SECTION 05 31 00

STEEL ROOF DECK

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\*\* NOTE TO SPECIFIER \*\* New Millennium Building Systems; steel roof deck and accessory products.  
This section is based on the products of New Millennium Building Systems, which is located at:  
1690 Broadway St.   
Bldg. 19, Ste. 160  
Fort Wayne, IN 46802  
Phone: 260-321-8080  
Fax: 260-868-6002  
Website: [www.newmill.com](http://www.newmill.com)   
Email: [info@newmill.com](mailto:info@newmill.com)   
New Millennium engineers and manufactures standard steel joists, architecturally unique "special profile" steel joists, and steel decking. The company is a nationwide leader in BIM-based steel joist design and BIM process management. New Millennium has also introduced the Flex-Joist Tension-Controlled Open Web Steel Joist design approach for increased steel joist strength, reliability and ductility. Among the benefits of the new approach is enhanced building safety, providing an early warning in the event of a roof overload condition.  
This specification includes New Millennium steel roof deck that is designed and manufactured nationwide at our six plant locations in accordance with the specifications of the Steel Deck Institute.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Steel roof deck and accessories.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 03 31 00 - Structural Concrete.
    2. Section 03 34 00 - Low Density Concrete.
    3. Section 05 12 13 - Architecturally-Exposed Structural Steel Framing.
    4. Section 05 21 13 - Deep Longspan Steel Joist Framing.
    5. Section 05 31 13 - Steel Floor Decking.
    6. Section 05 50 00 - Metal Fabrications.
    7. Section 07 22 13 - Asphaltic Perlite Concrete Deck.
    8. Section 07 27 00 - Air Barriers.
    9. Section 07 81 00 - Applied Fireproofing.
    10. Section 09 51 00 - Acoustical Ceilings.
    11. Section 09 90 00 - Painting and Coating.
    12. Division 15 - Mechanical: Roof drains.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American National Standards Institute (ANSI).
    2. ASTM International (ASTM):
       1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
       2. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
       3. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
       4. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
       5. ANSI/ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
       6. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
       7. ANSI/ASTM E795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests.
    3. American Iron and Steel Institute (AISI):
       1. AISI - North American Specification for the Design of Cold-Formed Steel Structural Members.
    4. American Welding Society (AWS):
       1. AWS D1.3 - Structural Welding Code - Sheet Steel.
    5. Factory Mutual (FM):
       1. Guide Listing - Approval Guide, Building Materials.
       2. Loss Prevention Data Sheet 1- 29.
    6. Steel Deck Institute (SDI):
       1. SDI Code of Standard Practice - 2014.
       2. SDI RD - Standard for Steel Roof Deck.
       3. SDI RDDM - Roof Deck Design Manual.
       4. SDI COSP - Code of Standard Practice.
       5. SDI MOC2 - Manual of Construction with Steel Deck.
    7. Underwriters Laboratories (UL):
       1. UL - Fire Resistance Directory.
    8. Underwriters Laboratories Canada (ULC):

\*\* NOTE TO SPECIFIER \*\* Edit the following paragraphs as required and applicable to the project requirements. Note that deck loads, structural framing, deck type and thickness, and concentrated loads must be clearly indicated on the Project Drawings.

* 1. DESIGN / PERFORMANCE REQUIREMENTS
     1. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's North American Specification for the Design of Cold-Formed Steel Structural Members and SDI RDDM Roof Deck Design Manual.
     2. Roof Decking:
        1. Deck shall meet the minimum design gage and yield strength specified on the drawings, or meet minimum specified section properties at specified yield strength.
        2. Whenever possible, the deck shall be multi-span.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph if Factory Mutual compliance for use as a component in Classes 1-60, 1-75 and 1-90 wind uplift construction is required. Delete if not required.

* + 1. Factory Mutual Guide Listing: Provide steel roof deck evaluated by FM and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.
    2. Fire-Test-Response Characteristics: Where indicated, provide steel deck units that are approved by UL, LLC and listed in the UL and ULC Fire Resistance Directories.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data: Manufacturer's data sheets on each product to be used, including:
        1. Deck property information for the proposed deck units as outlined in section 5.6 of SDI COSP-2017.
        2. Preparation instructions and recommendations.
        3. Storage and handling requirements and recommendations.
        4. Erection instructions.
     3. Shop Drawings: Show location, connections, bearing on supports, methods of anchoring, attachment of accessories, adjusting plate details and the manufacturer's erection instructions and pertinent details.

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraphs if LEED is not applicable.

* + 1. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
       1. Product Data for Credit MR 4.1 and MR 4.2: For products having recycled content, documentation including percentages by weight of post consumer and preconsumer recycled content
          1. Include statement indicating costs for each product having recycled content.
       2. Product Data for Credit MR 5.1 and Credit MR 5.2: Submit data, including location and distance from Project of material manufacturer and point of extraction, harvest or recovery for main raw material.
          1. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.
    2. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.
    3. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
  1. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Member in good standing of Steel Deck Institute (SDI).

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraph if testing is not required.

* + 1. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated.

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraph if welding is not required.

* + 1. Welding: Qualify procedures and personnel according to AWS D1.3, Structural Welding Code - Sheet Steel.
  1. DELIVERY, STORAGE, AND HANDLING
     1. Store products in compliance with SDI MOC2
     2. Separate sheets and store on dry wood sleepers; slope for positive drainage. Cut plastic wrap to encourage ventilation. Protect with a waterproof covering and ventilate to avoid condensation.
  2. SEQUENCING
     1. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraph if acoustical deck is not required.

* + 1. Coordinate installation of sound-absorbing insulation strips and non-corrosive spacers (lath when required) in the topside ribs of cellular acoustical deck as specified in Section 07 51 13.13 - Cold-Applied Built-Up Asphalt Roofing to ensure protection of insulation strips against damage from effects of weather and other causes.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: New Millennium Building Systems, which is located at: 1690 Broadway St.  
          Bldg. 19, Ste. 160; Fort Wayne, IN 46802; Tel: 260-321-8080; Fax: 260-868-6002; Email: [request info (info@newmill.com)](https://admin.arcat.com/users.pl?action=UserEmail&company=New+Millennium+Building+Systems&coid=35565&rep=&fax=260-868-6002&message=RE:%20Spec%20Question%20(05312mil):%20%20&mf=); Web: <https://www.newmill.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Edit the following paragraphs as required and applicable to the project requirements. All steel decking is available in lengths ranging from 6 feet 0 inches to 40 feet 0 inches. Extra charges are applied to lengths less than 6 feet 0 inches. Contact New Millennium if lengths exceeding 40 feet 0 inches are required.

* 1. ROOF DECK

\*\* NOTE TO SPECIFIER \*\* Select the roof Deck type(s) required from the following paragraphs and delete those not required. Note that ventilated deck is required for use with cementitious insulation fill.

* + 1. Steel Roof Deck - General: Fabricate deck to comply with SDI RD - Standard for Steel Roof Deck, with the minimum section properties indicated. Deck type and thickness shall be as indicated on the Drawings:

\*\* NOTE TO SPECIFIER \*\* Where rigid roofing insulation is used with 1.0RD deck, a minimum 1 inch thickness is required..

* + - 1. Type 1.0RD is 1 inch deep, 36 inches wide with nested side laps.
      2. Type 1.0RDV Ventilated Deck is 1 inch deep, 36 inches wide with nested side laps and slot vents in the bottom flutes. Openings equal 0.5 percent of total surface area.

\*\* NOTE TO SPECIFIER \*\* Type F Intermediate rib deck is Factory Mutual is approved for use as a component in Classes 1-60, 1-75 and 1-90 wind uplift construction. When ratings above 1-90 are required use special requirements in accordance with Factory Mutual Data Sheet 1- 29, Section 2.2.13. Where rigid roofing insulation is used with F deck, a minimum 1 inch thickness is required.

* + - 1. Type F Intermediate Rib deck is 1-1/2 inches deep, 36 inches wide with nested side laps.

\*\* NOTE TO SPECIFIER \*\* Type B Wide rib deck is Factory Mutual is approved for use as a component in Classes 1-60, 1-75 and 1-90 wind uplift construction. When ratings above 1-90 are required use special requirements in accordance with Factory Mutual Data Sheet 1- 29, Section 2.2.13. Where rigid roofing insulation is used with B deck, a minimum 1 inch thickness is required.

* + - 1. Type B Wide Rib deck is 1-1/2 inches deep and 36 inches wide with nested side laps.

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraph if welding is not required.

* + - * 1. Provide with rolled-in hanger tabs.
      1. Type BI Wide Rib deck is 1-1/2 inches deep and 36 inches wide with interlocking side laps.

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraph if welding is not required.

* + - * 1. Provide with rolled-in hanger tabs.

\*\* NOTE TO SPECIFIER \*\* Type BI and BIV ventilated deck is available with openings equaling 0.5 percent and up to 1.5 percent of total surface area. Insert the opening required.

* + - 1. Type BV Wide Rib Ventilated deck is 1-1/2 inches deep and 36 inches wide with nested side laps. Openings equal \_\_\_ percent of total surface area.
      2. Type BIV Wide Rib Ventilated deck is 1-1/2 inches deep and 36 inches wide with interlocking side laps. Openings equal \_\_\_ percent of total surface area.

\*\* NOTE TO SPECIFIER \*\* Type BA and BAV ventilated deck is available with openings equaling 0.5 percent and up to 1.5 percent of total surface area. Insert the opening required.

* + - 1. Type BA Wide Rib Acoustical deck is 1-1/2 inches deep and 36 inches wide with nested side laps. Vertical ribs are perforated and provides an NRC rating of 0.60 with a minimum of 1-1/2 inch thick rigid roofing insulation, as tested in accordance with ANSI/ASTM C 423 and E 795.
      2. Type BIA Wide Rib Acoustical deck is 1-1/2 inches deep and 36 inches wide with interlocking side laps. Vertical ribs are perforated and provide an NRC rating of 0.60 with a minimum of 1-1/2 inch thick rigid roofing insulation, as tested in accordance with ANSI/ASTM C 423 and E 795.
      3. Type B Wide Rib Dek Cellular is 1-1/2 inches deep and 24-1/2 inches wide. It has a liner panel that is attached to the bottom of the deck profile.
      4. Type B Wide Rib Dek Cellular Acoustical is 1-1/2 inches deep and 24-1/2 inches wide. It has a perforated liner panel that will provide an NRC rating of 0.70 when used with rigid insulation. Fiberglass batts are installed in the deck cells at the factory under controlled conditions.

\*\* NOTE TO SPECIFIER \*\* Type N Deep Wide rib deck is Factory Mutual is approved for use as a component in Classes 1-60, 1-75 and 1-90 wind uplift construction. When ratings above 1-90 are required use special requirements in accordance with Factory Mutual Data Sheet 1- 29, Section 2.2.13. Where rigid roofing insulation is used with B deck, a minimum 1 inch thickness is required.

* + - 1. Type N Deep Wide Rib deck is 3 inches deep and 24 inches wide with nested side laps.
      2. Type NW32 Deep Wide Rib deck is 3 inches deep ad 32 inches wide with nested side laps.
      3. Type NW32I Deep Wide Rib deck is 3 inches deep and 32 inches wide with interlocking side laps.
      4. Type NW32A Deep Wide Rib Acoustical deck is 3 inches deep and 32 inches wide with nested side laps. The vertical ribs are perforated and provide an NRC rating between 0.70 and 0.95.
      5. Type NW32IA Deep Wide Rib Acoustical deck is 3 inches deep and 32 inches wide with interlocking side laps. The vertical ribs are perforated and provide a NRC rating between 0.70 and 0.95.
      6. Type N-Dek Cellular Acoustical deck is 3 inches deep and 24-1/2 inches wide. It has a perforated liner panel that will provide an NRC rating of 0.95 when used with rigid insulation. Fiberglass batts are installed in the deck cells at the factory under controlled conditions. With the Dek-Knek Sidelap Attachment system this will provide a finished underside ceiling with self-aligning sidelaps and concealed fasteners.
      7. Type N-Dek Cellular is 3 inches deep and 24-1/2 inches wide. It has a liner panel that is attached to the bottom of the deck profile. With the Dek-Knek Sidelap Attachment system this will provide a finished underside ceiling with self-aligning sidelaps and concealed fasteners.
      8. Type N-Dek Cellular Acoustical is 3 inches deep and 24-1/2 inches wide. It has a perforated liner panel that will provide an NRC rating of 0.95 when used with rigid insulation. Fiberglass insulation batts are installed in the deck cells at the factory under controlled conditions. With the Dek-Knek Sidelap Attachment system this will provide a finished underside ceiling with self- aligning sidelaps and concealed fasteners.
      9. Type N Curve-Dek is 3 inches deep and 24-1/2 inches wide. Rolled in a concave or convex direction.
      10. Type NA Curve-Dek is 3 inches deep and 24-1/2 inches wide. Rolled in a concave or convex direction. Vertical ribs are perforated.
      11. Type NC Curve-Dek Cellular is 3 inches deep and 24-1/2 inches wide. It has a liner panel attached to the bottom of the deck profile. Rolled in a concave or convex direction.
      12. Type NCA Curve-Dek Cellular Acoustical is 3 inches deep and 24-1/2 inches wide. It has a perforated liner panel attached to the bottom of the deck profile. Rolled in a concave or convex direction.
      13. Type N-Dek Inverted Narrow Rib deck is 3 inches deep and 24 inches wide with nested side laps.
      14. Type N-Dek Acoustical Inverted Narrow Rib deck is 3 inches deep and 24 inches wide with nested side laps. Vertical ribs are perforated and provide an NRC rating of 0.80. Tested in accordance with ASTM C 423-02a and E795-00.
      15. Type NA Deep Wide Rib Acoustical deck is 3 inches deep and 24 inches wide with nested side laps. Vertical ribs are perforated and provide an NRC rating of 0.65 with or without rigid roofing insulation, as tested in accordance with ANSI/ASTM C 423 and E 795.
      16. Type N-Dek Acoustical Narrow Rib Acoustical deck is 3 inches deep and 24 inches wide with nested side laps. Vertical ribs are perforated and provide an NRC rating of 0.75 to 0.95 when used with rigid insulation.
      17. Type N-Dek Interlocking Acoustical Narrow Rib Acoustical deck is 3 inches deep and 24 inches wide. Vertical ribs are perforated and provide an NRC rating of 0.75 to 0.95 when used with rigid insulation.
    1. Deck Materials
       1. Sheet steel for galvanized deck shall conform to ASTM A 653/A 653M Structural Steel, with a minimum yield strength of 33 ksi (230 MPa) or other galvanized structural sheet steels or high strength low alloy steels in accordance with AISI S100, Section A2.
       2. Sheet steel for uncoated or phosphatized top/painted bottom deck shall conform to ASTM A 1008 / A 1008M with a minimum yield strength of 33 ksi (230 MPa) or other structural sheet steels or high strength low alloy steels in accordance with AISI S100, Section A2.
       3. Sheet steel for accessories shall conform to ASTM A 653/A 653M, Structural Steel for structural accessories, ASTM A 653/A 653M Commercial Steel for non-structural accessories, or ASTM A 1008 / A 1008M for either structural or non-structural accessories. Other structural sheet steels or high strength low alloy steels shall be permitted in accordance with AISI S100, Section A2. All sheet steel for accessories shall have a minimum specified yield strength of 33 ksi (230 MPa).
    2. Deck Finish:

\*\* NOTE TO SPECIFIER \*\* Select the deck finish required from the following paragraphs and delete those not required. Note that the primer-painted finish is intended to protect the steel for a reasonable installation period while exposed to ordinary atmospheric conditions and shall be considered an impermanent and provisional coating.

* + - 1. Galvanized coating shall comply with A653/A653M with zinc coating as follows:

\*\* NOTE TO SPECIFIER \*\* Select the galvanized coating thickness required from the following paragraphs and delete those not required.

* + - * 1. G30.
        2. G40.
        3. G60.
        4. G90.
      1. Primer-painted finish gray on both the top and bottom sides.
      2. Two-coat bright white primer bottom side and a primer-painted topside.
      3. Two-coat bright white primer bottom side and a galvanized topside.
  1. ACCESSORlES
     1. Column closures, end closures, side closures and cover plates shall be the standard type provided by the deck manufacturer unless indicated otherwise on the Drawings.
     2. Galvanizing Repair Paint for Roof Decks: High-zinc-dust content paint for re-galvanizing welds in galvanized steel conforming to ASTM A 780.
     3. Fasteners: As manufactured by Hilti, Buildex, Simpson Strong-Tie or approved equal.
     4. Flexible Closure Strips.

1. EXECUTION
   1. EXAMINATION
      1. Do not install roof deck until supporting construction is in place.
      2. Examine support framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work of this section.
      3. If supporting construction is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
   2. PREPARATION
      1. Clean surfaces thoroughly prior to installation.
      2. Locate deck bundles to prevent overloading of support members.
   3. INSTALLATION - GENERAL
      1. Install deck panels and accessories in accordance with the Contract Documents approved installation drawings and requirements of this Section.
      2. Place deck panels on structural supports and adjust to final position with ends aligned. Attach firmly to the supports immediately after placement in order to form a safe working platform.
      3. Cut and neatly fit deck units and accessories around openings and other work projecting through or adjacent to the decking.
      4. Trades that subsequently cut unscheduled openings through the deck are responsible for reinforcing the openings.
   4. INSTALLATION - ROOF DECK
      1. Install and fasten deck and accessories in accordance with the Contract Documents, approved installation drawings and requirements of ANSI/SDI RD.
      2. End Bearing: Install deck ends over supports with a minimum end bearing of 1-1/2 inches (38 mm) unless otherwise shown on approved installation drawings.
      3. Side Closures: Fasten to supporting structure and deck in accordance with the Contract Documents, approved installation drawings and requirements of ANSI/SDI RD.
      4. Ridge and valley plates, flat plates at changes of deck direction and sump pans, shall be fastened to the deck in accordance with the Contract Documents, approved installation drawings and requirements of ANSI/SDI RD.
   5. INSPECTION AND REPAIR
      1. Before roof insulation placement, the deck shall be inspected for tears, dents, or other damage that may prevent the deck from acting as a tight and substantial form. Replace decking which has been damaged or permanently deflected.
      2. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint.
      3. Repair Painting: Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
   6. PROTECTION
      1. Protect installed products until completion of project.
      2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION