STAR™ Anhydride Line Pipe

API 15HR Design - Product Data

Applications

- Production Lines
- Injection Lines
- Disposal Line
- Transfer Lines
- Oil, Gas, Saltwater
- CO_2 and H_2S

Product Description

- **Sizes** - 1½ through 8 inches
- **Pressure** - Up to 2,500 psi (17.2 MPa)
- **Temperature** - up to 150°F (65.6°C) Max.
- **Resin System** - Anhydride Cured Epoxy
- **Reinforcement** - Premium Fiberglass
- **Joining Systems** - API 8rd Threaded
- **Joint Length** - 33 Feet (10 mts) Nominal Random Lengths of 20 to 33 Feet (6.1 to 10 mts)
- **Fittings** - A variety of filament wound API 5B threaded fittings are available. API 15HR design systems require higher rated fittings, refer to the STAR High Pressure Threaded Fittings Product Data sheet. Temperature interpolation is not recommended for fittings.

High Pressure Design

(≥ 500 psi)

- **Design Life** - 20 years at full rating
- **Design Temperature** - 150°F (65.6°C)
- **Wall Thickness** - Minimum
- **Hoop Stress** - Lower Confidence Limit (LCL) of Long Term Hydrostatic Strength according to ASTM D2992-B
- **100% Factory Hydro Test** - All sizes 1.5 times the Series pressure rating

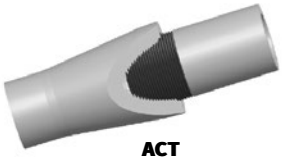
Benefits

- Corrosion Control
- Reduced Installation Costs
- Improved Flow Efficiency
- Constant ID throughout Pressure Classes
- Reduced Paraffin & Scale Build-Up
- Reduced Maintenance Cost

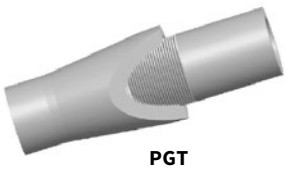
Joining System

- **ACT** - Molded threads using a graphite, ceramic and epoxy composite for high performance applications.
- **PGT** - Typical ground threads produced with numerical controlled grinding equipment.
- All 1½ in. EUE 10rd and 2⅜ in. - 4½ in. EUE 8rd API threads conform to API 5B Table 14, 14 Edition (L4 is minimum) and all 5½ - 9⅝ in. OD 8rd casing threads conform to API 5B Table 7, 14 Edition (L4 is minimum).

View of Joint Illustrations



ACT



PGT

STAR Anhydride Line Pipe (API Design- Product Data)

Series 500

500 psi (3.4 MPa)

Pipe size	Thread size	Pipe Dimensions										Minimum bending radius		Short-Term Tensile Rating	
		Inside diameter		Outside diameter		Minimum Wall Thickness		Connection diameter		Pipe weight					
in.	in.	in.	mm	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	ft	m	lb	kg
3	3½ (A,P)	3.00	76.2	3.12	79.3	0.05	1.4	4.16	105.6	1.00	1.5	159	48.5	2400	1,089
4	4½ (P)	3.75	95.3	3.90	99.1	0.07	1.7	5.16	130.9	1.32	2.0	196	59.7	3000	1,361
4	4½ (A,P)	3.91	99.3	4.07	103.3	0.07	1.8	5.15	130.7	1.29	1.9	204	62.2	3000	1,361
5	5½ (A)	4.74	120.4	4.93	125.2	0.08	2.1	5.99	152.3	1.89	2.8	248	75.6	4800	2,177
6	6⅝ (P)	5.50	139.7	5.72	145.4	0.10	2.5	7.09	180.1	2.53	3.8	287	87.5	5900	2,676
6	6⅝ (A,P)	5.85	148.6	6.08	154.5	0.10	2.7	7.12	180.8	2.64	3.9	306	93.3	7400	3,357
8	8⅝ (A,P)	7.50	190.5	7.80	198.1	0.13	3.4	4.40	6.5	9.20	233.7	392	119.5	11900	5,398

Series 750

750 psi (5.2 MPa)

Pipe size	Thread size	Pipe Dimensions										Minimum bending radius		Short-Term Tensile Rating	
		Inside diameter		Outside diameter		Minimum Wall Thickness		Connection diameter		Pipe weight					
in.	in.	in.	mm	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	ft	m	lb	kg
2	2⅜ (A)	2.00	50.8	2.12	53.9	0.05	1.4	2.99	75.9	0.59	0.9	108	32.9	1600	726
2½	2⅞ (A,P)	2.38	60.3	2.52	63.9	0.06	1.6	3.50	88.8	0.77	1.1	127	38.7	1900	862
2½	2⅞ (A)	2.43	61.7	2.58	65.5	0.07	1.7	3.48	88.5	0.70	1.0	130	39.6	1900	862
3	3½ (A,P)	3.00	76.2	3.19	80.9	0.08	2.1	4.22	107.2	1.24	1.8	162	49.4	3300	1,497
4	4½ (P)	3.75	95.3	3.98	101.0	0.10	2.6	5.22	132.5	1.63	2.4	199	60.7	4000	1,814
4	4½ (A,P)	3.91	99.3	4.14	105.3	0.11	2.7	5.26	133.7	1.88	2.8	210	64.0	5200	2,359
5	5½ (A)	4.74	120.4	5.02	127.6	0.13	3.3	6.11	155.2	2.60	3.9	254	77.4	7400	3,357
6	6⅝ (P)	5.50	139.7	5.84	148.3	0.15	3.8	7.21	183.2	3.40	5.1	293	89.3	9000	4,082
6	6⅝ (A,P)	5.85	148.6	6.20	157.5	0.16	4.0	7.23	183.6	3.48	5.2	312	95.1	10500	4,763
8	8⅝ (A,P)	7.50	190.5	7.96	202.3	0.20	5.1	9.39	238.5	5.80	8.6	400	121.9	17100	7,756

Series 1000

1000 psi (6.9 MPa)

Pipe size	Thread size	Pipe Dimensions										Minimum bending radius		Short-Term Tensile Rating	
		Inside diameter		Outside diameter		Minimum Wall Thickness		Connection diameter		Pipe weight					
in.	in.	in.	mm	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	ft	m	lb	kg
1½	1.90 (A)	1.50	38.1	1.62	41.3	0.05	1.4	2.49	63.3	0.44	0.7	83	25.3	1200	544
2	2⅜ (A,P)	2.00	50.8	2.16	54.9	0.07	1.8	3.02	76.7	0.66	1.0	109	33.2	1700	771
2½	2⅞ (A,P)	2.38	60.3	2.57	65.2	0.09	2.2	3.56	90.4	0.96	1.4	130	39.6	2600	1,179
2½	2⅞ (A)	2.43	61.7	2.63	66.9	0.09	2.2	3.54	89.9	0.89	1.3	133	40.5	2500	1,134
3	3½ (A,P)	3.00	76.2	3.24	82.4	0.11	2.8	4.28	108.8	1.49	2.2	165	50.3	4200	1,905
4	4½ (P)	3.75	95.3	4.05	102.9	0.14	3.5	5.34	135.6	2.24	3.3	205	62.5	6200	2,812
4	4½ (A,P)	3.91	99.3	4.23	107.3	0.14	3.6	5.32	135.2	2.19	3.3	213	64.9	6300	2,858
5	5½ (A)	4.74	120.4	5.12	130.1	0.17	4.4	6.23	158.2	3.00	4.5	257	78.3	8800	3,992
6	6⅝ (P)	5.50	139.7	5.96	151.3	0.20	5.1	7.40	187.8	4.33	6.4	299	91.1	12300	5,579
6	6⅝ (A,P)	5.85	148.6	6.32	160.6	0.21	5.4	7.41	188.3	4.46	6.6	317	96.6	13500	6,123
8	8⅝ (A,P)	7.50	190.5	8.11	205.9	0.27	6.9	9.66	245.4	7.51	11.2	408	124.4	23000	10,433

Series 1250

1250 psi (8.6 MPa)

Pipe size	Thread size	Pipe Dimensions										Minimum bending radius		Short-Term Tensile Rating	
		Inside diameter		Outside diameter		Minimum Wall Thickness		Connection diameter		Pipe weight					
in.	in.	in.	mm	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	ft	m	lb	kg
1½	1.90 (A)	1.50	38.1	1.65	42.0	0.07	1.7	2.51	63.8	0.46	0.7	84	25.6	1200	544
2	2⅜ (A,P)	2.00	50.8	2.20	56.0	0.09	2.3	3.08	78.3	0.83	1.2	112	34.1	2300	1,043
2½	2⅞ (A,P)	2.38	60.3	2.62	66.5	0.11	2.8	3.59	91.2	1.02	1.5	131	39.9	2800	1,270
2½	2⅞ (A)	2.43	61.7	2.68	68.2	0.11	2.8	3.59	91.2	1.07	1.6	135	41.1	3200	1,451
3	3½ (A,P)	3.00	76.2	3.31	84.0	0.14	3.5	4.35	110.4	1.75	2.6	168	51.2	5100	2,313
4	4½ (P)	3.75	95.3	4.13	105.0	0.17	4.4	5.46	138.7	2.58	3.8	208	63.4	7300	3,311
4	4½ (A,P)	3.91	99.3	4.31	109.4	0.18	4.6	5.46	138.8	2.65	3.9	218	66.4	8100	3,674
5	5½ (A)	4.74	120.4	5.22	132.7	0.22	5.5	6.40	162.7	3.78	5.6	263	80.2	11500	5,216
6	6⅝ (P)	5.50	139.7	6.08	154.4	0.25	6.4	7.64	194.1	5.33	7.9	305	93.0	15600	7,076
6	6⅝ (A,P)	5.85	148.6	6.45	163.7	0.27	6.8	7.73	196.3	5.77	8.6	326	99.4	18200	8,255
8	8⅝ (A,P)	7.50	190.5	8.27	209.9	0.34	8.7	9.93	252.1	9.35	13.9	417	127.1	29300	13,290

STAR Anhydride Line Pipe (API Design- Product Data)

Series 1500

1500 psi (10.3 MPa)

Pipe size	Thread size	Pipe Dimensions										Minimum bending radius		Short-Term Tensile Rating	
		Inside diameter		Outside diameter		Minimum Wall Thickness		Connection diameter		Pipe weight					
in.	in.	in.	mm	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	ft	m	lb	kg
1½	1.90 (A)	1.50	38.1	1.69	42.8	0.08	2.1	2.57	65.4	0.59	0.9	87	26.5	1700	771
2	2⅜ (A,P)	2.00	50.8	2.25	57.1	0.11	2.8	3.15	80.0	1.01	1.5	115	35.1	3000	1,361
2½	2⅞ (A,P)	2.38	60.3	2.67	67.8	0.13	3.4	3.68	93.5	1.18	1.8	133	40.5	3300	1,497
2½	2⅞ (A)	2.43	61.7	2.74	69.6	0.14	3.4	3.65	92.6	1.26	1.9	138	42.1	3800	1,724
3	3½ (A,P)	3.00	76.2	3.37	85.6	0.17	4.2	4.47	113.6	2.03	3.0	171	52.1	6000	2,722
4	4½ (P)	3.75	95.3	4.21	107.0	0.21	5.3	5.76	146.4	3.02	4.5	211	64.3	8500	3,856
4	4½ (A,P)	3.91	99.3	4.39	111.6	0.22	5.5	5.63	142.9	3.26	4.9	223	68.0	10200	4,627
5	5½ (A)	4.74	120.4	5.33	135.3	0.26	6.7	6.58	167.2	4.59	6.8	269	82.0	14300	6,486
6	6⅝ (A,P)	5.50	139.7	6.18	157.0	0.31	7.8	7.83	198.9	6.33	9.4	312	95.1	19100	8,664
8	8⅝ (A,P)	7.50	190.5	8.43	214.1	0.42	10.6	10.37	263.3	11.16	16.6	424	129.2	35000	15,876

Series 1750

1750 psi (12.1 MPa)

Pipe size	Thread size	Pipe Dimensions										Minimum bending radius		Short-Term Tensile Rating	
		Inside diameter		Outside diameter		Minimum Wall Thickness		Connection diameter		Pipe weight					
in.	in.	in.	mm	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	ft	m	lb	kg
1½	1.90 (A)	1.50	38.1	1.72	43.8	0.10	2.5	2.60	66.1	0.68	1.0	89	27.1	2000	907
2	2⅜ (A,P)	2.00	50.8	2.29	58.2	0.13	3.3	3.15	80.0	1.05	1.6	117	35.7	3200	1,451
2½	2⅞ (A,P)	2.38	60.3	2.72	69.1	0.16	4.0	3.80	96.6	1.40	2.1	137	41.8	4000	1,814
2½	2⅞ (A)	2.43	61.7	2.79	71.0	0.16	4.0	3.75	95.4	1.46	2.2	141	43.0	4500	2,041
3	3½ (A,P)	3.00	76.2	3.44	87.3	0.20	5.0	4.60	116.8	2.33	3.5	175	53.3	7200	3,266
4	4½ (P)	3.75	95.3	4.30	109.1	0.25	6.2	5.89	149.6	3.69	5.5	218	66.4	10800	4,899
4	4½ (A,P)	3.91	99.3	4.48	113.8	0.26	6.5	5.80	147.4	3.61	5.4	226	68.9	11300	5,126
5	5½ (A)	4.74	120.4	5.43	137.9	0.31	7.9	6.99	177.5	5.37	8.0	273	83.2	16400	7,439
6	6⅝ (A,P)	5.50	139.7	6.30	160.1	0.36	9.2	8.26	209.8	7.37	11.0	319	97.2	23100	10,478

Series 2000

2000 psi (13.8 MPa)

Pipe size	Thread size	Pipe Dimensions										Minimum bending radius		Short-Term Tensile Rating	
		Inside diameter		Outside diameter		Minimum Wall Thickness		Connection diameter		Pipe weight					
in.	in.	in.	mm	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	ft	m	lb	kg
1½	1.90 (A)	1.50	38.1	1.75	44.5	0.11	2.9	2.65	67.4	0.73	1.1	90	27.4	2200	998
2	2⅜ (A,P)	2.00	50.8	2.34	59.4	0.15	3.8	3.28	83.4	1.23	1.8	119	36.3	3800	1,724
2½	2⅞ (A,P)	2.38	60.3	2.77	70.5	0.18	4.6	3.87	98.3	1.62	2.4	140	42.7	4800	2,177
2½	2⅞ (A)	2.43	61.7	2.85	72.4	0.18	4.7	3.86	98.1	1.66	2.5	143	43.6	5200	2,359
3	3½ (A,P)	3.00	76.2	3.51	89.0	0.23	5.8	4.73	120.1	2.63	3.9	178	54.3	8000	3,629
4	4½ (P)	3.75	95.3	4.38	111.3	0.28	7.2	6.14	156.0	4.14	6.2	221	67.4	12100	5,488
4	4½ (A,P)	3.91	99.3	4.57	116.0	0.30	7.5	5.95	151.1	4.31	6.4	231	70.4	13500	6,123
6	6⅝ (A)	5.50	139.7	6.43	163.2	0.42	10.6	8.52	216.5	8.47	12.6	324	98.8	26100	11,839

Series 2250

2250 psi (15.5 MPa)

Pipe size	Thread size	Pipe Dimensions										Minimum bending radius		Short-Term Tensile Rating	
		Inside diameter		Outside diameter		Minimum Wall Thickness		Connection diameter		Pipe weight					
in.	in.	in.	mm	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	ft	m	lb	kg
1½	1.90 (A)	1.50	38.1	1.80	45.6	0.13	3.3	2.71	68.8	0.81	1.2	92	28.0	2500	1,134
2	2⅜ (A)	2.00	50.8	2.39	60.8	0.17	4.4	3.37	85.5	1.40	2.1	122	37.2	4400	1,996
2½	2⅞ (A,P)	2.38	60.3	2.83	71.9	0.20	5.2	3.99	101.5	1.86	2.8	143	43.6	5600	2,540
2½	2⅞ (A)	2.43	61.7	2.91	73.9	0.21	5.3	3.97	100.8	1.87	2.8	146	44.5	5900	2,676
3	3½ (A,P)	3.00	76.2	3.57	90.8	0.26	6.6	4.86	123.4	2.95	4.4	181	55.2	9100	4,128
4	4½ (P)	3.75	95.3	4.47	113.5	0.32	8.2	6.33	160.9	4.58	6.8	224	68.3	13400	6,078
4	4½ (A)	3.91	99.3	4.66	118.3	0.34	8.6	6.32	160.6	4.97	7.4	236	71.9	15700	7,121

STAR Anhydride Line Pipe (API Design- Product Data)

Series 2500

2500 psi (17.2 MPa)

Pipe size	Thread size	Pipe Dimensions										Minimum bending radius		Short-Term Tensile Rating	
		Inside diameter		Outside diameter		Minimum Wall Thickness		Connection diameter		Pipe weight					
in.	in.	in.	mm	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	ft	m	lb	kg
1½	1.90 (A)	1.50	38.1	1.82	46.3	0.15	3.7	2.93	74.3	0.96	1.4	94	28.7	2900	1,315
2	2⅜ (A,P)	2.00	50.8	2.43	61.7	0.19	4.9	3.58	91.0	1.60	2.4	125	38.1	5000	2,268
2½	2⅞ (A,P)	2.38	60.3	2.89	73.3	0.23	5.8	4.26	108.1	2.05	3.0	145	44.2	6100	2,767
2½	2⅞ (A)	2.43	61.7	2.97	75.4	0.24	6.0	4.24	107.7	2.12	3.2	149	45.4	6600	2,994
3	3½ (A,P)	3.00	76.2	3.65	92.6	0.29	7.4	5.18	131.5	3.40	5.1	186	56.7	10600	4,808
4	4½ (A,P)	3.75	95.3	4.56	115.8	0.36	9.2	6.53	165.9	5.35	8.0	231	70.4	16400	7,439

Addition Pressure Classes are available on request.

All pipe dimensions are nominal except where noted. Nominal wall thickness is (OD-ID)/2.

Series Pressure Rating (API 15HR) – Based on minimum wall thickness dimensions and API 15HR for a 20-year life expectancy. API monogram pipe available on request.

(A) ACT – Advanced Composite Thread; (P) PGT – Precision Ground Thread. Consult NOV Fiber Glass Systems Sales for thread type availability from manufacturing location.

Material selection is based on the desired design and operating conditions, and chemical compatibility of NOV Fiber Glass Systems constituents with fluids.

The standard pressure ratings are for non-cyclic, water, and hydrocarbon service. Additional service factors should be considered for compressible gas service. For guidance or for other applications, consult NOV Fiber Glass Systems Engineering.

Typical SLT* Properties

Axial Modulus	**psi**	1.87×10^6
	GPa	12.9
Hoop Modulus	**psi**	3.58×10^6
	GPa	24.7
Shear Modulus	**psi**	1.6×10^6
	GPa	11

Poisson's Ratio		
V_{ah}		0.36
V_{ha}		0.69

Coefficient of Thermal Expansion		
Axial	**in/in/°F**	11.0×10^{-6}
	mm/mm/°C	19.8×10^{-6}
Hoop	**in/in/°F**	6.2×10^{-6}
	mm/mm/°C	11.2×10^{-6}
Thermal Conductivity	**BTU/ft•hr•°F**	0.23
	W/m•°C	0.4

Specific Gravity		2
Absolute Roughness	**in**	0.00021
	mm	0.00533
Hazen-Williams Coefficient		150

* Ambient standard laboratory testing

Performance Ratings vs. Temperature

ASTM D 2992-B		**Anhydride**
150°F (65.6°C) 20 Year Life, LTHS (Long Term Hydrostatic Stress)	**psi**	23,768
	MPa	163.9
150°F (65.6°C) 20 Year Life, LCL (Lower Confidence Limit)	**psi**	21,400
	MPa	147.5

Joining System Information

Pipe Size	Thread Type	Pin Upset O.D.		Thread Length		Make Up Length Loss	
		in	mm	in	mm	in	mm
1½	1.90 in. EUE 10rd	2.15	54.6	2.36	59.9	2.06	52.4
2	2⅜ in. EUE 8rd	2.60	66.0	2.94	74.7	2.56	65.1
2½	2⅞ in. EUE 8rd	3.10	78.7	3.25	82.6	2.86	73.0
3	3½ in. EUE 8rd	3.75	95.3	3.50	88.9	3.13	79.4
4	4½ in. EUE 8rd	4.75	120.7	3.88	98.6	3.50	88.9
5	5½ in. OD 8rd	5.55	141.0	4.75	120.7	4.38	111.1
6	6⅝ in. OD 8rd	6.65	168.9	4.25	108.0	3.88	98.4
8	8⅝ in. OD 8rd	8.65	219.7	4.85	123.2	4.50	114.3

API CONNECTIONS - All products are produced integral joint unless indicated (TC) Threaded and Coupled. Any order may include up to 15% threaded and coupled pipe. All 1in. EUE 10rd and 2⅜ - 4½ in. EUE 8rd API threads conform to API 5B Table 14, 14 Edition (L4 is minimum) and all 5½ - 9⅝ in. OD 8rd casing threads conform to API 5B Table 7, 14 Edition (L4 is minimum).

Pipe Capacity

Pipe Size	Inside Diameter		Capacity	
	in	mm	bbls/1,000 ft	(m3/km)
1½	1.50	38.1	2.20	1.1
2	2.00	50.8	3.90	2.0
2½	2.38	60.5	5.50	2.9
2½	2.43	61.7	5.70	3.0
3	3.00	76.2	8.70	4.5
4	3.75	95.3	13.70	7.1
4	3.91	99.3	14.80	7.7
5	4.74	120.4	21.80	11.4
6	5.50	139.7	29.40	15.3
6	5.85	148.6	33.20	17.3
8	7.50	190.5	54.60	28.5

Fiber Glass Systems
17115 San Pedro Avenue, Ste 200
San Antonio, Texas 78232 USA
Phone: 210 477 7500
Fax: 210 477 7560

OG8010ENG February 2023 | JIG 23-CAPS-FGS-OG-0173

Wichita	ISO-0435	15HR-0004	Q1-1936
Betim	ISO-4690	15HR-0112	Q1-3838
Qingdao	10000344468	15HR-0106	
Oman	10000344468	15HR-0034	
Saudi Arabia	10000344468	15HR-0115	