

**DRILL PIPE DATA SHEET**  
**DRILL PIPE: 4 1/2" IEU by 16.60 lb/ft by Grade S135 by Range 2 (31.5 ft)**  
**TOOL JOINT: 5 1/4" OD by 2 9/16" ID by TSDS40 (135 ksi SMYS)**

DRILL PIPE BODY DIMENSIONAL DATA		
	NEW	PREMIUM (80% RBW)
OD (in)	4.500	4.365
ID, Ref (in)	3.826	3.826
Wall Thickness (in)	0.337	0.270
Cross Sectional Area (in <sup>2</sup> )	4.407	3.469
Polar Section Modulus, J/c (in <sup>3</sup> )	8.543	6.694
Section Modulus, I/c (in <sup>3</sup> )	4.271	3.347

Premium class values are based on a minimum wall thickness equal to 80% of New drill pipe nominal wall thickness, reference API RP 7G-2.

DRILL PIPE BODY PERFORMANCE PROPERTIES		
	NEW	PREMIUM (80% RBW)
Tensile Yield (lb)	595,004	468,297
Torsional Yield (ft-lb)	55,453	43,450
Collapse Pressure (psi)	16,773	10,964
Internal Yield Pressure (psi)	17,693	16,176
Material Yield Strength (psi)	135,000	

Drill pipe body performance properties are based on API RP 7G. Class New drill pipe body data is for reference only and is not intended for drill string design purposes.

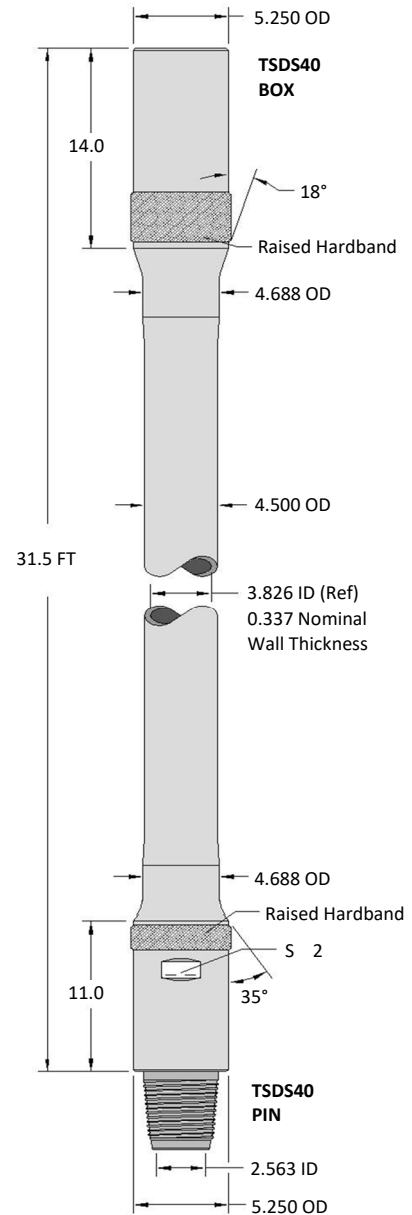
TOOL JOINT DATA (NEW)		
Connection Size	TSDS40	
OD (in)	5.250	
ID (in)	2.563	
Box Tool Joint OD Length (in)	14.0	
Pin Tool Joint OD Length (in)	11.0	
Material Yield Strength (psi)	135,000	
<b>Thread Compound Friction Factor</b>	<b>1.0 (a)</b>	<b>1.15 (b)</b>
Recommended Make-Up Torque (ft-lb)	24,800	28,500 (c)
Max Make-Up Torque (ft-lb)	28,800	33,200 (d)
Torsional Yield (ft-lb)	41,300	
Torsional Strength Ratio, Tj/DPB	0.74	
Approximate Tension to Yield Pin at Recommended Make-Up Torque (lb)	681,000	
Approximate Tension to Yield Pin at Max Make-Up Torque (lb)	515,000	
Tool Joint Tensile Yield (lb)	925,700	
Balanced OD (in)	5.202	

(a) Make-Up torque values shown under column 1.0 are based on using a 1.0 friction factor thread compound (0.08 coefficient of friction).

(b) Make-Up torque values shown under column 1.15 have been adjusted based on using a 1.15 friction factor thread compound. The make-up torque values are only applicable when using a thread compound rated by the manufacturer to have a 1.15 friction factor.

(c) Recommended Make-Up Torque is based on 60% of the connection torsional yield, ref API RP 7G.

(d) Max Make-Up Torque is based on 70% of the connection torsional yield. It is the maximum make-up torque that can be applied to the connection to prevent downhole make-up, reference IADC Drilling Manual. Never exceed the Max Make-Up Torque value.



ASSEMBLY DATA (New)							
Weight (Approx.)		Capacity (Approx.)		Displacement Open Ends (Approx.)		Drift Diameter	Assembly Length Shld'r to Shld'r (Approx.)
(lb/Joint)	(lb/ft)	(US gal/ft)	(BBL/ft)	(US gal/ft)	(BBL/ft)	(in)	(ft)
611	19.39	0.5524	0.0132	0.2962	0.0071	2.438	31.5

Assembly data based on New TSC 95% RBW drill pipe nominal dimensions and no internal plastic coating. Conversion Factor: 1 BBL = 42 US Gallons

**Notes:**

1. All data is calculated based on standard methods. No safety factor applied.
2. Premium Class drill pipe data is based on a minimum wall thickness equal to 80% of New drill pipe nominal wall thickness, reference API RP7G.
3. Drawing is for reference purposes only, not to scale, and based on New drill pipe nominal dimensions, units of inches unless otherwise indicated.
4. Specified tool joint OD is smaller than the standard API tool joint for 4-1/2 IEU drill pipe. User is advised to contact their elevator manufacturer for elevator hoist capacity rating versus tool joint OD.

Tool Joint Make-Up Torque TSDS40 x 2.563" ID (135 ksi SMYS) 1.0 Friction Factor Thread Compound (1)			
Tool Joint OD (in)	Recommended Make-Up Torque (1) (2) (ft-lb)	Max Make-Up Torque (1) (3) (ft-lb)	Torsional Yield Ref. (ft-lb)
5.250	24,800	28,800	41,300
5.125	23,000	26,800	38,300
5.094	22,300	25,900	37,100

Combined Torque and Tension to Yield Drill Pipe Body Premium Class (80% RBW) 4 1/2" IEU x 16.60 lb/ft x Grade S135 (5)	
Operational Torque (ft-lb)	Drill Pipe Body Max Tension (lb)
0	468,297
1,000	468,100
2,000	467,800
3,000	467,100
4,000	466,300
5,000	465,100
6,000	463,800
7,000	462,100
8,000	460,200
9,000	458,100
10,000	455,700
11,000	453,000
12,000	450,000
13,000	446,800
14,000	443,300
15,000	439,500
16,000	435,300
17,000	430,900
18,000	426,200
19,000	421,100
20,000	415,700
21,000	409,900
22,000	403,800

Tool Joint Make-Up Torque TSDS40 x 2.563" ID (135 ksi SMYS) 1.15 Friction Factor Thread Compound (4)		
Tool Joint OD (in)	Recommended Make-Up Torque (4) (2) (ft-lb)	Max Make-Up Torque (4) (3) (ft-lb)
5.250	28,500	33,200
5.125	26,400	30,800
5.094	25,600	29,800

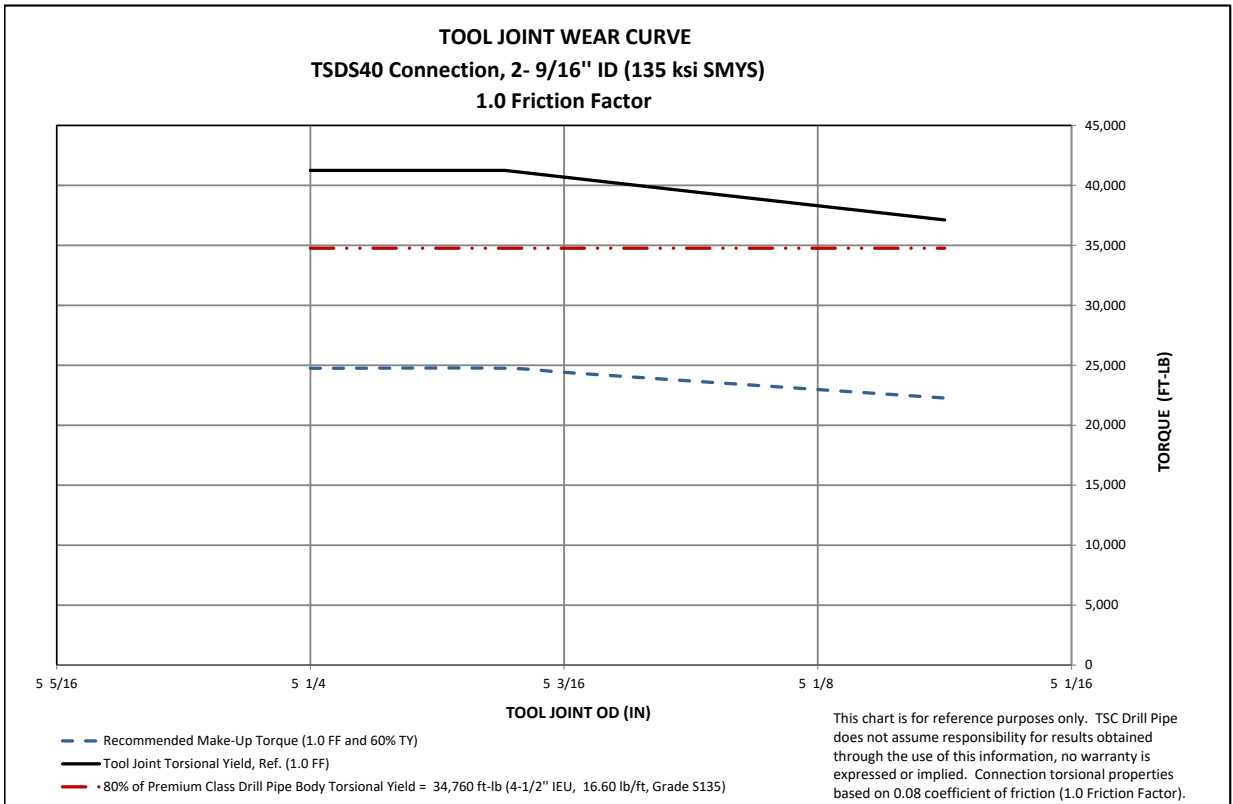
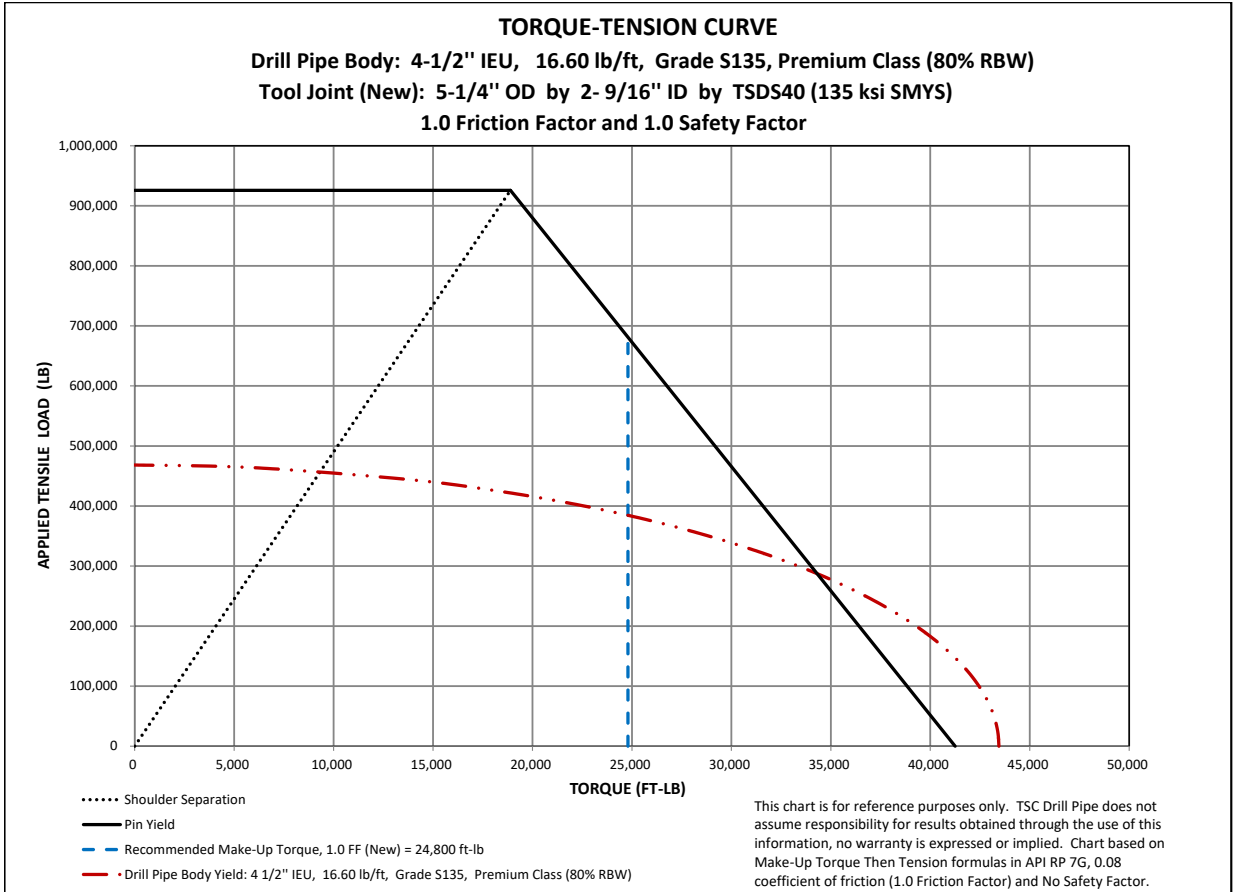
Estimated Elevator Hoist Capacity (lb) (6)		
Tool Joint OD	4.781" Dia Assumed Elev. Bore	4.813" Dia Assumed Elev. Bore
5.250	406,200	380,300
5.125	294,100	268,200
5.094	266,600	240,700

Caution: Operational (rotating) torque should never exceed 80% of the connection make-up torque, reference IADC Drilling Manual.

\* Estimated elevator hoist capacity is less than premium class (80% RBW) drill pipe body tensile yield capacity.

Notes:

- (1) Make-Up Torque values are based on 1.0 friction factor thread compound (0.08 coefficient of friction).
- (2) Recommended Make-Up Torque is based on 60% of the connection torsional yield, reference API RP 7G.
- (3) Max Make-Up Torque is based on 70% of the connection torsional yield. It is the maximum make-up torque that can be applied to the connection to prevent downhole make-up, reference IADC Drilling Manual. Never exceed Max Make-Up Torque.
- (4) Make-Up Torque values have been adjusted based on using a 1.15 friction factor thread compound. The make-up torque values are only applicable when using a thread compound rated by the manufacturer to have a 1.15 friction factor.
- (5) Premium class drill pipe is based on 80% remaining pipe body wall and other requirements specified in API RP 7G-2. Combined torque and tension based on API RP 7G, no safety factor applied.
- (6) Estimated elevator hoist capacity is for reference only and based on projected taper area, 110,000 psi SMYS and no safety factor. User is advised to contact their elevator manufacturer for elevator hoist capacity rating versus tool joint OD.



The technical information contained herein is for reference purposes only. TSC Drill Pipe does not assume responsibility for results obtained through the use of the technical information, no warranty is expressed or implied. User is fully responsible for the accuracy and suitability of use of the technical information and application of appropriate safety factor.