

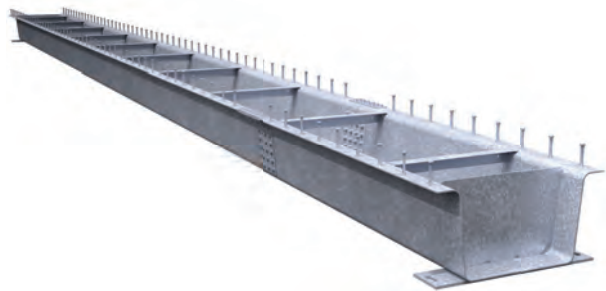
An aerial photograph showing the construction of a bridge over a river. The bridge structure consists of several parallel steel beams supported by wooden pilings. A green pipe is visible on the right side of the bridge. The surrounding area is lush with green trees and vegetation. The image is split diagonally by a white line, with the top-left portion being a solid blue color.

Valmont® Bridge Solutions U-BEAM™ Specification Guide

Valmont® U-BEAM™:

Your bridge to shorter traffic disruptions and longer service life.

With more than 47,000 deficient bridges in the U.S. currently in use, infrastructure experts need superior solutions. At Valmont Structures, we saw improving bridge life-cycle costs as a long-term solution for extending the life of our nation's bridge inventory, so we developed an innovative, economical and sustainable alternative to the "standard" bridge. The Valmont U-Beam™ is a steel bridge beam with a total service life of at least 100 years! The galvanized coating on our beam ensures the first 60 of those years are maintenance-free.



Valmont® U-BEAM™: The flexibility you need for the longevity you demand.

The Valmont U-BEAM™ offers the variety of packages and options your projects require and the service lifespan you've only dreamed of.

- AASHTO design and fabrication
- 60-year maintenance-free coating protection
- 100-year total service life
- Innovative fabrication eliminates fatigue critical details
- High-capacity plant allows for shorter delivery lead times than competing products
- Easy, convenient and fast installation – as quickly as one day
- Competitive price and less expensive installation costs
- Environmentally inert, recyclable and long-lasting coating system
- Lighter than traditional concrete beams
- Multiple U-BEAMS can be delivered on one standard trailer

U-BEAM™ Selection Chart Per AASHTO LRFD Requirements

| | Bridge Length (ft) | | | | | | | | | | | | | | | |
|---------|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| Spacing | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
| 4' - 6" | U12 | U12 | U12 | U12 | U12 | U18 | U18 | U18 | U24 | U24 | U30 | U30 | U33 | U33 | S.D. | S.D. |
| 5' - 0" | U12 | U12 | U12 | U12 | U12 | U18 | U18 | U24 | U24 | U24 | U30 | U30 | U33 | S.D. | S.D. | S.D. |
| 5' - 6" | U12 | U12 | U12 | U12 | U12 | U18 | U18 | U24 | U24 | U30 | U30 | U33 | S.D. | S.D. | S.D. | S.D. |
| 6' - 0" | U12 | U12 | U12 | U12 | U18 | U18 | U18 | U24 | U24 | U30 | U30 | U33 | S.D. | S.D. | S.D. | S.D. |
| 6' - 6" | U12 | U12 | U12 | U12 | U18 | U18 | U24 | U24 | U30 | U30 | U33 | S.D. | S.D. | S.D. | S.D. | S.D. |
| 7' - 0" | U12 | U12 | U12 | U12 | U18 | U18 | U24 | U24 | U30 | U33 | S.D. | S.D. | S.D. | S.D. | S.D. | S.D. |
| 7' - 6" | U12 | U12 | U12 | U12 | U18 | U24 | U24 | U30 | U30 | U33 | S.D. | S.D. | S.D. | S.D. | S.D. | S.D. |
| 8' - 0" | U12 | U12 | U12 | U18 | U18 | U24 | U24 | U30 | U33 | S.D. | S.D. | S.D. | S.D. | S.D. | S.D. | S.D. |

U-BEAM sizes are acceptable for any **spacing above** or **length to the left of** specific selection

*S.D.—Contact your Valmont representative for Special Designs

Strength, Load and Other Design Parameters

- This design assumes the superstructure is a simple supported span, where span length is defined as center to center of bearing locations.
- The design span length is assumed to be one foot shorter than the bridge length, assuming the centerline of the bearing line is 6 inches from the bridge ends.
- The deck thickness is assumed as 8" with a 2" haunch, and concrete compressive strength is taken as 5000 psi.
- The top 1/2" thickness of the deck is assumed sacrificial and is not accounted for in the limit state design requirements.
- A future wearing surface load of 25 psf is included for the design.
- Barrier loading is taken as 350 plf and distributed to each girder equally.
- In the selection chart S.D. designates that a specific U-BEAM™ design is required.
- U-BEAM™ material is AASHTO M270, and the design yield strength is 50 ksi.
- Live Load is HL-93, as defined in AASHTO LRFD Design Specifications.
- All U-BEAM™ cross sections are designed as compact per the AASHTO LRFD cross section proportion limits.
- The live load distribution factor is calculated by the lever rule, per AASHTO LRFD NCHRP Report 529h Section 4 B4 Lever Rule Formula.
- The live load deflection is calculated with two lanes of traffic and a minimum 28-foot bridge width with all lanes loaded and the dynamic allowance factor applied.
- The live load deflection meets AASHTO recommendations of less than span/800.
- The bridge deck concrete compressive service stresses are below allowable limits as defined in AASHTO LRFD.
- The U-BEAM tensile service stresses are below allowable limits as defined in AASHTO LRFD.

***psf** (pounds per square foot)

***psi** (pounds per square inch)

***ksi** (thousand pounds per square inch)

***plf** (pounds per linear foot)

U12 U-BEAM™

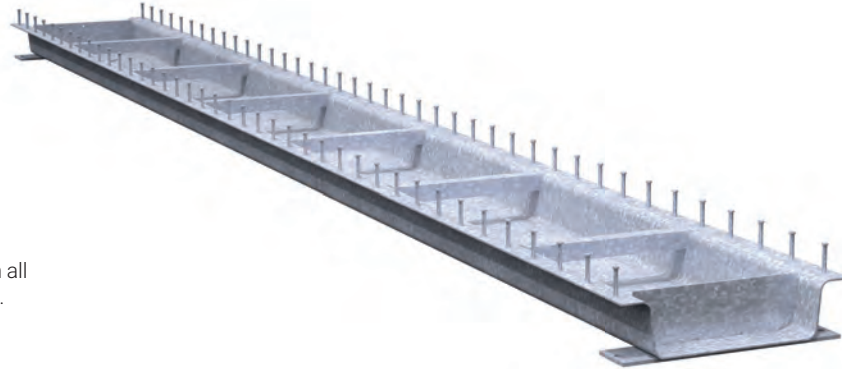
Main U Member (Primary Member)

Fabricated from 0.375" thick steel plate, the shape is cold-formed by press brake, with a minimum bend radius five times the thickness of the plate, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN).

Shape Trapezoidal Steel Box Section per AASHTO Section 6.11. Box Section Flexural Members.

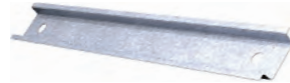
Finish Standard finish is hot-dip galvanized per AASHTO M111 (ASTM A123) on all final assembly components. Custom finishes are available upon request.

Size Width 4'-4", length up to 45' (confirm with U-BEAM Selection Chart)



Holes in Primary Members

Standard size, drilled or cut undersize 1/8" and reamed.



Drain Holes

Two 1.25" drain holes drilled at the end of each U-BEAM.



Drain Hole Cover

After galvanization, the drain holes are covered with 20-gauge galvanized metal screen with 1/4" openings.



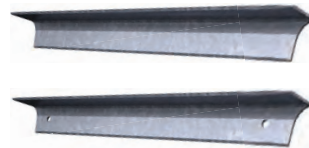
Internal End Bearing Diaphragm Plates (Primary Component)

Fabricated from 0.375" thick steel plate, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN). Shop-welded down both sides and across the bottom.



Angle Braces (Secondary Component)

Fabricated from 4" x 4" x 1/4" Angles, AASHTO M270 Grade 36 (ASTM A36), no Impact Testing required. Angle braces are provided at 6' standard spacing along the U-BEAM™ length. Angle braces are shop-welded across the top and down one side. Angle braces at the ends of the U-BEAM are pre-drilled with 3/4" holes on the vertical legs for lifting.



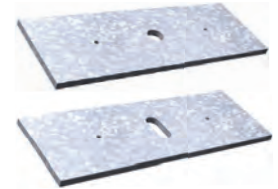
Inspection Hatch Hole and Cover

12" diameter inspection Hatch Hole and standard cover with swivel action access.



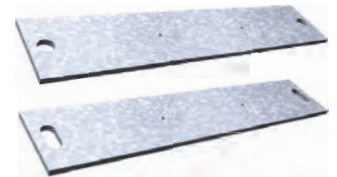
Position Dowel Sole Plates (Secondary Component)

Fabricated from 3/4" thick steel plate, AASHTO M270 Grade 36 (ASTM A36), Impact Testing Charpy V-Notch (CVN). Sole plates are provided at the bearing locations with each U-BEAM. Plates are pre-drilled with a single round hole for fixed condition or a single slotted hole for expansion condition, and are shop-welded to the girder.



Anchor Bolt Sole Plates (Secondary Component)

Fabricated from 3/4" thick steel plate, AASHTO M270 Grade 36 (ASTM A36), Impact Testing Charpy V-Notch (CVN). Sole plates are provided at the bearing locations with each U-BEAM. Plates are pre-drilled with a two round holes for fixed condition or two slotted holes for expansion condition, and are shop-welded to the girder.



Shear Stud Connectors

Fabricated from AASHTO M169 (ASTM A109), 7/8" diameter x 4" or 6" long stud-type shear connectors per AASHTO/AWS D1.5M/D1.5.



Bolts, Nuts and Washers

ASTM F3125 high-strength bolts and nuts with hardened washers.



U18 U-BEAM™

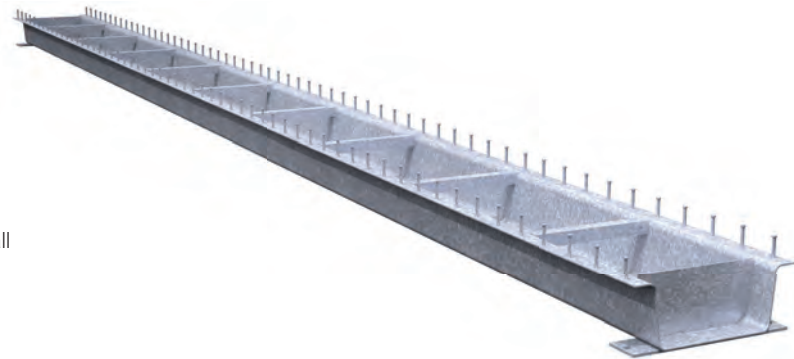
Main U Member (Primary Member)

Fabricated from 0.375" thick steel plate, the shape is cold-formed by press-brake, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN).

Shape Trapezoidal Steel Box Section per AASHTO Section 6.11. Box Section Flexural Members.

Finish Standard finish is hot-dip galvanized per AASHTO M111 (ASTM A123) on all final assembly components. Custom finishes are available upon request.

Size Width 4'-4", length up to 60' (confirm with U-BEAM Selection Chart)



Holes in Primary Members

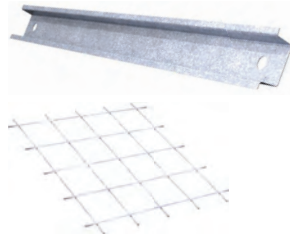
Standard size, drilled or cut undersize 1/8" and reamed.

Drain Holes

Two 1.25" drain holes drilled at the end of each U-BEAM.

Drain Hole Cover

After galvanization, the drain holes are covered with 20-gauge galvanized metal screen with 1/4" openings.



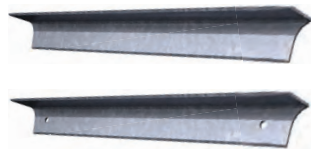
Internal End Bearing Diaphragm Plates (Primary Component)

Fabricated from 0.375" thick steel plate, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN). Shop-welded down both sides and across the bottom.



Angle Braces (Secondary Component)

Fabricated from 4" x 4" x 1/4" Angles, AASHTO M270 Grade 36 (ASTM A36), no Impact Testing required. Angle braces are provided at 6' standard spacing along the U-BEAM™ length. Angle braces are shop-welded across the top and down one side. Angle braces at the ends of the U-BEAM are pre-drilled with 3/4" holes on the vertical legs for lifting.



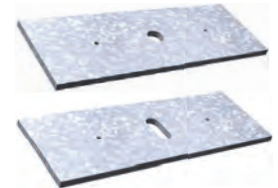
Inspection Hatch Hole and Cover

12" diameter inspection Hatch Hole and standard cover with swivel action access.



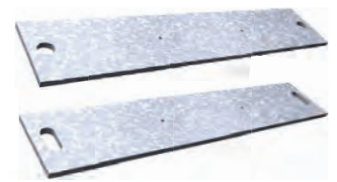
Position Dowel Sole Plates (Secondary Component)

Fabricated from 3/4" thick steel plate, AASHTO M270 Grade 36 (ASTM A36), Impact Testing Charpy V-Notch (CVN). Sole plates are provided at the bearing locations with each U-BEAM. Plates are pre-drilled with a single round hole for fixed condition or a single slotted hole for expansion condition, and are shop-welded to the girder.



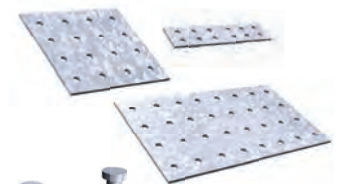
Anchor Bolt Sole Plates (Secondary Component)

Fabricated from 3/4" thick steel plate, AASHTO M270 Grade 36 (ASTM A36), Impact Testing Charpy V-Notch (CVN). Sole plates are provided at the bearing locations with each U-BEAM. Plates are pre-drilled with a two round holes for fixed condition or two slotted holes for expansion condition, and are shop-welded to the girder.



Splice Plates (Primary Component)

Fabricated from 0.375" thick steel plate, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN).



Shear Stud Connectors

Fabricated from AASHTO M169 (ASTM A109), 7/8" diameter x 4" or 6" long stud-type shear connectors per AASHTO/AWS D1.5M/D1.5.



Bolts, Nuts and Washers

ASTM F3125 high-strength bolts and nuts with hardened washers.



U24 U-BEAM™

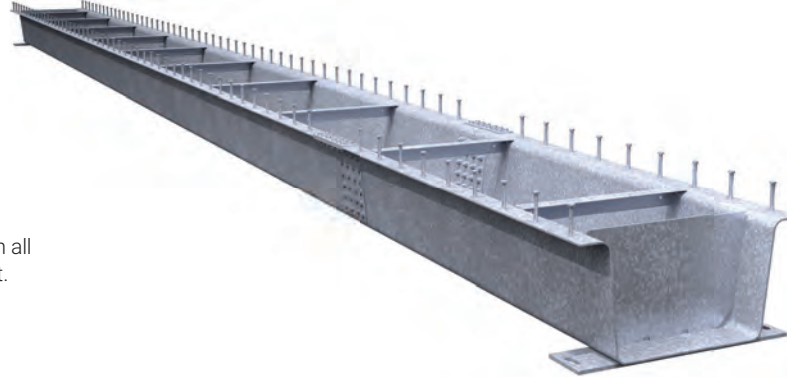
Main U Member (Primary Member)

Fabricated from 0.375" thick steel plate, the shape is cold-formed by press-brake, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN).

Shape Trapezoidal Steel Box Section per AASHTO Section 6.11. Box Section Flexural Members.

Finish Standard finish is hot-dip galvanized per AASHTO M111 (ASTM A123) on all final assembly components. Custom finishes are available upon request.

Size Width 4'-4", length up to 70' (confirm with U-BEAM Selection Chart)



Holes in Primary Members

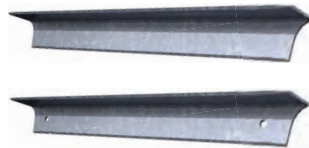
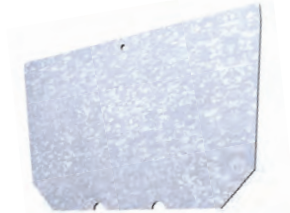
Standard size, drilled or cut undersize 1/8" and reamed.

Drain Holes

Two 1.25" drain holes drilled at the end of each U-BEAM.

Drain Hole Cover

After galvanization, the drain holes are covered with 20-gauge galvanized metal screen with 1/4" openings.



Internal End Bearing Diaphragm Plates (Primary Component)

Fabricated from 0.375" thick steel plate, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN). Shop-welded down both sides and across the bottom.

Angle Braces

(Secondary Component)

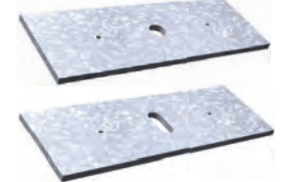
Fabricated from 4" x 4" x 1/4" Angles, AASHTO M270 Grade 36 (ASTM A36), no Impact Testing required. Angle braces are provided at 6' standard spacing along the U-BEAM™ length. Angle braces are shop-welded across the top and down one side. Angle braces at the ends of the U-BEAM are pre-drilled with 3/4" holes on the vertical legs for lifting.

Inspection Hatch Hole and Cover

12" diameter inspection Hatch Hole and standard cover with swivel action access.

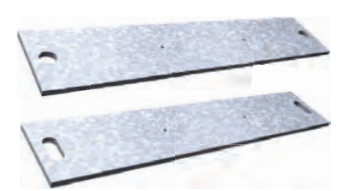
Position Dowel Sole Plates (Secondary Component)

Fabricated from 3/4" thick steel plate, AASHTO M270 Grade 36 (ASTM A36), Impact Testing Charpy V-Notch (CVN). Sole plates are provided at the bearing locations with each U-BEAM. Plates are pre-drilled with a single round hole for fixed condition or a single slotted hole for expansion condition, and are shop-welded to the girder.



Anchor Bolt Sole Plates (Secondary Component)

Fabricated from 3/4" thick steel plate, AASHTO M270 Grade 36 (ASTM A36), Impact Testing Charpy V-Notch (CVN). Sole plates are provided at the bearing locations with each U-BEAM. Plates are pre-drilled with a two round holes for fixed condition or two slotted holes for expansion condition, and are shop-welded to the girder.



Splice Plates (Primary Component)

Fabricated from 0.375" thick steel plate, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN).



Shear Stud Connectors

Fabricated from AASHTO M169 (ASTM A109), 7/8" diameter x 4" or 6" long stud-type shear connectors per AASHTO/AWS D1.5M/D1.5.



Bolts, Nuts and Washers

3/4" diameter ASTM F3125 high-strength bolts and nuts with hardened washers.



U30 U-BEAM™

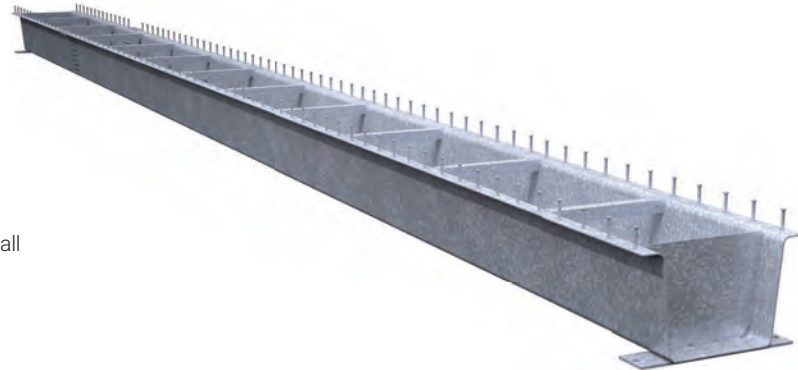
Main U Member (Primary Member)

Fabricated from 0.375" thick steel plate, the shape is cold-formed by press-brake, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN).

Shape Trapezoidal Steel Box Section per AASHTO Section 6.11. Box Section Flexural Members.

Finish Standard finish is hot-dip galvanized per AASHTO M111 (ASTM A123) on all final assembly components. Custom finishes are available upon request.

Size Width 4'-4", length up to 80' (confirm with U-BEAM Selection Chart)



Holes in Primary Members

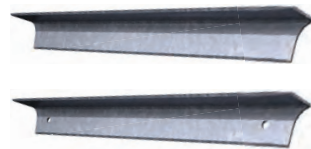
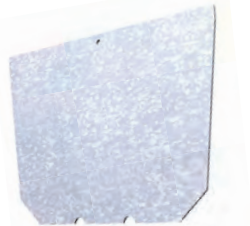
Standard size, drilled or cut undersize 1/8" and reamed.

Drain Holes

Two 1.25" drain holes drilled at the end of each U-BEAM.

Drain Hole Cover

After galvanization, the drain holes are covered with 20-gauge galvanized metal screen with 1/4" openings.



Internal End Bearing Diaphragm Plates (Primary Component)

Fabricated from 0.375" thick steel plate, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN). Shop-welded down both sides and across the bottom.

Angle Braces

(Secondary Component)

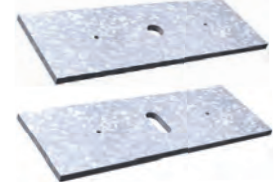
Fabricated from 4" x 4" x 1/4" Angles, AASHTO M270 Grade 36 (ASTM A36), no Impact Testing required. Angle braces are provided at 6' standard spacing along the U-BEAM™ length. Angle braces are shop-welded across the top and down one side. Angle braces at the ends of the U-BEAM are pre-drilled with 3/4" holes on the vertical legs for lifting.

Inspection Hatch Hole and Cover

12" diameter inspection Hatch Hole and standard cover with swivel action access.

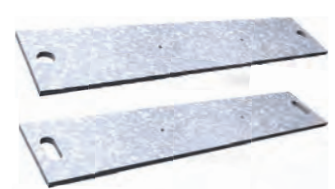
Position Dowel Sole Plates (Secondary Component)

Fabricated from 3/4" thick steel plate, AASHTO M270 Grade 36 (ASTM A36), Impact Testing Charpy V-Notch (CVN). Sole plates are provided at the bearing locations with each U-BEAM. Plates are pre-drilled with a single round hole for fixed condition or a single slotted hole for expansion condition, and are shop-welded to the girder.



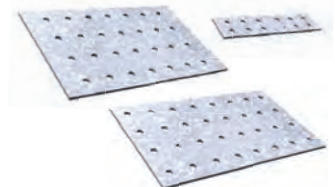
Anchor Bolt Sole Plates (Secondary Component)

Fabricated from 3/4" thick steel plate, AASHTO M270 Grade 36 (ASTM A36), Impact Testing Charpy V-Notch (CVN). Sole plates are provided at the bearing locations with each U-BEAM. Plates are pre-drilled with a two round holes for fixed condition or two slotted holes for expansion condition, and are shop-welded to the girder.



Splice Plates (Primary Component)

Fabricated from 0.375" thick steel plate, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN).



Shear Stud Connectors

Fabricated from AASHTO M169 (ASTM A109), 7/8" diameter x 4" or 6" long stud-type shear connectors per AAASHTO/AWS D1.5M/D1.5.



Bolts, Nuts and Washers

3/4" diameter ASTM F3125 high-strength bolts and nuts with hardened washers.



U33 U-BEAM™

Main U Member (Primary Member)

Fabricated from 0.375" thick steel plate, the shape is cold-formed by press-brake, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN).

Shape

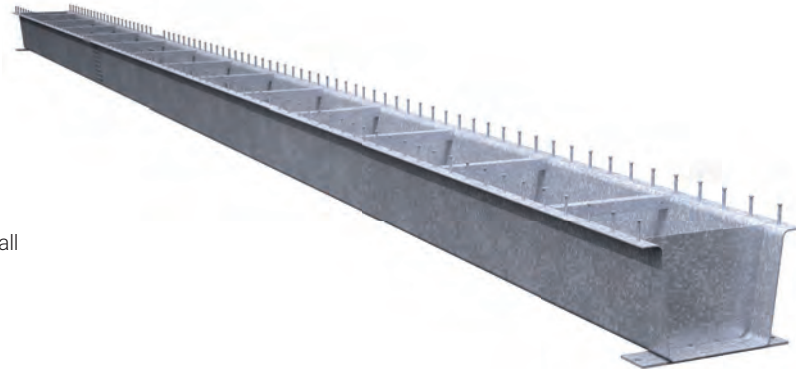
Trapezoidal Steel Box Section per AASHTO Section 6.11. Box Section Flexural Members.

Finish

Standard finish is hot-dip galvanized per AASHTO M111 (ASTM A123) on all final assembly components. Custom finishes are available upon request.

Size

Width 4'-6", length up to 90' (confirm with U-BEAM Selection Chart)



Holes in Primary Members

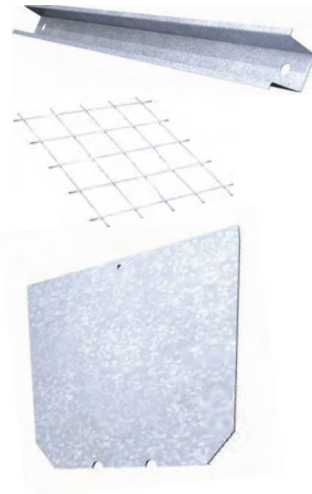
Standard size, drilled or cut undersize 1/8" and reamed.

Drain Holes

Two 1.25" drain holes drilled at the end of each U-BEAM.

Drain Hole Cover

After galvanization, the drain holes are covered with 20-gauge galvanized metal screen with 1/4" openings.



Internal End Bearing Diaphragm Plates (Primary Component)

Fabricated from 0.375" thick steel plate, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN). Shop-welded down both sides and across the bottom.

Angle Braces (Secondary Component)

Fabricated from 4" x 4" x 1/4" Angles, AASHTO M270 Grade 36 (ASTM A36), no Impact Testing required. Angle braces are provided at 6' standard spacing along the U-BEAM™ length. Angle braces are shop-welded across the top and down one side. Angle braces at the ends of the U-BEAM are pre-drilled with 3/4" holes on the vertical legs for lifting.

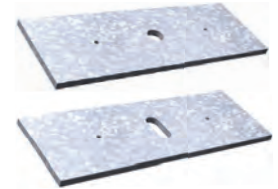


Inspection Hatch Hole and Cover

12" diameter inspection Hatch Hole and standard cover with swivel action access.

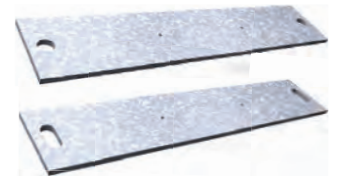
Position Dowel Sole Plates (Secondary Component)

Fabricated from 3/4" thick steel plate, AASHTO M270 Grade 36 (ASTM A36), Impact Testing Charpy V-Notch (CVN). Sole plates are provided at the bearing locations with each U-BEAM. Plates are pre-drilled with a single round hole for fixed condition or slotted holes for expansion condition, and are shop-welded to the girder.



Anchor Bolt Sole Plates (Secondary Component)

Fabricated from 3/4" thick steel plate, AASHTO M270 Grade 36 (ASTM A36), Impact Testing Charpy V-Notch (CVN). Sole plates are provided at the bearing locations with each U-BEAM. Plates are pre-drilled with a two round holes for fixed condition or two slotted holes for expansion condition, and are shop-welded to the girder.



Splice Plates (Primary Component)

Fabricated from 0.375" thick steel plate, AASHTO M207 Grade 50 (ASTM A709 Grade 50), Impact Testing Charpy V-Notch (CVN).



Shear Stud Connectors

Fabricated from AASHTO M169 (ASTM A109), 7/8" diameter x 4" or 6" long stud-type shear connectors per AAASHTO/AWS D1.5M/D1.5.



Bolts, Nuts and Washers

3/4" diameter ASTM F3125 high-strength bolts and nuts with hardened washers.



Additional Components

**External Channel
Diaphragms**
(Secondary Component)

Fabricated from C12x25 Channel, AASHTO M270 Grade 36 (ASTM A36), no Impact Testing required. External diaphragms are not required by design, but provided at customer-specified spacing along the U-BEAM length. Channel diaphragms are bolted onto connection stiffener plates welded external to the tub girder. Channels are supplied separately and field-bolted to the tub girder.



**Guardrail Post
Bracket**
(Secondary Component)

Fabricated from C12x25 Channel, HSS 12" x 6" x 1/4" Tube and WT x 38 Structural Tee, Min. ASHTO M270 Grade 36 (ASTM A36), no Impact Testing required. Guardrail post brackets are not required by design, but provided at customer-specified spacing along the U-BEAM length. All components are supplied separately and field-bolted to the tub girder.



**Reinforced
Elastomeric Bearing
Pads**

Standard size 1 1/4" thick by 8" wide and 30" long, Grade 4 or 5, 100% virgin polyisoprene, 50 durometer shore A with 2" round hole, 1 5/8" x 3" slotted hole, or no hole.

