

Well Construction

Drilling Technologies

Drill String Torque Reducer (DSTR™)

Expro's Drill String Torque Reducer (DSTR™) is a drill string tool intended for use in deviated wells where excessive rotary torque causes drilling and casing wear problems.

This tool is an integral component consisting of a short mandrel fitted with a bearing supported non-rotating sleeve. It is designed to be positioned between the connections of the drillpipe at the well radius section of the hole. Achieving an international award for innovation at the Houston oil show in 1996, the tool is now acknowledged as the industry standard.

Another benefit seen with the tool is the reduction of casing wear. For a given deviation profile, the applications program assists in maximizing the tools performance by determining the deployment in the critical sections of the borehole. However, for most extended reach drilling applications, the tools are used in the build sections of the borehole, helping to extend the envelope of rotary drilling.

Features and benefits

- 5 inch, 5 1/2 inch and 6 5/8 inch sizes
- Reduces friction factor
- Can withstand 14,000 lbf side force
- One piece mandrel with mechanical properties exceeds the specification of the drillpipe
- Overall dimensions permits use within standard drilling stand and average derrick height
- Durable design allows for optimization in the harshest of well profiles and environments
- Dual sleeve retention mechanism for downhole reliability



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Specifications

Tool series	Connection ¹¹	TJ OD (DWG-PN) (in)	Nom ID (in)	Drift ID (in)	Neck OD (in)	Sleeve OD (in)	Max. make-up torque (ft-lb) ^{1,2}	Connection strength ¹		Mandrel strength ⁸		Mandrel capacity ⁹		Service interval ¹⁷
								Tension (lb)	Torsion (lb-ft)	Tension (lb)	Torsion (lb-ft)	Burst (psi)	Collapse (psi)	
5"	NC50 ^{3,4,5}	6.500 (83542)	3.250	3.125	4.995	7.625	32,100	1,311,119	53,501	1,545,406	133,606	42,795	35,746	2,000,000
	XT50 ⁶						65,400	1,642,500	109,000					
	TT500 ⁶						74,600	1,394,200	106,600					
	TT525 ⁶						83,300	1,666,100	119,000					
	VX50 ⁷						55,200	1,690,000	85,200					
	NC50 VAM EIS ⁷						50,400	1,370,000	80,600					
5 7/8"	5 1/2" FH ^{3,4,5}	7.250 (2010017058)	3.500	3.375	4.995	7.900	45,456	1,683,697	75,760	1,344,165	123,262	36,664	31,115	2,000,000
	GPDS55 ⁶						71,400	1,864,200	188,900					
	5 1/2" FH DSTJ ¹¹						45,456	1,683,697	75,760					
	5 1/2" FH EIS ⁷						73,800	1,864,200	119,700					
	XT54 ⁶						69,100	1,750,800	115,100					
	HT55 ⁶						69,400	1,864,200	115,500					
	TT550 ⁶						80,300	1,766,300	114,700					
	DPM-MT57 ²⁰						81,200	2,000,000	135,300					
	VX57 ⁷						76,300	2,000,000	119,000					
	XT57 ⁶						95,100	2,039,700	158,500					
	TT585 ⁶						122,400	2,189,300	174,800					
6 5/8"	6 5/8" FH ^{3,4,5}	8.250 (2014008002)	4.250	4.125	6.245	9.625	68,650	2,202,363	114,422	2,270,367	250,233	39,133	33,004	2,000,000
	6 5/8" FH VAM EIS ^{7,10}		4.500	4.375			94,700	2,050,000	155,000	2,029,014	232,283	34,229	29,224	

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Tool series	Nom ID (in)	Shoulder to Shoulder ¹⁵		Sleeve length (in)	Weight (lb)	Min. Tong area		Mud type ¹⁶	Side load rating		Maximum BHT		Max. BHP ¹⁹ (psi)	Max. RPM limit	Capacity ¹⁸ (bbl/ft)	Displacement ¹⁸ (bbl/ft)
		Min. (in)	Max. (in)			Box (in)	Pin (in)		Static ¹³	Dynamic ¹⁴	(°F)	(°C)				
5"	3.250	41	60	14.250	510	10	8	WBM OBM SBM	20,000	14,000	400	204	N/A	250	0.0103	0.0369
5 7/8"	3.500	41	60	14.250	620	10	8	WBM OBM SBM	20,000	14,000	400	204	N/A	250	0.0119	0.0442
6 5/8"	4.250	41	60	15.600	760	10	8	WBM OBM SBM	20,000	14,000	400	204	N/A	250	0.0175	0.0587
	4.500				730										0.0197	0.0563

- All rotary shouldered connection (RSC) strengths and make-up torques (MUT) values to be used as a guide only. Values to be confirmed by client per system of work and should match string conditions. DSTR mandrel has a minimum yield strength of 140ksi. No safety factor has been applied.
- All MUT values are based on a friction factor of 1.0.
- Connections are considered to have API Stress Relief Grooves on pin and API Stress Relief Groove or Boreback on box.
- Maximum MUT taken as 60% of the torque to yield an RSC per API RP7G (A.17). Minimum MUT taken at T4 per API RP7G (A.25).
- Connection strength is calculated per API RP7G (A.16 and A.18). DSTR mandrel has a minimum yield strength of 140ksi.
- RSC strength and MUT values as per NOV Grant Prideco Connection Performance sheet.
- RSC strength and MUT values as per Vallourec Drilling Connection Performance sheet. These values assume a minimum yield strength of 130ksi.
- Structural strength is calculated across mandrel neck per API RP7G (A.13 and A.14) using maximum worn OD and ID. DSTR mandrel has a minimum yield strength of 140 ksi. No safety factor applied.
- Mandrel burst and collapse strength is calculated across mandrel neck per API RP7G (A.2 and A.8). No safety factor has been applied.
- Values taken to suit 4.50" ID per Vallourec Drilling requirements.
- FH DSTJ connections evaluated as standard FH. Confirm with client.
- If a connection type is not shown, but is required, contact Expro for further assistant.
- True side load without rotation, 1.5 SF included.
- Safe operating dynamic side load with 1.5 SF included: value based on 3rd Generation DSTR dynamic side load testing (Report# D2010017017, Feb 2014).
- Shoulder to shoulder lengths are approximate values only. These lengths depend on connection re-cuts and customer requirements.
- Compatible with majority of muds. Successfully run in water, oil, and synthetic based mud. Contact Expro if uncommon chemicals or concentrations are present in mud system.
- Recommended revolutions between servicing intervals.
- Actual values averaged over standard tool length.
- Bearing package is not hydrostatically sealed or mud lubricated.
- Values for DPM-MT57 connection provided by Drill Pipe Master.