

STAR® Aromatic Amine Line Pipe (High Pressure - API 15HR DESIGN - Product Data)

Product Description

- Pressure - Up to 2500 psi (17.2 MPa)
- Resin System - Aromatic Amine Cured Epoxy
- Reinforcement - Premium Fiberglass
- Joining Systems - API 8rd Threaded
- Nominal Length of Joint - 30 Feet (9.1 mts)
Random Lengths of 20 to 32 Feet (6.1 to 9.8 mts)
- Temperature - Up to 212°F (100°C) Maximum
- Sizes - 1½ through 8 inches
- 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

- API 15HR Design
- Design Life - 20 years at full rating
- Design Temperature - 150°F (65.5°C) and 212°F* (100°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 at 1.5 times the Series pressure rating

Flow Factors

- Hazen Williams C=150
- Absolute Roughness = 0.00021 in. (0.00533 mm)

Nominal Moduli

- Modulus of Elasticity
Hoop - 3.2×10^6 psi (22.8 GPa)
Axial - 1.8×10^6 psi (12.6 GPa)
- Poisson's Ratio (Minor) = 0.38

Physical Properties

- Density = 126 lbs/cu ft (2025 kgs/cu m)
- Specific Gravity = 2.03

Thermal Properties

- Coefficient of Thermal Conductivity
 $0.23 \text{ BTU}/(\text{ft}\cdot\text{hr}\cdot^\circ\text{F})$ ($0.4 \text{ W}/(\text{m}\cdot^\circ\text{C})$)
- Coefficient of Thermal Expansion
 $0.88 \times 10^{-5} \text{ in}/\text{in}/^\circ\text{F}$ ($1.58 \times 10^{-6} \text{ mm}/\text{mm}/^\circ\text{C}$)

*Pressure rating per ISO 14692-2 Annex D; partial factor A1 applied for temperatures in excess of 200°F (93.3°C).

Benefits

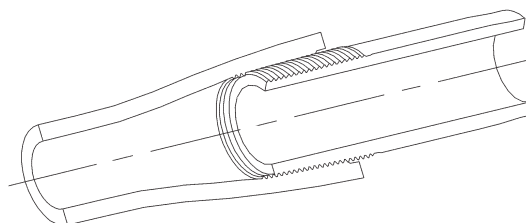
- Corrosion Control
- Reduced Installation Costs
- Improved Flow Efficiency
- Reduced Paraffin & Scale Build-Up
- Reduced Maintenance Cost

Applications

- Production Lines or Injection Lines
- Transfer Lines or Disposal Lines
- Oil, Gas, Saltwater, CO₂ and H₂S

Joining System

Advanced Composite Thread (ACT)



API Threads

- ACT - Molded threads using a graphite, ceramic and epoxy composite for high performance applications.
- All 1½" EUE 10rd and 2 3/8" - 4 1/2" EUE 8rd API threads conform to API 5B Table 14, 14th Edition (L4 is minimum) and all 5 1/2" - 9 5/8" OD 8rd casing threads conform to API 5B Table 7, 14th Edition (L4 is minimum).

SIZE		PIPE DIMENSIONS										Minimum Bending Radius		Short Term Tensile Rating		*Mfg. Loc
Pipe	Thread	Inside Diameter		Min. Wall Thickness		Nom. Wall Thickness		Pipe Weight		Connection Diameter		Ft	(m)	Lbs	(kN)	
		In	(mm)	In	(mm)	In	(mm)	Lbs/ft	(kg/m)	In	(mm)					
Series 500 (3.4 MPa)⁽¹⁾ - ACT (All Sizes)		500 psi @ 150°F (3.4 MPa @ 65.5°C), 440 psi @ 200°F (3.0 MPa @ 93.3°C), 400 psi @ 212°F (2.75 MPa @ 100°C)														
6	6 5/8	5.50	139.7	0.117	3.0	0.134	3.40	2.9	4.3	7.14	181	289	88.1	6800	30.25	B,O
6	6 5/8	5.85	148.6	0.124	3.2	0.138	3.51	3.0	4.5	7.14	181	307	93.6	8300	36.92	W,H
8	8 5/8	7.50	190.5	0.160	4.1	0.177	4.50	4.6	6.9	9.24	235	394	120.1	14100	62.72	W,H,O,B

Series 750 (5.2 MPa)⁽¹⁾ - ACT (All Sizes)		750 psi @ 150°F (5.2 MPa @ 65.5°C), 660 psi @ 200°F (4.5 MPa @ 93.3°C), 600 psi @ 212°F (4.1 MPa @ 100°C)														
2 1/2	2 7/8	2.43	61.7	0.078	2.0	0.087	2.2	0.9	1.3	3.52	89	131	39.9	2400	10.68	W,H
3	3 1/2	3.00	76.2	0.097	2.5	0.108	2.7	1.3	2.0	4.24	108	161	49.1	3700	16.46	W,H,O,B
4	4 1/2	3.75	95.3	0.121	3.1	0.138	3.5	2.1	3.1	5.28	134	204	62.2	5600	24.91	B,O
4	4 1/2	3.91	99.3	0.126	3.2	0.140	3.6	2.0	3.0	5.27	134	210	64.0	5700	25.35	W,H
5	5 1/2	4.74	120.4	0.153	3.9	0.170	4.3	2.9	4.3	6.11	155	255	77.7	8000	35.59	W
6	6 5/8	5.50	139.7	0.178	4.5	0.203	5.2	4.1	6.2	7.27	185	297	90.5	11100	49.38	B,O
6	6 5/8	5.85	148.6	0.189	4.8	0.210	5.3	3.9	5.8	7.30	185	315	96.0	12700	56.49	W,H
8	8 5/8	7.50	190.5	0.242	6.2	0.269	6.8	6.8	10.1	9.42	239	403	122.8	19800	88.07	W,H,O,B

Series 1000 (6.9 MPa)⁽¹⁾ - ACT (All Sizes)		1000 psi @ 150°F (6.9 MPa @ 65.5°C), 880 psi @ 200°F (6.1 MPa @ 93.3°C), 805 psi @ 212°F (5.6 MPa @ 100°C)														
2	2 3/8	2.00	50.8	0.087	2.2	0.097	2.46	0.73	1.09	3.04	77.22	110	33.5	2000	8.90	W,H,O,B
2 1/2	2 7/8	2.43	61.7	0.106	2.7	0.118	3.00	1.07	1.59	3.57	90.68	134	40.8	3000	13.34	W,H
3	3 1/2	3.00	76.2	0.131	3.3	0.145	3.68	1.58	2.35	4.29	108.97	165	50.3	4500	20.01	W,H,O,B
4	4 1/2	3.75	95.3	0.163	4.1	0.187	4.75	2.44	3.63	5.34	135.64	206	62.8	6600	29.36	B,O
4	4 1/2	3.91	99.3	0.170	4.3	0.189	4.80	2.64	3.93	5.38	136.65	215	65.5	7800	34.70	W,H
5	5 1/2	4.74	120.4	0.206	5.2	0.229	5.82	3.57	5.31	6.22	157.99	261	79.6	11600	51.60	W
6	6 5/8	5.50	139.7	0.239	6.1	0.274	6.96	5.05	7.52	7.44	188.98	303	92.3	14200	63.16	B,O
6	6 5/8	5.85	148.6	0.255	6.5	0.283	7.19	5.28	7.86	7.52	191.01	322	98.1	17300	76.95	W,H
8	8 5/8	7.50	190.5	0.327	8.3	0.363	9.22	8.60	12.80	9.67	245.62	413	125.9	27600	122.77	W,H,O,B

Series 1250 (8.6 MPa)⁽¹⁾ - ACT (All Sizes)		1250 psi @ 150°F (8.6 MPa @ 65.5°C), 1100 psi @ 200°F (7.6 MPa @ 93.3°C), 1005 psi @ 212°F (6.9 MPa @ 100°C)														
2	2 3/8	2.00	50.8	0.110	2.8	0.122	3.10	0.90	1.34	3.10	78.74	113	34.4	2600	11.57	W,H,O,B
2 1/2	2 7/8	2.43	61.7	0.134	3.4	0.149	3.78	1.27	1.89	3.63	92.20	137	41.8	3700	16.46	W,H
3	3 1/2	3.00	76.2	0.165	4.2	0.184	4.67	1.83	2.72	4.36	110.74	169	51.5	6200	27.57	W,H,O,B
4	4 1/2	3.75	95.3	0.207	5.3	0.236	5.99	2.98	4.43	5.46	138.68	212	64.6	8700	38.70	W,H,O,B
4	4 1/2	3.91	99.3	0.215	5.5	0.239	6.07	2.98	4.43	5.49	139.45	221	67.4	9900	44.04	W,H,O,B
5	5 1/2	4.74	120.4	0.261	6.6	0.290	7.37	4.67	6.95	6.39	162.31	268	81.7	14200	63.16	W
6	6 5/8	5.50	139.7	0.303	7.7	0.337	8.56	6.21	9.24	7.63	193.80	311	94.8	19500	86.74	W,H,O,B
8	8 5/8	7.50	190.5	0.413	10.5	0.459	11.66	11.08	16.49	10.05	255.27	424	129.2	35800	159.25	W,H,O,B

Series 1500 (10.3 MPa)⁽¹⁾ - ACT (All Sizes)		1500 psi @ 150°F (10.3 MPa @ 65.5°C), 1315 psi @ 200°F (9.0 MPa @ 93.3°C), 1260 psi @ 212°F (8.7 MPa @ 100°C)														
1 1/2	1.90	1.50	38.1	0.119	3.02	0.132	3.35	0.70	1.04	2.62	66.55	91	27.7	1700	7.56	H
2	2 3/8	2.00	50.8	0.134	3.40	0.149	3.78	1.07	1.59	3.16	80.26	116	35.4	3200	14.23	W,H,O,B
2 1/2	2 7/8	2.43	61.7	0.163	4.14	0.181	4.60	1.47	2.19	3.71	94.23	141	43.0	5100	22.69	W,H
3	3 1/2	3.00	76.2	0.201	5.11	0.223	5.66	2.33	3.47	4.47	113.54	174	53.0	7100	31.58	W,H,O,B
4	4 1/2	3.75	95.3	0.251	6.38	0.287	7.29	3.72	5.54	5.63	143.00	218	66.4	10900	48.49	B,O
4	4 1/2	3.91	99.3	0.262	6.65	0.291	7.39	3.65	5.43	5.66	143.76	226	68.9	12200	54.27	W,H,O,B
5	5 1/2	4.74	120.4	0.317	8.05	0.352	8.94	5.57	8.29	6.71	170.43	274	83.5	17000	75.62	W
6	6 5/8	5.50	139.7	0.368	9.35	0.409	10.39	7.21	10.73	7.85	199.39	318	96.9	24200	107.65	W,H,O,B

SIZE		NOMINAL PIPE DIMENSIONS										Minimum Bending Radius		Short Term Tensile Rating		*Mfg. Loc
Pipe	Thread	Inside Diameter		Min. Wall Thickness		Nom. Wall Thickness		Pipe Weight		Connection Diameter		Ft	(m)	Lbs	(kN)	
		In	(mm)	In	(mm)	In	(mm)	Lbs/ft	(kg/m)	In	(mm)					
Series 1750 (12.1 MPa)⁽¹⁾ - ACT (All Sizes) 1750 psi @ 150°F (12.1 MPa @ 65.5°C), 1535 psi @ 200°F (10.6 MPa @ 93.3°C), 1460 psi @ 212°F (10.1 MPa @ 100°C)																
2	2 3/8	2.00	50.8	0.158	4.01	0.176	4.47	1.26	1.88	3.22	81.75	122	37.2	3800	16.90	W,H,O,B
2 1/2	2 7/8	2.43	61.7	0.192	4.88	0.213	5.41	1.70	2.53	3.80	96.52	148	45.1	5800	25.80	W,H
3	3 1/2	3.00	76.2	0.237	6.02	0.264	6.71	2.62	3.90	4.59	116.59	182	55.5	8900	39.59	W,H,O,B
4	4 1/2	3.75	95.3	0.297	7.54	0.339	8.61	4.41	6.56	5.80	147.32	224	68.3	13200	58.72	W,H,O,B
4	4 1/2	3.91	99.3	0.309	7.85	0.344	8.74	4.39	6.53	5.94	150.88	228	69.5	14500	64.50	W,H,O,B
6	6 5/8	5.50	139.7	0.435	11.05	0.483	12.27	8.82	13.13	8.25	209.55	326	99.4	27600	122.77	W,H,O,B

Series 2000 (13.8 MPa)⁽¹⁾ - ACT (All Sizes) 2000 psi @ 150°F (13.8 MPa @ 65.5°C), 1750 psi @ 200°F (12.1 MPa @ 93.3°C), 1610 psi @ 212°F (11.1 MPa @ 100°C)																
1 1/2	1.90	1.50	38.1	0.137	3.5	0.153	3.89	0.84	1.3	2.72	69.09	91	27.7	2500	11.12	W,H
2	2 3/8	2.00	50.8	0.183	4.7	0.203	5.16	1.44	2.1	3.29	83.57	122	37.2	4400	19.57	W,H,O,B
2 1/2	2 7/8	2.43	61.7	0.222	5.6	0.247	6.27	2.15	3.2	3.97	100.84	148	45.1	6600	29.36	W,H
3	3 1/2	3.00	76.2	0.275	7.0	0.305	7.75	3.22	4.8	4.86	123.44	182	55.5	9900	44.04	W,H,O,B
4	4 1/2	3.75	95.3	0.343	8.7	0.382	9.70	4.69	7.0	5.98	151.89	228	69.5	15400	68.50	W,H,O,B

Series 2500 (17.2 MPa)⁽¹⁾ - ACT (All Sizes) 2500 psi @ 150°F (17.2 MPa @ 65.5°C), 2200 psi @ 200°F (15.1 MPa @ 93.3°C), 2010 psi @ 212°F (13.9 MPa @ 100°C)																
1 1/2	1.90	1.50	38.1	0.176	4.47	0.20	4.98	1.02	1.5	2.89	73.4	96	29.3	3200	15.57	W
2	2 3/8	1.88	47.7	0.221	5.61	0.25	6.35	1.68	2.5	3.44	87.3	120	36.6	4900	21.80	H
2	2 7/8	2.23	56.6	0.262	6.65	0.30	7.62	2.41	3.5	4.11	104.4	143	43.6	7200	32.03	H
3	3 1/2	2.72	69.0	0.320	8.13	0.37	9.40	3.53	5.2	4.95	125.7	147	53.0	10400	46.26	H

NOTE: Additional pressure classes are available on request.

⁽¹⁾**SERIES PRESSURE (API 15HR)** - Based on minimum wall thickness dimensions and API 15HR Edition 3, for a 20 year life expectancy.

Joining System Information (API 8rd Thread)

Joining System Pipe Size - Inches	1 1/2	2	2 1/2	3	4	5	6	8	8
Thread Size	1.90" EUE 10rd	2 3/8" EUE 8rd	2 7/8" EUE 8rd	3 1/2" EUE 8rd	4 1/2" EUE 8rd	5 1/2" OD 8rd	6 5/8" OD 8rd	8 5/8" OD 8rd	9 5/8" OD 8rd
• Pin Upset O.D.	In (mm)	2.15 (54.6)	2.60 (66.0)	3.10 (78.7)	3.75 (95.3)	4.75 (120.7)	5.55 (141.0)	6.65 (168.9)	8.65 (219.7)
• Thread Length	In (mm)	2.36 (59.9)	2.94 (74.7)	3.25 (82.6)	3.50 (88.9)	3.88 (98.6)	4.75 (120.7)	4.25 (108.0)	4.85 (123.2)
• Make Up Length Loss	In (mm)	2.06 (52.4)	2.56 (65.1)	2.86 (73.0)	3.13 (79.4)	3.50 (88.9)	4.38 (111.1)	3.88 (98.4)	4.50 (114.3)

API CONNECTIONS - All products are produced integral joint unless indicated (TC) Threaded and Coupled. All 1 1/2" EUE 10rd and 2 3/8" - 4 1/2" EUE 8rd API threads conform to API 5B Table 14, 14th Edition (L4 is minimum) and all 5 1/2" - 9 5/8" OD 8rd casing threads conform to API 5B Table 7, 14th Edition (L4 is minimum).

Manufacturing Location

W = Wichita

H = Harbin

O = Oman

B = Brazil

Pipe Capacity				
Size Pipe	Inside Diameter		Capacity	
	in	(mm)	Bbls/1,000 ft. (m ³ /km)	
1.90	1.50	(38.1)	2.20	(1.1)
2	1.88	(47.8)	3.40	(1.8)
2	2.00	(50.8)	3.90	(2.0)
2 ½	2.43	(61.7)	5.70	(3.0)
3	2.72	(69.1)	7.2	(3.8)
3	3.00	(76.2)	8.70	(4.5)
4	3.35	(85.1)	10.9	(5.7)
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)
8	7.98	(202.7)	61.80	(32.2)

95% Lower Confidence Limit (ASTM D2992B)				
Temperature		psi	MPa	
150°F	65.5°C	18,008	124.2	
200°F	93.3°F	15,815	109.0	
212°F	100°F	14,500	100.0	

National Oilwell Varco has produced this brochure for general information only, and it is not intended for design purposes. Although every effort has been made to maintain the accuracy and reliability of its contents, National Oilwell Varco in no way assumes responsibility for liability for any loss, damage or injury resulting from the use of information and data herein nor is any warranty expressed or implied. Always cross-reference the bulletin date with the most current version listed at the web site noted in this literature.



15HR-0004
15HR-0014
LICENSEE Q1 RATED



® The API QMS Registered mark is either a trademark or registered trademark of the American Petroleum Institute in the United States and/or other countries

North America
17115 San Pedro Ave. Suite 200
San Antonio, Texas 78232 USA
Phone: 210 477 7500

South America
Avenida Fernando Simoes
Recife, Brazil 51020-390
Phone: 55 31 3501 0023

Europe
P.O. Box 6, 4190 CA
Geldermalsen, The Netherlands
Phone: 31 345 587 587

Asia Pacific
No. 7A, Tuas Avenue 3
Jurong, Singapore 639407
Phone: 65 6861 6118

Middle East
P.O. Box 17324
Dubai, UAE
Phone: 971 4881 3566