



COMPOSITE FLOOR SYSTEM

# SPECIFICATIONS

ECONOMY THROUGH ECOLOGY®

A detailed 3D cutaway diagram of the Ecospan composite floor system. It shows a series of parallel, corrugated metal deck panels supported by a steel joist. The panels are secured to the joist with bolts. A cross-section of a concrete slab is shown on top of the panels, with a grid of rebar reinforcement. The diagram illustrates the assembly and how the panels interlock.

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The information presented in this catalog has been prepared in accordance with recognized engineering principles and is for general information only. While believed to be accurate, this information should not be used or relied upon for any specific application without competent professional examination and verification of its accuracy, suitability and applicability by an engineer, architect or other licensed professional.

The Vulcraft/Verco Group (Vulcraft) employs engineers for the design, manufacture and marketing of its products. The Ecospan® Engineer does not accept the responsibility of the Design Professional of record for any structure. Vulcraft accepts the delegation of the engineering responsibility only for the products it manufactures, provided the application and applicable loading for these products are specified by the Design Professional of record. Vulcraft provides engineering for the design of its products which does not displace the need on any project for a Design Professional of record.

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## Guide Specification

Specifier Notes: This guide specification is written in Construction Specifications Institute (CSI) 3-Part Format in accordance with The *CSI Construction Specifications Practice Guide*, including *MasterFormat*, *SectionFormat*, and *PageFormat*.

This section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the Project and local building code. Coordinate this section with Division 01, other specification sections, and the Drawings. Delete all Specifier Notes after editing this section.

Section numbers and titles are based on *MasterFormat 2014 Update*.

## SECTION 05 22 00 COMPOSITE FLOOR SYSTEM

Specifier Notes: This section covers NUCOR Vulcraft/Verco Group "Ecospan" composite floor system. Consult Vulcraft National Accounts for assistance in editing this section for the specific application.

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A.Composite Floor System:
  - 1.Steel joists.
  - 2.Steel decking.
  - 3.Shear connectors.
  - 4.Slab reinforcement.
  - 5.Concrete slab.
  - 6.Accessories.

#### 1.2 RELATED REQUIREMENTS

Specifier Notes: Edit the following list of related sections as required for Project. Limit the list to sections with specific information that the reader might expect to find in this section, but is specified elsewhere.

- A.Section 03 20 00 – Concrete Reinforcing: Slab reinforcement.
- B.Section 03 30 00 – Cast-in-Place Concrete: Concrete slab.

#### 1.3 REFERENCE STANDARDS

Specifier Notes: List reference standards used elsewhere in this section, complete with designations and titles.

- A.American Concrete Institute (ACI) ([www.concrete.org](http://www.concrete.org)):
  - 1.ACI 318 – Building Code Requirements for Structural Concrete and Commentary.
- B.American Welding Society (AWS) ([www.aws.org](http://www.aws.org)):
  - 1.AWS D1.1/D1.1M – Structural Welding Code - Steel.
  - 2.AWS D1.3/D1.3M – Structural Welding Code - Sheet Steel.





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C.ASTM International (ASTM) ([www.astm.org](http://www.astm.org)):

- 1.ASTM A307 – Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.
- 2.ASTM A325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- 3.ASTM A529/A529M – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
- 4.ASTM A563 – Standard Specification for Carbon and Alloy Steel Nuts.
- 5.ASTM A572/A572M – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
- 6.ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- 7.ASTM A992/A992M – Standard Specification for Structural Steel Shapes.
- 8.ASTM A1008/A1008M – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
- 9.ASTM C1513 – Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
- 10.ASTM F436 – Standard Specification for Hardened Steel Washers.

D.NUCOR Vulcraft/Verco Group ([www.ecospan-usa.com](http://www.ecospan-usa.com)):

- 1.Ecospan COSP – Code of Standard Practice.

E.Society for Protective Coatings (SSPC) ([www.sspc.org](http://www.sspc.org)):

- 1.SSPC Painting Manual.
- 2.SSPC-Paint 20 – Zinc-Rich Coating (Type I Inorganic and Type II Organic).

F.Steel Deck Institute (SDI) ([www.sdi.org](http://www.sdi.org)):

- 1.SDI FDDM – Floor Deck Design Manual.
- 2.SDI MOC2 – Manual of Construction with Steel Deck

## 1.4 PRE-INSTALLATION MEETINGS

*Specifier Notes: Edit pre-installation meetings as required for Project. Delete if not required.*

A.Convene pre-installation meeting [1 week] [2 weeks] before start of Work of this Section.

B.Require attendance of parties directly affecting Work of this Section, including Contractor, Architect, Engineer, installer, and manufacturer's representative.

C.Review the Following:

- 1.Materials.
- 2.Installation/erection.

*Specifier Notes: Include field quality control and adjusting if those requirements are specified in Part 3 of this section.*

- 3.Field quality control.
- 4.Adjusting.
- 5.Protection.
- 6.Coordination with other Work.





## 1.5 SUBMITTALS

*Specifier Notes: Edit submittal requirements as required for Project. Delete submittals not required.*

A. Comply with Division 01.

B. Submittals for Review:

1. Product Data: Submit manufacturer's product data, indicating joist and decking profiles, characteristics, dimensions, structural properties, materials, and finishes.
2. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating the following:
  - a. Joists: Joist identification numbers, types, locations, spacings, bridging, and attachments.
  - b. Decking: Decking plan, support locations, projections through decking, openings, relevant details, and accessories.

C. Sustainable Design Submittals: Submit manufacturer's certificates prepared by independent, third party certifying the following:

1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content, show cost of products containing recycled content, and certify recycled content information source.
2. Regional Materials: Certify that materials have been harvested, extracted, recovered, or manufactured within 500-mile radius of Project site.

D. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.

E. Warranty Documentation: Submit manufacturer's standard warranty.

## 1.6 QUALITY ASSURANCE

*Specifier Notes: Edit the following paragraphs to specify a minimum level of experience of the parties performing the Work of this section.*

A. Manufacturer's Qualifications: Manufacturer regularly engaged, for a minimum of 10 years, in the manufacturing of composite floor systems.

B. Welder's Qualifications: AWS D1.1/D1.1M and AWS D1.3/D1.3M.

## 1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists, decking, and accessories in accordance with manufacturer's instructions.

B. Store joists and decking off ground.

C. Protect materials from damage in accordance with SDI MOC2.

D. Store decking in accordance with SDI MOC2, with one end elevated to provide drainage.

E. Protect decking with vented, waterproof covering.

F. Place decking bundles on structural steel members in accordance with SDI MOC2.

G. Tie down loose decking bundles to prevent wind damage.





**PART 2 PRODUCTS**

**2.1 MANUFACTURERS**

A.Manufacturer: NUCOR Vulcraft/Verco Group, 6230 Shiloh Road, Suite 140, Alpharetta, Georgia 30005. Toll Free 888-375-9787. Phone 678-965-6667. Fax 678-965-6929. Website www.ecospan-usa.com.

*Specifier Notes: Specify if substitutions will be permitted.*

B.Substitutions: [Not permitted] [Comply with Division 01].

**2.2 DESIGN CRITERIA**

A.Design Requirements:

- 1.Design composite floor system including layouts, spans, and fasteners under supervision of professional engineer registered in state in which Project is located.

*Specifier Notes: 100 percent of non-composite dead load is standard. Insert additional camber requirements as required for Project.*

- 2.Camber joists based on [100 percent of non-composite dead load] [\_\_\_\_\_].
- 3.Design welded connections in accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M.
- 4.Where steel deck is not designed to support load, design slab in accordance with recognized construction principles or manufacturer’s recommendations.

*Specifier Notes: Provide loads as required for Project.*

B.Design composite floor system to withstand following unfactored loads:

- 1.Non-composite Dead Load:
  - a.Concrete: \_\_\_\_\_psf.
  - b.Joists: \_\_\_\_\_psf.
  - c.Decking: \_\_\_\_\_psf.
  - d.Bridging: \_\_\_\_\_ psf.
  - e.Total: \_\_\_\_\_ psf.
- 2.Construction Live Load: \_\_\_\_\_psf.
- 3.Composite Dead Load:
  - a.Fixed Partitions: \_\_\_\_\_ psf.
  - b.Mechanical, Electrical, Plumbing: \_\_\_\_\_ psf.
  - c.Fire Suppression: \_\_\_\_\_ psf.
  - d.Fireproofing: \_\_\_\_\_ psf.
  - e.Floor Coverings and Ceilings: \_\_\_\_\_ psf.
  - f.Total: \_\_\_\_\_ psf.
- 4.Composite Live Load:
  - a.Design Live Load: \_\_\_\_\_ psf.
  - b.Reduction Factor: \_\_\_\_\_ percent.
  - c.Reduced Design Live Load: \_\_\_\_\_ psf.
  - d.Movable Partitions: \_\_\_\_\_ psf.
  - e.Total: \_\_\_\_\_ psf.
- 5.Total Non-composite and Composite Loads: \_\_\_\_\_ psf.
- 6.Maximum Allowable Live Load Deflection: Span/\_\_\_\_\_.







### 2.3 MATERIALS

A.Composite Floor System: “Ecospan” composite floor system.

B.Steel Shapes:

*Specifier Notes: Edit as required for Project. Delete reference standards for steel shapes not required.*

- 1.ASTM A572/A572M, [50 ksi] [55 ksi] [\_\_\_\_\_ ksi].
- 2.ASTM A529/A529M, [50 ksi] [55 ksi] [\_\_\_\_\_ ksi].
- 3.ASTM A992/A992M.

*Specifier Notes: Obtain percent of recycled content for each material based on closest NUCOR Vulcraft/Verco Group fabrication facility to Project site.*

- 4.Recycled Content: Minimum \_\_\_\_\_ percent recycled steel, with minimum \_\_\_\_\_ percent classified as post consumer.

*Specifier Notes: Include the first paragraph for galvanized steel decking OR the second paragraph for uncoated or prime-painted steel decking. Delete paragraph not required for Project.*

C.Galvanized Steel Sheet:

- 1.ASTM A653/A653M.
- 2.Recycled content: Minimum \_\_\_\_\_ percent recycled steel, with minimum \_\_\_\_\_ percent classified as post consumer.

D.Steel Sheet:

- 1.ASTM A1008/A1008M.
- 2.Recycled content: Minimum \_\_\_\_\_ percent recycled steel, with minimum \_\_\_\_\_ percent classified as post consumer.

*Specifier Notes: Include the section number for the section specifying slab reinforcement.*

E.Slab Reinforcement: Specified in Section [03 20 00] [03 \_\_ \_\_].

*Specifier Notes: Include the section number for the section specifying concrete slab.*

F.Concrete Slab: Specified in Section [03 30 00] [03 \_\_ \_\_].

### 2.4 ACCESSORIES

A.Shear Connectors: “Shearflex” screws.

- 1.Self-drilling, self-tapping connectors.

B.Bolts, Nuts, and Washers: ASTM A307, ASTM A325, ASTM A563, and ASTM F436.

C.Screws: ASTM C1513.

D.Touch-Up Paint for Galvanized Surfaces: SSPC-Paint 20, Type I or II.

E.Welding Materials: AWS D1.1/D1.1M and AWS D1.3/D1.3M; type required for materials being welded.





## 2.5 FABRICATION OF STEEL JOISTS

A.Fabricate steel joists in accordance with manufacturer's standard practice.

*Specifier Notes: Specify depth of joists. Joists are available in depths from 10 to 48 inches.*

B.Joist Depth: [\_\_\_\_\_ inches] [As indicated on the Drawings].

C.Top and Bottom Chord Members:

- 1.Two equal-sized angles.
- 2.Minimum Yield Strength: 50,000 psi.

D.Web Members:

- 1.Round rods; crimped or un-crimped angles; rectangular bars.
- 2.Minimum Yield Strength: 50,000 psi.

*Specifier Notes: Specify joist bearing seats.*

E.Joist Bearing Seats: [Flush or standard.] [Indicated on the Drawings.]

F.Welding Materials and Methods: In accordance with Ecospan COSP.

G.Primer: Apply manufacturer's standard gray primer in accordance with SSPC Painting Manual.

## 2.6 FABRICATION OF STEEL DECKING

A.Manufacture steel decking and accessories in accordance with SDI FDDM.

*Specifier Notes: Specify gauge of steel sheets and depth of decking.*

B.Manufacture decking from \_\_\_\_\_ gauge to \_\_\_\_\_ gauge steel sheets to [1-inch] [1-5/16-inch] [1-1/2-inch] [2-inch] [3-inch] [\_\_\_\_\_-inch] depth.

C.Detail deck units to span 3 or more supports when possible, with lapped ends and nesting side laps.

- 1.For deck units which do not nest, butt ends in accordance with manufacturer's instructions.

D.Accessories: Fabricate in accordance with manufacturer's instructions.

*Specifier Notes: Specify finish of decking.*

E.Finish: [Uncoated] [Manufacturer's standard gray primer] [Galvanized, G60 coating class] [Galvanized, G90 coating class] [\_\_\_\_\_].







## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas to receive composite floor system.
- B. Verify surfaces to support composite floor system are clean, dry, flat, plumb, level, square, stable, rigid, and capable of supporting the weight.
- C. Notify Architect of conditions that would adversely affect installation.
- D. Do not begin installation until unacceptable conditions are corrected.

### **3.2 INSTALLATION – GENERAL**

- A. Install composite floor system in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install composite floor system plumb, level, square, and true to line.
- C. Anchor composite floor system securely in place to supports as indicated on the Drawings.
- D. Tolerances: Install composite floor system within manufacturer's installation tolerances.

### **3.3 ERECTION OF STEEL JOISTS**

- A. Erect steel joists and accessories in accordance with manufacturer's instructions, Ecospan COSP, and as indicated on the Drawings.
- B. Lift and support joists in upright position during unloading and erection.
- C. Place joists plumb, at elevations, lines, and spacings as indicated on the Drawings.
- D. Complete joist attachment to supporting members before placing decking.
- E. Complete joist and decking attachments in each bay before applying construction loads.
- F. Provide minimum bearing length of 2-1/2 inches on steel, 4 inches on masonry or concrete, or as indicated on the Drawings.
- G. Bridging:
  - 1. Install horizontal bridging before installing decking.
  - 2. Terminate horizontal bridging rows with diagonal X-bridging or positive anchorage to wall before placing decking.
- H. Provide for distribution of concentrated loads incurred during erection.
- I. Welding: Conform to manufacturer's requirements.
- J. Do not make corrections or alterations to joists without manufacturer's approval.



### **3.4 INSTALLATION OF STEEL DECKING**

A. Install steel decking and accessories in accordance with manufacturer's instructions and as indicated on the Drawings.

B. Laps:

1. Lap ends minimum of 3 inches for form deck.
2. Center laps over supports.
3. Nest side laps.

C. Place decking flat and square, without warp or deflection.

D. Provide minimum bearing on steel in accordance with manufacturer's instructions.

E. Attachment to Supporting Members:

1. Mechanically fasten or weld decking to supporting members as indicated on the Drawings.
2. Deck may be tack welded to secure in position before shear connectors are installed.
3. Welding: Conform to AWS D1.3/D1.3M.

F. Shear Connectors:

1. Install shear connectors at spacings indicated on the Drawings.
2. Drive shear connectors using equipment provided by manufacturer, through decking, and into joist top cord, until bottom collar is tight against decking.

G. Cutting and Fitting Decking:

1. Cut and fit deck units and accessories at perimeter and around projections and openings.
2. Make cuts neat and trim.

H. Pour Stops:

1. Install pour stops at edges and around projections and openings, upturned to top of slab.
2. Provide pour stops of sufficient strength to remain stationary under weight of wet concrete without distortion.
3. Screw or weld pour stops in place.

### **3.5 PLACEMENT OF CONCRETE SLAB**

A. Slab Reinforcement:

1. Place slab reinforcement for concrete slab as specified in Section [03 20 00] [03 \_\_ \_\_].
2. Lap reinforcement in accordance with ACI 318 and SDI MOC2.

B. Place concrete for slab as specified in Section [03 30 00] [03 \_\_ \_\_] and SDI MOC2.

C. Maintain minimum concrete slab thicknesses as indicated on the Drawings.

D. Locate slab openings not shown on the Drawings a minimum of 6 inches from edge of top chord of joists.

E. Terminate Concrete Placement:

1. Above beams or girders, wherever possible.
2. Parallel to joists midway between joists.

F. Locate Joints:

1. Perpendicular to joists over supporting member.
2. Parallel to joists midway between joists.



*Specifier Notes: Include the following article for testing and inspection services to be provided by an outside entity. Coordinate with Division 01 requirements for testing and inspection services. Delete if not required.*

### **3.6 FIELD QUALITY CONTROL**

A. Testing Laboratory Services:

1. Inspect steel joists for conformance to specified requirements:
  - a. Verify placement including location, alignment, and bearing.
  - b. Inspect joist-to-seat and seat-to-support welds.
2. Inspect steel decking for conformance to specified requirements:
  - a. Verify decking type and gage.
  - b. Verify decking placement and alignment.
  - c. Inspect welds and weld pattern.
  - d. Inspect fastener types, locations, quantities, and placement.

*Specifier Notes: Include the following article if composite floor system surfaces will be exposed to view after installation. Edit as required for Project. Delete if not required.*

### **3.7 ADJUSTING**

- A. Clean welds and abrasions after installation of composite floor system.
- B. Touch-up painted surfaces with same primer as originally applied.
- C. Touch-up galvanized coatings with galvanizing repair paint; apply as recommended by manufacturer.

### **3.8 PROTECTION**

- A. Protect installed composite floor system from damage during construction.

**END OF SECTION**





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The Vulcraft/Verco Group (Vulcraft) employs engineers for the design, manufacture and marketing of its products. The Ecospan® Engineer does not accept the responsibility of the Design Professional of record for any structure. Vulcraft accepts the delegation of the engineering responsibility only for the products it manufactures, provided the application and applicable loading for these products are specified by the Design Professional of record. Vulcraft provides engineering for the design of its products which does not displace the need on any project for a Design Professional of record.

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