



**Grant Prideco**

F.M. 1227  
 Miller Industrial Park #1  
 P. O. Box 1310  
 Navasota, Texas 77868

<b>S P E C</b>	<b>DEPARTMENT</b> <b>ENGINEERING SPECIFICATIONS</b>		<b>A P P R O V E D</b>	<b>WRITTEN BY</b>	
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**H-SERIES® DRILL PIPE SPECIFICATION**

**1.0 SCOPE**

This specification establishes the requirements for H-SERIES® drill pipe manufactured by Grant Prideco and its licensees. The requirements defined herein are in addition to those specified in the latest editions of the American Petroleum Institutes Specifications 7 and 5D. The API specifications should be consulted for the base requirements for a particular component. Additionally, the Grant Prideco Standard Products Catalog should be consulted for approved specific connection types, OD and ID combinations, and pipe size, weight, and grade.

**2.0 REFERENCES**

- 2.1 The latest edition or revision of the following specifications and standards shall form part of this specification:
  - 2.1.1 API Specification 5D
  - 2.1.2 API Specification Spec 7

**3.0 TOOL JOINTS**

- 3.1 Heat Treatment. Tool joints shall be heat-treated utilizing the quench and temper process.
- 3.2 Mechanical Properties.
  - 3.2.1 OD hardness shall be limited to 293 to 331 BHN. Testing shall be conducted at a 100% frequency.

- 3.2.2 Charpy V-Notch Impact values for full sized specimens at 72°F shall be a minimum of 35 ft-lbs for a single reading and a minimum of 40 ft.-lbs for the average of three readings.
- 3.3 All mechanical testing (yield, tensile, hardness and impact strength) shall be conducted on 1 joint per pin and box / heat / heat treat lot.
- 3.4 Non-Destructive Flaw Detection. Each joint shall be tested utilizing the Magnetic Particle Inspection method for longitudinal and transverse defects.
- 3.5 Microstructure evaluation to determine proper metallurgical structure shall be conducted at the same frequency as the mechanical testing.
- 3.6 Box and pin tool joints shall have the H-SERIES refacing benchmark.
- 3.7 Tool joints shall not be pre broken (make and break) unless specified. If so specified, joints shall be torqued to 60% of the torsional yield strength for the connection, three times, and examined visually after breaking out after the final makeup.
- 3.8 Hardbanding shall be applied, if specified, on the box or pin (or both) tool joints. When specified the standard application on the box tool joint is 4, ¾" wide bands on the OD and 1, ¾" band extending down the 18 degree taper. The standard application on the pin tool joint is 2, ¾" wide bands on the OD, starting ½" from the 35 (or 18) degree taper. Three equally spaced longitudinal fingers are applied below the box hardband on the 18-degree taper when tungsten carbide applications are selected. For chromium based (casing friendly) applications, no fingers are applied.

#### **4.0 DRILL PIPE BODY**

- 4.1 Internal Upset Transition. The length of the transition or Miu for IEU and IU upsets shall be 4" minimum including an 8" minimum radius. This length is measured in the "as forged" condition, prior to any machining operations.
- 4.2 Upset dimensions shall be appropriate for the weld neck configuration of the tool joint being attached.

#### **5.0 FINISHED DRILL PIPE ASSEMBLY**

- 5.1 Tool joints shall be attached to the drill pipe body utilizing either the continuous drive or inertia friction welding method.
- 5.2 The weld zone shall be heat treated by the quench and temper method.

- 5.3 Hardness for the weld zone after heat treatment shall be a maximum of 37 HRc.
- 5.4 The weld zone strength (calculated according to API Spec 7) shall exceed the nominal strength of the pipe body by a minimum of 10%.
- 5.5 Marking. The finished assembly shall be serialized with a unique number traceable to the heat numbers for the individual drill pipe body, box tool joint, and pin tool joint components.
- 5.6 Finishing. The tool joint threads shall have a 50% zinc tool joint thread compound and pressed steel thread protectors applied. The assembly shall be painted along its length with a black paint and the stenciling applied shall be in white.

## **6.0 CERTIFICATION**

- 6.1 Each drill pipe order shall have a certification package assembled containing the following:
  - 6.1.1 Steel chemistries by heat number.
  - 6.1.2 Mechanical test results following heat treatment.
  - 6.1.3 Serialization log tracing each unique assembly number to the corresponding heat number for each component and overall assembly tally length.
  - 6.1.4 Product performance sheet.
  - 6.1.5 Certification of compliance to specification(s).
  - 6.1.6 Drill pipe body inspection certification.