STAR™ Aliphatic Amine Line Pipe

API 15HR Design - Product Data

Applications

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

Product Description

- **Sizes** - 1½ through 8 inches
- **Pressure** - Up to 3,000 psi (20.7 MPa)
- **Temperature** - up to 200°F (93.3°C) Max.
- **Resin System** - Aliphatic Amine Cured Epoxy
- **Reinforcement** - Premium Fiberglass
- **Joining Systems** - API 8rd Threaded
- **Joint Length** - 30 Feet (9.1 mts) Nominal Random Lengths of 20 to 32 Feet (6.1 to 9.8 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

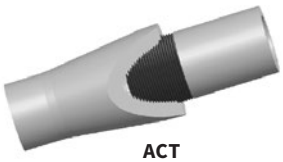
Benefits

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

Joining System

- **ACT** - Molded threads using a graphite, ceramic and epoxy composite for high performance applications.
- 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

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		**73.4°F (23°C)**	**150°F (65.6°C)**	**180°F (82.2°C)**	**200°F (93.3°C)**
11.4 Year Life, LTHS	**psi**	26,353	22,203	20,578	19,494
	MPa	181.7	153.1	141.9	134.4
20 Year Life, LTHS (Long Term Hydrostatic Stress)	**psi**	26,004	21,404	19,602	18,401
	MPa	179.3	147.6	135.2	126.9
20 Year Life, LCL (Lower Confidence Limit)	**psi**	24,596	20,335	18,666	17,554
	MPa	169.6	140.2	128.7	121.0

150°F and 180°F data are interpolated

Joining System Information

Pipe Size	**Thread Type**	**Pin Upset O.D.**		**Thread Length**		**Make Up Length Loss**	
		in	**mm**	**in**	**mm**	**in**	**mm**
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
8	9⅝ in. OD 8rd	9.65	245.1	5.13	130.3	4.75	120.7

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)**
2	1.94	49.3	3.70	1.9
2½	2.37	60.2	5.40	2.8
3	2.94	74.7	8.40	4.4
3½	3.33	84.6	10.77	5.6
4	3.85	97.8	14.40	7.5
5	4.74	120.4	21.80	11.4
6	5.50	139.7	29.40	15.3
6	5.93	150.6	34.20	17.8
8	7.74	196.6	58.10	30.3

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

Series 500

500 psi (3.4 MPa) @150°F (65.6°C), 450 psi (3.1 MPa) @180°F (82.2°C); 400 psi (2.8 MPa) @200°F (93.3°C)

		Pipe Dimensions													
Pipe Size	Thread Size	Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight		Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
in.	in.	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	in.	mm	ft	m	lb	kg
3	3½	2.94	74.7	3.06	77.7	0.06	1.5	0.83	1.2	4.20	106.7	155	47.3	2,200	997
4	4½	3.85	97.8	4.01	101.9	0.07	1.8	1.16	1.7	5.45	138.4	201	61.3	2,900	1315
5	5½TC	4.74	120.4	4.93	125.2	0.09	2.3	1.76	2.6	6.25	158.8	248	75.6	4,700	2131
6	6⅝	5.94	150.9	6.18	157.0	0.11	2.8	2.46	3.7	7.15	181.6	310	94.5	6,900	3129
8	8⅝	7.74	196.6	8.06	204.7	0.15	3.8	4.08	6.1	9.22	234.2	403	122.9	11,700	5307

Series 750

750 psi (5.2 MPa) @150°F (65.6°C); 650 psi (4.5 MPa) @180°F (82.2°C); 600 psi (4.1 MPa) @200°F (93.3°C)

		Pipe Dimensions													
Pipe Size	Thread Size	Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight		Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
in.	in.	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	in.	mm	ft	m	lb	kg
2	2⅜	1.94	49.3	2.06	52.3	0.06	1.5	0.55	0.8	3.05	77.5	106	32.4	1,600	725
2½	2⅞	2.37	60.2	2.52	64.0	0.07	1.8	0.67	1.0	3.57	90.7	126	38.5	1,700	771
3	3½	2.94	74.7	3.13	79.5	0.08	2.0	0.99	1.5	4.24	107.7	157	47.9	2,800	1270
4	4½	3.85	97.8	4.09	103.9	0.11	2.8	1.61	2.4	5.58	141.7	204	62.2	4,300	1950
5	5½TC	4.74	120.4	5.04	128.0	0.14	3.6	2.23	3.3	6.25	158.8	252	76.9	6,500	2948
6	6⅝	5.50	139.7	5.85	148.6	0.16	4.1	3.40	5.1	7.33	186.2	293	89.4	9,300	4218
6	6⅝	5.94	150.9	6.31	160.3	0.17	4.3	3.46	5.1	7.31	185.7	316	96.4	10,300	4672
8	8⅝	7.74	196.6	8.23	209.0	0.22	5.6	6.00	8.9	9.55	242.6	412	125.6	17,800	8073

Series 1000

1000 psi (6.9 MPa) @150°F (65.6°C); 900 psi (6.2 MPa) @180°F (82.2°C); 850 psi (5.9 MPa) @200°F (93.3°C)

		Pipe Dimensions													
Pipe Size	Thread Size	Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight		Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
in.	in.	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	in.	mm	ft	m	lb	kg
2	2⅜	1.94	49.3	2.11	53.6	0.07	1.8	0.57	0.8	3.09	78.5	106	32.4	1,600	725
2½	2⅞	2.37	60.2	2.57	65.3	0.09	2.3	0.81	1.2	3.56	90.4	129	39.4	2,300	1043
3	3½	2.94	74.7	3.19	81.0	0.11	2.8	1.22	1.8	4.40	111.8	160	48.8	3,400	1542
4	4½	3.85	97.8	4.17	105.9	0.15	3.8	2.08	3.1	5.65	143.5	209	63.8	6,000	2721
5	5½TC	4.74	120.4	5.14	130.6	0.18	4.6	2.86	4.3	6.45	163.8	257	78.4	9,100	4127
6	6⅝	5.50	139.7	5.97	151.6	0.21	5.3	4.19	6.2	7.41	188.2	299	91.2	12,100	5488
6	6⅝	5.94	150.9	6.44	163.6	0.23	5.8	4.78	7.1	7.60	193.0	323	98.5	14,300	6486
8	8⅝	7.74	196.6	8.40	213.4	0.30	7.6	7.81	11.6	9.73	247.1	420	128.1	23,800	10795

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

Series 1250

1250 psi (8.6 MPa) @ 150°F (65.6°C); 1100 psi (7.6 MPa) @180°F (82.2°C); 1050 psi (7.2 MPa) @200°F (93.3°C)

		Pipe Dimensions													
Pipe Size	Thread Size	Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight		Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
in.	in.	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	in.	mm	ft	m	lb	kg
2	2⅜	1.94	49.3	2.15	54.6	0.09	2.3	0.69	1.0	3.13	79.5	108	33.0	2,000	907
2½	2⅞	2.37	60.2	2.62	66.5	0.12	3.0	0.99	1.5	3.67	93.2	131	40.0	2,800	1270
3	3½	2.94	74.7	3.26	82.8	0.14	3.6	1.51	2.2	4.37	111.0	163	49.7	4,400	1995
4	4½	3.85	97.8	4.26	108.2	0.19	4.8	2.60	3.9	5.76	146.3	213	65.0	7,600	3447
6	6⅝	5.50	139.7	6.09	154.7	0.27	6.9	5.29	7.9	7.59	192.8	305	93.0	15,300	6939
6	7	5.94	150.9	6.58	167.1	0.29	7.4	6.21	9.2	8.08	205.2	330	100.6	18,300	8300
8	9⅝	7.74	196.6	8.57	217.7	0.38	9.7	10.81	16.1	11.12	282.4	429	130.8	30,400	13789

Series 1500

1500 psi (10.3 MPa) @150°F (65.6°C); 1350 psi (9.3 MPa) @180°F (82.2°C); 1250 psi (8.6 MPa) @200°F (93.3°C)

		Pipe Dimensions													
Pipe Size	Thread Size	Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight		Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
in.	in.	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	in.	mm	ft	m	lb	kg
2	2⅜	1.94	49.3	2.19	55.6	0.11	2.8	0.87	1.3	3.27	83.1	111	33.9	2,500	1133
2½	2⅞	2.37	60.2	2.68	68.1	0.14	3.6	1.21	1.8	3.74	95.0	134	40.9	3,500	1587
3	3½	2.94	74.7	3.33	84.6	0.17	4.3	1.80	2.7	4.46	113.3	166	50.6	5,400	2449
4	4½	3.85	97.8	4.35	110.5	0.23	5.8	3.11	4.6	5.78	146.8	218	66.5	9,200	4173
6	6⅝	5.50	139.7	6.22	158.0	0.32	8.1	6.43	9.6	7.76	197.1	312	95.1	19,200	8708
6	7	5.94	150.9	6.71	170.4	0.35	8.9	7.27	10.8	8.17	207.5	336	102.5	22,000	9979
8	9⅝	7.74	196.6	8.75	222.3	0.46	11.7	13.19	19.6	11.74	298.2	438	133.6	37,200	16873

Series 1750

1750 psi (12.1 MPa)@150°F (65.6°C); 1550 psi (10.7 MPa) @180°F (82.2°C); 1450 psi (10.0 MPa) @200°F (93.3°C)

		Pipe Dimensions													
Pipe Size	Thread Size	Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight		Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
in.	in.	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	in.	mm	ft	m	lb	kg
2	2⅜	1.94	49.3	2.24	56.9	0.14	3.6	0.98	1.5	3.36	85.3	112	34.2	2,800	1270
2½	2⅞	2.37	60.2	2.73	69.3	0.16	4.1	1.46	2.2	3.76	95.5	137	41.8	4,300	1950
3	3½	2.94	74.7	3.39	86.1	0.20	5.1	2.17	3.2	4.50	114.3	170	51.9	6,500	2948
4	4½	3.85	97.8	4.44	112.8	0.27	6.9	3.70	5.5	5.94	150.9	222	67.7	11,100	5034
6	6⅝	5.50	139.7	6.35	161.3	0.38	9.7	7.59	11.3	8.18	207.8	318	97.0	22,500	10205
6	7	5.94	150.9	6.85	174.0	0.41	10.4	8.55	12.7	8.38	212.9	343	104.6	26,200	11884

Series 2000

2000 psi (13.8 MPa) @150°F (65.6°C); 1800 psi (12.4 MPa) @180°F (82.2°C); 1700 psi (11.7 MPa) @200°F (93.3°C)

Pipe Size	Thread Size	Pipe Dimensions: Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight		Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
in.	in.	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	in.	mm	ft	m	lb	kg
2	2⅜	1.94	49.3	2.29	58.2	0.16	4.1	1.11	1.7	3.38	85.9	114	34.8	3,300	1496
2½	2⅞	2.37	60.2	2.79	70.9	0.19	4.8	1.67	2.5	3.87	98.3	140	42.7	5,000	2267
3	3½	2.94	74.7	3.47	88.1	0.24	6.1	2.47	3.7	4.63	117.6	173	52.8	7,500	3401
4	4½	3.85	97.8	4.53	115.1	0.31	7.9	4.27	6.4	6.08	154.4	227	69.2	13,000	5896
6	7	5.50	139.7	6.48	164.6	0.44	11.2	8.99	13.4	8.79	223.3	324	98.8	26,300	11929

Series 2500

2500 psi (17.2 MPa) @150°F (65.6°C); 2250 psi (15.5 MPa) @180°F (82.2°C); 2100 psi (14.5 MPa); @200°F (93.3°C)

Pipe Size	Thread Size	Pipe Dimensions: Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight		Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
in.	in.	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	in.	mm	ft	m	lb	kg
2	2⅜	1.94	49.3	2.38	60.5	0.20	5.1	1.47	2.2	3.60	91.4	120	36.6	4,400	1995
2½	2⅞	2.37	60.2	2.91	73.9	0.24	6.1	2.12	3.2	4.02	102.1	146	44.6	6,500	2948
3	3½	2.94	74.7	3.61	91.7	0.30	7.6	3.18	4.7	4.85	123.2	181	55.2	9,800	4445
4	4½	3.33	84.6	4.09	103.9	0.34	8.6	4.44	6.6	6.48	164.6	206	62.8	13,000	5896
4	5½	3.85	97.8	4.73	120.1	0.40	10.2	5.96	8.9	7.13	181.1	237	72.3	17,100	7756

Series 3000

3000 psi (20.7 MPa) @150°F (65.6°C); 2700 psi (18.6 MPa) @180°F (82.2°C); 2550 psi (17.6 MPa); @200°F (93.3°C)

Pipe Size	Thread Size	Pipe Dimensions: Inside Diameter		Outside Diameter		Minimum Wall Thickness		Pipe Weight		Connection Diameter		Minimum Bending Radius		Short-Term Tensile Rating	
in.	in.	in.	mm	in.	mm	in.	mm	lb/ft	kg/m	in.	mm	ft	m	lb	kgs
2	2⅜	1.94	49.3	2.49	63.2	0.25	6.4	1.77	2.6	3.64	92.5	125	38.1	5,500	2494
3	4½[TC]	2.94	74.7	3.77	95.8	0.37	9.4	4.16	6.2	7.00	177.8	189	57.7	12,500	5669
4	4½	3.33	84.6	4.27	108.5	0.42	10.7	5.39	8.0	6.77	172.0	214	65.3	16,000	7257
4	5½	3.85	97.8	4.93	125.2	0.49	12.4	7.39	11.0	7.67	194.8	247	75.3	21,400	9706

Addition Pressure Classes are available on request.All products are produced Integral Joint unless indicated (TC) Threaded and Coupled.

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.

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.

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