bar dampers are spring loaded to remain in the open position and are closed by pulling and locking the chain.
- 5.11.5 When used on gabled buildings with ribbed mot panels, the vent will straddle the ridge, while on single slope buildings vents will be mounted slightly down slope from the high side wall.

5.12 Roof Curbs (For Equipment)

- 5.12.1 Roof curbs shall be a one-piece unit consisting of a top box, or shell, and bottom skirt, or flange. Units shall be of welded construction, and top of shell shall provide a level surface for supporting foot mounted equipment.
- 5.12.2 Each unit shall be individually sized and designed to meet specific job requirements. Roof slope must be specified so that curb base will be fabricated to match. Curb shell can be insulated if specified.
- 5.12.3 Roof curbs shall be made using 18 gauge (min.), G-90 galvanized steel for shell and flange and shall have internal angle reinforcing as required. Pointed (white) units to match color coated mot panels, are available.
- 5.12.4 Roof curbs are supported by structural sub-framing and are installed with flange under the roof panels. Roof panels are fastened to the flange with sealant and screws to provide a weathertight assembly.

5.13 Pipe Flashing

- 5.13.1 Pipe flashing units shall be a one-piece construction that accommodates pipes made of steel, copper, cast Iron, P.V.C. and sheet metal.
- 5.13.2 Unit may be specified in one of three sizes, as follows:
 - #3 size for ¼ “to 4” outside pipe diameter
 - #5 size for 4 “to 7” outside pipe diameter
 - #8 size for 7 “to 13” outside pipe diameter
- 5.13.3 Units shall be made of a flexible rubber compound (EPDM or equal) formulated to provide maximum weathertightness. Unit shall be pre-molded to form a pipe collar. Bonded to base of collar shall be a 1/32” ± thick, moldable aluminum ring which bonds with ease to conform to any panel configuration.



General Specifications

- 5.13.4 Pipe flashing units shall be furnished with necessary sealant and screw fasteners to attach unit to roof panels and provide a weathertight assembly.
- 5.13.5 These units are not to be used as flashing for any hot flue applications where temperature exceeds 150 degrees.

5.14 Insulation

- 5.14.1 Insulation shall be blanket type, fiberglass with vapor barrier facing, suitable for application to walls and roof of metal buildings.
- 5.14.2 The Insulation shall be made of long and fine fiber fiberglass, evenly distributed and of uniform density, bonded with phenolic thermo-setting resins. This product TIMA standard PEB 202 UL fine Hazard Class 25/50 Standard insulation designations, nominal thickness, and thermal resistance (R) factors are as follows:

<u>Insulation Designation</u>	<u>Nominal Thickness</u>	<u>“R” Value</u>
R6	2”	6.4
R10	3¾”	9.7
R13	4¾”	12.9
R19	6¾”	19.2

Width of fiberglass blanket should be specified on order 36 to 72 inches.

- 5.14.3 Vapor barrier facing shall be either a vinyl film (3.2 mil thickness) or a vinyl reinforced polyester (WMP-VR) film (3 mil approximate thickness), and shall have an Underwriters Laboratories flame spread rating of 25 or less* and a smoke developed rating of 50 or less. Water vapor transmission value is 1.00 perms for vinyl film facing and .02 perms for WMP-VR facing. Color of facing material shall be white, and width shall be 78-inches so as to provide a 3-inch tab projecting beyond each side of the fiberglass blanket. (Only in the Eastern and Southern Regions).

Vinyl reinforced polyester facing is recommended when air temperatures of 30° F or below are anticipated during shipment or erection.

*Note: The numerical flame spread rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

- 5.14.4 Blanket type insulation shall be installed on roof and/or walls between exterior panels and secondary framing members (purlins and girts). Tabs on facing material shall be lapped folded, and stapled at side joints to provide continuity of the vapor barrier.
- 5.14.5 Insulation with other vapor barrier facings and/or in widths other than 72-inches can be furnished upon special request.



SECTION 6. BUILDING INFORMATION

6.1 Anchor Bolts

- 6.1.1 Anchor bolts shall be furnished by others (not Armor) and shall be set in strict accordance with Armor's anchor bolt drawings. Anchor bolts shall be of length and strength to properly resist the governing reactions induced by the design loads and shall be of the diameter shown on Armor's anchor bolt drawings. All anchor bolts shall be unpainted so as to bond with the concrete in which they are set.

Anchor bolts can be furnished by Armor if specifically called for by the contract documents.

6.2 Foundations

- 6.2.1 The building foundation shall be designed by a qualified engineer to support the metal building and all other loads required by the occupant's usage. Armor's anchor bolt drawings shall show column reactions to be used for designing the building foundation. Armor shall not be responsible for the design or adequacy of the foundation provided.



SECTION 7. BUILDING ERECTION

7.1 Building Erection

- 7.1.1 The erection of Armor Buildings shall be in accordance with applicable erection drawings, and other erection information furnished by Armor.
- 7.1.2 Erection shall be performed by a qualified erector using proper tools and equipment. It shall be the responsibility of the erector to comply with all applicable legal and safety requirements. It shall further be the responsibility of the erector to determine and provide any and all temporary bracing, bridging, blocking, shoring, and/or securing of components, etc. as required for stability during the entire erection process.
- 7.1.3 Erector shall not make any field modifications to any structural member except as authorized and specified by Armor.



SECTION 8. WARRANTIES

8.1 Wall Paint Warranties

- 8.1.1 All Armor color coated wall panels may be warranted, within limits set by the warranty, for a period of forty (40) years against chalk, fade, crack, check, blister, or peel. This 40-year warranty is offered only if so requested on the contract documents.

8.2 Roof Paint Warranty

- 8.2.1 All Armor color coated (white only) roof panels may be warranted, within limits set by the warranty for a period of forty (40) years against chalk, fade, crack, check, blister, or peel. This 40-year warranty is offered only if so requested on the contract documents.

- 8.2.2 All unpainted Galvalume™ roof panels may be warranted, within limits set by the warranty, for a period of twenty (20) years, 6 months against rupture, perforation and structural failure. This 20 year, 6 months warranty is available only if panels are installed using “Extended Life” fasteners furnished by Armor, and then it is offered only if so requested on the contract documents, at additional cost.

8.3 Warranty Limits

- 8.3.1 All warranties are subject to certain limits and condition. Specimen copies of any or all warranties may be obtained by contacting Armor’s manufacturing facilities. These specimen copies and sample copies specifically state the limits and conditions of each warranty. Please refer to warranty, terms and conditions of building contract.