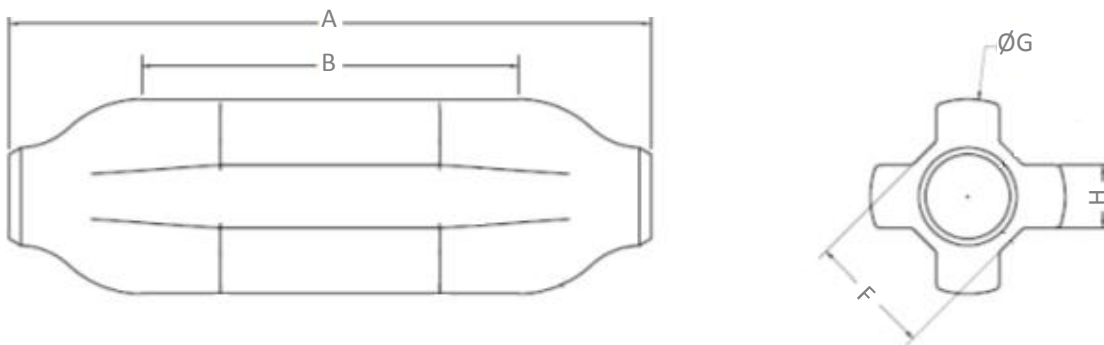


TenFlow™ Sucker Rod Guide

TenFlow™ is a Tenaris proprietary Beam Pumping injected sucker rod guide designed to maximize the Erodible Wear Volume (E WV) minimizing the flow turbulence.

Dimensions:



Nominal sizes			Dimensions																								
Tubing	Guide Length	Rod	A		B		F		ØG		H																
			in	mm	in	mm	in	mm	in	mm	in	mm															
2 3/8"	5"	3/4"	5.5	140	3.07	78	1.22	31	1.85	47	0.63	16															
		7/8"					1.30	33																			
2 7/8"		3/4"					2.68	68					1.22	31	2.30	58.5	0.75	19									
		7/8"											1.34	34													
2 3/8"	7"	1"	7.6	193	5	127			1.45	37	1.85	47	0.63	16													
		3/4"							1.22	31																	
2 7/8"		7/8"					4.52	115	1.30	33					2.30	58.5	0.75	19									
		3/4"							1.22	31																	
3 1/2"		7/8"							4.41	112									1.34	34	2.64	67	0.75	19			
		1"																	1.45	37							
2 7/8"		9"					1 1/8"	8.8							224	5.87	149	1.57	40	2.30					58.5	0.75	19
							3/4"											1.22	31								
	7/8"		1.34	34																							
1"	1.45		37																								

Nominal sizes			Guide total volume		Erodible wear volume		Coupling used to compare	Tubing arc scavenged
Tubing	Guide Length	Rod	cm ³	in ³	cm ³	in ³		
2 3/8"	5"	3/4"	105.0	6.4	15.9	1.0	3/4" FS	159°
		7/8"	100.4	6.1	16.4	1.0	7/8" SH	159°
2 7/8"		3/4"	156.1	9.5	58.1	3.5	3/4" FS	168°
		7/8"	149.5	9.1	40.7	2.5	7/8" FS	168°
2 3/8"	7"	1"	143.8	8.8	24.0	1.5	1" SH	168°
		3/4"	156.6	9.6	25.5	1.6	3/4" FS	159°
7/8"		146.5	8.9	25.5	1.6	7/8" SH	159°	
2 7/8"		3/4"	229.6	14.0	87.7	5.4	3/4" FS	168°
		7/8"	221.2	13.5	62.6	3.8	7/8" FS	168°
3 1/2"		1"	211.9	12.9	37.0	2.3	1" SH	168°
		3/4"	277.8	17.0	134.0	8.2	3/4" FS	132°
		7/8"	268.3	16.4	107.0	6.5	7/8" FS	132°
	1"	260.5	15.9	55.7	3.4	1" FS	132°	
2 7/8"	9"	1 1/8"	253.3	15.5	46.4	2.8	1 1/8" SH	132°
		3/4"	284.8	17.4	111.6	6.8	3/4" FS	168°
		7/8"	273.8	16.7	79.8	4.9	7/8" FS	168°
		1"	262.3	16.0	47.6	2.9	1" FS	168°

Materials:

Typical values for Polyphenylene sulfide (PPS) 40% and 30% glass reinforced are displayed in the following table

Property	Test Standard	PPS30 (**)	PPS40 (**)
Density	ISO 1183	1.58 g/cm ³	1.65 g/cm ³
Tensile strength	ISO 527-2/1A	170 MPa	195 MPa
Elongation at break	ISO 527-2/1A	1.9 %	1.9 %
Tensile Modulus	ISO 527-2/1A	12000 MPa	14700 MPa
Unnotched Charpy impact strength @23°C	ISO 179/1eU	34 kJ/m ²	53 kJ/m ²
Unnotched Charpy impact strength @-40°C	ISO 179/1eU	34 kJ/m ²	53 kJ/m ²
Notched Charpy impact strength @23°C	ISO 180/1eA	9 kJ/m ²	10 kJ/m ²
Notched Charpy impact strength @-40°C	ISO 179/1eA	9 kJ/m ²	10 kJ/m ²

Typical values for Polyphthalamide polymer (PPA) unfilled (0%) and with a 33% glass reinforced are displayed in the following table

Property	Test Standard	PPA00 (**)	PPA33 (**)
Density	ISO 1183	1.1 g/cm ³	1.44 g/cm ³
Tensile strength	ASTM D638	55MPa	193 MPa
Elongation at break	ASTM D638	10%	2.1 %
Tensile Modulus	ASTM D638	1793 MPa	13100 MPa

** Values shown have been taken from a reduced number of tests and shall not be used to establish specifications.

Rod guide properties:

Property	PPS40	PPS30	PPA00	PPA33
Color	White	Grey	Natural	Black
Maximum Service Temperature*	200°C	200°C	165°C	165°C
Dynamic Friction Coefficient	0.30	0.28	0.22	0.25
Fiberglass Content	40%	30%	0%	33%

*Maximum temperature limitation is dependent on well conditions. Please contact Tenaris' Technical Sales Representative for further assistance.