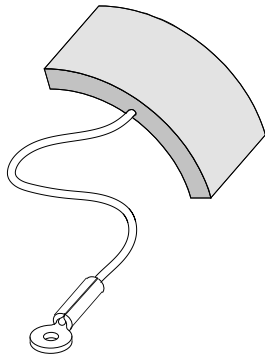




AMERON
INTERNATIONAL

FIBERGLASS - COMPOSITE PIPE GROUP

Bondstrand® Product Data



Bondstrand Series 7000 Antistatic Fiberglass Pipe and Fittings

for industrial service

Uses and Applications

Above ground jet fuel lines

Double-contained jet fuel lines

General industrial service where static electrical charge build-up is possible or through hazardous areas (Class 1, Div. 1 and 2)

Listings and Approvals

MIL-P-29206A for jet fuels and petroleum liquids

Performance

Bondstrand Series 7000 fiberglass pipe, fittings and flanges incorporate high-strength conductive filaments to prevent accumulation and discharge of potentially dangerous levels of static electrical charges. Series 7000 piping systems are made electrically continuous by using a conductive adhesive in the adhesive-bonded joint and for mounting flanges. Accumulated charges are dissipated from the fiberglass pipe system by stainless steel cables embedded in fiberglass grounding saddles. The grounding saddles are adhesive bonded to the pipe at appropriate locations to assure resistance to ground is less than one MEG OHM.

System rating of 150 psig at 210°F (10 bar at 99°C).

Individual system components may not have the same ratings as the pipe. Refer to the detailed product information for the specific components to determine the pressure rating for the system as a whole.

Composition

Pipe: Filament-wound fiberglass reinforced epoxy resin pipe with conductive filaments in the pipe wall.

Fittings: Wide range of filament-wound epoxy resin fittings reinforced with fiberglass strands and conductive veils employing Quick-Lock® adhesive joint or flanged ends.

Flanges: Filament-wound epoxy reinforced with fiberglass strands and conductive filaments.

Blind flanges: Injection molded nonconductive epoxy in 2 through 12-inch (50 to 300 mm) sizes.

Grounding saddles: Filament-wound fiberglass with stainless steel grounding cable.

Adhesive: RP60B two-part thermosetting electrically conductive epoxy.

Joining Systems

Quick-Lock straight/taper adhesive-bonded joint featuring integral pipe stop in bell for precise laying lengths.

One-piece flanges in hubbed (standard) and hubless (heavy duty) configuration.

All pipe is shipped ready for assembly with Quick-Lock bell x shaved spigot.

ISO-9001



DNV

CERTIFICATED FIRM

Static Electricity Generation and Accumulation

Static electricity accumulation is most likely to be a problem in pipes conveying non-conducting fluids at high velocities (less than 1000 pico-Siemens per meter). Measurable amounts of electricity can be generated in the fluid when the flow velocity exceeds 9 ft/sec in fiberglass pipe and 20 ft/sec in metallic systems. Filtration units and valves typically experience the highest rate of static electricity accumulation when high flow rates occur. Charge densities are affected by the conductivity of the fluid, the pipe and the filter media. Depending on the media, flow through filters generally tends to give rise to charge densities 5 to 1000 times greater than flow through unrestricted pipes.

Pipe Lengths

Bondstrand pipe is produced in different lengths depending on pipe size and location of manufacture. Pipe can be cut to specified lengths at the factory. Consult your Ameron representative.

Nominal Pipe Size		Length	
(in)	(mm)	(ft)	(m)
2-6	50-150	20, 30*	6.1, 9.1*
8	200	20, 30*	6.1, 9.1*
10-16	250-400	20*	6.1*

* Standard lengths

Fittings and Flanges

90° and 45° elbows

45° Laterals

Tees and reducing tees

Crosses

Reducers

Nipples and couplings

Reducing saddles furnished with Quick-Lock spigot outlet
Flanged outlet
Metallic bushing outlet

Flanges are produced with ANSI B16.5 Cl. 150 drilling.

Other drillings, as well as undrilled flanges, are available.

Grounding saddles

Typical Pipe Dimensions and Weights

Nominal Pipe Size		Pipe Inside Diameter		Nominal Wall Thickness		Shipping Weight	
(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb/ft)	(kg/m)
2	50	2.09	53	.16	4.1	1.0	1.5
3	80	3.22	82	.16	4.1	1.5	2.3
4	100	4.14	105	.20	5.2	2.4	3.5
6	150	6.26	159	.20	5.2	3.5	5.2
8	200	8.22	209	.25	6.5	5.0	7.4
10	250	10.35	263	.32	8.1	6.2	9.3
12	300	12.35	314	.38	9.6	7.4	11.0
14	350	13.56	344	.41	10.5	8.7	14.7
16	400	15.50	394	.47	11.9	11.2	19.0

Typical Pipe Performance

Nominal Pipe Size		Internal Pressure Rating*		Ultimate Collapse Pressure**		Designation per ASTM D2996
(in)	(mm)	(psig)	(MPa)	(psig)	(MPa)	
2	50	450	3.10	500	3.45	RTRP-11FE-1112
3	80	425	2.93	400	2.76	RTRP-11FE-1112
4	100	400	2.76	400	2.76	RTRP-11FE-1113
6	150	300	2.07	163	1.12	RTRP-11FE-1113
8	200	250	1.72	150	1.03	RTRP-11FE-1114
10	250	200	1.38	150	1.03	RTRP-11FE-1114
12	300	170	1.17	150	1.03	RTRP-11FE-1114
14	350	165	1.14	150	1.03	RTRP-11FE-1115
16	400	165	1.14	150	1.03	RTRP-11FE-1116

* At 210°F (99°C) using Bondstrand RP60B adhesive.

** At 70°F (21°C). Reduce linearly to 90% at 150°F (66°C) and 80% at 200°F (93°C).

Typical Pipe Performance

Nominal Pipe Size		Stiffness Factor*		Pipe Stiffness		Beam Moment of Inertia**	
(in)	(mm)	(lb·in)	(N·m)	(psi)	(MPa)	(in ⁴)	(10 ⁶ mm ⁴)
2	50	620	70	2900	20.0	0.59	0.25
3	80	620	70	860	5.93	1.99	0.83
4	100	1360	154	890	6.14	5.50	2.29
6	150	1360	154	270	1.86	18.10	7.53
8	200	1890	214	170	1.17	45.10	18.8
10	250	1890	214	86	0.59	88.60	36.9
12	300	1890	214	51	0.35	149	62.0
14	350	2230	252	46	0.32	208	86.6
16	400	3250	367	45	0.31	353	147

* Per ASTM D2412.

** Use these values to calculate permissible spans.

Typical Physical Properties

Pipe Property	Units	Value	Method
Thermal conductivity Pipe wall	Btu·in/(hr·ft ² ·°F)	2.3	Ameron
	W/m·°C	0.33	
Thermal expansion Linear	10 ⁻⁶ in/in/°F	10	Ameron
	10 ⁻⁶ mm/mm/°C	18	
Flow coefficient	Hazen-Williams	150	
Absolute roughness	10 ⁻⁶ ft	17.4	–
	10 ⁻⁶ m	5.3	–
Specific gravity	–	1.79	D792
Density	lb/in ³	0.07	
Grounding resistance @ 1500 volts	10 ⁶ ohms	1.0*	
Shielding capability	volts	100*	

* Maximum values when measured in accordance with Annexes 2 and 3 of proposed ASTM standard for marine antistatic pipe.

Typical Mechanical Properties

Pipe Property	Units	70°F (21°C)	200°F (93°C)	Method
Circumferential Tensile stress at weeping	10 ³ psi	24.0	18.5	ASTM D1599
	MPa	165	128	
Tensile modulus	10 ⁶ psi	3.65	3.20	Ameron
	GPa	25.2	22.1	
Poisson's ratio		0.56	0.70	Ameron
Longitudinal Tensile strength	10 ³ psi	8.50	6.90	ASTM D2105
	MPa	59.0	44.6	
Tensile modulus	10 ⁶ psi	1.60	1.24	ASTM D2105
	GPa	11.1	8.50	
Beam apparent elastic modulus	10 ⁶ psi	1.70	1.00	ASTM D2925
	GPa	11.7	6.90	
Hydrostatic design basis (cyclic)*	10 ³ psi	6.0	—	ASTM D2992A
	MPa	41.4	—	

* At 150°F (66°C).

Support Spacing

Recommended maximum support spacing for Bondstrand Series 7000 pipe at various operating temperatures. Values based on 0.5-inch (12 mm) deflection at midspan for fluid specific gravity = 1.0.

Nominal Pipe Size		Span in Feet (m)* Temperature in °F (°C)					
(in)	(mm)	100	(38)	150	(66)	200	(93)
2	50	11.8	3.6	11.2	3.4	10.4	3.2
3	80	13.6	4.1	12.8	3.9	11.9	3.6
4	100	15.4	4.7	14.6	4.5	13.6	4.1
6	150	17.2	5.2	16.4	5.0	15.1	4.6
8	200	19.2	5.9	18.1	5.5	16.9	5.2
10	250	20.3	6.2	19.2	5.9	17.9	5.5
12	300	21.3	6.5	20.1	6.1	18.7	5.7
14	350	22.3	6.8	21.2	6.5	19.6	6.0
16	400	23.3	7.1	22.3	6.8	20.5	6.2

* Span recommendations are intended for normal horizontal piping support arrangements, a compromise between continuous spans and simple spans, but include no provision for weight such as fittings, valves, flanges, etc. or thrust from branches and turns. Fully continuous spans may be installed with support spacing up to 20% greater than values shown for this deflection; for simple spans the support spacing should be reduced by 20% from tabulated values.

Technical Support

Consult Ameron for further recommendations concerning the use of Bondstrand pipe systems. For more information regarding static electricity in fuel pipelines, request Ameron Fiberglass Pipe Division publication EB-43.

Important Notice

This literature and the information and recommendations it contains are based on data reasonably believed to be reliable. However, such factors as variations in environment, application or installation, changes in operating procedures, or extrapolation of data may cause different results. Ameron makes no representation or warranty, express or implied, including warranties of merchantability or fitness for purpose, as to the accuracy, adequacy or completeness of the recommendations or information contained herein. Ameron assumes no liability whatsoever in connection with this literature or the information or recommendations it contains. Product specifications are subject to change.

Written comments regarding this document are invited. Please write Engineering Manager, Ameron Fiberglass Pipe Division.



FIBERGLASS - COMPOSITE PIPE GROUP - HEADQUARTERS

P.O. Box 801148 • Houston, TX 77280 • Tel: (713) 690-7777 • Fax: (713) 690-2842 • <http://www.ameron.com>

Asia
Ameron (Pte) Ltd.
No. 7A, Tuas Avenue 3
Singapore 639407
Tel: 65 861 6118
Fax: 65 862 1302/861 7834
info@ameron.com.sg

Europe
Ameron B.V.
J.F. Kennedylaan 7
4191 MZ Geldermalsen
The Netherlands
Tel: +31 345 587 587
Fax: +31 345 587 561
info@ameron-fpg.nl

Americas
P.O. Box 878
Burkburnett, TX 76354
Tel: (940) 569-1471
Fax: (940) 569-2764

Composites
P.O. Box 71370
11 McBride Street
Newnan, Georgia 30263
Tel: (770) 253-2000
Fax: (770) 253-9234

Centron International
P.O. Box 490
600 FM 1195 South
Mineral Wells, Texas 76068
Tel: (940) 325-1341
Fax: (940) 325-9681
<http://www.centrongre.com>