



FOR REFERENCE ONLY

Drill Pipe Performance Characteristics

Size and Weight: 5.875" 26.30 ppf 0.415" wall IEU
Grade: S-135
Range: 2
Tool Joint: 7.000" x 4.250" XT57

Pipe Body:

	Nominal 100% RBW	95% RBW	Ultra Class 90% RBW	Premium 80% RBW
OD (in):	5.875	5.834	5.792	5.709
Wall Thickness (in):	0.415	0.394	0.374	0.332
Nominal ID (in):	5.045	5.045	5.045	5.045
Tensile Strength (lbs):	961,001	909,482	858,327	757,114
Torsional Strength (ft-lbs):	117,915	111,476	105,101	92,533
Burst Capacity (psi):	16,688	18,119	17,165	15,258
Collapse Capacity (psi):	14,892	13,540	12,169	9,368

Notes: Body properties are calculated based on uniform OD and wall thickness.
 Burst capacity for Nominal (100% RBW) based on 87.5% RBW per API.

Tubular Assembly:

Adjusted Weight (lbs/ft): 30.88	Fluid Displacement (gal/ft): 0.47
Approximate Length (ft): 32.1	Fluid Displacement (bbls/ft): 0.0112
Box TJ Length (in): 17	Fluid Capacity w/IPC (gal/ft): 0.99
Pin TJ Length (in): 12	Fluid Capacity w/IPC (bbls/ft): 0.0235
Upset Type: IEU	Fluid Capacity w/o IPC (gal/ft): 0.99
Max Upset OD (in): 6.000	Fluid Capacity w/o IPC (bbls/ft): 0.0236
Drift Size (in): 4.125	

Note: These are OEM values that may vary with actual values due to mill tolerances, IPC tolerances, OEM rounding, and other factors. Pipe is purchased at a guaranteed 95% RBW. IPC is applied to a nominal thickness of 0.009". Pipe will have an ID of 4.981", which is smaller than pipe purchased at 87.5%.

Connection: XT57

TJ OD (in): **7.000**
 TJ ID (in): **4.250**

MYS (ksi): 120

Maximum MUT is recommended (unless stated). Lower than maximum MUT should only be used when MUT is limited by rig equipment or connection tensile. Lower than minimum MUT should never be used.

	Maximum MUT (ft-lbs): 56,500
Tension at Shoulder Separation @ Max MUT (lbs):	Tensile Limited
Tension at Connection Yield @ Max MUT (lbs):	959,500
	Minimum MUT (ft-lbs): 47,200
Tension at Shoulder Separation @ Min MUT (lbs):	Tensile Limited
Tension at Connection Yield @ Min MUT (lbs):	1,196,200

Tool Joint Torsional Strength (ft-lbs): 94,200
 Tool Joint Tensile Strength (lbs): 1,200,500

XT57 is a trademark of NOV Grant Prideco.

Note: MUT values are based on a friction factor of 1.0. There is no published pressure rating for this connection.

Elevator Shoulder:

Smooth Edge Height (in): 3/32
 Smooth Edge OD (in): 7.188
 SE Elevator Shoulder Capacity (lbs): 1,223,100

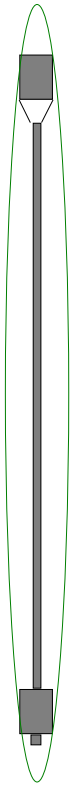
 Nominal TJ OD (in): 7.000
 Nominal TJ OD Elevator Shoulder Capacity (lbs): 993,000

 Assumed Elevator Bore (in): 6.125

Note: Elevator capacity based on assumed elevator bore, no wear factor, and contact stress of 110, 100 psi. An increased elevator shoulder OD increases elevator capacity without affecting make-up torque.

Operational Limits of Drill Pipe

Connection	XT57	Tool Joint OD (in)	7.000	Tool Joint ID (in)	4.250	Tool Joint Specified Minimum Yield Strength (psi)	120,000
Pipe Body	80 % Inspection Class	Pipe Body OD (in)	5.875	Wall Thickness (in)	0.415	Pipe Body Grade	S-135



**Combined Loading for Drill Pipe at
Maximum Make-up Torque = 56,500 (ft-lbs)**

Operational Torque (ft-lbs)	Assembly Max Tension (lbs)	Pipe Body Max Tension (lbs)	Connection Max Tension (lbs)
0	757,100	757,100	959,500
2,500	756,800	756,800	959,500
5,000	756,000	756,000	959,500
7,500	754,600	754,600	959,500
10,000	752,700	752,700	959,500
12,500	750,200	750,200	959,500
15,000	747,100	747,100	959,500
17,500	743,500	743,500	959,500
20,000	739,200	739,200	959,500
22,500	734,400	734,400	959,500
25,000	729,000	729,000	959,500
27,500	722,900	722,900	959,500
30,000	716,200	716,200	959,500
32,500	708,900	708,900	959,500
35,000	700,900	700,900	959,500
37,500	692,200	692,200	959,500
40,000	682,700	682,700	959,500
42,500	672,500	672,500	959,500
45,000	661,600	661,600	959,500
47,500	649,700	649,700	959,500

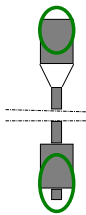
Operational drilling torque is limited by the Make-up Torque.

**Combined Loading for Drill Pipe at
Minimum Make-up Torque = 47,200 (ft-lbs)**

Operational Torque (ft-lbs)	Assembly Max Tension (lbs)	Pipe Body Max Tension (lbs)	Connection Max Tension (lbs)
0	757,100	757,100	1,196,200
2,000	756,900	756,900	1,196,200
4,000	756,400	756,400	1,196,200
5,900	755,600	755,600	1,196,200
7,900	754,400	754,400	1,196,200
9,900	752,800	752,800	1,196,200
11,900	750,800	750,800	1,196,200
13,900	748,500	748,500	1,196,200
15,800	746,000	746,000	1,196,200
17,800	743,000	743,000	1,196,200
19,800	739,600	739,600	1,196,200
21,800	735,800	735,800	1,196,200
23,800	731,600	731,600	1,196,200
25,700	727,300	727,300	1,196,200
27,700	722,400	722,400	1,196,200
29,700	717,100	717,100	1,196,200
31,700	711,300	711,300	1,196,200
33,700	705,100	705,100	1,196,200
35,600	698,800	698,800	1,196,200
37,600	691,700	691,700	1,196,200

Operational drilling torque is limited by the Make-up Torque.

Connection Make-up Torque Range



	Make-up Torque (ft-lbs)	Connection Max Tension (lbs)
Min MUT	47,200	1,196,200
	48,200	1,170,800
	49,300	1,142,800
	50,300	1,117,300
	51,300	1,091,900
	52,400	1,063,900
	53,400	1,038,400
	54,400	1,013,000
	55,500	985,000
	56,500	959,500
Max MUT	56,500	959,500

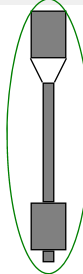
Note: Recommended MUT should always be used when possible. If not possible, MUT should be as close to Recommended MUT as possible.

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06-17-2015

Note: Connection torsional strength is less than 80% pipe body torsional strength.

Drill Pipe Configuration

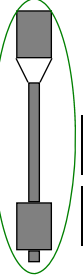


Pipe Body OD	(in)	5.875
Pipe Body Wall Thickness	(in)	0.415
Pipe Body Grade		S-135
Drill Pipe Length		Range2
Connection		XT57
Tool Joint OD	(in)	7.000
Tool Joint ID	(in)	4.250
Pin Tong	(in)	12
Box Tong	(in)	17

Nominal Weight Designation		26.30
Drill Pipe Approximate Length	(ft)	32.1
SmoothEdge Height	(in)	5/32 Raised
Tool Joint SMYS	(psi)	120,000
Upset Type		IEU
Max Upset OD (DTE)	(in)	6.000

Note: Tong space may include hardfacing.

Drill Pipe Performance



Performance of Drill Pipe with Pipe Body at 80% Inspection Class

Applied Make-up Torque (ft-lbs)			Operational Torque (ft-lbs)	Max Tension (lbs)
Recommended MUT	56,600	Tension Only	0	757,100
Minimum MUT	47,200	Combined Loading	47,600	649,400
		Tension Only	0	757,100
		Combined Loading	37,600	691,900

Drill-Pipe Length Range2

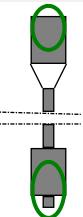
		Best Estimates		Nominal (least accurate)
		(without Coating)	(with Coating)	
Drill Pipe Adjusted Weight (lbs/ft)	30.88			29.79
Fluid Displacement (gal/ft)	0.47			0.46
Fluid Displacement (Bbls/ft)	0.0112			0.0108
Fluid Capacity (gal/ft)	0.99	0.99		1.01
Fluid Capacity (Bbls/ft)	0.0236	0.0235		0.024
Drift Size (in)	4.125			

Note: Oil field barrel equals 42 US gallons.

Note: Drill pipe assembly values are best estimates and may vary due to pipe body mill tolerance, internal plastic coating, and other factors.

Connection Performance

XT57 (7.000 (in) OD X 4.250 (in) ID) 120,000 (psi)



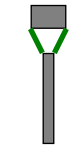
Applied Make-up Torque (ft-lbs)		Tension at Shoulder Separation (lbs)	Tension at Connection Yield (lbs)
Recommended Make-up Torque	56,600	Tensile Limited	959,200
Minimum Make-up Torque	47,200	Tensile Limited	1,198,100
Tool Joint Torsional Strength (ft-lbs)	94,300		
Tool Joint Tensile Strength (lbs)	1,200,500		

Tool Joint Dimensions	
Balanced OD (in)	6.930
Minimum Tool Joint OD for API Premium Class (in)	6.599
Minimum Tool Joint OD for Counterbore (in)	6.566

Note: Recommended make-up torque is the maximum make-up torque that should be applied.
Note: To maximize connection operational tensile, a MUT (T4) = 47,100 (ft-lbs) should be applied.

Elevator Shoulder Information

Elevator OD 5/32 Raised 7.312 (in)

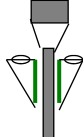


	SmoothEdge Height 5/32 Raised	Nominal Tool Joint OD	Worn to Bevel Diameter	Worn to Min TJ OD for API Premium Class
Box OD (in)	7.312	7.000	6.721	6.599
Elevator Capacity (lbs)	1,379,800	993,000	662,000	521,500
Assumed Elevator Bore Diameter (in)	6.125			

Note: Elevator capacity based on assumed Elevator Bore, no wear factor, and contact stress of 110,100psi.
Note: A raised elevator OD increases elevator capacity without affecting make-up torque.

Pipe Body Slip Crushing Capacity

Pipe Body Configuration (5.875 (in) OD 0.415 (in) Wall S-135)

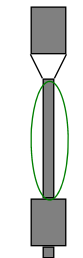


		Nominal	80% Inspection Class	API Premium Class
Slip Crushing Capacity (lbs)		742,000	589,000	589,000
Assumed Slip Length (in)	16.5			
Transverse Load Factor (K)	2.6			

Note: Slip Crushing: Slip crushing load is calculated with the Spiri-Reinhold equation from "Why Does Drill Pipe Fail in the Slip Area" World Oil, 1959 for the slip length and transverse load factor shown and is for reference only. Slip crushing is dependent on the slip design and condition, coefficient of friction, loading conditions, time in slips, drill pipe OD and wall variation, and other factors. Consult with the slip manufacturer for additional information.

Pipe Body Performance

Pipe Body Configuration (5.875 (in) OD 0.415 (in) Wall S-135)



		Nominal	80% Inspection Class	API Premium Class
Pipe Tensile Strength (lbs)	961,000	757,100	757,100	
Pipe Torsional Strength (ft-lbs)	117,900	92,500	92,500	
TJ/PipeBody Torsional Ratio	0.80	1.02	1.02	
80% Pipe Torsional Strength (ft-lbs)	94,300	74,000	74,000	
Burst (psi)	16,688	15,258	15,258	
Collapse (psi)	14,892	9,368	9,368	
Pipe OD (in)	5.875	5.709	5.709	
Wall Thickness (in)	0.415	0.332	0.332	
Nominal Pipe ID (in)	5.045	5.045	5.045	
Cross Sectional Area of Pipe Body (in^2)	7.119	5.608	5.608	
Cross Sectional Area of OD (in^2)	27.109	25.598	25.598	
Cross Sectional Area of ID (in^2)	19.990	19.990	19.990	
Section Modulus (in^3)	9.083	7.128	7.128	
Polar Section Modulus (in^3)	18.165	14.255	14.255	

Note: Nominal Burst calculated at 87.5% RBW per API.

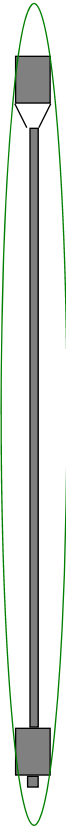
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William Ogilvie 03-15-2012



Operational Limits of Drill Pipe

Connection	XT57	Tool Joint OD (in)	7.000	Tool Joint ID (in)	4.250	Tool Joint Specified Minimum Yield Strength (psi)	120,000
Pipe Body	80 % Inspection Class	Pipe Body OD (in)	5.875	Wall Thickness (in)	0.415	Pipe Body Grade	S-135



Combined Loading for Drill Pipe at Recommended Make-up Torque = 56,600 (ft-lbs)

Operational Torque (ft-lbs)	Assembly Max Tension (lbs)	Pipe Body Max Tension (lbs)	Connection Max Tension (lbs)
0	757,100	757,100	959,200
2,500	756,800	756,800	959,200
5,000	756,000	756,000	959,200
7,500	754,600	754,600	959,200
10,000	752,700	752,700	959,200
12,500	750,200	750,200	959,200
15,000	747,100	747,100	959,200
17,500	743,500	743,500	959,200
20,000	739,200	739,200	959,200
22,500	734,400	734,400	959,200
25,000	729,000	729,000	959,200
27,500	722,900	722,900	959,200
30,000	716,200	716,200	959,200
32,500	708,900	708,900	959,200
35,100	700,500	700,500	959,200
37,600	691,800	691,800	959,200
40,100	682,300	682,300	959,200
42,600	672,100	672,100	959,200
45,100	661,100	661,100	959,200
47,600	649,400	649,400	959,200

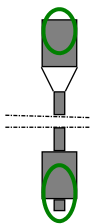
Operational drilling torque is limited by the Make-up Torque.

Combined Loading for Drill Pipe at Minimum Make-up Torque = 47,200 (ft-lbs)

Operational Torque (ft-lbs)	Assembly Max Tension (lbs)	Pipe Body Max Tension (lbs)	Connection Max Tension (lbs)
0	757,100	757,100	1,198,100
2,000	756,900	756,900	1,198,100
4,000	756,400	756,400	1,198,100
5,900	755,600	755,600	1,198,100
7,900	754,400	754,400	1,198,100
9,900	752,800	752,800	1,198,100
11,900	750,800	750,800	1,198,100
13,800	748,600	748,600	1,198,100
15,800	746,000	746,000	1,198,100
17,800	743,000	743,000	1,198,100
19,800	739,600	739,600	1,198,100
21,800	735,800	735,800	1,198,100
23,700	731,900	731,900	1,198,100
25,700	727,300	727,300	1,198,100
27,700	722,400	722,400	1,198,100
29,700	717,100	717,100	1,198,100
31,600	711,600	711,600	1,198,100
33,600	705,400	705,400	1,198,100
35,600	698,800	698,800	1,198,100
37,600	691,900	691,900	1,198,100

Operational drilling torque is limited by the Make-up Torque.

Connection Make-up Torque Range



	Make-up Torque (ft-lbs)	Connection Max Tension (lbs)
Min MUT	47,200	1,198,100
	48,200	1,172,700
	49,300	1,144,700
	50,300	1,119,300
	51,400	1,091,300
	52,400	1,065,900
	53,500	1,038,000
	54,500	1,012,500
	55,600	984,600
	Rec MUT	56,600

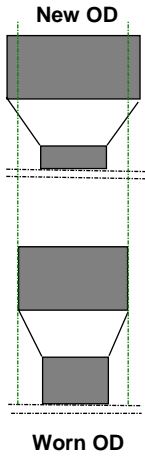
Note: Recommended MUT should always be used when possible. If not possible, MUT should be as close to Recommended MUT as possible.

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Connection Wear Table

Connection	XT57	Tool Joint OD (in)	7.000	Tool Joint ID (in)	4.250	Tool Joint Specified Minimum Yield Strength (psi)	120,000
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Connection Wear

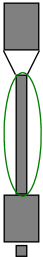


Tool Joint OD (in)	Connection Torsional Strength (ft-lbs)	Rec MUT (ft-lbs)	Connection Max Tension (lbs)	Min MUT (ft-lbs)	Connection Max Tension (lbs)
7	94,300	56,600	959,200	47,200	1,198,100
6.961	94,300	56,600	953,900	47,100	1,194,500
6.921	93,600	56,200	958,500	46,800	1,195,700
6.882	91,200	54,700	990,700	45,600	1,180,900
6.842	88,700	53,200	1,022,400	44,400	1,156,500
6.803	86,300	51,800	1,051,300	43,200	1,131,900
6.763	83,900	50,300	1,082,100	41,900	1,104,600
6.724	81,500	48,900	1,110,200	40,700	1,079,800
6.684	79,100	47,500	1,137,700	39,500	1,055,000
6.645	76,800	46,100	1,134,800	38,400	1,006,000
6.605	74,400	44,600	1,113,300	37,200	939,700
6.566	72,100	43,300	1,054,200	36,100	878,900

Pipe Body

Combined Loading Table (Torque-Tension)

Pipe Body	80 % Inspection Class	Pipe Body OD (in)	5.875	Wall Thickness (in)	0.415	Pipe Body Grade	S-135
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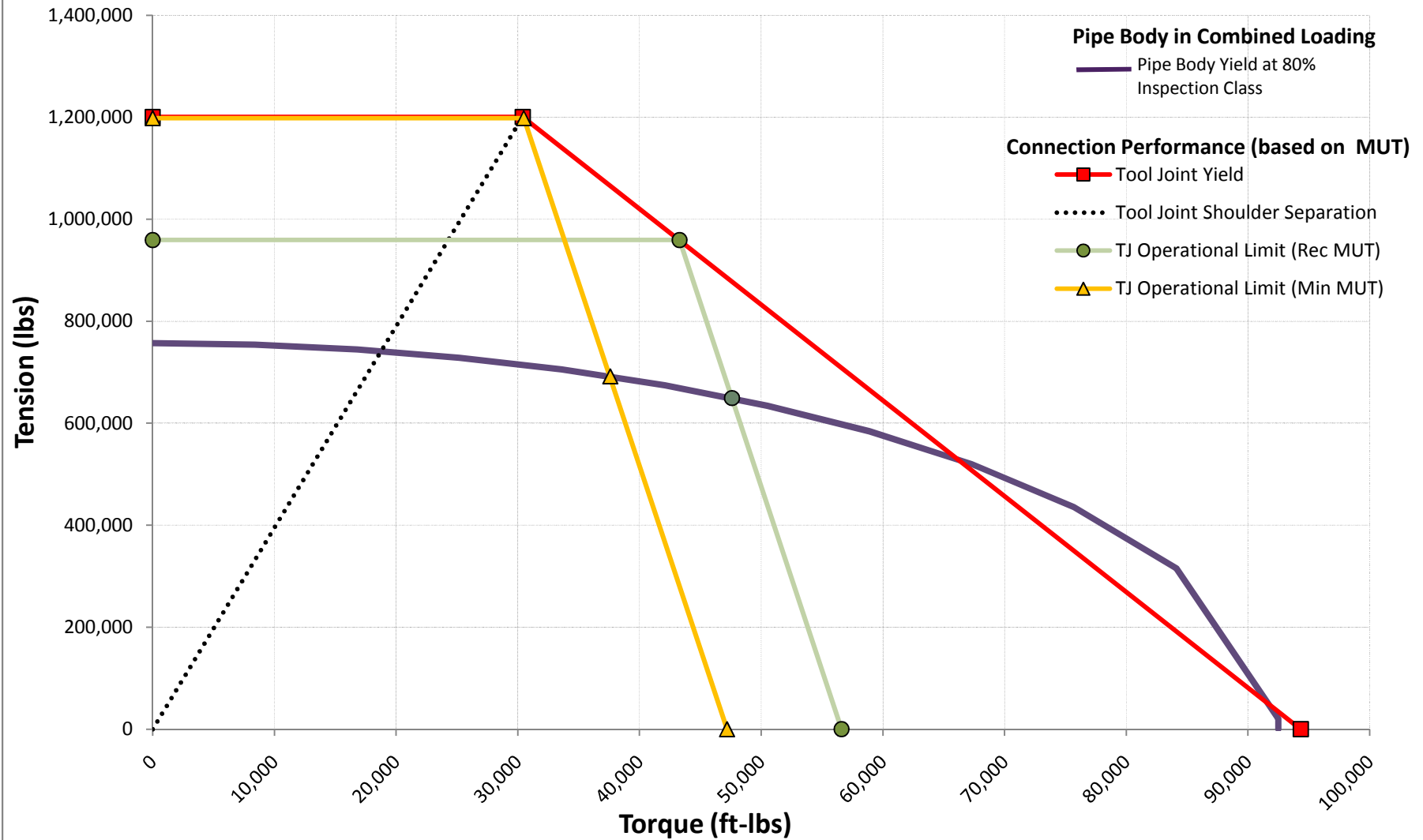


Pipe Body Torque (ft-lbs)	0	8,400	16,800	25,200	33,600	42,100	50,500	58,900	67,300	75,700	84,100	92,500
Pipe Body Max Tension (lbs)	757,100	754,000	744,500	728,500	705,400	674,200	634,400	583,900	519,600	435,400	315,800	20,500

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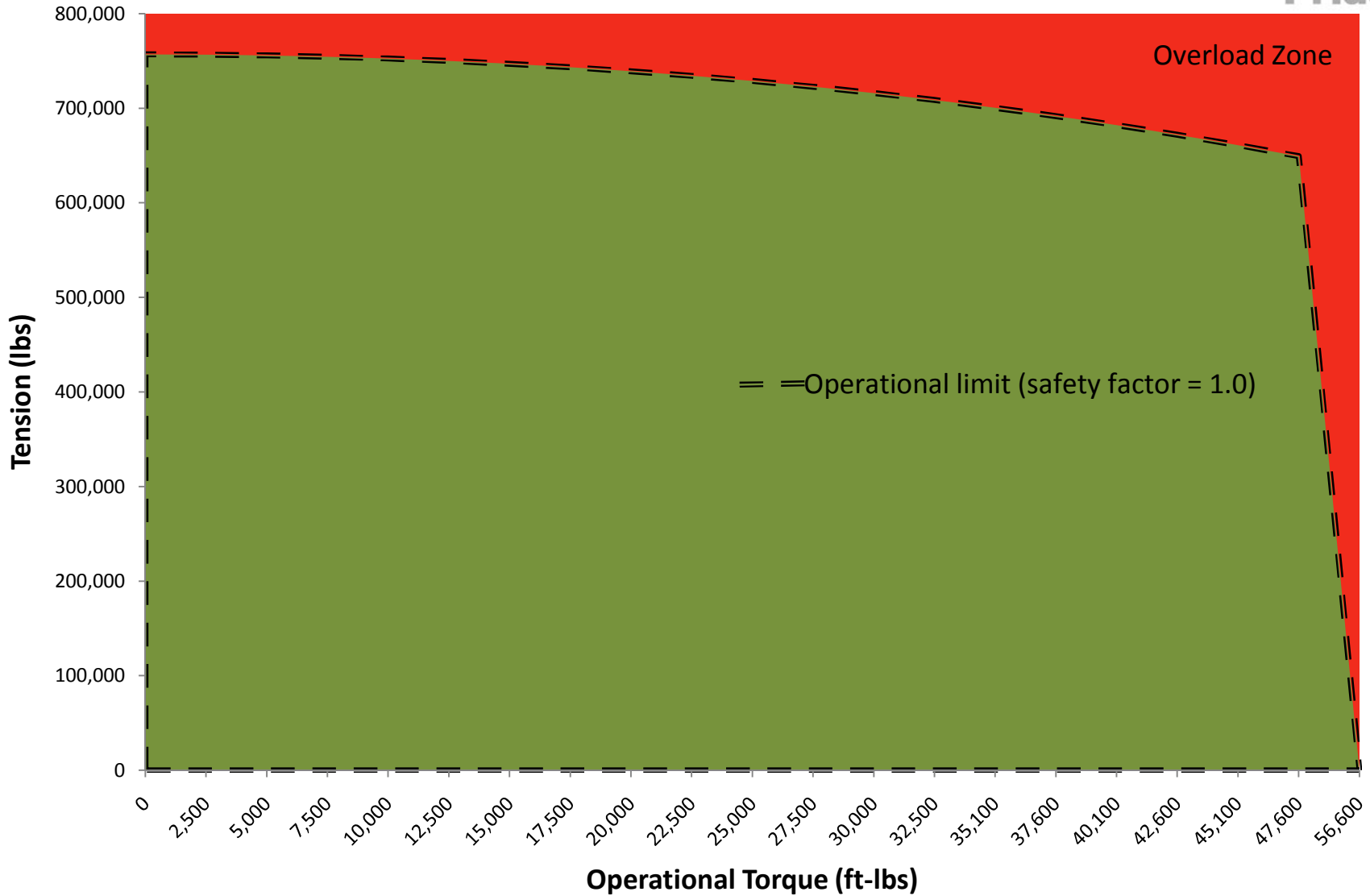
Torque-Tension Graph

Connection: XT57 (7.000 (in) OD X 4.250 (in) ID) SMYS = 120,000 (psi)
Pipe Body: 80% Inspection Class, 5.875 (in) OD, 0.415 (in) wall thickness, S-135 Pipe Grade
(safety factor = 1.0)



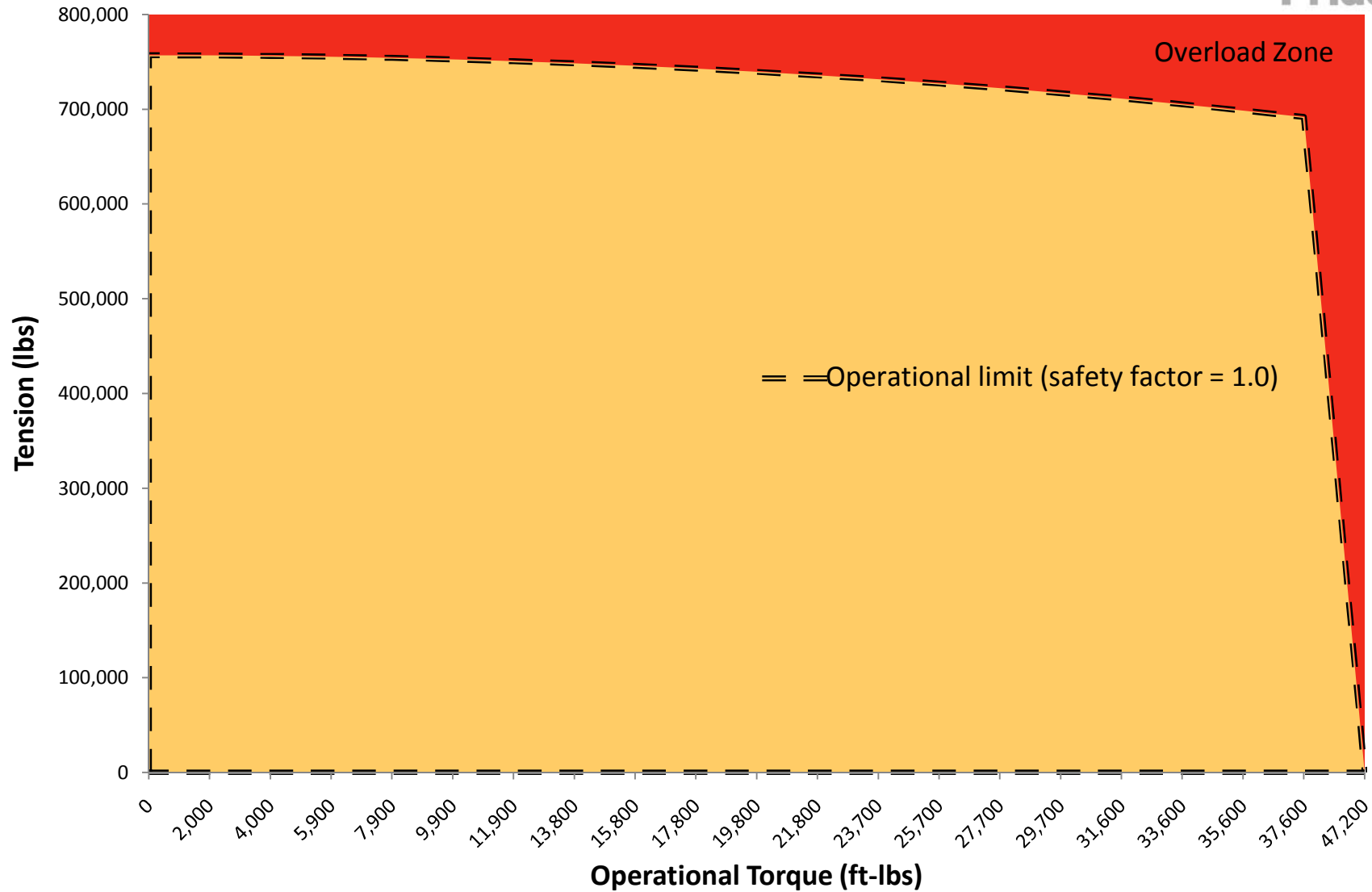
Drill Pipe Operational Limits (Connection at Recommended MUT = 56,600 (ft-lbs))

Connection: XT57 (7.000 (in) OD X 4.250 (in) ID) SMYS = 120,000 (psi)
Pipe Body: 80% Inspection Class, 5.875 (in) OD, 0.415 (in) wall thickness, S-135 Pipe Grade



Drill Pipe Operational Limits (Connection at Minimum MUT = 47,200 (ft-lbs))

Connection: XT57 (7.000 (in) OD X 4.250 (in) ID) SMYS = 120,000 (psi)
Pipe Body: 80% Inspection Class, 5.875 (in) OD, 0.415 (in) wall thickness, S-135 Pipe Grade



Connection Wear for XT57 (7.000 (in) OD X 4.250 (in) ID)

Material SMYS (specified minimum yield strength) = 120,000 (psi)

