

STAR™ Aromatic Amine Line Pipe

API 15HR Design - Product Data

Applications

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

Product Description

- **Sizes** - 1½ through 8 inches
- **Pressure** - Up to 2,500 psi (17.2 MPa)
- **Temperature** -
Aromatic = up to 212°F (100°C) Max.
- **Resin System** - Aromatic Amine Cured Epoxy
- **Reinforcement** - Premium Fiberglass
- **Joining Systems** - API 8rd Threaded
- **Joint Length** - 29.5-33 ft (9.0-10.1 m) nominal
- **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 (65.6°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

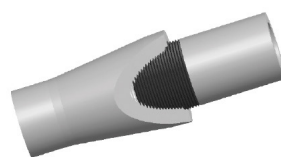
Benefits

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

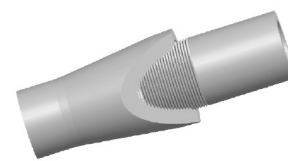
Joining System

- **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" EUE 10rd and 2 ¾" - 4 ½" EUE 8rd API threads conform to API 5B Table 14, 14 Edition (L4 is minimum) and all 5 ½" - 9 ⅝" OD 8rd casing threads conform to API 5B Table 7, 14 Edition (L4 is minimum).

View of Joint Illustrations



ACT



PGT

STAR Aromatic Amine Line Pipe (API Design- Product Data)

Series 500

500 psi (3.4 MPa) @150°F (65.6°C), 440 psi (3.0 MPa) @200°F (93.3°C); 400 psi (2.8 MPa) @212°F (100°C)

Pipe Size	Thread Size	Pipe Dimensions								Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
		Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight							
in	in	in	mm	in	mm	in	mm	lb/ft	kg/m	in	mm	ft	m	lb	kg
3	3 ½	3.00	76.2	3.15	80.0	0.06	1.5	0.88	1.3	4.11	104.4	158	48.2	2100	952
4	4 ½	3.91	99.3	4.10	104.1	0.08	2.0	1.43	2.1	5.15	130.8	206	62.8	3600	1632
6	6 ½	5.50	139.7	5.77	146.6	0.12	3.0	3.23	4.8	7.14	181.4	291	88.7	6800	3084
6	6 ½	5.85	148.6	6.13	155.7	0.12	3.0	2.98	4.4	7.13	181.1	308	93.9	8200	3719
8	8 ½	7.50	190.5	7.85	199.4	0.16	4.1	5.05	7.5	9.22	234.2	395	120.4	12100	5488

Series 750

750 psi (5.2 MPa) @ 150°F (65.5°C), 660 psi (4.5 MPa) @ 200°F (93.3°C), 600 psi (4.1 MPa) @ 212°F (100°C)

Pipe Size	Thread Size	Pipe Dimensions								Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
		Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight							
in	in	in	mm	in	mm	in	mm	lb/ft	kg/m	in	mm	ft	m	lb	kg
2 ½	2 7/8	2.38	60.5	2.54	64.5	0.08	2.0	0.85	1.3	3.50	88.9	129	39.4	2300	1043
2 ½	2 7/8	2.43	61.7	2.61	66.3	0.08	2.0	0.86	1.3	3.50	88.9	132	40.3	2300	1043
3	3 ½	3.00	76.2	3.21	81.5	0.10	2.5	1.43	2.1	4.24	107.7	164	50.0	3600	1632
4	4 ½	3.75	95.3	4.03	102.4	0.12	3.0	2.14	3.2	5.28	134.1	204	62.2	5400	2449
4	4 ½	3.91	99.3	4.19	106.4	0.13	3.3	1.97	2.9	5.25	133.4	211	64.4	5500	2494
5	5 ½	4.74	120.4	5.08	129.0	0.15	3.8	2.77	4.1	6.10	154.9	255	77.8	7700	3492
6	6 ½	5.50	139.7	5.91	150.1	0.18	4.6	4.14	6.2	7.27	184.7	297	90.6	10700	4853
6	6 ½	5.85	148.6	6.27	159.3	0.19	4.8	4.19	6.2	7.28	184.9	315	96.1	12300	5579
8	8 ½	7.50	190.5	8.03	204.0	0.24	6.1	7.01	10.4	9.42	239.3	405	123.5	19200	8708

Series 1000

1000 psi (6.9 MPa) @ 150°F (65.5°C), 880 psi (6.1 MPa) @ 200°F (93.3°C), 805 psi (5.6 MPa) @ 212°F (100°C)

Pipe Size	Thread Size	Pipe Dimensions								Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
		Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight							
in	in	in	mm	in	mm	in	mm	lb/ft	kg/m	in	mm	ft	m	lb	kg
2	2 ¾	2.00	50.8	2.19	55.6	0.09	2.3	0.80	1.2	3.04	77.2	111	33.9	1900	861
2 ½	2 7/8	2.38	60.5	2.60	66.0	0.10	2.5	1.02	1.5	3.55	90.2	131	40.0	2800	1270
2 ½	2 7/8	2.43	61.7	2.67	67.8	0.11	2.8	1.03	1.5	3.55	90.2	134	40.9	2900	1315
3	3 ½	3.00	76.2	3.29	83.6	0.13	3.3	1.68	2.5	4.29	109.0	166	50.6	4300	1950
4	4 ½	3.75	95.3	4.12	104.6	0.16	4.1	2.62	3.9	5.37	136.4	208	63.4	6600	2993
4	4 ½	3.91	99.3	4.29	109.0	0.17	4.3	2.52	3.8	5.35	135.9	216	65.9	7400	3356
5	5 ½	4.74	120.4	5.20	132.1	0.20	5.1	3.75	5.6	6.24	158.5	262	79.9	11100	5034
6	6 ½	5.50	139.7	6.05	153.7	0.24	6.1	5.22	7.8	7.44	189.0	304	92.7	14200	6441
6	6 ½	5.85	148.6	6.41	162.8	0.25	6.4	5.46	8.1	7.48	190.0	323	98.5	16600	7529
8	8 ½	7.50	190.5	8.22	208.8	0.32	8.1	8.99	13.4	9.67	245.6	414	126.2	26400	11974

STAR Aromatic Amine Line Pipe (API Design- Product Data)

Series 1250

1250 psi (8.6 MPa) @ 150°F (65.5°C), 1100 psi (7.6 MPa) @ 200°F (93.3°C), 1005 psi (6.9 MPa) @ 212°F (100°C)

Pipe Size	Thread Size	Pipe Dimensions								Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
		Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight							
in	in	in	mm	in	mm	in	mm	lb/ft	kg/m	in	mm	ft	m	lb	kg
2	2 3/8	2.00	50.8	2.24	56.9	0.11	2.8	0.97	1.4	3.10	78.7	114	34.8	2400	1088
2 1/2	2 7/8	2.38	60.5	2.66	67.6	0.13	3.3	1.20	1.8	3.60	91.4	134	40.9	3400	1542
2 1/2	2 7/8	2.43	61.7	2.74	69.6	0.13	3.3	1.24	1.8	3.61	91.7	137	41.8	3600	1632
3	3 1/2	3.00	76.2	3.36	85.3	0.16	4.1	2.06	3.1	4.37	111.0	171	52.2	5500	2494
4	4 1/2	3.75	95.3	4.22	107.2	0.21	5.3	3.17	4.7	5.47	138.9	213	65.0	8700	3946
4	4 1/2	3.91	99.3	4.38	111.3	0.21	5.3	3.10	4.6	5.50	139.7	221	67.4	9300	4218
5	5 1/2	4.74	120.4	5.32	135.1	0.26	6.6	4.44	6.6	6.39	162.3	267	81.4	13400	6078
6	6 5/8	5.50	139.7	6.17	156.7	0.30	7.6	6.47	9.6	7.62	193.5	312	95.1	17400	7892
8	8 5/8	7.50	190.5	8.41	213.6	0.41	10.4	11.41	17.0	10.07	255.8	424	129.3	33700	15286

Series 1500

1500 psi (10.3 MPa) @ 150°F (65.5°C), 1315 psi (9.0 MPa) @ 200°F (93.3°C), 1260 psi (8.7 MPa) @ 212°F (100°C)

Pipe Size	Thread Size	Pipe Dimensions								Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
		Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight							
in	in	in	mm	in	mm	in	mm	lb/ft	kg/m	in	mm	ft	m	lb	kg
1 1/2	1.90	1.50	38.1	1.73	43.9	0.10	2.5	0.65	1.0	2.56	65.0	88	26.9	1800	816
2	2 3/8	2.00	50.8	2.29	58.2	0.13	3.3	1.16	1.7	3.16	80.3	118	36.0	2900	1315
2 1/2	2 7/8	2.38	60.5	2.72	69.1	0.16	4.1	1.37	2.0	3.65	92.7	136	41.5	4000	1814
2 1/2	2 7/8	2.43	61.7	2.80	71.1	0.16	4.1	1.57	2.3	3.70	94.0	142	43.3	4700	2131
3	3 1/2	3.00	76.2	3.44	87.4	0.20	5.1	2.45	3.6	4.47	113.5	175	53.4	6500	2948
4	4 1/2	3.75	95.3	4.32	109.7	0.25	6.4	3.76	5.6	5.63	143.0	218	66.5	10900	4944
4	4 1/2	3.91	99.3	4.49	114.0	0.26	6.6	3.69	5.5	5.65	143.5	226	68.9	11200	5080
5	5 1/2	4.74	120.4	5.44	138.2	0.31	7.9	5.54	8.2	6.68	169.7	274	83.6	16900	7665
6	6 5/8	5.50	139.7	6.31	160.3	0.36	9.1	7.86	11.7	7.85	199.4	320	97.6	21700	9842

Series 1750

1750 psi (12.1 MPa) @ 150°F (65.5°C), 1535 psi (10.6 MPa) @ 200°F (93.3°C), 1460 psi (10.1 MPa) @ 212°F (100°C)

Pipe Size	Thread Size	Pipe Dimensions								Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
		Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight							
in	in	in	mm	in	mm	in	mm	lb/ft	kg/m	in	mm	ft	m	lb	kg
1 1/2	1.90	1.50	38.1	1.76	44.7	0.12	3.0	0.77	1.1	2.61	66.3	90	27.5	2200	997
2	2 3/8	2.00	50.8	2.35	59.7	0.16	4.1	1.34	2.0	3.22	81.8	120	36.6	3400	1542
2 1/2	2 7/8	2.38	60.5	2.79	70.9	0.19	4.8	1.74	2.6	3.80	96.5	141	43.0	5200	2358
2 1/2	2 7/8	2.43	61.7	2.87	72.9	0.19	4.8	1.76	2.6	3.79	96.3	144	43.9	5300	2404
3	3 1/2	3.00	76.2	3.52	89.4	0.23	5.8	2.76	4.1	4.59	116.6	178	54.3	8100	3674
4	4 1/2	3.75	95.3	4.43	112.5	0.30	7.6	4.41	6.6	5.82	147.8	224	68.3	13000	5896
4	4 1/2	3.91	99.3	4.59	116.6	0.31	7.9	4.61	6.9	5.89	149.6	233	71.1	13200	5987
6	6 5/8	5.50	139.7	6.46	164.1	0.43	10.9	9.19	13.7	8.25	209.6	327	99.7	25900	11748

STAR Aromatic Amine Line Pipe (API Design- Product Data)

Series 2000

2000 psi (13.8 MPa) @ 150°F (65.5°C), 1750 psi (12.1 MPa) @ 200°F (93.3°C), 1610 psi (11.1 MPa) @ 212°F (100°C)

Pipe Size	Thread Size	Pipe Dimensions								Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
		Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight							
in	in	in	mm	in	mm	in	mm	lb/ft	kg/m	in	mm	ft	m	lb	kg
1 ½	1.90	1.50	38.1	1.80	45.7	0.14	3.6	0.88	1.3	2.65	67.3	93	28.4	2200	997
2	2 ¾	2.00	50.8	2.40	61.0	0.18	4.6	1.54	2.3	3.29	83.6	123	37.5	4000	1814
2 ½	2 ¾	2.38	60.5	2.85	72.4	0.21	5.3	1.96	2.9	3.99	101.3	144	43.9	5900	2676
2 ½	2 ¾	2.43	61.7	2.94	74.7	0.22	5.6	2.16	3.2	3.99	101.3	149	45.5	6600	2993
3	3 ½	3.00	76.2	3.60	91.4	0.27	6.9	3.34	5.0	4.82	122.4	184	56.1	8800	3991
4	4 ½	3.75	95.3	4.50	114.3	0.34	8.6	5.13	7.6	5.98	151.9	230	70.1	13800	6259

Series 2250

2250 psi (15.5 MPa) @ 150°F (65.5°C), 1970 psi (13.5 MPa) @ 200°F (93.3°C), 1800 psi (12.4 MPa) @ 212°F (100°C)

Pipe Size	Thread Size	Pipe Dimensions								Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
		Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight							
in	in	in	mm	in	mm	in	mm	lb/ft	kg/m	in	mm	ft	m	lb	kg
1 ½	1.90	1.50	38.1	1.84	46.7	0.15	3.8	1.01	1.5	2.75	69.9	95	29.0	2600	1179
2	2 ¾	2.00	50.8	2.46	62.5	0.21	5.3	1.77	2.6	3.48	88.4	126	38.5	5000	2267
2 ½	2 ¾	2.23	56.6	2.76	70.1	0.23	5.8	2.13	3.2	4.12	104.6	140	42.7	6300	2857
3	3 ½	2.72	69.1	3.37	85.6	0.28	7.1	3.11	4.6	4.99	126.7	170	51.9	9100	4127
4	4 ½	3.35	85.1	4.15	105.4	0.35	8.9	4.91	7.3	6.29	159.8	210	64.1	14300	6486
4	4 ½	3.75	95.3	4.61	117.1	0.39	9.9	5.67	8.4	6.33	160.8	233	71.1	16800	7620

Series 2500

2500 psi (17.2 MPa) @ 150°F (65.5°C), 2200 psi (15.1 MPa) @ 200°F (93.3°C), 2010 psi (13.9 MPa) @ 212°F (100°C)

Pipe Size	Thread Size	Pipe Dimensions								Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
		Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight							
in	in	in	mm	in	mm	in	mm	lb/ft	kg/m	in	mm	ft	m	lb	kg
1 ½	1.90	1.50	38.1	1.89	48.0	0.17	4.3	1.08	1.6	2.89	73.4	96	29.3	3000	1360
2	2 ¾	1.88	47.8	2.39	60.7	0.22	5.6	1.65	2.5	3.56	90.4	119	36.3	4800	2177
2 ½	2 ¾	2.23	56.6	2.83	71.9	0.26	6.6	2.34	3.5	4.26	108.2	142	43.3	6900	3129
3	3 ½	2.72	69.1	3.45	87.6	0.32	8.1	3.58	5.3	5.13	130.3	174	53.1	10600	4808

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.

ACT – Advanced Composite Thread; **P GT** – 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.

STAR Aromatic Amine Line Pipe (API Design- Product Data)

Typical SLT* Properties

Axial Modulus	psi	1.87 x 10 ⁶
	GPa	12.9
Hoop Modulus	psi	3.58 x 10 ⁶
	GPa	24.7
Shear Modulus	psi	1.6 x 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 x 10 ⁻⁶
	mm/mm/°C	19.8 x 10 ⁻⁶
Hoop	in/in/°F	6.2 x 10 ⁻⁶
	mm/mm/°C	11.2 x 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

Temperature		psi	MPa
150°F	65.5°C	18,008	124.2
200°F	93.3°C	15,815	109.0
212°F	100°C	14,500	100.0

Joining System Information

Pipe Size	Thread Type	Pin Upset O.D.		Thread Length		Make Up Length Loss	
		in	mm	in	mm	in	mm
1 ½	1.90" EUE 10rd	2.15	54.6	2.36	59.9	2.06	52.4
2	2 ¾" EUE 8rd	2.60	66.0	2.94	74.7	2.56	65.1
2 ½	2 7/8" EUE 8rd	3.10	78.7	3.25	82.6	2.86	73.0
3	3 ½" EUE 8rd	3.75	95.3	3.50	88.9	3.13	79.4
4	4 ½" EUE 8rd	4.75	120.7	3.88	98.6	3.50	88.9
5	5 ½" OD 8rd	5.55	141.0	4.75	120.7	4.38	111.1
6	6 ¾" OD 8rd	6.65	168.9	4.25	108.0	3.88	98.4
8	8 ¾" 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 1 ½" EUE 10rd and 2 ¾" - 4 ½" EUE 8rd API threads conform to API 5B Table 14, 14 Edition (L4 is minimum) and all 5 ½" - 9 ¾" OD 8rd casing threads conform to API 5B Table 7, 14 Edition (L4 is minimum).

Pipe Capacity

Pipe Size	Inside Diameter		Capacity	
	in	mm	bbbls/1,000 ft	(m3/km)
1 ½	1.50	38.1	2.20	1.1
2	2.00	50.8	3.90	2.0
2 ½	2.23	56.6	4.8	2.5
2 ½	2.38	60.5	5.50	2.9
2 ½	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

STAR Aromatic Line Pipe (API Design- Product Data)

Fiber Glass Systems

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