

# **Kirby Building Systems**

## **PRODUCT SPECIFICATIONS**



**Kirby Building Systems**  
**March 6, 2006**

## PREFACE

These specifications describe the criteria used in the design and fabrication of metal building systems by Kirby Building Systems.

These specifications are intended to insure that the architect, engineer, builder, and/or owner understand the basis for design, application and manufacture of all Kirby metal building systems, and are for use as an outline of material performance requirements.

The standards, specifications, and/or interpretation and recommendations of professionally recognized agencies and groups (e.g., AISC, AWS, ASTM, AISI, MBMA, etc.) are utilized as the basis for establishing Kirby Building Systems' design, manufacturing and quality criteria, standards, methods, practices, and tolerances. Unless stipulated otherwise in the order documents, Kirby Building Systems' design, manufacturing and quality criteria, standards, methods, practices, and tolerances will govern the work -- any other interpretations to the contrary notwithstanding.

In keeping with material availability and Kirby's policy of continuous product improvement, specifications are subject to change without notice.

For the purpose of these specifications, Kirby Building Systems shall herein be referred to as Kirby.

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## PART 1 - GENERAL

### 1.1 General

Specifications herein describe the material quality, design criteria and workmanship used in metal building systems designed, manufactured and furnished by Kirby.

### 1.2 Purpose

Specifications herein are intended for use as an outline of the performance requirements for the materials, manufacture and design criteria used in Kirby metal building systems.

### 1.3 References

- A. Engineering and/or mechanical properties of materials utilized by Kirby in the manufacture of its product line are provided and/or referenced within these specifications. Applications of these materials are covered under their pertinent sections. Industry specification standards have been referenced where applicable within these specifications.
- B. Specific references used in conjunction with these specifications:
  - 1. AISC - American Institute of Steel Construction
    - a. Specification for Structural Steel Buildings 1989 with the 1999 Supplement.
    - b. Steel Design Guide Series 3 - Serviceability Design Considerations for Low-Rise Buildings Second Edition- 2003.
  - 2. AISI American Iron and Steel Institute
    - a. Specification for the Design of Cold-Formed Steel Structural Members-1996 Edition.
    - b. North American Specification for the Design of Cold-Formed Steel Structural Members-2001 Edition with the 2004 Supplement
  - 3. ASTM - American Society for Testing and Materials
    - a. A6-05a - Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
    - b. A36-05 - Specification for Carbon Structural Steel.
    - c. A108-03e1 – Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished
    - d. A123-02 - Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    - e. A153-05 - Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
    - f. A194-05a - Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.
    - g. A307-04 - Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
    - h. A325-04b - Specification for Structural Bolts, Steel, Heat-Treated, 120/105 ksi Minimum Tensile Strength.
    - i. A475-03 - Specification for Zinc-Coated Steel Wire Strand.

- j. **A490-04a - Specification for Structural Bolts, Alloy Steel, Heat-Treated 150 ksi Minimum Tensile Strength.**
- k. **A500-03a - Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.**
- l. **A501-01 - Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.**
- m. **A529-05 - Specification for High-Strength Carbon-Manganese Steel of Structural Quality.**
- n. **A563-04a - Specification for Carbon and Alloy Steel Nuts.**
- o. **A568-05 - Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.**
- p. **A572-04 - Specification for High Strength Low-Alloy Columbium-Vanadium Structural Steel.**
- q. **A653-05 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.**
- r. **A792-05 - Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.**
- s. **A924-04 - Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.**
- t. **A1008-05a – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.**
- u. **A1011-05 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.**
- v. **C991-03 - Standard Specification for Flexible Glass Fiber Insulation for Pre-Engineered Metal Buildings.**
- w. **D1494-97 (2001)- Test Method for Diffused Light Transmission Factor of Reinforced Plastic Panels.**
- x. **E1514-98 (2003)- Specification for Structural Standing Steam Steel Roof Panel Systems.**
- y. **E1592-05 – Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.**
- z. **E1646-95 (2003) - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.**
- aa. **E1680-95 (2003) - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.**

4. AWS - American Welding Society
  - a. D1.1-04 - Structural Welding Code Steel.
  - b. D1.3-98 - Structural Welding Code Sheet Steel.
  - c. A2.4-98 - Standard Welding Symbols.
5. Corps of Engineers CEGS-07416 uplift testing for KLM 2100 and Rook-Lok Plus™ mechanical seam.
6. Factory Mutual 1-60 and 1-90 rating for KLM 2100 and Rook-Lok Plus™ mechanical seam.
7. MBMA Low Rise Building Systems Manual - 2002 Edition.
8. NAIMA 202-96 (Rev. 2000) Standard for Flexible Fiberglass Insulation Systems in Metal Buildings.
9. SJI (Steel Joist Institute) - Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders 2002.
10. SSPC (Steel Structures Painting Council) - SP-2-05 - Specification for Hand Tool Cleaning.
11. Underwriters Laboratory UL 580 test Class 90 for all roof panels.
12. Indiana Master Plan Numbers for gable and single slope buildings
13. Florida Product Approval for KirbyRib II, KirbyWall, KRP, KLS 2100, and KLM 2100 panels.

## 1.4 Terms

Building geometry terms shall be as defined herein.

- A. *Width* shall be as measured from structural line to structural line and/or face of sidewall girt to face of sidewall girt.
- B. *Length* shall be as measured from structural line to structural line and/or face of endwall girt to face of endwall girt.
- C. *Eave Height* shall be as measured from the top of the eave member to the bottom of the primary frame base plate, or finish floor elevation when column base is above or below floor elevation.
- D. *Bay Spacing/Interior Bay* shall be as measured from centerline to centerline of the primary frames.
- E. *Bay Spacing/End Bay* shall be as measured from the face of the endwall girt to the centerline of the first interior primary frame.
- F. *Roof Slope* shall be the angle the roof surface makes with the horizontal. Kirby roof slope limitations are given in the furnished table in conjunction with frame types and roof coverings. (Refer to the table section)

## 1.5 Systems Design

- A. Design criteria shall be the system of designing the primary, primary endwall and secondary framing systems for the loads as specified and in accordance with Kirby Building Systems' design practices. Kirby's design practices are in general conformance with the MBMA Building Systems Manual and do not conform to any specific federal, state, or local building laws and regulations except as specified and clearly set forth in the order documents.

- B. Design loads shall be the application and combination of loads as specified and clearly set forth in the order documents, and shall be in accordance with Kirby standard design practices. Design loads may include dead loads, collateral loads, roof live loads, roof snow loads, wind loads, and/or impact loads as specified.**
1. **Dead Load** shall be the weight of the metal building system supplied by Kirby Building Systems, such as roof, framing and covering members.
  2. **Roof Live Load** shall be the loads that are produced (1) during maintenance by workers, equipment, and materials, and (2) during the life of the structure by movable objects and do not include wind, snow, seismic, or dead loads.
  3. **Floor Live Loads** shall be those loads induced on the floor system by the use and occupancy of the building.
  4. **Roof Snow Load** shall be that vertical load induced by the weight of snow, assumed to act on the horizontal projection on the roof of the structure.
  5. **Wind Load** shall be the load imposed on a structure by a given wind speed blowing from any horizontal direction.
  6. **Auxiliary Load** shall be the dynamic live loads which the structure must safely withstand, such as those induced by cranes and material handling systems.
  7. **Collateral Load** shall be the weight of additional permanent loads, including provision for future loads, specified in the order documents, other than the metal building system, such as sprinklers, mechanical and electrical systems, ceilings, and partitions.
  8. **Seismic Load** shall be the assumed lateral load acting in any horizontal direction on the structural system due to the action of earthquakes.
- C. Kirby's standard design practices incorporate Serviceability Limits from the Metal Building Systems Manual, 2002 edition, (reprinted from AISC Steel Design Guide Series #3, "Serviceability Design Considerations for Low-Rise Buildings"). Owner requirements that exceed these limits must be included in the building contract documents. The building code specified in the contract documents may also provide deflection limitations.**
1. **Vertical Deflections:**

		<small>*Roof Snow = Factored 50 Yr. Ground Snow</small>	
a.	<b>Roof Panels</b>	<b>Roof Live or *Snow Load</b>	<b>L/150</b>
b.	<b>Purlins</b>	<b>Roof Live or *Snow Load</b>	
		supporting metal roof only	L/150
		supporting ceiling tiles	L/240
		supporting plastered/drywall ceiling	L/360
c.	<b>Rafters</b>	<b>Roof Live or *Snow Load</b>	
		supporting metal roof only	L/150
		supporting ceiling tiles	L/240
		supporting plastered/drywall ceiling	L/360
d.	<b>Floor Joist/ Beams</b>	<b>Floor Live</b>	
		supporting concrete slabs	L/360
		supporting plywood deck, etc.	L/240

e.	Crane Runway	Crane Vertical Static Load CMAA Class A, B, C CMAA Class D CMAA Class E Underhung and Monorail Cranes CMAA Class A, B, C	L/600 L/800 L/ 1000 L/450
f.	Jib Crane	Crane Vertical Load	L/225
g.	Lintel Beams	Total Load	L/600 ≤ 0.3"

2. **Horizontal Deflections:**

\*\*10Yr. = 50Yr. X 75%

a.	Wall Panels	**10Yr. Design Wind Pressure	L/120
b.	Girts	**10Yr. Design Wind Pressure supporting metal wall supporting masonry wall	L/120 L/240 ≤ 1½"
c.	Frame	**10Yr. Design Wind Pressure supporting metal wall supporting masonry wall Crane Lateral Load or**10Yr. Design Wind Pressure pendant operated crane cab operated crane	H/60 H/200‡ H/100 @ Runway H/240 ≤ 2" @ Runway
d.	Crane Runways	Crane Lateral Load	L/400
e.	Wind Beams	**10Yr. Design Wind Pressure	L/240

‡This can be H/100 with proper detailing of the masonry wall. Contact Kirby for further information.

D. Fieldwork, materials and/or work by others shall not be the responsibility of Kirby.

1.6 Submittals

- A. Design Certification shall be a letter certifying to Kirby's customer that the building conforms to the order documents. The letter shall be signed and sealed by a registered engineer.
- B. Design Calculations, Drawings, and Documents shall contain the information requested for permits and approvals and sufficient information for building erection and are furnished as stipulated in the order documents.
- C. Foundation reactions shall be furnished by Kirby. Kirby shall not be responsible for the design of or the adequacy of the foundation.

1.7 Manufacturing

- A. Structural members shall typically be fabricated by shearing, flame cutting, forming, welding, punching, drilling, reaming, etc., as required in accordance with Kirby's standard practices.
  - 1. Welded plate members fabricated from plate or bar stock materials shall have flanges and webs joined on one side of the web by a continuous process fillet weld.

2. Shop connections shall typically be welded using either the submerged or the gas shielded arc process. Welding shall be in accordance with Kirby's standard practices. Kirby's welding practices and procedures are generally in compliance with the applicable sections, relating to design requirements and allowable stresses, of the "AWS Structural Welding Code - Steel".
  3. Field connections shall typically be by the bolting of structural members using high strength bolts and machine bolts in shop drilled, punched or reamed holes in accordance with Kirby's standard practices.
  4. Workmanship/tolerance of the manufactured building parts shall be in accordance with the quality control standards of Kirby.
- B. Shop painting of members with shop primer paint shall be provided for the purpose of protecting the steel members during transportation, during proper and temporary jobsite storage, and during erection. Shop primer does not provide the appearance, durability and/or protection of an appropriate field applied finish. Kirby shall not be responsible for field touch-up painting that may be required. Kirby is not responsible for any deterioration of the shop primer paint as a result of improper handling and/or storage. Kirby shall not be responsible for any paint and/or coatings of any kind that may be applied and/or required.
1. Cleaning of steel members shall typically be the removal of oil, dirt, loose scale and/or foreign matter prior to painting (SSPC-SP2).
  2. Coating of steel members shall typically be one shop coat of 1 mil thickness of Kirby standard primer paint in accordance with the standard practices of Kirby.

## 1.8 Qualifications

- A. Kirby is a certified manufacturer under AISC's Certification Program, Class MB, Metal Buildings.
- B. Structural framing and covering shall be the design of a licensed Professional Engineer experienced in the design of metal building systems.
- C. Kirby's shop fabrication shall be in accordance with MBMA Building Systems Manual, and for items not covered, AISC Specification for Structural Steel for Buildings.

## 1.9. Warranties

- A. Kirby's standard warranty of products fabricated by Kirby, excluding paint, carry a warranty against failure due to defective material or workmanship for a period of one (1) year from date of shipment. Kirby's liability under this warranty shall be limited to furnishing, but not dismantling or installing, necessary replacement material F.O.B. Kirby's plant, Portland, Tennessee. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED AND THERE ARE NO WARRANTIES, REPRESENTATIONS OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR ANY PARTICULAR PURPOSE BEYOND THOSE STATED HEREIN. IN NO EVENT SHALL KIRBY BE LIABLE FOR LOSS OF PROFITS, OR OTHER INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES.**
- B. Warranties on color coated panels, roof warranties, or any additional warranties on the building may, at Kirby's sole option, be obtained or purchased by builder. Warranty shall be as stated in the warranty certificate. Available warranties are:
1. Kirby's 35-Year Limited Warranty for KIRBY-COOL Color Panel Finishes.
  2. Kirby's 20-Year Limited Warranty for Zinc-Aluminum Alloy coated Roof Panels.
  3. Kirby's Standing Seam Limited 20-Year Weathertightness Warranty; payment is required for the warranty and approval of Kirby must be obtained at the time the order is accepted.

## PART 2 - PRODUCTS

### 2.1 Primary Framing

A. Primary framing shall typically be the main load carrying structural members. They shall include the transverse rigid frames, lean-to rafters and columns, canopy rafter, interior columns (beam and column frames), and/or other types of framing as furnished by Kirby.

1. Rigid frame "RF" and "RS" shall typically be manufactured of solid web members having tapered or uniform depth rafters rigidly connected to tapered or uniform depth columns. This system provides a clear span, single gable (RF) or single slope (RS), rigid frame with by-pass or flush sidewall girts, designed to support the specified loads.
2. Beam and Column "BC" and "BS" shall typically be manufactured of solid web members having tapered and/or uniform depth rafter or girder members rigidly connected to tapered or uniform depth exterior columns and round section interior columns. This system provides a single gable (BC) or single slope (BS) rigid frame, with interior columns and by-pass or flush sidewall girts, designed to support the specified loads.
3. Lean-To "LT" shall typically be manufactured of solid web members having tapered or uniform depth rafters connected to uniform depth columns. This system provides a clear span, single slope, straight column, by-pass or flush sidewall, dependent structure designed to support the specified loads.

B. Materials used in the fabrication of primary framing systems shall be designed utilizing Kirby's standard practices, generally in compliance with the applicable sections of AISC and AISI.

1. Structural flat plate, strip and/or bar stock generally shall be of material based on the requirements of ASTM A-1008, ASTM A-1011 or ASTM A-572 as applicable and shall have a minimum yield strength of 55,000 psi.
2. W, M, and S shapes, angles, channels and other hot-rolled shapes shall be of material based on the requirements of ASTM A-1008, ASTM A-1011, ASTM A-572 or ASTM A-36 as applicable and shall have minimum yield strengths 50,000 psi or 36,000 psi.
3. Other yield strength materials may be used based on the particular building design requirements.
4. Members fabricated from plate or bar stock materials shall have flanges and webs joined on one side of the web by a continuous process fillet weld.
5. Pipe and tube sections shall be of material based on the requirements of ASTM A500 Grade B.

**2.2 Endwall Framing**

- A. Endwall Framing shall be the main load carrying members of the building endwall. They shall include the corner columns, endwall columns, and endwall rafters; and shall be manufactured of cold-formed light gauge sections, welded plate sections and/or structural sections.**
- 1. Bearing Frame "BF" shall be a system having rafter beams connected to corner columns and endwall columns, and shall be designed to support the specified loads.**
  - 2. Half Load Main Frame shall provide a primary configured frame of the same type as the primary framing and may be specified when future expansion is not anticipated, and may or may not be used in conjunction with endwall columns. This system provides a single gable or single slope, rigid frame designed to support the specified loads.**
  - 3. Full Frame shall provide a primary configured frame of the same type as the primary framing and may be specified when future expansion is anticipated and may or may not be used in conjunction with endwall columns. This system provides a single gable or single slope, rigid frame designed to support the specified loads.**
- B. Materials used in the fabrication of primary endwall framing systems shall be designed utilizing Kirby's standard practices, generally in compliance with the applicable sections of AISC and AISI.**
- 1. Structural flat plate, strip and/or bar stock generally shall be of material based on the requirements of ASTM A-1008, ASTM A-1011 or ASTM A-572 as applicable and shall have a minimum yield strength of 55,000 psi.**
  - 2. W, M, and S shapes, angles, rods, channels and other hot-rolled shapes shall be of material based on the requirements of ASTM A-1008, ASTM A-1011, ASTM A-572 or ASTM A-36 as applicable and shall have minimum yield strengths of 50,000 psi or 36,000 psi.**
  - 3. Cold-form members shall be fabricated of material based on the requirements of ASTM A-1008, ASTM A-1011 or ASTM A-572 as applicable, and shall have a minimum yield strength of 55,000 psi.**
  - 4. Other yield strength materials may be used based on the particular building design requirements.**
  - 5. Members fabricated from plate or bar stock materials shall have flanges and webs joined on one side of the web by a continuous process fillet weld.**
  - 6. Pipe and tube sections shall be of material based on the requirements of ASTM A500 Grade B.**

**2.3 Secondary Framing**

- A. Secondary framing shall be the structural members, which carry the loads to the primary framing systems; and shall include the eave struts, purlins, girts, and other miscellaneous structural members. They shall be manufactured of cold-formed light gauge sections, welded plate sections, structural sections, and/or open web members.**

1. Eave Struts shall be nominal 6", 8", 10" or 12" deep "cee" shaped members; and shall be manufactured of 12 through 16 gauge steel; and shall be designed as simple span for the specified loads.
  2. Purlins and girts shall be nominal 6", 8", 10", or 12" deep "zee" shaped members; and shall be manufactured of 12 through 16 gauge steel designed simple span and/or continuous span for the specified loads.
  3. Open web members shall be manufactured parallel chord members. They shall be designed to the Steel Joist Institute standards, simple span, to support the specified loads.
- B. Materials used in the fabrication of secondary framing systems shall be designed utilizing Kirby's standard practices, generally in compliance with the applicable sections of AISC and AISI.**
1. Structural flat plate, strip and/or bar stock generally shall be of material based on the requirements of ASTM A-1008, ASTM A-1011 or ASTM A-572 as applicable and shall have a minimum yield strength of 55,000 psi.
  2. W, M, and S shapes, angles, rods, channels and other hot-rolled shapes shall be of material based on the requirements of ASTM A-1008, ASTM A-1011, ASTM A-572 or ASTM A-36 as applicable and shall have minimum yield strengths of 50,000 psi or 36,000 psi.
  3. Cold-form members shall be fabricated of material based on the requirements of ASTM A-1008, ASTM A-1011 or ASTM A-572 as applicable and shall have a minimum yield strength of 55,000 psi.
  4. Other yield strength materials shall be used based on the particular building design requirements.
  5. Open web members shall be fabricated of material that conforms to the material specifications designated by the Steel Joist Institute as acceptable for this product.
  6. Members fabricated from plate or bar stock material shall have flanges and webs joined on one side of the web by a continuous process fillet weld.

## **2.4 Bracing**

- A. Bracing for lateral loads (wind, seismic, etc.) shall be a system of diagonal, portal, fixed base, torsional and/or diaphragm bracing designed for the specified loads in accordance with Kirby's design practices. They shall typically utilize cables, rods, angles and/or welded plate sections designed to support the specified loads.**
- B. Materials used in the fabrication of bracing systems shall be designed utilizing Kirby's standard practices, generally in compliance with the applicable sections of AISC and AISI.**
1. Structural flat plate, strip and/or bar stock generally shall be of material based on the requirements of ASTM A-1008, ASTM A-1011 or ASTM A-572 as applicable and shall have a minimum yield strength of 55,000 psi.

2. W, M, and S shapes, angles, rods, channels and other hot-rolled shapes shall be of material based on the requirements of ASTM A-108, A-1008, ASTM A-1011, ASTM A-572 or ASTM A-36 as applicable and shall have minimum yield strengths of 50,000 psi or 36,000 psi.
3. Cables shall be ASTM A-475, 7 strand, extra-high strength material, 1/4" diameter minimum.

## 2.5 Covering

- A. Roof covering shall typically be the roof panels, their attachments, trim and sealants used on the exterior of the roof. They shall be one of the following panel systems.
  1. KirbyRibll shall be a system of roof panels providing a 36" wide net covering, having 1- 1/4" high major ribs at 12" centers and two minor ribs between the major ribs. Sidelaps shall be one full major rib and shall utilize the bearing edge of the underlying major rib for support. KirbyRibll panels shall be continuous from ridge to eave until panel length exceeds 41'-0", in which case endlaps are provided. Endlaps shall be 6" and occur over a supporting member. This panel is available in 29, 26, 24 and 22 gauges (minimum quantities may apply).
  2. The KLS 2100 and KLM 2100 systems shall consist of 24" wide panels with a 3" trapezoidal rib on each side. The standard panel shall have three minor ribs in the flat of the panel. The KLS 2100 and KLM 2100 roof systems shall be installed utilizing concealed floating clips. The sidelaps contain factory-applied mastic, and shall either "self lock" and snap together or be mechanically seamed. KLS 2100 and KLM 2100 panels shall be in lengths continuous from ridge to eave until the panel length exceeds 45'-6", in which case endlaps shall be provided. Endlaps shall be 6" and occur 12" above a supporting member. The endlap shall utilize a 16 gauge back-up plate. Metal closures shall be used at the eave and ridge (high side of roof slope). These panels are available in 24 and 22 gauges (minimum quantities may apply).
  3. The Roof-Lok™ and Roof-Lok Plus™ systems consist of standard 16" wide panels with a 2" vertical rib on each side. The standard panel shall have striations in the flat of the panel to minimize oil canning. The systems shall be installed utilizing concealed floating or fixed clips. The sidelaps contain factory-applied mastic and are locked together by an electrically powered seaming machine. Panels shall be in lengths continuous from ridge to eave until panel length exceeds 45'-6", in which case endlaps shall be provided. Endlaps shall be 6" and occur 10" above a supporting member. The endlap shall utilize a 16 gauge back-up plate and shall be pre-punched for proper placement of fasteners. Metal closures shall be used at the ridge (high side of roof slope). These panels are available in 24 and 22 gauges (minimum quantities may apply).

4. Kirby's roof covering systems allow for 6" maximum blanket thickness over the purlin. Kirby acknowledges that there are proprietary methods of insulating where insulation between the purlins may be utilized. Rigid board insulating material can be used with caution in over the purlin applications. Special conditions apply when installing rigid board insulation.
  5. "R" and "U" Values for the Kirby covering systems shall typically be as denoted in the furnished table (Refer to the table section). Nominal insulation density is considered to be in accordance with NAIMA 202 and to have vinyl facings.
  6. Uplift rating for Kirby Roof covering systems shall be rated as UL 90, as listed by Underwriters' Laboratories, as denoted in the furnished table (Refer to the table section). For details, see erection documents.
- B. Wall covering shall typically be the wall panels, their attachments, and trim used on the exterior of the walls. They shall be one of the following panel systems.**
1. KirbyWall shall be a system of wall panels providing a 36" wide net coverage having 1-5/16" deep major ribs at 12" centers and one sculptured "valley" shape between major ribs. Sidelaps shall be one major rib. KirbyWall panels shall be continuous from eave to base until panel length exceeds 40', in which case endlaps are provided. Endlaps shall be 4" and occur over a supporting member. This panel is available in 29, 26, 24 and 22 gauges (minimum quantities may apply).
  2. KirbyRibII shall be a system of wall panels providing a 36" wide net coverage having 1-1/4" high major ribs at 12" centers and two minor ribs between major ribs. Sidelaps shall be one major rib and shall utilize the bearing edge of the underlying major rib for support. KirbyRibII panels shall be continuous from eave to base until panel length exceeds 40', in which case endlaps are provided. Endlaps shall be 4" and occur over a supporting member. This panel is available in 29, 26, 24 and 22 gauges (minimum quantities may apply).
  3. KRP shall be a system of wall panels providing a 36" wide net coverage having 1-1/4" deep major ribs at 12" centers and two minor ribs between major ribs. Sidelaps shall be one major rib. KRP panels shall be continuous from eave to base until panel length exceeds 40', in which case endlaps are provided. Endlaps shall be 4" and occur over a supporting member. This panel is available in 29, 26, 24 and 22 gauges (minimum quantities may apply).
  4. StuccoChoice shall be a system of wall panels providing a 16" wide net coverage having concealed fasteners and interlocking sidelaps. StuccoChoice panels shall be continuous from eave to base until panel length exceeds 24', in which case trimmed panel joints are provided. Panel joints shall occur over a supporting member. A 7/8" hat section will be provided for applications with insulation thickness less than 4". A 1-1/2" hat section will be provided for applications with insulation thickness equal to or greater than 4". This panel is available in 20 gauge.

5. Insulated Wall Panels shall be a system of wall panels with roll-formed exterior and interior faces chemically bonded to a continuously foamed-in place polyurethane core. The net coverage, minimum length and maximum length of these panels varies based on the panel type and is given in the following individual panel descriptions. The painted steel faces shall have non-directional stucco embossed texture. The standard thickness for these panels shall be 2 inches.
- a. Premium Flat Light Emboss panels shall be a system of wall panels providing a 36" wide net coverage having concealed fasteners and interlocking sidelaps. Premium Flat Light Emboss panels shall be continuous from eave to base until panel length exceeds 40', in which case trimmed panel joints are provided. The minimum length for these panels is 8'. Panel joints shall occur over a supporting member. This panel is available with a 22 gauge exterior panel and a 26 gauge interior panel. The R-value for this panel is 15.2.
  - b. Micro Rib panels shall be a system of wall panels providing a 36" or 42" wide net coverage having concealed fasteners and interlocking sidelaps. Micro Rib panels shall be continuous from eave to base until panel length exceeds 40', in which case trimmed panel joints are provided. The minimum length for these panels is 8'. Panel joints shall occur over a supporting member. This panel is available with a 26 gauge exterior panel and a 26 gauge interior panel. The R-value for this panel is 15.2.
  - c. Shadow Wall Panels shall be a system of wall panels providing a 42" wide net coverage having concealed fasteners and interlocking sidelaps. Shadow Wall panels shall be continuous from eave to base until panel length exceeds 53', in which case trimmed panel joints are provided. The minimum length for these panels is 8'. Panel joints shall occur over a supporting member. This panel is available with a 26 gauge exterior panel and a 26 gauge interior panel. The R-value for this panel is 15.9.
  - d. Plank Panels shall be a system of wall panels providing a 42" wide net coverage having concealed fasteners and interlocking sidelaps. Plank panels shall be continuous from eave to base until panel length exceeds 53', in which case trimmed panel joints are provided. The minimum length for these panels is 8'. Panel joints shall occur over a supporting member. This panel is available with a 26 gauge exterior panel and a 26 gauge interior panel. The R-value for this panel is 15.9.

- e. Heavy Stucco Texture panels shall be a system of wall panels providing a 42" wide net coverage having concealed fasteners and interlocking sidelaps. Heavy Stucco Texture panels shall be continuous from eave to base until panel length exceeds 40', in which case trimmed panel joints are provided. The minimum length for these panels is 8'. Panel joints shall occur over a supporting member. This panel is available with a 26 gauge exterior panel and a 26 gauge interior panel. The R-value for this panel is 15.9.
  - f. Concrete Texture panels shall be a system of wall panels providing a 36" wide net coverage having concealed fasteners and interlocking sidelaps. Concrete Texture panels shall be continuous from eave to base until panel length exceeds 28', in which case trimmed panel joints are provided. The minimum length for these panels is 5'. Panel joints shall occur over a supporting member. This panel is available with a 22 gauge exterior panel and a 26 gauge interior panel. The R-value for this panel is 15.2.
- C. Materials used in the fabrication of roof and wall coverings shall typically be in accordance with the furnished table. (Refer to the table section)
- D. Coatings and Finishes for roof and wall coverings and their flashings shall, unless otherwise specified, be of the materials and properties given in the furnished table. (Refer to the table section)
- 1. KirbyRibll roof panels shall typically be unfinished zinc-aluminum alloy coated steel, or are available in sixteen fluoropolymer standard colors over AZ55 or AZ50 zinc-aluminum coated steel, as specified. KLS 2100, KLM 2100, Roof-Lok™ and Roof-Lok Plus™ are available in five fluoropolymer standard colors over AZ55 or AZ50 zinc-aluminum coated steel, as specified and unfinished zinc-aluminum alloy coated steel.
    - a. All of the above roof panels are available in Kirby's new cool-scape™ heat reflective colors. The special cool-scape coating increases the emissivity values above 80% and the reflectivity, even on medium-to-dark colored roofs, is increased to meet Energy Star specifications for steep-sloped roofs greater than 2:12.
  - 2. Non-insulated, exterior wall panels shall typically be prefinished in a choice of sixteen fluoropolymer standard colors applied over AZ55 or AZ50 zinc-aluminum coated steel or unfinished zinc-aluminum alloy coated steel, as specified.
  - 3. Non-insulated, interior liner panels shall typically be 29 gauge Diamond White silicon-polyester finish applied over AZ55 or AZ50 zinc-aluminum coated steel or unfinished zinc-aluminum alloy coated steel, as specified.
  - 4. StuccoChoice wall panels shall typically be prefinished in a choice of twenty-four standard colors applied over G90 galvanized coated steel. The finish for these panels is comprised of acrylic and marble crush.

5. Insulated, painted wall panels shall typically be prefinished in a choice of four fluoropolymer standard colors applied over G90 galvanized coated steel.
  6. Heavy Stucco Texture wall panels shall typically be prefinished in a choice of four standard colors applied over G90 galvanized coated steel. The finish for these panels is comprised of an aggregated fiber reinforced polymer.
  7. Concrete Texture wall panels shall typically be prefinished in a choice of eight standard colors applied over G90 galvanized coated steel. The finish for these panels is comprised of a textured acrylic and a silica aggregate.
- E. Trim shall typically be of 26 gauge steel of 50,000 psi minimum yield strength and shall be compatible with the material, finish, and profile of the adjoining roof or wall system.
- F. Fasteners for roof and wall covering systems shall typically be one or more types of self-drilling or self-tapping screws as defined in the furnished table. (Refer to the table section). Blind rivets shall typically be used in trim and accessory attachment or splicing. For application details, see erection documents.
- G. Systems covering sealants shall typically be preformed roll-tape sealants, tube sealants, and closures as required for weathertightness of the roof. Sealants shall meet the FDA Regulations, as chemically acceptable to the U.S. Department of Agriculture for use in meat and poultry processing areas.
1. Tape sealants shall be of preformed butyl rubber base, and shall typically be supplied as a 3/16" x 1/4" extruded shape as standard. Wide tape sealant, 3/16" x 7/8" shall be available if specified and is standard at the eave, ridge and rakes for KLS 2100 and KLM 2100 roofs. Pre-cut 1/8" x 1-1/2" tape sealant shall be used at the endlaps for KLS 2100 and KLM 2100 Roofs.
  2. Tube sealants shall be an acrylic or one part urethane base caulking material.
  3. Closures shall be of a closed cell foam material of a gray or neutral color, and shall be die cut to panel profiles. Closures shall be supplied as required to provide weathertightness.

**2.6 Miscellaneous Members**

Miscellaneous members shall typically be those members to augment the primary, primary endwall and secondary framing systems. They shall include members such as base angles, flange braces, jambs, headers, and bridging or sag members, and shall be designed to be supportive of the framing systems.

- A. Base Angles shall be a cold-formed steel angle 3" x 2" x 14 gauge, 55,000 psi minimum yield. They shall be anchored to slab or other collateral construction at 4' maximum centers and within 12" of any end with power driven fasteners or other secure methods not provided by Kirby.
- B. Flange Braces shall typically be an angle member of 55,000 psi minimum yield steel and shall attach to the purlin and/or girt and a clip on the interior flange of the primary framing system.

**2.7 Accessories****A. Translucent Roof Panels**

Panels shall be of nominal 8 oz. fiberglass having woven reinforcing, textured exterior surface, white finish, and conform to the configuration of the roof panels. The panels are general purpose, Type I non-rated as standard and shall be available as UL rated Type II upon request. Translucent roof panels shall also be available in a sandwich construction whereby a similar 5 oz. fiberglass panel has been bonded to the underside of the standard translucent roof panel to create a 1/8" minimum dead air space. These panels are available for KirbyRibII, KLS 2100 and KLM 2100 roof panels. Translucent roof panels are the same width as the roof panel and are compatible for use over two 5'-0" purlin spaces. Translucent roof panels shall not be used as side-to-side nor end-to-end installations.

**B. Translucent Wall Panels**

Panels shall be of nominal 8 oz. fiberglass having chopped strand reinforcing, textured exterior surface, white finish, and conform to the configuration of the wall panels, nominally 36" wide and generally supplied in lengths suitable for field cutting. Translucent wall panels may be used as side-to-side installations.

**C. Mini-Ridge Ventilator**

Ventilator shall have a 9" x 23" throat with a cord operated damper and a birdscreen. Ventilators are zinc-aluminum coated or White. Vent base configuration is matched to the roof panel on which it is used (except KLS 2100, KLM 2100, Roof-Lok™, or Roof-Lok Plus™). The base rating is 583 C.F.M. at 5 MPH, 20° F., 20' stack height.

**D. Continuous or Sectional Ridge Gravity Ventilator**

Ventilator shall have a 9"x10'-0" throat with a cord operated damper and a birdscreen. Vents are zinc-aluminum coated or White. The 10' sectional vents are such that continuous runs of ridge vents can be field assembled. The base rating per a 9"x10'-0" section vent is 2,170 C.F.M. at 5 MPH, 20° F., 20' stack height.

**E. Roof Curb Units**

Curb units shall be fabricated, from zinc-aluminum coated sheet steel, to the size opening specified. Units shall have endcaps that match the high rib of the roof panel (KirbyRibII, KLS 2100, KLM 2100, Roof-Lok™ or Roof-Lok Plus™). Standard sub-frame shall be minimum 16 gauge steel "zee" or "cee" sections. All fasteners and sealants required for installation shall be furnished by Kirby.

**F. Pipe Flashing Units**

Units shall be for the flashing of plumbing vent stacks and/or other pipe-like roof penetrations. Base shall be neoprene with lead ring to be field configured to fit roof panel. Boot shall be neoprene.

**G. Personnel Doors**

**1. Standard Doors (Field Assembled)**

Doors shall typically be a single door 3070 or a double door 6070 available in flush panel (solid) or long vision. Glass and glazing of personnel door is not by Kirby.

a. Door leaf shall be a sandwich-constructed member fabricated of 20 gauge G60 galvanized steel sheets painted Bronze or White. Top and bottom flush channels are prefinished 16 gauge galvanized channels. Vertical edges are continuously locked with hemmed edges. Doors are filled with a one-piece rigid foam material used for insulating against cold or heat. Doors are mortised for 4-1/2" x 4-1/2" template (.134 wt.) hinges with continuous reinforcement. Doors are prepared for Government series 86 and 161 locksets approved in accordance with the Steel Door Institute performance tests and specifications.

b. Frames shall be fabricated of galvanized G60 16 gauge steel painted Bronze or White. Frames are mortised for 4-1/2" x 4-1/2" template hinges (.134 wt.) and ASA universal strike plates approved in accordance with the Steel Door Institute performance tests and specifications.

c. Hardware shall typically consist of a minimum of: (a) 1-1/2 pair full mortise hinges per leaf; (b) one key-in-knob lever handle lockset; (c) one aluminum threshold; (d) one astragal and one pair of surface bolts per double door. Jambs, heads, and sill are weather-stripped.

2. **Premium Doors (Factory Assembled)**  
Doors shall typically be a single door 3070 or 4070, or a double door 6070 available in flush panel (solid), half-glass, narrow lite or vision lite. Glass and glazing of premium personnel doors is included.
- a. Door leaf shall be a sandwich-constructed member fabricated of 20 gauge A60 galvanized steel sheets painted Bronze or White. Perimeter channels are prefinished 16 gauge galvanized channels. Doors are filled with a one-piece rigid foam material used for insulating against cold or heat. Doors are mortised for 4-1/2" x 4-1/2" templated hinges with 10 gauge reinforcement plates welded in place. All doors shall have 14 gauge lockset reinforcement and 12 gauge closer reinforcement plates. When requested doors shall be prepared with 14 gauge reinforcements for panic devices and push-pull plates.
  - b. Frames shall be fabricated of galvanized A60 16 gauge steel painted Bronze or White. Hinge jambs shall be mortised and reinforced with 10 gauge steel welded in place and tapped for 1 1/2 pairs of 4 1/2" x 4 1/2" templated hinges. Strike jambs shall be mortised and reinforced to receive an ANSI/DHI A115.1 strike plate.
  - c. Sub-frames (framed openings) shall be galvanized A60 16 gauge steel and made to match the depth and fabricated to meet the needs of the installed application.
  - d. Hardware shall typically consist of a minimum of: (a) 3 pairs of full mortise hinges per leaf; (b) one grade 2 key-in-knob lever handle lockset; (c) one aluminum threshold; (d) one latch guard; (e) one astragal and one pair of surface bolts per double door. Jambs, heads, and sill are weather-stripped.
  - e. Additional options for the premium doors include: (a) mortise locksets; (b) kick plates and crash chains; (c) ball bearing hinges with non-removable pins; (d) exit devices with lever trim; (e) door closers.

H. **Framed Openings In Walls**

Openings shall typically be an opening framed with 16 gauge minimum, cold-formed members, designed to meet specified loads. Openings shall be trimmed in accordance with Kirby's standard practices.

J. **Windows**

1. **Standard Windows (Self Flashing)**

- a. Windows shall typically be of aluminum frame construction with head, sill, and jamb fins of the configuration required for self-flashing and self-framing installation in KirbyRibII, KirbyWall or KRP panels.
- b. 3030 and 3060 horizontal slide windows shall be available with Bronze or mill finished frames.
- c. Windows have half screens of Charcoal Gray fiberglass.
- d. Glazing shall be a standard minimum of double strength "B" quality clear glass. Glazing shall also be available in obscure or 7/16" double clear glass with a 1/4" closed air space.

**2 Premium Windows (Factory Assembled)**

- a. Windows shall typically be of thermal break aluminum frame construction with head, sill, and jamb fins of the configuration required for self-flashing and self-framing installation in KirbyRibII, KirbyWall or KRP panels. A steel subframe to match the girt depth is standard.
- b. Fixed, horizontal slide and vertical slide windows in custom sizes shall be available with white or bronze baked-on enamel finish.
- c. Horizontal and vertical slide windows have half screens of Charcoal Gray fiberglass.
- d. Glazing shall be a standard minimum of 5/8" clear insulated glass. Many other glazing options are available such as tinted, Low-E, tempered, etc.).

**K. Adjustable Louvers**

Louvers shall be shop fabricated 18 gauge galvanized steel, self-framing, self-flashing welded frames with 20 gauge galvanized blades. Louvers are painted Bronze after assembly. Louvers shall have a minimum free air flow area of 65%. Louvers shall have exterior mounted removable birdscreens. Adjustable louvers shall be equipped with a hand crank and a spring loaded closure system for optional operation by pull chain.

**L. Canopies**

Canopies shall typically be an overhang provided with a roof finish and trim finish matching that of the main structure. Soffit panels are optional. Canopies shall be framed of cold-formed light gauge shapes, welded built-up sections, hot-rolled sections and/or open web members.

1. Eave Canopies shall be the extension of the roofline at the eave. Eave canopies are measured from a structural line to structural line and/or face of sidewall girt to face of eave member.
2. Purlin Extension Canopy shall be the extension of the roofline at the gable and/or endwall of the structure. Purlin extensions are measured from structural line to structural line and/or face of endwall girt to face of purlin rake cap.
3. Below Eave Canopies shall be below eave and/or rake canopies.

**M. Facades**

Facades shall typically be constructed of cold-formed secondary framing members and built-up or hot-rolled frames. Facade systems are available as parapet (vertical) and mansard (sloped) face. Facade systems are measured from structural line and/or face of wall girt to face of facade girt for overhang. Height is measured vertical from structural line to structural line and/or top of facade rail to bottom of facade rail.

1. Facing materials shall typically be KirbyRibII panels, KirbyWall panels, KRP panels or StuccoChoice as specified in the order documents. Facade soffit panels are KirbyRibII.
2. Closed Facade Systems shall be designed with internal guttering between facade and building and have a closed back for weathertightness.

## PART 3 - EXECUTION

### 3.1 Foundations and Anchor Bolts

- A. Foundation design, including anchor bolt lengths and anchorage into the concrete, shall be done by a Registered Professional Engineer experienced in the design of such structures. This professional should assure that adequate provisions are made in the foundation design for loads imposed by column reactions of the building, other imposed loads, and the bearing capacity of the soil and other conditions of the building site. Kirby does not design and accepts no responsibility for the design, materials, and construction of the foundation or foundation embedments.
- B. Anchor bolts are not supplied by Kirby. Anchor bolts shall not be less than the diameter or quantity shown on the Kirby anchor bolt setting drawings. Foundation reactions are furnished by Kirby. All anchor bolts are to be set in strict accordance with Kirby drawings.

### 3.2 Receiving, Storage and Handling of Jobsite Materials

- A. All materials shall be unloaded, handled, hauled and delivered to storage by competent workmen in a manner that will prevent bends, dents, scratches or other damage. Damaged materials shall be rejected and promptly replaced. All materials shall be properly stored and protected from weather damage. All shipments must be thoroughly checked by the consignee. If shortage or damage is found, a notation must be placed on the bill of lading and must be confirmed by the carrier.
- B. Upon receipt, all bundles of primed material shall be stored on blocking at an angle sufficient to allow any trapped water to drain and should be protected from the weather by covers allowing air circulation. Water, ice and snow should not be allowed to collect and remain thereon.
- C. Bundles of roof and/or wall panels shall be inspected for moisture upon receipt. If moisture is present, dry the panels and, if possible, store them in a warm, dry place. The panel bundles shall be elevated and sloped in a manner to allow moisture to drain. Cover all bundles with a tarp or plastic, leaving airspaces for adequate air circulation.

### 3.3 Erection

The erection of the Kirby building system shall be performed by a qualified erector, in accordance with the appropriate erection drawings, erection guides and/or other documents furnished by Kirby, using proper tools, equipment and safety practices.

- A. Erection practices shall conform to "Common Industry Practices", Section 6, MBMA Low Rise Building Systems Manual.
- B. It shall be the erector's responsibility to comply with all appropriate legal and safety requirements.

- C. It shall be the erector's responsibility to determine and provide any and all temporary bracing, shoring, blocking, bridging, and/or securing of components, etc., as required during erection of the building. This temporary bracing, et al shall also be sufficient to secure the structural framing during erection against loads, such as wind and seismic, comparable in intensity to those for which the completed structure is designed.
- D. Field connections shall be bolted (unless otherwise noted). 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 shall be zinc plated with yellow dichromate coloring for easy identification. A-325 bolts are furnished without washers unless noted on the erection drawings, and must be tightened to a snug-tight condition unless otherwise noted on the Kirby Drawings supplied for the project. When joints are noted as pre-tensioned, the bolts must be tightened by the turn-of-the-nut method. {Ref: AISC 9th Edition Manual of Steel Construction, "Specification for Structural Joints Using ASTM A-325 or A-490 Bolts", Section 8 (d)(1), page 5-273.}
- E. All secondary bolted connections, unless noted otherwise and as shown on drawings, shall be furnished with high strength bolts conforming to the physical specifications of ASTM A-325 or shall be a "stud bolt" conforming to the physical specifications of ASTM A-449. All high strength bolts shall be zinc plated with yellow dichromate coloring for easy identification. All "stud bolts" shall be silver zinc plated. A-325 bolts and stud bolts are furnished without washers unless noted on the erection drawings. All secondary bolted connections shall be tightened to a snug-tight condition unless otherwise noted on the Kirby Drawings supplied for the project.
- F. There shall be no field modifications to primary structural members except as authorized and specified by Kirby Building Systems.