

Armstrong World Industries, Inc.

Ceiling & Suspension System Specification

Please understand that you are responsible for the accuracy of all project specifications, including any Armstrong guide specifications that you use.

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SECTION 09 22 26.23 (09120)

METAL SUSPENSION SYSTEMS

Drywall Flat or Curved Applications

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Suspension System Framing and Furring for Plaster and Gypsum Board Assemblies
 - 2. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.
- B. Related Sections:
 - 1. Section 09250 - Gypsum Board
 - 2. Section 09150 - Acoustical Ceilings
 - 3. Division 15 Sections - Mechanical Work
 - 4. Division 16 Sections - Electrical Work
- C. Alternates
 - 1. Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted no later than TEN (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Architect's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products that have not been approved by Addenda, the specified products shall be provided without additional compensation.
 - 2. Submittals, which do not provide adequate data for the product evaluation, will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); Furring System component profiles and sizes; Compliance with the referenced standards.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - 2. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
 - 3. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability"
 - 4. ASTM D 610 Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces
 - 5. ASTM B 117 Standard Practice for Operating Salt Spray (Fog) Apparatus
 - 6. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

7. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
8. ASTM C 1858 Standard Practice for Design, Construction, and Material Requirements for Direct Hung Suspended T-bar Type Ceiling Systems Intended to Receive Gypsum Panel Products in Areas Subject to Earthquake Ground Motions
9. ASTM C 645 Standard Specification for Nonstructural Steel Framing Members
10. ASTM C 754 Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board
11. ASTM C1002 Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
12. ASTM E 119 Standard Test Method for Fire Tests of Building Construction and Material (if applicable).
13. NOA #07-0119.02 Miami/Dade Wind Uplift.
14. NAO #09-0512.02 Miami/Dade Impact.
15. ESR-1289 ICC-ES Evaluation Report.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical literature.
- B. Samples: 8 inch long samples of suspension system components, including main runner, cross tees and angle molding.
- C. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: To ensure proper interface, all drywall furring components shall be produced or supplied by a single manufacturer.
- B. All accessory components from other manufacturers shall conform to ASTM standards.
- C. Fire Resistance Ratings: As indicated by reference to design designations in UL Fire Resistance Directory, for types of assemblies in which drywall ceilings function as a fire protective membrane and tested per ASTM E 119. Installation in accordance with the UL Design being referenced.
- D. Coordination of Work:
 1. Coordinate drywall furring work with installers of related work including, but not limited to acoustical ceilings, building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.
 2. All work above the ceiling line should be completed prior to installing the drywall sheet goods. There should be no materials resting against or wrapped around the suspension system, hanger wires or ties.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

1.7 WARRANTY

- A. Suspensions System: Submit a written limited warranty executed by the manufacturer, agreeing to repair or replace grid components that are supplied with a hot-dipped galvanized coating or aluminum base material. Failures include, but are not limited to:
The occurrence of 50% red rust as defined by ASTM D 610 test procedures as a result of defects in materials or factory workmanship.
- B. Warranty Period:
Grid: Ten years from date of installation.
- C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

Suspension Systems: Armstrong World Industries, Inc.

2.2 SUSPENSION SYSTEMS

A. Components:

1. Main Beam: Shall be double-web construction (minimum 0.0179 inch prior to protective coating, ASTM C645), hot dipped galvanized (per ASTM A653).
 - a. **HD8906/HD890610**: 1-11/16 inch web height, 1-1/2 inch flange, available with G40 or G90 hot dipped galvanization.
 - b. **HD8906HRC**: 1-11/16 inch web height, 1-1/2 inch flange, available with G40 or hot dipped galvanization. (61% Recycle content, 53% Post Consumer, 8& Pre-Consumer).
 - c. **HD8906IIC**: 1-11/16 inch web height, 1-1/2 inch flange, available with G40 or G90 hot dipped galvanization (to be used with IIC Sound Clip).
 - d. **HD8906F08**: 1-11/16 inch web height with pre-cut facets (8 inches on center) for radius installations, 1-1/2 inch flange.
 - e. **HD8906F16**: 1-11/16 inch web height with pre-cut facets (8 inches from ends, then 16 inches on center) for radius installations, 1-1/2 inch flange.
 - f. **HD7940**: Metric, 43mm web height, 38mm flange, route spacing 150mm O.C. available with G40 or G90 hot dipped galvanization.
 - g. **7940**: Metric, 43mm web height, 38mm flange, route spacing 150mm O.C. available with G40 or G90 hot dipped galvanization.
 - h. **HD7940**: Metric, 43mm web height, 38mm flange, route spacing 200mm O.C. available with G40 or G90 hot dipped galvanization
 - i. **HD7940G**: Metric, 43mm web height, 38mm flange, route spacing 150mm O.C. available with G40 or G90 hot dipped galvanization
2. Primary Cross Tees: Shall be double-web steel construction (minimum 0.0179 inch prior to protective coating, ASTM C645), hot dipped galvanized (minimum G40 or G90 per ASTM A653)
 - a. **XL8945P**: 48 inch, web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange
 - b. **XL8945PHRC**: 48 inch, web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange. (61% Recycle content, 53% Post Consumer, 8& Pre-Consumer).
 - c. **XL8965**: 72 inch, web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange.
 - d. **XL8965HRC**: 72 inch, web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange. (61% Recycle content, 53% Post Consumer, 8& Pre-Consumer).
 - e. **XL8947**: 50 inch, web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange. (For Type "F" 2'x4' light fixture compatibility)
 - f. **XL8940**: 40 inch, web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange.
 - g. **XL7936G90**: 36 inch web height 1-1/2 inch with rectangular bulb and pre-finished 1-1/2 inch knurled flange.
 - h. **XL7961**: Metric 1600mm, web height 38mm with rectangular bulb and pre-finished 38mm knurled flange Route 800mm center of tee.
 - i. **XL7930**: Metric 1200mm, web height 38mm with rectangular bulb and pre-finished 38mm knurled flange Routes 450mm, 600mm, 750mm.
 - j. **XL7925**: Metric 900mm, web height 38mm with rectangular bulb and pre-finished 38mm knurled flange
 - k. **XL7920**: Metric 600mm, web height 38mm with rectangular bulb and pre-finished 38mm knurled flange
3. QuikStix Soffits DGS: Shall be double web steel construction (minimum 0.0179 inch prior to protective coating, ASTM C645), Tees designed for creating soffits; 1-1/2 inch web height. 1-1/2 inch flange, flattened bulb, bending crimp, knockouts and alignment holes to facilitate creating 15, 30, 45, 60 and 90 degree angles; available with G40 or G90 hot dipped galvanization.
 - a. **QS612**: 12 foot tee with knockouts 6 inches on center, route holes 6 inches on center.
 - b. **QS812**: 12 foot tee with knockouts 8 inches on center route holes 8 inches on center.,
4. Wall Molding:
 - a. **LAM-12**: 12 foot Locking Angle Molding, 1-1/4 inch x 1-1/4 inch with pre-engineered locking tabs punched 8 inches on center, knurled surface, screw stop hem, pre-punched holes in top flange, 4" O.C., .018 mil. 25g.

- b. **LAM-12HRC**: 12 foot Locking Angle Molding, 1-1/4 inch x 1-1/4 inch with pre-engineered locking tabs punched 8 inches on center, knurled surface, screw stop hem, pre-punched holes in top flange, 4" O.C., .018 mil. 25g. (61% Recycle content, 53% Post Consumer, 8& Pre-Consumer).
 - c. **KAM -12**: 12 foot Knurled Angle molding, 1-1/4 inch x 1-1/4 inch, knurled surface, screw stop hem, pre-punched holes in top flange, 4" O.C., .018 mil. 25g.
 - d. **KAM -12HRC**: 12 foot Knurled Angle molding, 1-1/4 inch x 1-1/4 inch, knurled surface, screw stop hem, pre-punched holes in top flange, 4" O.C., .018 mil. 25g. (61% Recycle content, 53% Post Consumer, 8& Pre-Consumer).
 - e. **KAM-10**: 10 foot Knurled Angle molding, 1-1/4 inch x 1-1/4 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .018 mil. 25g.
 - f. **KAM1510B**: 10 foot Knurled Angle molding, 1-1/2 inch x 1-1/2 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .018 mil. 25g
 - g. **KAM1512B**: 12 foot Knurled Angle molding, 1-1/2 inch x 1-1/2 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .018 mil. 25g
 - h. **KAM151020**: 10 foot Knurled Angle molding, 1-1/2 inch x 1-1/2 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .033 mil. 20g
 - i. **KAM151020E**: 10 foot Knurled Angle molding, 1-1/2 inch x 1-1/2 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .028 mil. 22g
 - j. **KAM151220E**: 12 foot Knurled Angle molding, 1-1/2 inch x 1-1/2 inch, knurled surface, screw stop hem, pre-punched holes in top flange 4" O.C., .028 mil. 22g
 - k. **KAM21025**: 10 foot Knurled Angle molding, 2 inch x 2 inch, knurled surface, pre-punched holes in top flange 4" O.C., .018 mil. 25g.
 - l. **KAM21020**: 10 foot Knurled Angle molding, 2 inch x 2 inch, knurled surface, pre-punched holes in top flange 4" O.C., .028 mil. 22g.
 - m. **KAM21020G90**: 10 foot Knurled Angle molding, 2 inch x 2 inch, knurled surface, pre-punched holes in top flange 4" O.C., .028 mil. 22g. G90 hot dipped galvanized.
 - n. **KAM20120EQ**: 10 foot Knurled Angle molding, 2 inch x 2 inch, knurled surface, pre-punched holes in top flange 4" O.C., .028 mil. 22g.
 - o. **7838**: Hot dipped galvanized (minimum G40), unhemmed channel molding, 3/4 inch x 1-9/16 inch x 1-1/4 inch flange.
 - p. **7858**: Reverse angle molding (minimum G40), unhemmed channel molding, 144 inch x 15/16 inch x 1-9/16 inch.
5. Transition Molding: Drywall to Acoustical ceiling.
- a. Pre-Painted Armstrong Global White integral acoustical flange and drywall taping flange, hot dipped cold rolled steel.
 - A. **7901**: 120 inch with 3/8 inch reveal and 9/16 inch acoustical flange.
 - B. **7902**: 120 inch with 3/8 inch reveal and 15/16 inch acoustical flange.
 - C. **7903**: 120 inch with 1 inch acoustical flange.
 - D. **7904**: 120 inch with 15/16" flush horizontal flange.
 - E. **7904PF**: 120 inch with 15/16" flush horizontal flange. (With Protective Film)
 - F. **7905**: 120 inch with 9/16" flush horizontal flange.
 - G. **7905PF**: 120 inch with 9/16" flush horizontal flange. (With Protective Flim)
 - H. **7906**: 120 inch "F" Flush vertical transition
 - I. **7907**: 120 inch with 9/16" tegular horizontal flange.
 - J. **7908**: 120 inch with 9/16" tegular horizontal flange.
 - b. Axiom Aluminum extrusion Pre-Painted Armstrong Global White integral acoustical flange and drywall taping flange.
 - A. **AXTRVSTR**: 120 inch x 9.16 inch x 1-11/16 inch Straight for Vector tile.
 - B. **AXTRTESTR**: 120 inch x 9.16 inch x 1-11/16 inch Straight for Tegular tile.
 - C. **AXTRTECUR**: 120 inch x 9.16 inch x 1-11/16 inch Curved for Tegular tile.
 - D. **AXTR2STR**: 120 inch x 2 inch x 1-1/2 inch Straight.
 - E. **AXTR2CUR**: 120 inch x 2 inch x 1-1/2 inch Curved.
 - F. **AXTR4STR**: 120 inch x 4 inch x 1-1/2 inch Straight.
 - G. **AXTR4CUR**: 120 inch x 4 inch x 1-1/2 inch Curved.
 - H. **AXTR6STR**: 120 inch x 6 inch x 1-1/2 inch Straight.
 - I. **AXTR6CUR**: 120 inch x 6 inch x 1-1/2 inch Curved.
 - J. **AXTR8STR**: 120 inch x 8 inch x 1-1/2 inch Straight.
 - K. **AXTR8CUR**: 120 inch x 8 inch x 1-1/2 inch Curved.
 - L. **AX4SPLICEB**: Splice Plate.
 - M. **AXTBC**: T-Bar Connector Clip.
 - N. **AXB**: Drywall Bottom Trim.

6. Clips:
 - a. **MBAC**: Main Beam Adapter Clip
 - b. **IIC**: Sound Isolation Clip (for use with HD8906IIC Main Runner)
 - c. **DWACS, DW50, DW58**: Drywall Attachment Clip for transitions to acoustical ceilings
 - d. **DW58LT**: Transition Clip for 5/8" drywall with Locking Tabs.
 - e. **DW50LT**: Transition Clip for 5/8" drywall with Locking Tabs.
 - f. **MBSC2**: Main Beam Spacer Clip.
 - g. **GSC9**: Adjustable Grid Spacer Clip, 9 inch.
 - h. **GSC12**: Adjustable Grid Spacer Clip, 12 inch.
 - i. **GSC14**: Adjustable Grid Spacer Clip, 14 inch.
 - j. **DW30C**: 30 degree, Drywall Angle Clip
 - k. **DW45C**: 45 degree, Drywall Angle Clip
 - l. **DW60C**: 60 degree, Drywall Angle Clip
 - m. **DW90C**: 90 degree, Drywall Angle Clip
 - n. **XTAC**: Cross Tee Adapter Clip.
 - o. **DDC**: Double Drywall Clip.
 - p. **DLCC**: Direct Load Ceiling Clip.
 - q. **DWC**: Drywall Clip.
 - r. **RC2**: Radius Clip required to cover all pre-cut facets, including those not being clipped.
 - s. **QSUTC**: Uptight Clip.
 7. Drywall LED XAL Linear Light Trim Kits
 - a. **DGSLTK24**: 2' Linear Light Trim Kit for XAL 24" x 4" LED fixture
 - b. **DGSLTK30**: 30" Linear Light Trim Kit for XAL 30"x 4" LED fixture
 - c. **DGSLTK48**: 4' Linear Light Trim Kit for XAL 48" x 4" LED fixture
 - d. **DGSLTK60**: 5' Linear Light Trim Kit for XAL 60" x 4" LED fixture
 - e. **DGSLTK72**: 6' Linear Light Trim Kit for XAL 72" x 4" LED fixture
 - f. **DGSLTK90**: 7'-6" Linear Light Trim Kit for XAL 90" x 4" LED fixture
 - g. **DGSLTK96**: 8' Linear Light Trim Kit for XAL 96" x 4" LED fixture
 - h. **DGSLTK120**: 10' Linear Light Trim Kit for XAL 120" x 4" LED fixture
 - i. **DGSLTKCON**: Continuous Linear Light Trim Kit for XAL 10' x 4" LED fixture
 8. Screws for wallboard application shall be bugle head screws in accordance with thickness of material used.
 9. Metal Trim or Plastic Members (by others):
 - a. Corner bead: Minimum #26 gauge, zinc alloy or plastic square edge type with expanded flanges.
 - b. Casing bead: Minimum #24 gauge, zinc alloy or plastic square edge type with expanded flanges.
 - c. Control Joints: Minimum #26 gauge, roll-formed zinc alloy, extruded aluminum or plastic with expanded flanges.
 - d. Special Trim Shapes: As detailed on plans, extruded aluminum with acrylic coating by Fry Reglet or approved equal.
 - e. Metal Lath: 3.4 lbs/square yard, galvanized 3/8 inch diamond mesh or flat rib lath; security lath for applications requiring high degree of security.
- B. Structural Classification:
1. Main Beam shall be heavy duty per ASTM C 635.
 2. Classification can require wires to be closer together for additional loading when used to support double layer gypsum, verticals, slopes, domes, half barrels, circles, soffits, canopies, and step conditions which call for loading or unusual designs and shapes in drywall construction. Using cross tees in the construction of circles, barrels, etc. is common in order to hold the radius.
 3. Deflection of fastening suspension system supporting light fixtures, ceiling grilles, access doors, verticals and horizontal loads shall have a maximum deflection of 1/360 of the span.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- A. Install suspension system and panels in accordance with the manufacturer's instructions, in compliance with ASTM installation standard, and with applicable codes as required by the authorities having jurisdiction.
- B. The Armstrong Drywall Grid System can be installed in interior or exterior applications.
- C. To secure to metal clips, concrete inserts, steel bar joist or steel deck, use power actuated fastener, or insert. Coordinate placement for hanger wire spaced as required for expected ceiling loads and layout.

- D. Install hanger wire as required with necessary on center spacing to support expected ceiling load requirements, following local practices, codes and regulations. Provide additional wires at light fixtures, grilles, and access doors where necessary. A pigtail knot shall be used with three tight wraps at top and bottom fastening locations.
- E. Add additional wire as needed when using compatible clips and accessories.
- F. Control Joints: Roll formed zinc alloy, aluminum, or plastic as required for expansion and contraction as shown on drawings.
- G. Expansion Joints: Roll formed zinc alloy, aluminum, or plastic as required for expansion and contraction as shown on drawings.
- H. Main beams shall be suspended from the overhead construction with hanger wire, spaced as required for expected ceiling loads, along the length of the main beams.
- I. Install cross tees at on center spacing as specified by the drywall manufacturer. Typical drywall cross tee spacing:
 - 1. 16 inches on center with 5/8 or 1/2 inch gypsum board
 - 2. 24 inches on center with 5/8 inch gypsum board
- J. Other items such as wood, sheet metal, or plastic panels should be screwed to comply with deflection limit equivalent to that of the ceiling installation.
- K. Use channel molding or angle molding to interface with Drywall Grid System to provide perimeter attachment or to obtain drop soffits, verticals, slopes, etc.
- L. To suspend a second ceiling beneath a new or existing drywall ceiling, without breaching the integrity of the upper ceiling, use the Drywall Clip. To form a transition from a drywall ceiling to an acoustical ceiling, use the Drywall Transition Clips spaced as required for expected loads.
- M. For light fixtures (Type G, Type F) use secondary framing cross tees as required to frame opening.
- N. Single cross tees in a route hole to be secured by 7/16 inch framing screw or alternative methods.

3.2 INSTALLATION - EXTERIOR APPLICATIONS

- A. Use G90 components for exterior applications.
- B. Use vertical bracing as required by codes and standards in accordance with local jurisdiction (non-fire rated installations).
- C. Install main beams as required according to Wind Uplift Design or local codes and standards.
- D. Install cross tees as required according to Wind Uplift Design or local codes and standards, with additional tees when point loading (vertical), and with additional hanger at midspan of cross tee, as needed.

3.3 INSTALLATION - INTERIOR APPLICATIONS

- A. Install main beams and cross tees at the on center spacing required for ceiling loading, and location of in-ceiling services.
- B. Additional bracing as required by code.

3.4 INSTALLATION - RADIUS APPLICATIONS

- A. Determine the bow or camber (Convex or Concave) in a main runner.
- B. Establish a jig or pattern on a flat surface; mark locations to cut main beam; and use four pan head screws to fasten a Radius Clip (RC2) flat to the web between the bulb and the flange, per the manufacturer's instructions.
- C. Install main beams with on center spacing and wire spacing, as needed, to support expected ceiling load.
- D. Additional bracing may be required by code.
- E. Install cross tees at on center spacing as specified by the manufacturer.

END OF SECTION