



# Technical Bulletin No. 6

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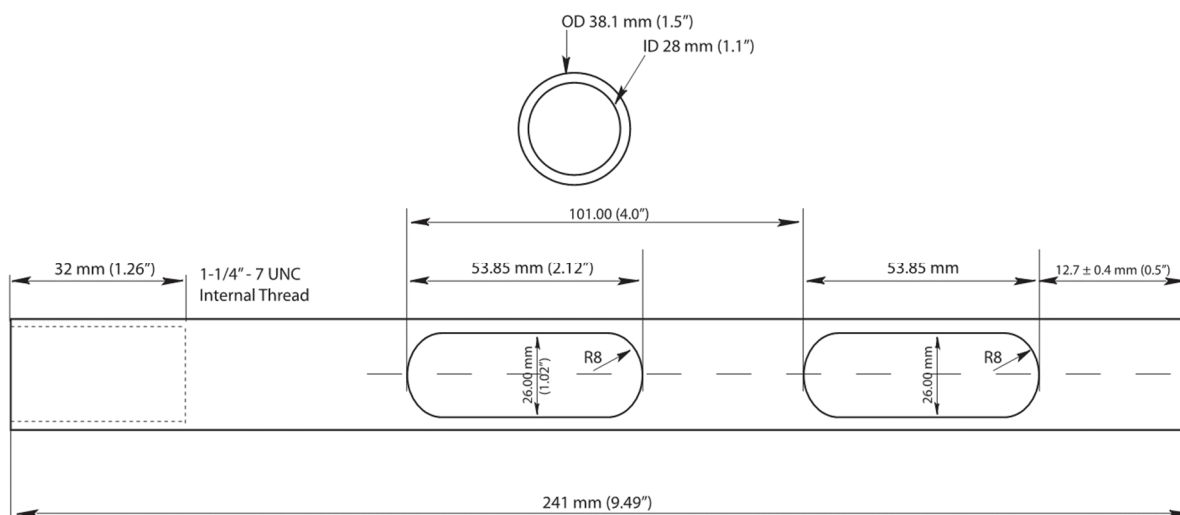
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Subject: Description and Capacity of the Heavy Duty (HD) connectors	

## Product Description

The Heavy Duty (HD) connectors utilize a 1 1/2" diameter connector tube and 6" long, 1" wide expansion pins. The tube is machined from ASTM A500 Grade C steel, and the pins are cast in ASTM A 47M, grade 32510 malleable iron. These are the same materials used to manufacture the standard Timberlinx connector tubes and pins. The following options for connector tubes are available:

- HDA019 – 19" long connector with a slot for one expansion pin at each end (similar to the A095)
- HDA095 – 9 1/2" long half-connector with a slot for one expansion pin and 1 1/4" – 7 UNC internal threads (similar to the A475)
- HDAA095 – 9 1/2" long half-connector with slots for two expansion pins and 1 1/4" – 7 UNC internal threads (similar to the AA675)

An illustration of HDAA095 connector is shown below. The following photo shows the relative sizes of the HDA095 and the A475 tubes with their expansion pins.



**Timberlinx HDAA095 Connector Tube**



**A475 (left) and HDA095 (right) Assemblies**

## Product Capacity

The load capacity in tension of the HD connectors has been determined by calculation and limited physical testing. The following limit states are considered.

**Tube Tension** – The net cross-sectional area of the HD connector tube at the slot is 0.34 in<sup>2</sup>, whereas that of the standard (1" diameter) tube is 0.16 in<sup>2</sup>. Given that the two tubes are manufactured from the same material, the HD tube has net-section yield capacity in tension that is 2.1 times that of the standard tube.

**Pin Dowel Bearing** – The HD expansion pin in a 1 9/16" (40mm) drill hole has a dowel-bearing contact area of 4.43 in<sup>2</sup>, whereas that of the standard expansion pin in a 1 1/8" drill hole is 2.16 in<sup>2</sup>. Thus, the dowel bearing capacity of the HD pin is 2.05 times that of the standard pin.

**Pin Bending** – Physical testing of the HD and standard expansion pins in four-point bending indicate that the yield moment for the HD pin is 1.45 k-ft, whereas that for the standard pin is 0.34 k-ft, an increase of 4.2 times.

**Threaded Rod Tension** – The 1 1/4"-7 UNC threaded rod has a net tensile area of 0.969 in<sup>2</sup>, whereas that of the 7/8"-9 UNC threaded rod is 0.462 in<sup>2</sup>. For rods manufactured of the same material, the 1 1/4" rod is 2.1 times stronger than the 7/8" rod.

**Recommendation** – Timberlinx recommends that designers use a multiplier of 2.0 on the capacity of the standard connector when designing connections using the corresponding HD connector loaded in tension.