

## *Guide Specification*

### **SUBJECT: UDI Conduit-in-Casing BORE SPACERS**

Conduit-in-Casing Bore Spacers are a very custom product. It is very important that the information shown at <http://www.udevices.com/fast-track-bore-spacer-request-form.html> be submitted to obtain a proposal drawing for a given application. This guide specification covers many of the features that should be expected of a well designed and manufactured product.

- 1) Bore Spacer wall material shall be 3/4" thick virgin HDPE (Color: white to insure that virgin material is used)
- 2) Bore Spacers used in straight bores that utilize 42" OD and smaller casings shall be of the single wall design. Bore Spacers used in straight bores that utilize a casing that is larger than 42" OD, and all directional bore Bore Spacers, shall be of the double wall design.
- 3) Bore Spacers shall incorporate integral float stops that insure the conduits do not touch the casing ID if the duct bundle floats up during the grouting operation.
- 4) Bore Spacers shall incorporate appropriate flow holes to permit the grout to flow between the compartments formed by the Bore Spacers. Flow holes reduce the grout pressure on the Bore Spacers and allow the grout to flow more freely.
- 5) Bore Spacers shall be placed five feet apart, center to center.
- 6) All fasteners shall be zinc plated steel.
- 7) All nuts shall be nylon insert locknuts that resist loosening.
- 8) All bolts and nuts shall have a flat washer between the fastener bearing surface and the Bore Spacer HDPE wall.
- 9) Spacer bushings, that are injection molded from ABS, shall maintain a separation of 3.812" between the walls of double wall Bore Spacers.
- 10) Bushing fasteners used on double wall Bore Spacers shall be adjusted to a slightly relaxed tightness to permit the two walls of the Bore Spacer to align with the conduits when the banding is pulled tight.
- 11) All machined corners of the Bore Spacer walls shall be rounded, eliminating sharp corners that might cut the assembly and installation personnel.
- 12) Bore Spacers used with PVC or RTRC conduit, that is provided in 10 ft. or 20 ft. lengths, and is joined by cementing the bell and spigot ends together, may be designed for either side loading or end loading of the conduit or a combination of both. Bore Spacers used with HDPE or FPVC conduit, that is joined by butt welding, must be designed for side loading of the conduit only.

- 13) To reduce the possibility of the duct bundle corkscrewing during installation, the Bore Spacers shall, as much as possible, have the weight of the conduits balanced symmetrically about the duct bundle vertical center line. They should also, as much as possible, have the weight of the duct bundle that is below the transverse center line equal to or more than the duct bundle weight that is above the transverse centerline. When this balance cannot be accomplished, a key rail, in the form of a structural steel “L” angle, shall be welded in the inside bottom of the casing and a complementing integral keyway shall be formed in the Bore Spacer to prevent duct bundle corkscrewing.
- 14) Bore Spacers shall incorporate wheels to allow the assembled duct bundle to roll freely through the casing.
- Normally, spacers designed for straight bore installations shall have two wheels per wall. The wheels shall be located at the bottom of the spacer approximately 36° off of the vertical center line.
  - Spacers designed for directional bores shall have at least four wheels per wall and shall be radially spaced an equal distance apart as much as possible.
  - Where possible, the wheels shall have relatively large OD’s to improve their ability to roll over small imperfections in the casing ID.
  - The combined capacity of two wheels on a single wall spacer, or two sets of wheels on a double wall spacer, shall exceed the weight of one Bore Spacer plus the weight of five feet of the duct bundle conduit.
  - The wheels shall be selected from the following table:

BORE SPACER WHEELS				
WHEEL DIA (INCHES)	RATED LOAD (LBS)	MATERIAL	BEARING TYPE	WHERE USED
1.625	60	HARD RUBBER	SELF LUBRICATING	ON VERY SMALL DIAMETER BORE SPACERS OR AS A LAST RESORT WHEN A LARGER WHEEL WILL NOT FIT INTO THE AVAILABLE SPACE.
2.000	200	POLYOLEFIN	POLYOLEFIN	ON SMALL TO MEDIUM DIAMETER BORE SPACERS OR WHEN A 3" WHEEL WILL NOT FIT INTO THE AVAILABLE SPACE
3.000	300	POLYOLEFIN	POLYOLEFIN	ON MEDIUM TO LARGE DIAMETER BORE SPACERS WHERE A 300 LB RATED WHEEL IS SUFFICIENT
4.000	800	PHENOLIC	ROLLER	ON LARGE TO VERY LARGE BORE SPACERS THAT REQUIRE THE 800 LB LOAD CAPACITY

- 15) As applicable, Bore Spacers shall allow for the inclusion of grout injection pipes. This allowance shall take into consideration the following:
  - a. Length of the bore.
  - b. Casing diameter.
  - c. Volume of grout required.
  - d. Length of time that will be required to inject the grout.
  - e. Method of grout injection that will be used.
  - f. Other special conditions
- 16) Each Bore Spacer shall be secured to the conduits with two bands and buckles. The bands will go around the outer transverse perimeter of the duct bundle and will be located approximately 6" from each side of each Bore Spacer. The bands and buckles shall be 201 stainless steel. The band shall be 5/8" wide X .030 thick and have a minimum breaking strength of 1,875 lbs.
- 17) A detail installation drawing of the Bore Spacers must be approved by the general contractor, the boring contractor, the duct bundle installation contractor, the grouting contractor, the grouting process/quality control expert and the owner's engineers prior to starting the job.
- 18) The Bore Spacers must be Underground Devices, Inc. or an approved equal.
- 19) The casing ID must be free of ridges, projections and seams that might impede the rolling of the wheels.
- 20) The volumetric space between the OD of the conduits and the ID of the casing shall be filled with thermal grout. The grout thermal resistivity shall be no higher than 70°C-cm/W at 6% moisture content or the thermal resistivity specified by the owner's engineers. Prior to starting the grouting operation, the grout designer shall have the grout certified by a firm such as Geotherm USA, Dublin, CA or an approved equal.
- 21) The volume of grout used should be measured and recorded.
- 22) A detail plan for the following operations must be submitted to and approved by the owner's engineers prior to starting the job:
  - a. The boring operation and casing installation.
  - b. The conduit bundle assembly and installation. (This plan must include the termination positions of all sacrificial grout injection pipes as applicable.)
  - c. The grouting contractor's plan.
  - d. The grouting process/quality control plan. (This plan should be done by a firm such as The Constellation Group LLC, Baltimore, MD or approved equal. This firm will author the plan and then will be at the job site to insure that the grouting operation is properly executed.)
  - e. Disposal of all contaminated fluids and materials.



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