

Reading Performance Sheets

Performance Calculator

Grant Prideco

NOY Wellbore
Technologies

Performance Sheets

- A Drill Pipe performance sheet is a NOV™ Grant Prideco™ document consisting of 6 pages of technical information including:
 - 2 pages of Performance Sheets
 - 4 pages of Graphs
- A Heavy Weight Drill Pipe performance sheet contains 2 pages of technical information
- A Drill Collar performance sheet contains 1 page of technical information
- Customers can only generate performance sheets (no graphs)
- Performance sheets can be created for Drill Pipe, Heavy Weight Drill Pipe, Drill Collar, or Landing String.
- Performance sheets can be made in either Imperial or Metric.

Performance Sheet Reading

Drill Pipe Performance Sheet Grant Prideco | NOV Wellbore Technologies

Pipe Body Specification

Pipe Body OD	in	4.0
Pipe Body Wall Thickness - Nominal	in	0.130 in - 14 Buft
Pipe Body Grade		S157™
Drill Pipe Length		Range 2
Max	ft	12.0
Min	ft	30.0
Type of Upset		IJ
Max Upset OD	in	4.188

Tool Joint Specification

Connection Type and Size		XT™99
Benchmark		H-Series™
SmoothEdge™ Height per side	in	N/A
Tool Joint SMYS	psi	120,000
Connection OD	in	5.0
Connection ID	in	2.563
Pin Tong Length	in	10.0
Box Tong Length	in	15.0
Thread Compound Friction Factor		1.0

Pipe Body Performance

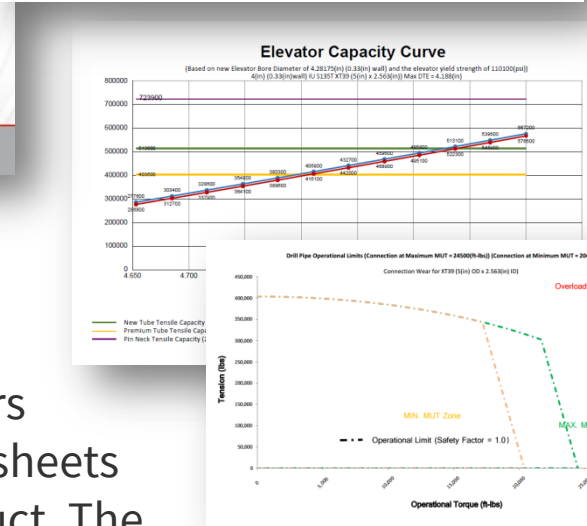
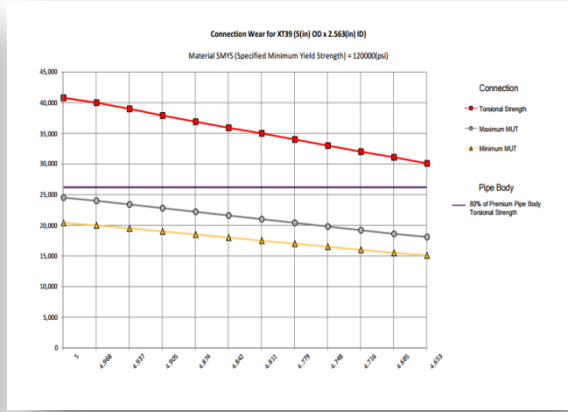
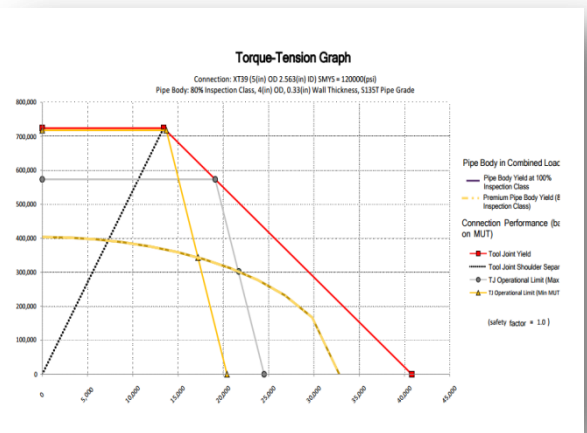
Burst Pressure *	psi	19,490	API Premium 17,800	80% Inspection Class 15,830
Collapse Pressure *	psi	26,140	14,830	
Slip-Coupling Capacity *	ft-lb	306,300	300,400	
Assumed Slip Length	in	16.5		
Assumed Transverse Load Factor (K)		4.7		
Adjusted Strength **		8.6		
Fluid Displacement **	US gal/ft	0.25		
Fluid Capacity **	US gal/ft	0.283		
	ft³/ft	0.0101		

Tool Joint Performance

Max Make-Up Torque (Recommended)	ft-lbs	26,400
Min TJO (API Premium)	in	4.653
Min TJO for Counterbore	in	4.653
Drift Size	in	2.458

Advisories and Warnings

Advisories:
Warnings:



Drill Pipe Performance Sheet Grant Prideco | NOV Wellbore Technologies

Combined Loading for Drill Pipe

Connection: XT99 5" O.D. x 2.563" I.D. (20 KS SMYS)
Pipe: 4" O.D. x 0.39" Wall Thickness (S157 80% Inspection Class)

Operational Assembly Max Torque (ft-lb)	Operational Assembly Max Tension (psi)	At Max MJT (24500 ft-lb)		At Min MJT (20400 ft-lb)	
		Operational Assembly Max Torque (ft-lb)	Operational Assembly Max Tension (psi)	Operational Assembly Max Torque (ft-lb)	Operational Assembly Max Tension (psi)
0	0	0	40000	0	40000
100	41000	900	40000	0	40000
200	42000	1800	40000	0	40000
300	43000	2700	40000	0	40000
400	44000	3600	40000	0	40000
500	45000	4500	40000	0	40000
600	46000	5400	40000	0	40000
700	47000	6300	40000	0	40000
800	48000	7200	40000	0	40000
900	49000	8100	40000	0	40000
1000	50000	9000	40000	0	40000
1100	51000	9900	40000	0	40000
1200	52000	10800	40000	0	40000
1300	53000	11700	40000	0	40000
1400	54000	12600	40000	0	40000
1500	55000	13500	40000	0	40000
1600	56000	14400	40000	0	40000
1700	57000	15300	40000	0	40000
1800	58000	16200	40000	0	40000
1900	59000	17100	40000	0	40000
2000	60000	18000	40000	0	40000
2100	61000	18900	40000	0	40000
2200	62000	19800	40000	0	40000
2300	63000	20700	40000	0	40000
2400	64000	21600	40000	0	40000
2500	65000	22500	40000	0	40000
2600	66000	23400	40000	0	40000
2700	67000	24300	40000	0	40000
2800	68000	25200	40000	0	40000
2900	69000	26100	40000	0	40000
3000	70000	27000	40000	0	40000
3100	71000	27900	40000	0	40000
3200	72000	28800	40000	0	40000
3300	73000	29700	40000	0	40000
3400	74000	30600	40000	0	40000
3500	75000	31500	40000	0	40000
3600	76000	32400	40000	0	40000
3700	77000	33300	40000	0	40000
3800	78000	34200	40000	0	40000
3900	79000	35100	40000	0	40000
4000	80000	36000	40000	0	40000
4100	81000	36900	40000	0	40000
4200	82000	37800	40000	0	40000
4300	83000	38700	40000	0	40000
4400	84000	39600	40000	0	40000
4500	85000	40500	40000	0	40000
4600	86000	41400	40000	0	40000
4700	87000	42300	40000	0	40000
4800	88000	43200	40000	0	40000
4900	89000	44100	40000	0	40000
5000	90000	45000	40000	0	40000
5100	91000	45900	40000	0	40000
5200	92000	46800	40000	0	40000
5300	93000	47700	40000	0	40000
5400	94000	48600	40000	0	40000
5500	95000	49500	40000	0	40000
5600	96000	50400	40000	0	40000
5700	97000	51300	40000	0	40000
5800	98000	52200	40000	0	40000
5900	99000	53100	40000	0	40000
6000	100000	54000	40000	0	40000
6100	101000	54900	40000	0	40000
6200	102000	55800	40000	0	40000
6300	103000	56700	40000	0	40000
6400	104000	57600	40000	0	40000
6500	105000	58500	40000	0	40000
6600	106000	59400	40000	0	40000
6700	107000	60300	40000	0	40000
6800	108000	61200	40000	0	40000
6900	109000	62100	40000	0	40000
7000	110000	63000	40000	0	40000
7100	111000	63900	40000	0	40000
7200	112000	64800	40000	0	40000
7300	113000	65700	40000	0	40000
7400	114000	66600	40000	0	40000
7500	115000	67500	40000	0	40000
7600	116000	68400	40000	0	40000
7700	117000	69300	40000	0	40000
7800	118000	70200	40000	0	40000
7900	119000	71100	40000	0	40000
8000	120000	72000	40000	0	40000

Tool Joint Capacity

Tool Joint OD (in)	Elevator Hoist Capacity (ft-lb)	Elevator Hoist Capacity (ft-lb) @ 1.25 in. Wear Factor
4.415	26600	17900
4.615	31100	20400
4.715	33600	22900
4.815	36100	25400
4.915	38600	27900
5.015	41100	30400
5.115	43600	32900
5.215	46100	35400
5.315	48600	37900
5.415	51100	40400
5.515	53600	42900
5.615	56100	45400
5.715	58600	47900
5.815	61100	50400
5.915	63600	52900
6.015	66100	55400
6.115	68600	57900
6.215	71100	60400
6.315	73600	62900
6.415	76100	65400
6.515	78600	67900
6.615	81100	70400
6.715	83600	72900
6.815	86100	75400
6.915	88600	77900
7.015	91100	80400
7.115	93600	82900
7.215	96100	85400
7.315	98600	87900
7.415	101100	90400
7.515	103600	92900

- NOV Grant Prideco engineers can generate performance sheets for a selection of best product. The tool is also available online.
- These can be used in the field to ensure safe drilling operation.

Drill Pipe

Performance Sheet Reading

Summary page – Drill pipe

Drill Pipe Performance Sheet

Pipe Body Specification		
Pipe Body OD	in	4.0
Pipe Body Wall Thickness - Nominal Weight		0.330 in - 14 lb/ft
Pipe Body Grade		S135T™
Drill Pipe Length		Range 2
- Max	ft	32.0
- Min	ft	30.0
Type of Upset		IU
Max Upset OD	in	4.188
Tong Length includes hardbanding if applicable		

Pipe Body Performance			
		Nominal	API Premium 80% Inspection Class
Burst Pressure *	psi	19,490	17,800
Collapse Pressure *	psi	20,140	13,830
Slip Crushing Capacity *	lbs	386,300	306,400
- Assumed Slip Length	in		16.5
- Assumed Transverse Load Factor (K)			4.2
Adjusted Weight **	lbs/ft		16.6
Fluid Displacement **	US gal/ft		0.25
	Bbbls/ft		0.006
Fluid Capacity **	US gal/ft		0.43
	Bbbls/ft		0.0101
* With no axial load or bending in string		** At Nominal Wall Thickness	
Note: Oil field barrel equivalent to 42 US gal		Note: Nominal burst calculated at 87.5% RBW per API	

The Technical information contained herein, including the product performance sheet and other attached documents, is for reference only and should not be considered as a recommendation. The user is fully responsible for the accuracy and suitability of use of the technical information. NOV Grant Prideco cannot assume responsibility for the results obtained through the use of this material. No expressed or implied warranty is intended. Drill pipe assembly properties are calculated based on uniform OD and wall thickness. No safety factor is applied. The information provided for various inspection classes and for various wear conditions (remaining body wall) is for information only and does not represent or imply acceptable operating limits. It is the responsibility of the customer and the end user to determine the appropriate performance ratings, acceptable use of the product, maintain safe operating practices, and to apply a prudent safety factor suitable for the application. For API connections that have different pin and box IDs, tool joint ID refers to the pin ID. Per Chapter 8, Section 4 VII of the drilling manual, it is recommended that drilling torque should not exceed 80% of MUT.

Tool Joint Specification		
Connection Type and Size		XT™39
Benchmark		H-Series™
SmoothEdge™ Height per side	in	N/A
Tool Joint SMYS	psi	120,000
Connection OD	in	5.0
Connection ID	in	2.563
Pin Tong Length	in	10.0
Box Tong Length	in	15.0
Thread Compound Friction Factor		1.0

Tool Joint Performance		
Max Make Up Torque (Recommended)	ft-lbs	24,500
Min Make Up Torque	ft-lbs	20,400
Min TJ OD (API Premium)	in	4.653
Min TJ OD for Counterbore	in	4.653
Drift Size	in	2.438
The Maximum make-up torque should be applied when possible. To Maximize connection operational tensile, a MUT (T4) = 20,200 should be applied.		

Advisories and Warnings	
Advisories:	
Warnings:	

Performance Sheet Reading

Summary page – Drill pipe

Pipe Body Performance		Nominal	API Premium 80% Inspection Class
Burst Pressure *	psi	19,490	17,800
Collapse Pressure *	psi	20,140	13,830
Slip Crushing Capacity *	lbs	386,300	306,400
- Assumed Slip Length	in		16.5
- Assumed Transverse Load Factor (K)			4.2
Adjusted Weight **	lbs/ft		16.6
Fluid Displacement **	US gal/ft		0.25
	Bbls/ft		0.006
Fluid Capacity **	US gal/ft		0.43
	Bbls/ft		0.0101

* With no axial load or bending in string ** At Nominal Wall Thickness
 Note: Oil field barrel equivalent to 42 US gal Note: Nominal burst calculated at 87.5% RBW per API

Pipe Body Performance: shows various performance aspects of the pipe at nominal and inspection class

Drill Pipe Performance Sheet
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Pipe Body Specification		Tool Joint Specification	
Pipe Body OD	in 4.0	Connection Type and Size	XT™19
Pipe Body Wall Thickness - Nominal Weight	0.330 in - 14 lb/ft	Benchmark	H-Series™
Pipe Body Grade	S135™	SmoothEdge™ Height per side	in N/A
Drill Pipe Length	Range 2	Tool Joint SMYS	psi 120,000
- Max	ft 32.8	Connection OD	in 5.0
- Min	ft 30.0	Connection ID	in 2.563
Type of Upset	IJ	Pin Tong Length	in 10.0
Max Upset OD	in 4.188	Box Tong Length	in 15.0
<small>Long length includes toolharding if applicable</small>		Thread Compound Friction Factor	1.0

Pipe Body Performance			
		Nominal	API Premium 80% Inspection Class
Burst Pressure *	psi	19,490	17,800
Collapse Pressure *	psi	20,140	13,830
Slip Crushing Capacity *	lbs	386,300	306,400
- Assumed Slip Length	in		16.5
- Assumed Transverse Load Factor (K)			4.2
Adjusted Weight **	lbs/ft		16.6
Fluid Displacement **	US gal/ft		0.25
	Bbls/ft		0.006
Fluid Capacity **	US gal/ft		0.43
	Bbls/ft		0.0101

Tool Joint Performance	
Max Make Up Torque (Recommended)	R-SUs 24,500
Min Make Up Torque	R-SUs 20,400
Min TJOOD (API Premium)	in 4.653
Min TJOOD for Counterbore	in 4.653
Drift Size	in 2.438

The Maximum allowable weight on bit (MAWB) should be applied to the pipe. The MAWB should be determined based on the MAWB of the pipe and the MAWB of the tool joint. The MAWB of the pipe should be determined based on the MAWB of the pipe and the MAWB of the tool joint. The MAWB of the tool joint should be determined based on the MAWB of the tool joint and the MAWB of the pipe.

Advisories and Warnings

Warnings:

Performance Sheet Reading

Summary page – Drill pipe

Tool Joint Performance		
Max Make Up Torque (Recommended)	ft-lbs	24,500
Min Make Up Torque	ft-lbs	20,400
Min TJ OD (API Premium)	in	4.653
Min TJ OD for Counterbore	in	4.653
Drift Size	in	2.438

The Maximum make-up torque should be applied when possible.
To Maximize connection operational tensile, a MUT (T4) = 20,200 should be applied.

Tool Joint Performance: provides information about torque, TJ OD, and drift.

WHY Recommended MUT?

The IADC drilling manual recommends that the operation/drilling torque be 80% or less of the Makeup Torque (MUT). Reducing MUT reduces your available torque for drilling. Maximizing MUT also reduces the possibility of uncontrolled downhole makeup from stick-slip or other dynamic conditions. For this reason, our recommended MUT is the maximum MUT

Drill Pipe Performance Sheet
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Pipe Body Specification		
Pipe Body OD	in	4.0
Pipe Body Wall Thickness - Nominal Weight	0.330 in - 14 lb/ft	
Pipe Body Grade		S135™
Drill Pipe Length		Range 2
- Max	ft	32.0
- Min	ft	30.0
Type of Upset		IJ
Max Upset OD	in	4.188

Long length includes tooljointing if applicable

Pipe Body Performance		
	Nominal	API Premium 80% Inspection Class
Burst Pressure *	psi	19,490 / 17,800
Collapse Pressure *	psi	20,140 / 13,630
Slip Crushing Capacity *	lbs	396,400
- Assumed Slip Length	in	16.5
- Assumed Transverse Load Factor (K)		4.2
Adjusted Weight **	lb/ft	16.6
Fluid Displacement **	US gal/ft	0.25
Fluid Capacity **	US gal/ft	0.43
	liters/ft	0.0101

* With no axial load or bending in string. ** All Nominal Wall Thickness. Note: Oil field barrel equivalent to 42 US gal. Note: Nominal buoy calculated at 82°F, 1500 psi air.

Tool Joint Specification		XT™19
Connection Type and Size		XT™19
Benchmark		H-Series™
SmoothEdge™ Height per side	in	N/A
Tool Joint SMYS	psi	120,000
Connection OD	in	5.0
Connection ID	in	2.563
Pin Tong Length	in	10.0
Box Tong Length	in	15.0
Thread Compound Friction Factor		1.0

Tool Joint Performance	
Max Make Up Torque (Recommended)	ft-lbs 24,500
Min Make Up Torque	ft-lbs 20,400
Min TJ OD (API Premium)	in 4.653
Min TJ OD for Counterbore	in 4.653
Drift Size	in 2.438

The Maximum make-up torque should be applied when possible. The Recommended make-up torque is MUT (T4) = 20,200. Should be applied.

Advisories and Warnings	
Advisories:	
Warnings:	

The technical information contained herein, including the product performance data and other physical properties, is for reference only and should not be treated as a recommendation. It is the user's responsibility to determine the correct and suitable use of the equipment supplied. NOV Wellbore Technologies and its subsidiaries are not responsible for the results obtained through the use of the material. The user should understand that the use of the material is limited to the conditions and applications for which it is designed and intended. The user should consult the manufacturer's literature for complete information. The user should understand that the use of the material is limited to the conditions and applications for which it is designed and intended. The user should consult the manufacturer's literature for complete information. The user should understand that the use of the material is limited to the conditions and applications for which it is designed and intended. The user should consult the manufacturer's literature for complete information.

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Performance Sheet Reading

Summary page – Drill pipe



Advisories and Warnings: shows the advisories and warnings for the configuration

Drill Pipe Performance Sheet
Grant Prideco | NOV Wellbore Technologies

Pipe Body Specification	
Pipe Body OD	in 4.0
Pipe Body Wall Thickness - Nominal Weight	0.330 in - 14 lb/ft
Pipe Body Grade	S135™
Drill Pipe Length	Range 2
- Max	ft 32.0
- Min	ft 30.0
Type of Upset	IJ
Max Upset OD	in 4.188
<small>Long length includes toolharding if applicable</small>	

Pipe Body Performance		
	Nominal	API Premium 80% Inspection Class
Burst Pressure *	psi 19,490	17,800
Collapse Pressure **	psi 20,140	13,630
Slip Crushing Capacity *	lb/ft 396,300	306,400
- Assumed Slip Length	in 16.5	
- Assumed Transverse Load Factor (K)		4.2
Adjusted Weight **	lb/ft 16.6	
Fluid Displacement **	US gal/ft 0.25	
	lbf/gal 0.006	
Fluid Capacity **	US gal/ft 0.43	
	lbf/gal 0.0101	

Tool Joint Specification	
Connection Type and Size	XT™19
Benchmark	H-Series™
SmoothEdge™ Height per side	in N/A
Tool Joint SMYS	psi 120,000
Connection OD	in 5.0
Connection ID	in 2.563
Pin Tong Length	in 10.0
Box Tong Length	in 15.0
Thread Compound Friction Factor	1.0

Tool Joint Performance	
Max Make Up Torque (Recommended)	ft-lbs 24,500
Min Make Up Torque	ft-lbs 20,400
Min TJ OD (API Premium)	in 4.653
Min TJ OD for Counterbore	in 4.653
Drift Size	in 2.438

Advisories and Warnings

Advisories:

Warnings:

* With no axial load or bending in string. ** At Nominal Wall Thickness.
 Note: OD field thread equivalent to 4202 gal. Note: Nominal burst calculated at 87°F, 1000 psi.

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Performance Sheet Reading

Combined Loading, Connection Wear and Elevator Capacity Page

Drill Pipe Performance Sheet

Combined Loading for Drill Pipe			
Connection: XT™39 5.0" x 2.563" (120 KSI SMYS)			
Pipe: 4.0" OD 0.330" Wall Thickness S-135™ 80% Inspection Class			
At Max MUT (24500 ft-lbs)		At Min MUT (20400 ft-lbs)	
Operational Torque(ft-lbs)	Assembly Max Tension(lbs)	Operational Torque(ft-lbs)	Assembly Max Tension(lbs)
0	403500	0	403500
1100	403300	900	403400
2300	402500	1800	402900
3400	401300	2700	402200
4600	399500	3600	401100
5700	397400	4500	399700
6800	394700	5400	398000
8000	391300	6300	396000
9100	387600	7200	393700
10300	383100	8100	391000
11400	378300	9000	388000
12500	373000	9900	384700
13700	366500	10900	380500
14800	360000	11800	376400
16000	352100	12700	372000
17100	344200	13600	367100
18200	335500	14500	361800
19400	325100	15400	356100
20500	314700	16300	350000
21700	302300	17200	343400

Connection Wear Table		
Connection: XT™39 5.0" x 2.563" (120 KSI SMYS)		
Tool Joint OD (in)	Max MUT	Min MUT
5.0	24500	20400
4.968	24000	20000
4.937	23400	19500
4.905	22800	19000
4.874	22200	18500
4.842	21600	18000
4.811	21000	17500
4.779	20400	17000
4.748	19800	16500
4.716	19200	16000
4.685	18600	15500
4.653	18100	15100

Elevator Capacity		
Tool Joint OD (in)	Elevator Hoist Capacity(lbs) No Wear	Elevator Hoist Capacity(lbs) 1/32 In. Wear Factor
4.653	286800	277600
4.685	312700	303400
4.716	337900	328600
4.748	364100	354800
4.779	389600	380300
4.811	416100	406900
4.842	442000	432700
4.874	468900	459600
4.905	495100	485800
4.937	522300	513100
4.968	548900	539600
5.0	576500	567200

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Performance Sheet Reading

Combined Loading of Drill Pipe

Combined Loading for Drill Pipe			
Connection: XT™39 5.0" x 2.563" (120 KSI SMYS)			
Pipe: 4.0" OD 0.330" Wall Thickness S-135T™ 80% Inspection Class			
At Max MUT (24500 ft-lbs)		At Min MUT (20400 ft-lbs)	
Operational Torque(ft-lbs)	Assembly Max Tension(lbs)	Operational Torque(ft-lbs)	Assembly Max Tension(lbs)
0	403500	0	403500
1100	403300	900	403400
2300	402500	1800	402900
3400	401300	2700	402200
4600	399500	3600	401100
5700	397400	4500	399700
6800	394700	5400	398000
8000	391300	6300	396000
9100	387600	7200	393700
10300	383100	8100	391000
11400	378300	9000	388000
12500	373000	9900	384700
13700	366500	10900	380500
14800	360000	11800	376400
16000	352100	12700	372000
17100	344200	13600	367100
18200	335500	14500	361800
19400	325100	15400	356100
20500	314700	16300	350000
21700	302300	17200	343400

Combined Loading: This is the tensile limit of the assembly with recommended operational torque applied (drilling or backreaming). More information is available from the combined loading curve.

Drill Pipe Performance Sheet
Grant Prideco | NOV Wellbore Technologies

Combined Loading for Drill Pipe			
Connection: XT™39 5.0" x 2.563" (120 KSI SMYS)			
Pipe: 4.0" OD 0.330" Wall Thickness S-135T™ 80% Inspection Class			
At Max MUT (24500 ft-lbs)		At Min MUT (20400 ft-lbs)	
Operational Torque(ft-lbs)	Assembly Max Tension(lbs)	Operational Torque(ft-lbs)	Assembly Max Tension(lbs)
0	403500	0	403500
1100	403300	900	403400
2300	402500	1800	402900
3400	401300	2700	402200
4600	399500	3600	401100
5700	397400	4500	399700
6800	394700	5400	398000
8000	391300	6300	396000
9100	387600	7200	393700
10300	383100	8100	391000
11400	378300	9000	388000
12500	373000	9900	384700
13700	366500	10900	380500
14800	360000	11800	376400
16000	352100	12700	372000
17100	344200	13600	367100
18200	335500	14500	361800
19400	325100	15400	356100
20500	314700	16300	350000
21700	302300	17200	343400

Connection Wear Table		
Connection: XT™39 5.0" x 2.563" (120 KSI SMYS)		
Tool Joint OD (in)	Max MUT	Min MUT
5.0	24500	20400
4.968	24000	20000
4.937	23400	19500
4.905	22800	19000
4.874	22200	18500
4.842	21600	18000
4.811	21000	17500
4.779	20400	17000
4.748	19800	16500
4.716	19200	16000
4.685	18600	15500
4.653	18100	15100

Elevator Capacity		
Tool Joint OD (in)	Elevator Hoist Capacity(lbs) No Wear	Elevator Hoist Capacity(lbs) 1/32 In. Wear Factor
4.653	206000	277000
4.685	212700	303000
4.716	219700	328000
4.748	226900	354000
4.779	234300	380000
4.811	241900	406000
4.842	249700	432000
4.874	257700	459000
4.905	265900	485000
4.937	274300	513000
4.968	282900	540000
5.0	292700	567000

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Performance Sheet Reading

Torque / Tension Graph – Drill pipe (only)

1. Recommended MUT
2. Tension Only
3. Combined Loading

Connection capacity

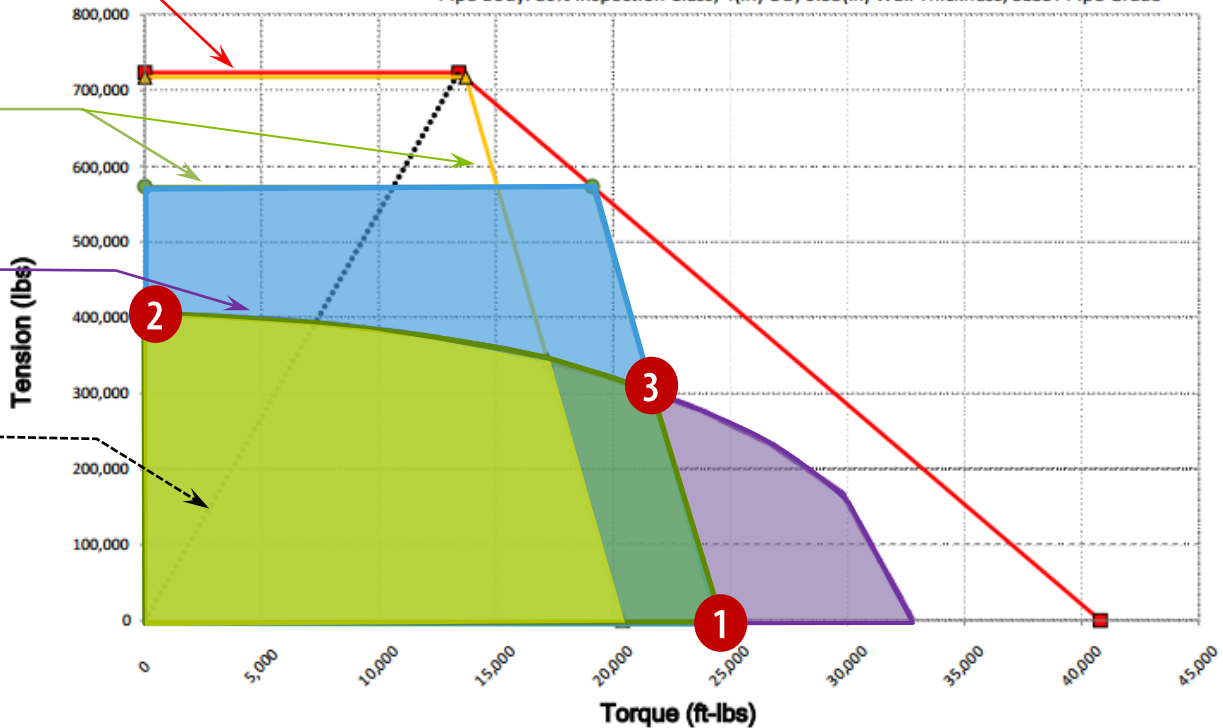
Connection capacity at various MUT

Pipe body capacity

Shoulder separation line

Torque-Tension Graph

Connection: XT39 (5(in) OD 2.563(in) ID) SMYS = 120000(psi)
 Pipe Body: 80% Inspection Class, 4(in) OD, 0.33(in) Wall Thickness, S135T Pipe Grade



Pipe Body in Combined Loading

- Pipe Body Yield at 80% Inspection Class
- Premium Pipe Body Yield (80% Inspection Class)

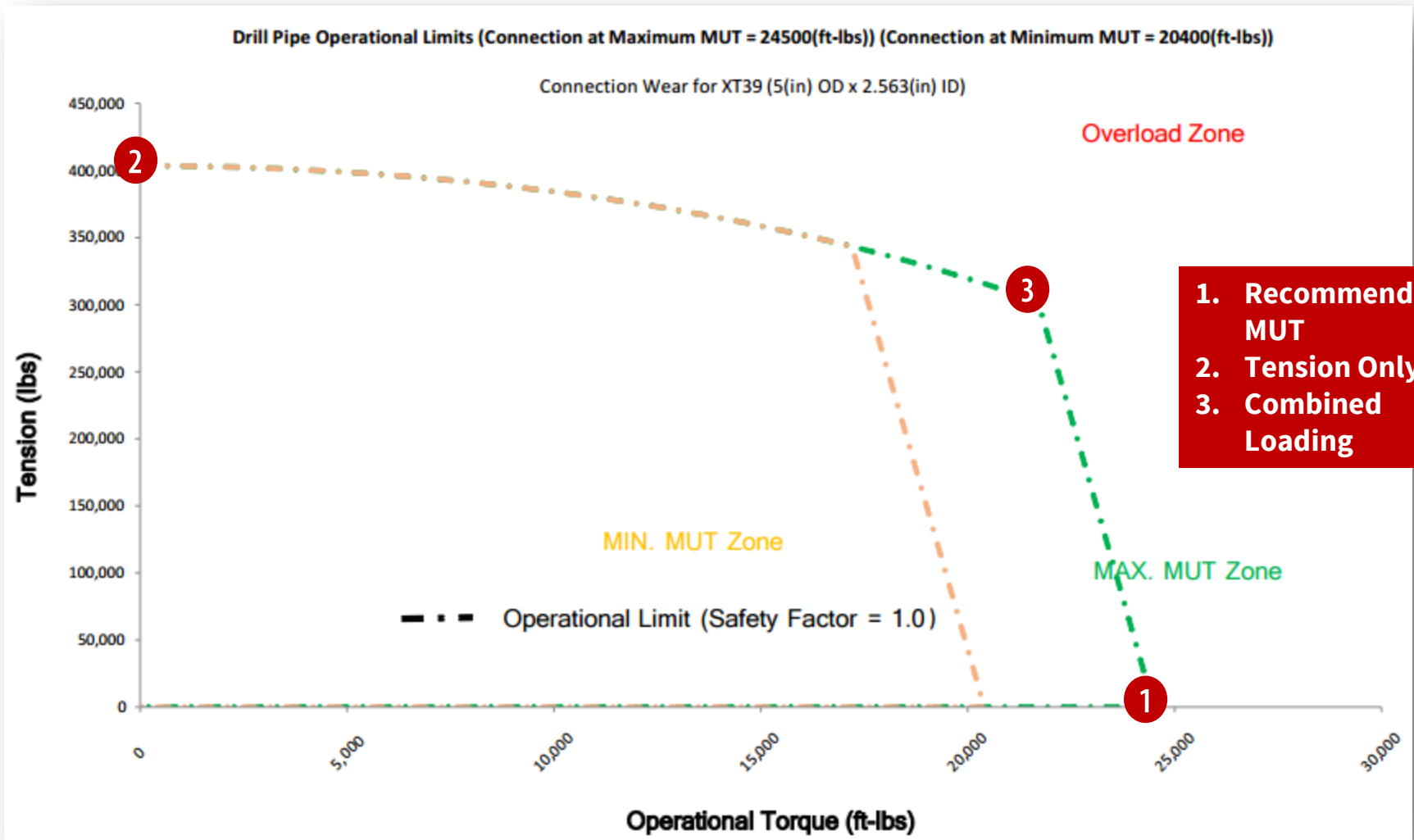
Connection Performance (based on MUT)

- Tool Joint Yield
- Tool Joint Shoulder Separation
- TJ Operational Limit (Max MUT)
- ▲ TJ Operational Limit (Min MUT)

(Safety Factor = 1.0)

Performance Sheet Reading

Simplified Torque / Tension Graph – Drill pipe (only)



Performance Sheet Reading

Connection Wear of Drill Pipe

Connection Wear Table		
Connection: XT™39 5.0" x 2.563" (120 KSI SMYS)		
Tool Joint OD (in)	Max MUT	Min MUT
5.0	24500	20400
4.968	24000	20000
4.937	23400	19500
4.905	22800	19000
4.874	22200	18500
4.842	21600	18000
4.811	21000	17500
4.779	20400	17000
4.748	19800	16500
4.716	19200	16000
4.685	18600	15500
4.653	18100	15100

Connection Wear: As tool joints wear, the respective maximum and minimum MUT values that should be applied also change.

Drill Pipe Performance Sheet
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Combined Loading for Drill Pipe
 Connection: XT™39 5.0" x 2.563" (120 KSI SMYS)
 Pipe: 4.0" OD 0.330" Wall Thickness S-135™ 80% Inspection Class

At Max MUT (24500 ft-lbs)		At Min MUT (20400 ft-lbs)	
Operational Torque(ft-lbs)	Assembly Max Tension(lbs)	Operational Torque(ft-lbs)	Assembly Max Tension(lbs)
0	403500	0	403500
1100	403500	900	402500
2300	402500	1800	402000
3400	401500	2700	402200
4600	399500	3600	401100
5700	397600	4500	399700
6800	394700	5400	398000
8000	391300	6300	396200
9100	387600	7200	394700
10200	383500	8100	393500
11400	378300	9000	388000
12500	373000	9900	384700
13700	366500	10900	380500
14800	360000	11800	376600
16000	352100	12700	372000
17100	344200	13600	367100
18200	335500	14500	361800
19400	325100	15400	356100
20500	314700	16300	350000
21700	302300	17200	343400

Connection Wear Table
 Connection: XT™39 5.0" x 2.563" (120 KSI SMYS)

Tool Joint OD (in)	Max MUT	Min MUT
5.0	24500	20400
4.968	24000	20000
4.937	23400	19500
4.905	22800	19000
4.874	22200	18500
4.842	21600	18000
4.811	21000	17500
4.779	20400	17000
4.748	19800	16500
4.716	19200	16000
4.685	18600	15500
4.653	18100	15100

Elevator Capacity

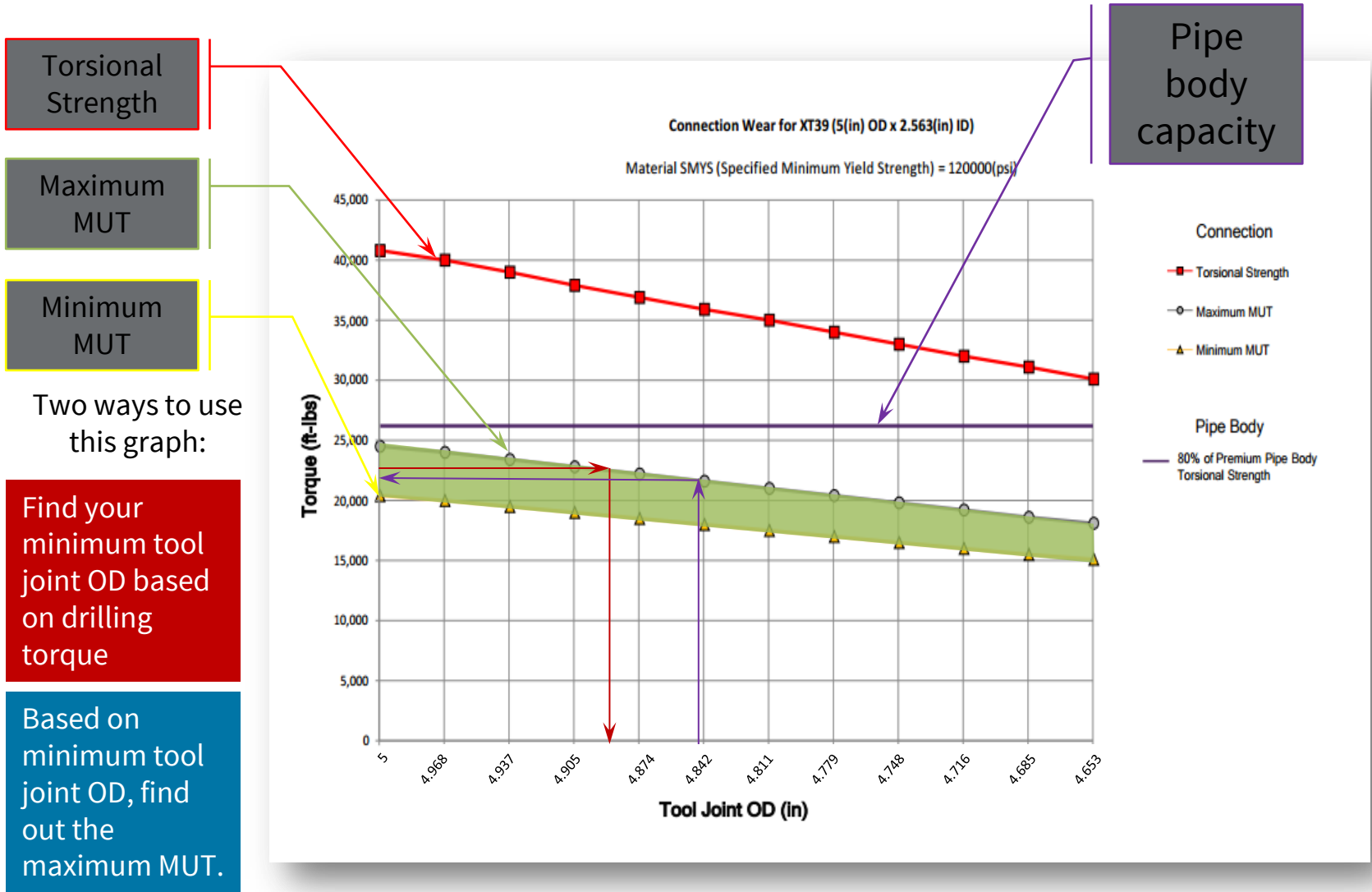
Tool Joint OD (in)	Elevator Hoist Capacity(lbs) No Wear	Elevator Hoist Capacity(lbs) 1/32 In. Wear Factor
4.653	206800	277600
4.685	312700	303400
4.716	337900	328500
4.748	364100	354800
4.779	389600	380300
4.811	416100	406900
4.842	442600	432700
4.874	468900	458000
4.905	495100	483800
4.937	522300	513100
4.968	549500	539000
5.0	576500	567200

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Performance Sheet Reading

Connection Wear of Drill Pipe



Performance Sheet Reading

Elevator Capacity of Drill Pipe

Elevator Capacity: shows elevator maximum capacity according to TJ OD wear

Elevator Capacity		
Tool Joint OD (in)	Elevator Hoist Capacity(lbs) No Wear	Elevator Hoist Capacity(lbs) 1/32 In. Wear Factor
4.653	286800	277600
4.685	312700	303400
4.716	337900	328600
4.748	364100	354800
4.779	389600	380300
4.811	416100	406900
4.842	442000	432700
4.874	468900	459600
4.905	495100	485800
4.937	522300	513100
4.968	548900	539600
5.0	576500	567200

Drill Pipe Performance Sheet
Grant Prideco | NOV Wellbore Technologies

Combined Loading for Drill Pipe

Connection: XT*59 5.0" x 2.563" (120 KSI SMYS)
 Pipe: 4.0" OD 0.330" Wall Thickness S-135T 80% Inspection Class

At Max MUT (24500 ft-lbs)		At Min MUT (20400 ft-lbs)	
Operational Torque(ft-lbs)	Assembly Max Tension(lbs)	Operational Torque(ft-lbs)	Assembly Max Tension(lbs)
0	403500	0	403500
1100	403500	900	403500
2300	402500	1800	402900
3400	401300	2700	402200
4600	399500	3600	401100
5700	397400	4500	399700
6800	394700	5400	398000
8000	391300	6300	396000
9100	387400	7200	393700
10200	383100	8100	391000
11400	378300	9000	388000
12500	373000	9900	384700
13700	367500	10900	380500
14800	361600	11800	376400
16000	355200	12700	372000
17100	348400	13600	367700
18200	341500	14500	363500
19400	334500	15400	359400
20500	327400	16300	355000
21700	320200	17200	343400

Connection Wear Table

Connection: XT*59 5.0" x 2.563" (120 KSI SMYS)

Tool Joint OD (in)	Max MUT	Min MUT
5.0	24500	20400
4.968	24000	20000
4.937	23400	19500
4.905	22800	19000
4.874	22200	18500
4.842	21600	18000
4.811	21000	17500
4.779	20400	17000
4.748	19800	16500
4.716	19200	16000
4.685	18600	15500
4.653	18100	15100

Elevator Capacity

Tool Joint OD (in)	Elevator Hoist Capacity(lbs) No Wear	Elevator Hoist Capacity(lbs) 1/32 In. Wear Factor
4.653	286800	277600
4.685	312700	303400
4.716	337900	328600
4.748	364100	354800
4.779	389600	380300
4.811	416100	406900
4.842	442000	432700
4.874	468900	459600
4.905	495100	485800
4.937	522300	513100
4.968	548900	539600
5.0	576500	567200

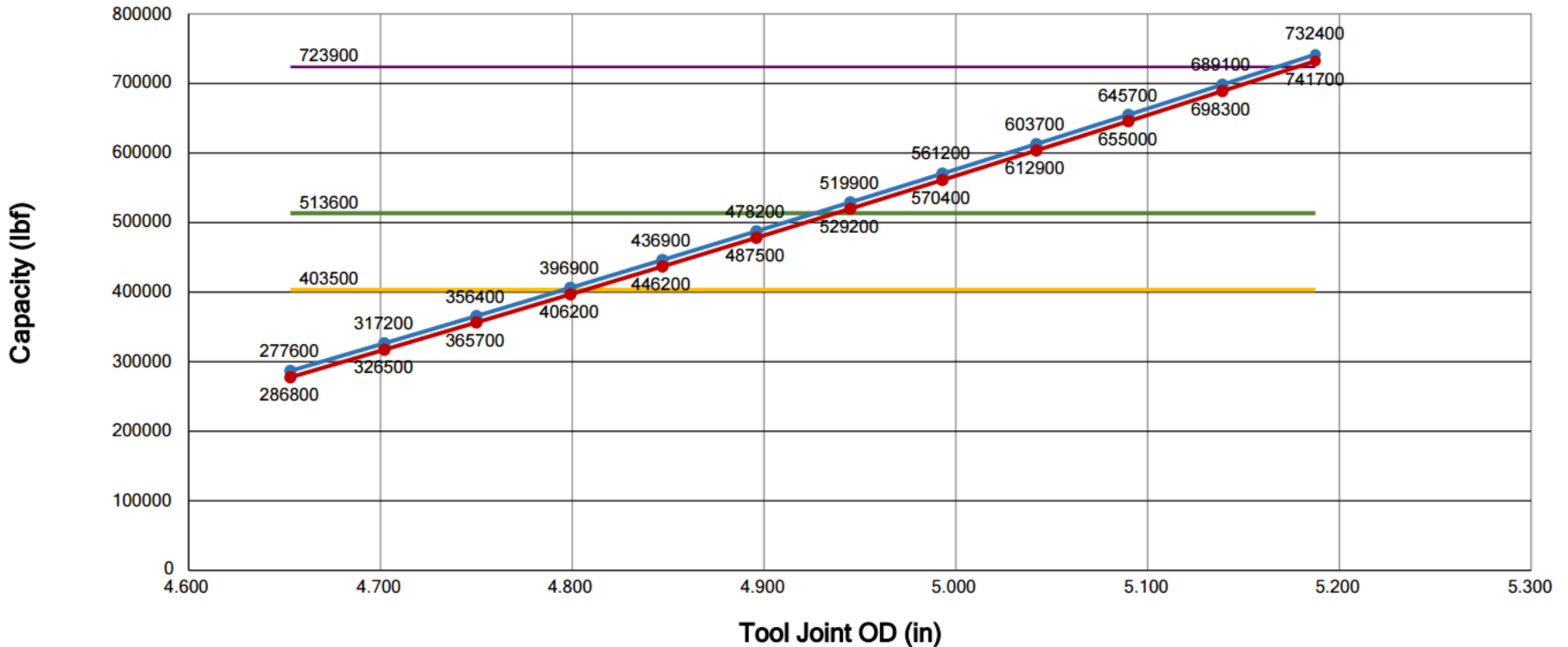
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Performance Sheet Reading

Elevator Capacity of Drill Pipe

Elevator Capacity Curve

(Based on new Elevator Bore Diameter of 4.282(in) (0.33(in) wall) and the elevator yield strength of 110100(psi)
 4(in) (0.33(in)wall) IU S135T XT39 (5(in) x 2.563(in)) Max DTE = 4.188(in)



- New Tube Tensile Capacity
- Premium Tube Tensile Capacity
- Pin Neck Tensile Capacity (2.563(in))
- Elevator Capacity (4.251 Bore at 100% SMYS With WF)
- Elevator Capacity (4.282 Bore at 100% SMYS No WF)

Heavy Weight Drill Pipe

Performance Sheet Reading

Summary page – Heavy Weight Drill Pipe

Performance Sheet format is very similar to drill pipe without the graphs

Heavy Weight Drill Pipe Performance Sheet

Grant Prideco | NOV Wellbore Technologies

Pipe Body Specification		
Nominal OD	in	6.625
Nominal ID	in	4.5
Design		Welded
Heavy Weight Type		Standard
Pipe Body Grade		Standard HRH
Approximate Length	ft	32.0
Max Upset OD	in	6.938
Tong length includes non-burbling of acceptable		

THWDP Assembly Performance		
Adjusted Weight*	lb/ft	98.09
Fluid Displacement*	US gal/ft	1.5
	bbbl/ft	0.0357
Fluid Capacity*	US gal/ft	0.43
	bbbl/ft	0.0107
Drift Size	in	3.063
Pipe Burst**	psi	24,000
Pipe Collapse**	psi	20,625
Pipe Cross Sectional Area of OD	in ²	34.47
Pipe Cross Sectional Area of ID	in ²	8.176
Pipe Section Modulus	in ³	26.763
Pipe Polar Section Modulus	in ³	53.525
Pipe Tensile Strength	lbs	1,422,000
Pipe Torsional Strength	ft-lbs	143,600
Tool Joint/Pipe Body Torsional Ratio		1.36

Tool Joint Specification		
Connection Type and Size		XTF™99
SmoothEdge™ Height	in	N/A
Tool Joint SMYS	psi	130,000
Tool Joint OD	in	8.5
Tool Joint ID	in	4.5
Connection ID Chamfer	in	5.25
Pin Tong	in	27.0
Box Tong	in	27.0
Friction Factor of Thread Compound		1.0
Number of Threads		1
Wearpad Length (per Wearpad)	in	25.0

Tool Joint Performance		
Min. JI OD for Counterbore	in	7.816
Max. Make Up Torque (Recommended)	ft-lbs	115,100
Torque at Shoulder Separation @ Min. MJT	lbs	2,580,700
Torsion at Connection Yield @ Max. MJT	ft-lbs	2,580,700
Min. Make Up Torque	ft-lbs	96,000
Tension at Shoulder Separation @ Min. MJT	lbs	2,178,200
Torsion at Connection Yield @ Min. MJT	ft-lbs	2,580,700
Yield Strength	lbs	2,580,700
Tensile Strength	ft-lbs	191,900
Balanced OD	in	8.814

* All Nominal Wall Thicknesses ** 90% No axial load or bending in string
Based on nominal burst calculated at 87,500, 800 psi Based on 90% burst based on standard 80% SMC yield

Advisories and Warnings

Advisories:

Warnings:

Diameter Plus ID Failure: Pin ID is larger than Pipe Body ID.

Heavy Weight Drill Pipe Performance Sheet

Grant Prideco | NOV Wellbore Technologies

Connection Wear Table		
Connection: XTF™99 8.5" x 4.5" (130 KSI SMYS)		
Tool Joint OD (in)	Max Mut	Min Mut
8.5	115100	90000
8.438	111400	92800
8.376	107700	89800
8.313	104000	86700
8.251	100400	83600
8.189	96800	80600
8.127	93200	77700
8.065	89700	74800
8.003	86300	71900
7.94	83000	69000
7.878	79400	66200
7.816	76000	63400

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Not Commercial

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The image shows a close-up of several grey metal drill collars. Each collar has a threaded end and a smooth, cylindrical body. The collars are arranged in a cluster, with some in the foreground and others in the background. The lighting is bright, highlighting the metallic texture and the threads. A semi-transparent black horizontal band is overlaid across the middle of the image, containing the text "Drill Collar".

Drill Collar

Performance Sheet Reading

Summary page – Drill Collar

Drill Collar performance sheets are a one page document

Drill Collar Performance Sheet
Grant Prideco | Wellbore Technologies

Drill Collar Specification		
Drill Collar OD	in	6.75
Drill Collar ID	in	2.25
Product Grade (SMYS)	psi	110,000
Drill Collar Type		Standard
Approximate Length	ft	31.0

Drill Collar Performance		
Adjusted Weight *	lbs/ft	108.14
Fluid Displacement *	US gal/ft	1.65
	bbls/ft	0.0393
Fluid Capacity *	US gal/ft	0.21
	bbls/ft	0.0049
Drift Size	in	2.125
Cross Sectional Area of OD	in ²	35.785
Cross Sectional Area of ID	in ²	3.976
Section Modulus	in ³	29.821
Polar Section Modulus	in ³	59.641
Moment of Inertia Drill Collar	in ⁴	100.64
Polar Moment of Inertia Drill Collar	in ⁴	201.29

Note: Oil field barrel equivalent to 42 US gal * At Nominal Wall Thickness
Note: Drill Collar values are best estimates and may vary due to length.

Connection Specification		
Connection Type and Size		NC50
Box Stress Relief Feature		Boreback Box
Pin Stress Relief Feature		1 in. SRG
Connection OD	in	6.75
Connection ID	in	2.25
Bevel Diameter	in	6.344
Friction Factor of Thread Compound		1.0

Connection Performance		
Min. OD for Counterbore	in	N/A
Max. Make Up Torque (Recommended)	ft-lbs	40,400
Tension at Shoulder Separation @ Max. MUT	lbs	1,272,400
Tension at Connection Yield @ Max. MUT	lbs	1,272,400
Min. Make Up Torque	ft-lbs	36,700
Tension at Shoulder Separation @ Min. MUT	lbs	1,446,700
Tension at Connection Yield @ Min. MUT	lbs	1,446,700
Tensile Strength	lbs	1,621,000
Torsional Strength	ft-lbs	64,600
Bending Strength Ratio (BSR)		2.19
Balanced OD	in	6.807

The Maximum make-up torque should be applied when possible.

Advisories and Warnings

Advisories:

Warnings:

- Connection is thread weak. The combined forces on the thread at MUT is less than new pipe tensile.

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Performance Sheet Reading

Summary page – Drill Collar

Drill Collar Specification		
Drill Collar OD	in	6.75
Drill Collar ID	in	2.25
Product Grade (SMYS)	psi	110,000
Drill Collar Type		Standard
Approximate Length	ft	31.0

Drill Collar Specification: shows the collar specification (*size, ID, SMYS and length*)

Drill Collar Performance Sheet
Grant Prideco | NOV Wellbore Technologies

Drill Collar Specification	
Drill Collar OD	in 6.75
Drill Collar ID	in 2.25
Product Grade (SMYS)	psi 110,000
Drill Collar Type	Standard
Approximate Length	ft 31.0

Drill Collar Performance	
Adjusted Weight *	lb/ft 108.14
Fluid Displacement *	US gal/ft 1.85
	bbbl/ft 0.0393
Fluid Capacity *	US gal/ft 0.21
	bbbl/ft 0.0049
Drill Size	in 2.125
Drill Size	in 5.75
Cross Sectional Area of OD	in ² 3.976
Cross Sectional Area of ID	in ² 29.821
Section Modulus	in ³ 106.64
Polar Section Modulus	in ³ 201.29
Moment of Inertia Drill Collar	in ⁴ 106.64
Polar Moment of Inertia Drill Collar	in ⁴ 201.29

* As Nominal Wall Thickness
New Drill Collar values are for reference only and may vary due to length.

Connection Specification	
Connection Type and Size	NC30
Box Stress Relief Feature	None
Pin Stress Relief Feature	1 in. SRG
Connection OD	in 6.75
Connection ID	in 2.25
Bevel Diameter	in 6.364
Friction Factor of Thread Compound	1.0

Connection Performance	
Min. OD for Connections	in N/A
Max. Make Up Torque (Recommended)	ft-lbs 40,400
Tension at Shoulder Separation @ Max. MJT	lbs 1,272,400
Tension at Connection Yield @ Max. MJT	lbs 1,272,400
Min. Make Up Torque	ft-lbs 35,700
Tension at Shoulder Separation @ Min. MJT	lbs 1,446,700
Tension at Connection Yield @ Min. MJT	lbs 1,446,700
Tensile Strength	lbs 1,621,000
Torsional Strength	ft-lbs 64,600
Bending Strength/Rate (BSR)	2.19
Subsided OD	in 6.837

The Minimum Make Up Torque should be applied when possible.

Advisories and Warnings

Advisories:

Warnings:

Connection is thread weak. The combined forces on the thread at MJT is less than pipe tensile.

Performance Sheet Reading

Summary page – Drill Collar

Drill Collar Performance		
Adjusted Weight *	lbs/ft	108.14
Fluid Displacement *	US gal/ft	1.65
	bbls/ft	0.0393
Fluid Capacity *	US gal/ft	0.21
	bbls/ft	0.0049
Drift Size	in	2.125
Cross Sectional Area of OD	in ²	35.785
Cross Sectional Area of ID	in ²	3.976
Section Modulus	in ³	29.821
Polar Section Modulus	in ³	59.641
Moment of Inertia Drill Collar	in ⁴	100.64
Polar Moment of Inertia Drill Collar	in ⁴	201.29
Note: Oil field barrel equivalent to 42 US gal * At Nominal Wall Thickness		
Note: Drill Collar values are best estimates and may vary due to length.		

Drill Collar Performance: weight, fluid displacements and data relating to geometry

Drill Collar Performance Sheet

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Drill Collar Specification		Connection Specification	
Drill Collar OD	in 6.75	Connection Type and Size	NC30
Drill Collar ID	in 2.25	Box Stress Relief Feature	None
Product Grade (SMYS)	psi 110,000	Pin Stress Relief Feature	1 in. SRG
Drill Collar Type	Standard	Connection OD	in 6.75
Approximate Length	ft 31.0	Connection ID	in 2.25
		Bevel Diameter	in 6.364
		Friction Factor of Thread Compound	1.0
Drill Collar Performance		Connection Performance	
Adjusted Weight *	lbs/ft 108.14	Min. OD for Connections	in N/A
Fluid Displacement *	US gal/ft 1.65	Max. Make Up Torque (Recommended)	ft-lbs 40,400
	bbls/ft 0.0393	Tension at Shoulder Separation @ Max. MJT	lbs 1,272,400
Fluid Capacity *	US gal/ft 0.21	Tension at Connection Yield @ Max. MJT	lbs 1,272,400
	bbls/ft 0.0049	Min. Make Up Torque	ft-lbs 35,700
Drift Size	in 2.125	Tension at Shoulder Separation @ Min. MJT	lbs 1,446,700
Cross Sectional Area of OD	in ² 35.785	Tension at Connection Yield @ Min. MJT	lbs 1,446,700
Cross Sectional Area of ID	in ² 3.976	Torsion Strength	lbs 1,621,000
Section Modulus	in ³ 29.821	Torsional Strength	ft-lbs 64,600
Polar Section Modulus	in ³ 59.641	Bending Strength/Rate (BSR)	2.19
Moment of Inertia Drill Collar	in ⁴ 100.64	Subsided OD	in 6.807
Polar Moment of Inertia Drill Collar	in ⁴ 201.29		
Note: Oil field barrel equivalent to 42 US gal * At Nominal Wall Thickness		Advisories and Warnings	
Note: Drill Collar values are best estimates and may vary due to length.		Advisories:	
		Warnings:	
		Connection is thread weak. The combined forces on the thread at MJT to Max. Min. may pipe failure.	

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Performance Sheet Reading

Summary page – Drill Collar

Connection Specification		
Connection Type and Size		NC50
Box Stress Relief Feature		Boreback Box
Pin Stress Relief Feature		1 in. SRG
Connection OD	in	6.75
Connection ID	in	2.25
Bevel Diameter	in	6.344
Friction Factor of Thread Compound		1.0

Connection Specification: defining the characteristics of the connection

Drill Collar Performance Sheet
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Drill Collar Specification		
Drill Collar OD	in	6.75
Drill Collar ID	in	2.25
Product Grade (SMYS)	psi	110,000
Drill Collar Type		Standard
Approximate Length	ft	31.0

Drill Collar Performance		
Adjusted Weight *	lb/ft	108.14
Fluid Displacement *	US gal/ft	1.85
	bbbl/ft	0.0393
Fluid Capacity *	US gal/ft	0.21
	bbbl/ft	0.0049
Drill Size	in	2.125
Cross Sectional Area of OD	in ²	5.785
Cross Sectional Area of ID	in ²	3.976
Section Modulus	in ³	29.821
Polar Section Modulus	in ³	53.641
Moment of Inertia Drill Collar	in ⁴	100.64
Polar Moment of Inertia Drill Collar	in ⁴	201.29

* As Nominal Wall Thickness
New Drill Collar values are for reference only and may vary due to length.

Connection Specification		
Connection Type and Size		NC50
Box Stress Relief Feature		Boreback Box
Pin Stress Relief Feature		1 in. SRG
Connection OD	in	6.75
Connection ID	in	2.25
Bevel Diameter	in	6.344
Friction Factor of Thread Compound		1.0

Connection Performance		
Min. OD for Counterbore	in	N/A
Max. Make Up Torque (Recommended)	ft-lbs	40,400
Tension at Shoulder Separation @ Max. MUJT	lbs	1,272,400
Tension at Connection Yield @ Max. MUJT	lbs	1,272,400
Min. Make Up Torque	ft-lbs	35,700
Tension at Shoulder Separation @ Min. MUJT	lbs	1,446,700
Tension at Connection Yield @ Min. MUJT	lbs	1,446,700
Tensile Strength	lbs	1,621,000
Torsional Strength	ft-lbs	64,600
Bending Strength/Rate (BSR)		2.19
Subsided OD	in	6.807

The Minimum Make Up Torque should be applied when possible.

Advisories and Warnings

Advisories:

Warnings:

Connection is thread weak. The combined forces on the thread at MUJT to Max. Min. may pipe failure.

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Performance Sheet Reading

Summary page – Drill Collar

Connection Performance		
Min. OD for Counterbore	in	N/A
Max. Make Up Torque (Recommended)	ft-lbs	40,400
Tension at Shoulder Separation @ Max. MUT	lbs	1,272,400
Tension at Connection Yield @ Max. MUT	lbs	1,272,400
Min. Make Up Torque	ft-lbs	36,700
Tension at Shoulder Separation @ Min. MUT	lbs	1,446,700
Tension at Connection Yield @ Min. MUT	lbs	1,446,700
Tensile Strength	lbs	1,621,000
Torsional Strength	ft-lbs	64,600
Bending Strength Ratio (BSR)		2.19
Balanced OD	in	6.807
The Maximum make-up torque should be applied when possible.		

Connection Performance: shows the operational and combined limits of drill collars

Drill Collar Performance Sheet

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Drill Collar Specification		Connection Specification			
Drill Collar OD	in	6.75	N/A		
Drill Collar ID	in	2.25	NCB		
Product Grade (SMYS)	psi	110,000	Box Stress Relief Feature	Boxback Box	
Drill Collar Type		Standard	Pin Stress Relief Feature	1 in. SRG	
Approximate Length	ft	31.0	Connection OD	in	6.75
Drill Collar Performance		Connection Performance			
Adjusted Weight *	lbm/ft	108.14	Min. OD for Counterbore	in	N/A
Fluid Displacement *	US gal/ft	1.85	Max. Make Up Torque (Recommended)	ft-lbs	40,400
	bbbl/ft	0.0399	Tension at Shoulder Separation @ Max. MUT	lbs	1,272,400
Fluid Capacity *	US gal/ft	0.21	Tension at Connection Yield @ Max. MUT	lbs	1,272,400
	bbbl/ft	0.0049	Min. Make Up Torque	ft-lbs	36,700
Drill Size	in	2.125	Tension at Shoulder Separation @ Min. MUT	lbs	1,446,700
Cross Sectional Area of OD	in ²	5.785	Tension at Connection Yield @ Min. MUT	lbs	1,446,700
Cross Sectional Area of ID	in ²	3.976	Tensile Strength	lbs	1,621,000
Section Modulus	in ³	29.821	Torsional Strength	ft-lbs	64,600
Polar Section Modulus	in ³	53.641	Bending Strength Ratio (BSR)		2.19
Moment of Inertia Drill Collar	in ⁴	100.64	Balanced OD	in	6.807
Polar Moment of Inertia Drill Collar	in ⁴	201.29	The Maximum make-up torque should be applied when possible.		

Advisories and Warnings

Advisories:

Warnings:

Connection is thread weak. The combined forces on the thread at MUT is less than one pipe thread.

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Performance Sheet Reading

Summary page – Drill Collar

Advisories and Warnings

Advisories:

Warnings:

- Connection is thread weak. The combined forces on the thread at MUT is less than new pipe tensile.

Advisories and Warnings: shows the advisories and warnings for the configuration

Drill Collar Performance Sheet
Grant Prideco | NOV Wellbore Technologies

Drill Collar Specification	
Drill Collar OD	in 6.75
Drill Collar ID	in 2.25
Product Grade (SMYS)	psi 110,000
Drill Collar Type	Standard
Approximate Length	ft 31.0

Drill Collar Performance	
Adjusted Weight *	lbm/ft 108.14
Fluid Displacement *	US gal/ft 1.85
	bbbl/ft 0.0399
Fluid Capacity *	US gal/ft 0.21
	bbbl/ft 0.0049
Drill Size	in 2.125
Cross Sectional Area of OD	in ² 5.785
Cross Sectional Area of ID	in ² 3.976
Section Modulus	in ³ 29.821
Polar Section Modulus	in ³ 15.641
Moment of Inertia Drill Collar	in ⁴ 100.64
Polar Moment of Inertia Drill Collar	in ⁴ 201.29

Connection Specification	
Connection Type and Size	NC80
Box Stress Relief Feature	Boreback Box
Pin Stress Relief Feature	1 in. SRG
Connection OD	in 6.25
Connection ID	in 2.25
Bevel Diameter	in 6.364
Friction Factor of Thread Compound	1.0

Connection Performance	
Min. OD for Connections	in N/A
Max. Make Up Torque (Recommended)	ft-lbs 40,400
Tension at Shoulder Separation @ Max. MUT	lbs 1,272,400
Tension at Connection Yield @ Max. MUT	lbs 1,272,400
Min. Make Up Torque	ft-lbs 35,700
Tension at Shoulder Separation @ Min. MUT	lbs 1,446,700
Tension at Connection Yield @ Min. MUT	lbs 1,446,700
Tensile Strength	lbs 1,621,000
Torsional Strength	ft-lbs 64,600
Bending Strength/Kaiser (BSR)	2.19
Subsided OD	in 6.807

Advisories and Warnings

Advisories:

Warnings:

- Connection is thread weak. The combined forces on the thread at MUT is less than new pipe tensile.

Questions?



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