

CONDUIT SUPPORT HANGERS

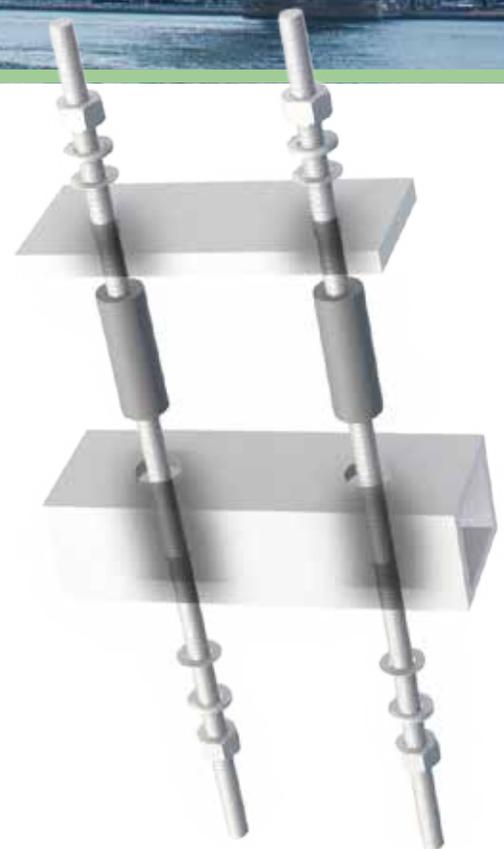
Atkore[™]
FRE Composites



When it comes to bridge projects, engineers and project managers turn to fiberglass conduit to provide a lightweight, economical, easy-to-install, corrosion-resistant alternative to PVC and/or steel conduit.

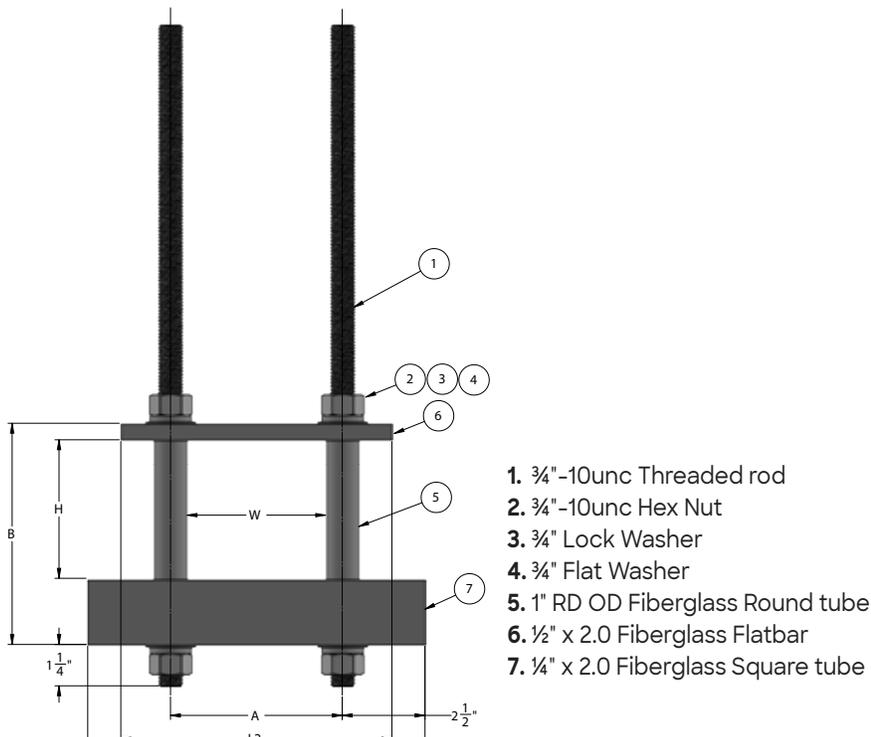
Fiberglass conduit provides a secure and stable pathway for electrical wires and cables to cross bridges. These raceways also carry power supply lines for bridge deck lighting, road signage, signals and telecom. Conduit hangers and supports are used to suspend and hold conduit and cabling. Their light weight and high strength provide considerable cost savings in materials, assembly and labor.

The suspension of conduit support systems from bridges - either through welding, clamping, drilling or bolting - requires considerable engineering design and data. FRE® Composites has extensive field experience in the design and installation of supporting hardware.



Hanger Design Considerations

- Hangers should have a minimum support surface width of 2 in. (50.8 mm) for adequate load-bearing capability
- Avoid sharp edges and puncture contact points
- Grid Type conduit support hangers are recommended for non-metallic conduit
- Materials of the same or similar composition and hardness should be used to minimize abrasion and wear at the duct and hanger interface
- Hanger opening should allow unrestricted movement of the conduit during installation and during thermal expansion and contraction. Openings should not allow the passage of the enlarged conduit bell end, Double Bell coupling, O-Ring expansion joints or Split stop rings



Vibration Effects and Vertical Loading

Bridge structures are subject to the transmission of vibrations from the road surfaces to the conduit runs. Threaded fasteners and specified fastening torque, lock nuts, lock washers and thread sealants must be used to ensure the hanger's integrity.

The design engineer should consult with the hanger supplier to assure the vertical load of the conduit run, the cable contained within and the hanger assembly will not exceed the vertical load capacity of the hanger support components.

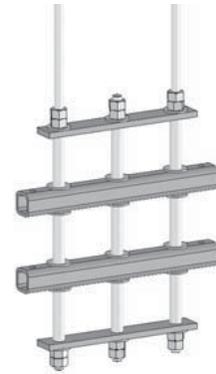
Permits and Approvals

Supporting conduit runs on bridge members, or the suspension of conduit support systems from bridges either through welding, clamping, drilling, or bolting, requires considerable engineering, design data and approvals of various government agencies. FRE Composites has extensive field experience in the design and installation of supporting hardware.

Hanger Types

Grid Hangers

Grid type hangers are designed so that each conduit run is individually supported and isolated from the conduit above and below. In this way, each conduit carries only its own weight and the internal cable weight but not the weight of any other conduit in the conduit bank.



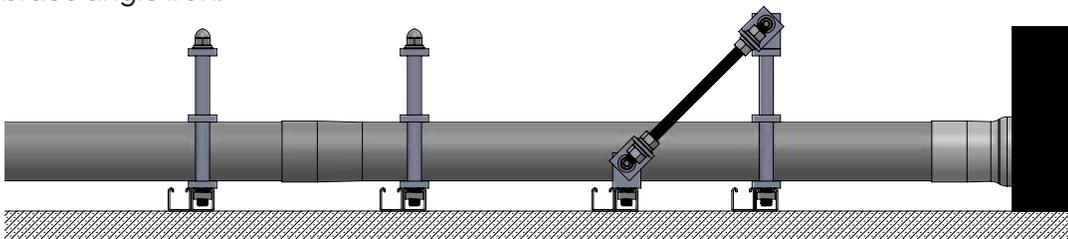
Typical Grid Type Conduit Hanger

Intermediate Hanger

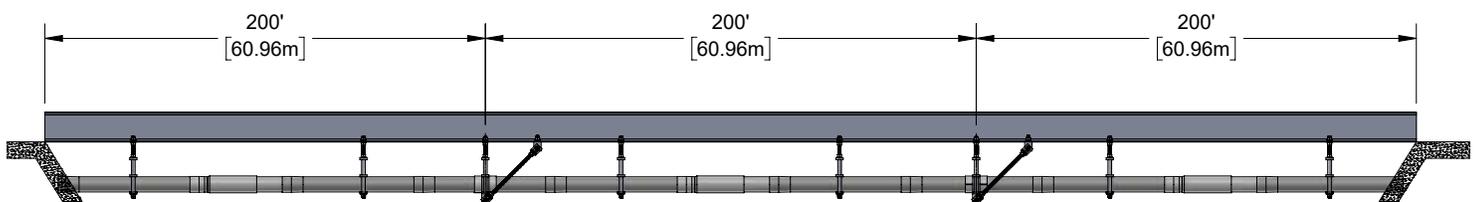
The intermediate hanger's sole purpose is to support the conduit system throughout the installation's length. Most hangers in a bridge installation are intermediate.

Anchor (Or Fixed) Hangers

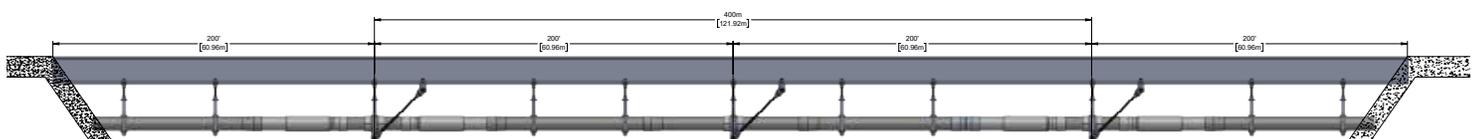
Like Intermediate Hangers, Anchor Hangers act as a support hanger but come with extended crossmembers used to help brace the hanger to a bridge structure. It has the same construction as an intermediate hanger, except that the bottom crossmember is 1.5 in. (51 mm) longer on each side. Bracing members are attached to this extended crossmember and can be adjusted using threaded rods or a fixed brace angle iron.



Base Mounted Hanger



Single Expansion Joint (Abutment to Abutment)



Back-To-Back Expansion Joint (Abutment to Abutment)

Hanger Placement Considerations

Hangers should be installed at right angles to the duct run, and in line with each other to avoid bends and kinks in the conduit run.

Span Calculations

FRE conduit systems' superior flexural strength enables engineers to increase the support spans thereby reducing the number of hangers required. (See [span deflection charts online for determining the correct hanger spacing](#)).

To use the span tables:

1. Determine the weight of the cable to be installed inside the conduit. If a variety of cable types will be used, calculated the conduit run based on the heaviest cable.
2. The tables list the cable weights on the vertical axis and the conduit span on the horizontal axis.
3. To determine the optimum span, select the correct cable weight from the vertical axis and follow the horizontal line to the right until it intersects the 1/2 in. or 12.7 mm design deflection curve.
4. By extending this point down to the horizontal axis, the recommended span distance is thus determined. The 1/2 in. or 12.7 mm deflection line is the most commonly used.
5. Some engineers prefer a deflection of 3/4 in. or 19.1 mm OR 1 in. or 25.4 mm. These curves are also provided in the tables.

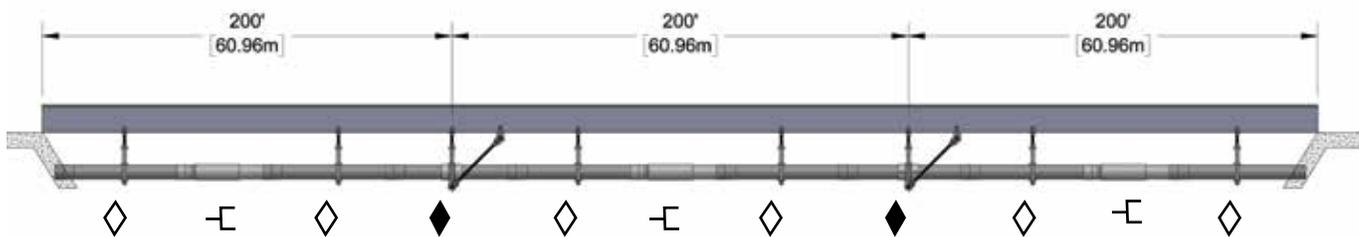
The intersection point must always fall to the left of the stress limit line for a safe installation.

Expansion Joint Placement

Conduit expansion and contraction is usually greater and independent of any bridge structure expansion and contraction.

- An O-Ring expansion joint must be provided every 200 ft. (60.96m) of conduit run to adequately control motion.
- Conduit must be securely braced at each 200 ft. (60.96m) interval.

The diagram below shows a typical bridge installation.

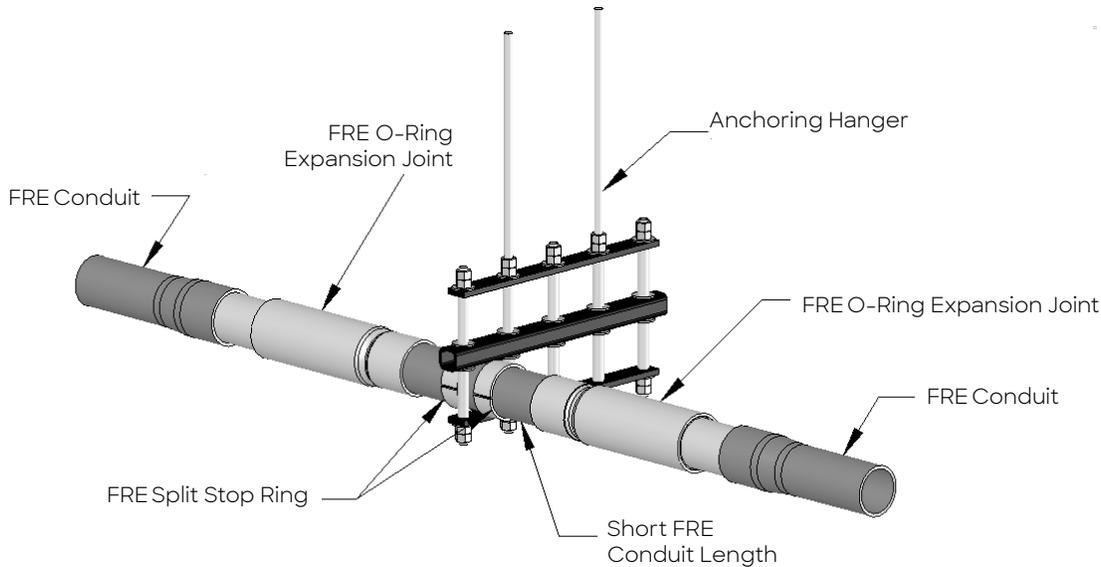


Legend

- ◇ Intermediate Hanger
- ◆ Fixed (Braced) Hanger with Split Stop Rings
- ⊥ Expansion Joint

Back-to-Back O-Ring Expansion Joints Installation Technique

The back-to-back technique places an O-Ring expansion joint on either side of the anchoring hanger and may save some installation time when applied to certain bridge types. A short length of conduit is positioned in the anchoring hanger and held in place by Split stop rings on either side of the anchoring hanger. O-Ring expansion joints are then attached back-to-back on this short piece of conduit and the conduit run is installed out from these O-Ring expansion joints in either direction.



Additional Installation Considerations for O-Ring Expansion Joints

- O-Ring expansion joints must be installed every 200 ft. (60.96m) of conduit run
- O-Ring expansion joints must always be located between an abutment wall and an anchoring hanger regardless of the distance between them
- Split stop rings must always be located on both sides of anchoring hangers to securely restrain the conduit
- Intermediate hanger openings must be large enough to permit free unrestricted motion of the conduit in the hanger
- After installing O-Ring expansion joints, an alignment check is necessary to ensure the unit will travel freely and not bind due to misalignment



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