

Bradford™ High Purity BioPharm Fittings



90° Elbow
pg. 4



45° Elbow
pg. 4



Tee
pg. 4



Reducing Tee
pg. 4



Concentric Reducer
pg. 5



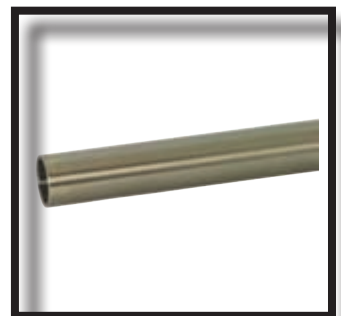
Eccentric Reducer
pg. 5



Auto Weld Ferrule
pg. 5



Cap
pg. 5



Tubing
pg. 6

Specifications.....pg. 10
Packaging.....pg. 11
Glossary of Terms.....pg. 12-14
Terms of Conditions.....pg. 15

Bradford™ High Purity BioPharm Fittings

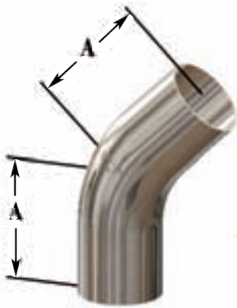
90° Elbows



BPE Table #DT-7

Size	A	PL Finish - SF1	List Price	PM Finish - SF4	List Price
1/2"	3.00	<i>T2S-050PL</i>		<i>T2S-050PM</i>	
3/4"	3.00	<i>T2S-075PL</i>		<i>T2S-075PM</i>	
1"	3.00	<i>T2S-100PL</i>		<i>T2S-100PM</i>	
1 1/2"	3.75	<i>T2S-150PL</i>		<i>T2S-150PM</i>	
2"	4.75	<i>T2S-200PL</i>		<i>T2S-200PM</i>	

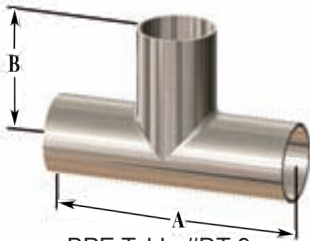
45° Elbows



BPE Table #DT-8

Size	A	PL Finish - SF1	List Price	PM Finish - SF4	List Price
1/2"	2.250	<i>T2KS-050PL</i>		<i>T2KS-050PM</i>	
3/4"	2.250	<i>T2KS-075PL</i>		<i>T2KS-075PM</i>	
1"	2.250	<i>T2KS-100PL</i>		<i>T2KS-100PM</i>	
1 1/2"	2.500	<i>T2KS-150PL</i>		<i>T2KS-150PM</i>	
2"	3.000	<i>T2KS-200PL</i>		<i>T2KS-200PM</i>	

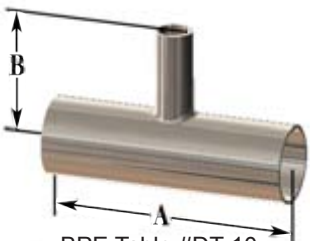
Tees



BPE Table #DT-9

Size	A	B	PL Finish - SF1	List Price	PM Finish - SF4	List Price
1/2"	3.750	1.875	<i>T7WWW-050PL</i>		<i>T7WWW-050PM</i>	
3/4"	4.000	2.000	<i>T7WWW-075PL</i>		<i>T7WWW-075PM</i>	
1"	4.250	2.125	<i>T7WWW-100PL</i>		<i>T7WWW-100PM</i>	
1 1/2"	4.750	2.375	<i>T7WWW-150PL</i>		<i>T7WWW-150PM</i>	
2"	5.750	2.875	<i>T7WWW-200PL</i>		<i>T7WWW-200PM</i>	

Reducing Tees



BPE Table #DT-10

Size	A	B	PL Finish - SF1	List Price	PM Finish - SF4	List Price
3/4" x 1/2"	4.000	2.000	<i>T7RWWW-075050PL</i>		<i>T7RWWW-075050PM</i>	
1" x 1/2"	4.250	2.125	<i>T7RWWW-100050PL</i>		<i>T7RWWW-100050PM</i>	
1" x 3/4"	4.250	2.125	<i>T7RWWW-100075PL</i>		<i>T7RWWW-100075PM</i>	
1 1/2" x 1/2"	4.750	2.375	<i>T7RWWW-150050PL</i>		<i>T7RWWW-150050PM</i>	
1 1/2" x 3/4"	4.750	2.375	<i>T7RWWW-150075PL</i>		<i>T7RWWW-150075PM</i>	
1 1/2" x 1"	4.750	2.375	<i>T7RWWW-150100PL</i>		<i>T7RWWW-150100PM</i>	
2" x 1/2"	5.750	2.625	<i>T7RWWW-200050PL</i>		<i>T7RWWW-200050PM</i>	
2" x 3/4"	5.750	2.625	<i>T7RWWW-200075PL</i>		<i>T7RWWW-200075PM</i>	
2" x 1"	5.750	2.625	<i>T7RWWW-200100PL</i>		<i>T7RWWW-200100PM</i>	
2" x 1 1/2"	5.750	2.625	<i>T7RWWW-200150PL</i>		<i>T7RWWW-200150PM</i>	

PL Finish – SF1
 OD = 32R_a Mechanically Polished
 ID = 20R_a Mechanically Polished

PM Finish – SF4
 OD = 32R_a Mechanically Polished
 ID = 15R_a Mechanically Polished and Electropolished

Bradford™ High Purity BioPharm Fittings

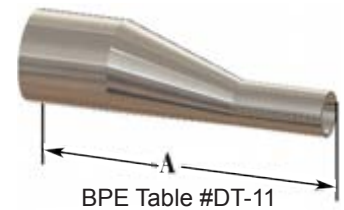
Concentric Reducers

Size	A	PL Finish - SF1	List Price	PM Finish - SF4	List Price
¾" x ½"	4.00	<i>T31W-075050PL</i>		<i>T31W-075050PM</i>	
1" x ½"	4.50	<i>T31W-100050PL</i>		<i>T31W-100050PM</i>	
1" x ¾"	4.00	<i>T31W-100075PL</i>		<i>T31W-100075PM</i>	
1½" x ½"	5.50	<i>T31W-150050PL</i>		<i>T31W-150050PM</i>	
1½" x ¾"	5.00	<i>T31W-150075PL</i>		<i>T31W-150075PM</i>	
1½" x 1"	5.00	<i>T31W-150100PL</i>		<i>T31W-150100PM</i>	
2" x ½"	7.75	<i>T31W-200050PL</i>		<i>T31W-200050PM</i>	
2" x ¾"	7.25	<i>T31W-200075PL</i>		<i>T31W-200075PM</i>	
2" x 1"	7.25	<i>T31W-200100PL</i>		<i>T31W-200100PM</i>	
2" x 1½"	5.25	<i>T31W-200150PL</i>		<i>T31W-200150PM</i>	



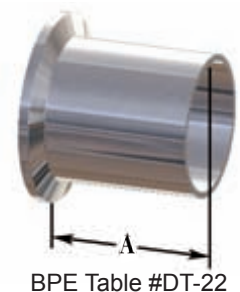
Eccentric Reducers

Size	A	PL Finish - SF1	List Price	PM Finish - SF4	List Price
¾" x ½"	4.00	<i>T32W-075050PL</i>		<i>T32W-075050PM</i>	
1" x ½"	4.50	<i>T32W-100050PL</i>		<i>T32W-100050PM</i>	
1" x ¾"	4.00	<i>T32W-100075PL</i>		<i>T32W-100075PM</i>	
1½" x ½"	5.50	<i>T32W-150050PL</i>		<i>T32W-150050PM</i>	
1½" x ¾"	5.00	<i>T32W-150075PL</i>		<i>T32W-150075PM</i>	
1½" x 1"	5.00	<i>T32W-150100PL</i>		<i>T32W-150100PM</i>	
2" x ½"	7.75	<i>T32W-200050PL</i>		<i>T32W-200050PM</i>	
2" x ¾"	7.25	<i>T32W-200075PL</i>		<i>T32W-200075PM</i>	
2" x 1"	7.25	<i>T32W-200100PL</i>		<i>T32W-200100PM</i>	
2" x 1½"	5.25	<i>T32W-200150PL</i>		<i>T32W-200150PM</i>	



Auto Weld Ferrules

Size	A	PL Finish - SF1	List Price	PM Finish - SF4	List Price
½"	1.75	<i>TL14AM7-050PL</i>		<i>TL14AM7-050PM</i>	
¾"	1.75	<i>TL14AM7-075PL</i>		<i>TL14AM7-075PM</i>	
1"	1.75	<i>TL14AM7-100PL</i>		<i>TL14AM7-100PM</i>	
1½"	1.75	<i>TL14AM7-150PL</i>		<i>TL14AM7-150PM</i>	
2"	2.25	<i>TL14AM7-200PL</i>		<i>TL14AM7-200PM</i>	
2½"	2.25	<i>TL14AM7-250PL</i>		<i>TL14AM7-250PM</i>	
3"	2.25	<i>TL14AM7-300PL</i>		<i>TL14AM7-300PM</i>	
4"	2.25	<i>TL14AM7-400PL</i>		<i>TL14AM7-400PM</i>	

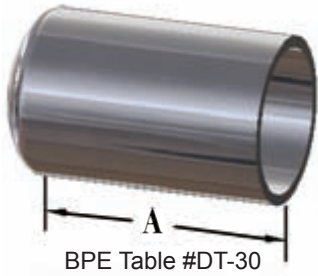


PL Finish – SF1
 OD = 32R_a Mechanically Polished
 ID = 20R_a Mechanically Polished

PM Finish – SF4
 OD = 32R_a Mechanically Polished
 ID = 15R_a Mechanically Polished and Electropolished

Bradford™ High Purity BioPharm Fittings

Weld Caps



Size	A	PL Finish - SF1	List Price	PM Finish - SF4	List Price
1/2"	1.50	<i>T16W-050PL</i>		<i>T16W-050PM</i>	
3/4"	1.50	<i>T16W-075PL</i>		<i>T16W-075PM</i>	
1"	1.50	<i>T16W-100PL</i>		<i>T16W-100PM</i>	
1 1/2"	1.50	<i>T16W-150PL</i>		<i>T16W-150PM</i>	
2"	1.50	<i>T16W-200PL</i>		<i>T16W-200PM</i>	

BPE - Pharmaceutical Grade Tubing

Size	Wall Thickness	Carton Qty	PL Finish - SF1 ¹	List Price*	PM Finish - SF4 ²	List Price*
1/2"	0.065	100'	<i>A270-050PL</i>		<i>A270-050PM</i>	
3/4"	0.065	100'	<i>A270-075PL</i>		<i>A270-075PM</i>	
1"	0.065	280'	<i>A270-100PL</i>		<i>A270-100PM</i>	
1 1/2"	0.065	340'	<i>A270-150PL</i>		<i>A270-150PM</i>	
2"	0.065	340'	<i>A270-200PL</i>		<i>A270-200PM</i>	
2 1/2"	0.065	220'	<i>A270-250PL</i>		<i>A270-250PM</i>	
3"	0.065	220'	<i>A270-300PL</i>		<i>A270-300PM</i>	
4"	0.083	100'	<i>A270-400PL</i>		<i>A270-400PM</i>	

* Tubing surcharges change monthly.

¹ SF1 - 316L ASTM A270-S2 ASME BPE Laserweld
ID = 20R_a mechanical polish OD = 32R_a mechanical polish

² SF4 - 316L ASTM A270-S2 ASME BPE Laserweld
ID = 15R_a electropolish OD = 32R_a mechanical polish



Operating Pressures

316L Stainless Steel Tube

Tube OD Size	Tube OD Size	Pressure (PSI)		
		working	yield	burst
1/2"	.065	3,250	6,500	19,500
3/4"	.065	2,167	4,330	13,000
1"	.065	2,280	3,300	9,100
1 1/2"	.065	1,520	2,200	6,100
2"	.065	1,140	1,600	4,600
2 1/2"	.065	910	1,300	3,600
3"	.065	760	1,100	3,000
4"	.083	730	1,000	2,900
6"	.109	635	900	2,540

The pressures shown in the table above are valid using Barlow's Formula and the following properties:

- material: 316 stainless steel
- yield strength (PSI): 25,000
- tensile strength (PSI): 70,000

Working Pressure = 1/4 of Burst Pressure, these valid from -20°F to 100°F.

All MTR's will be supplied by tubing manufacturer.

Accessories

Clamps

Service pressure ratings are based on the following parameters: matching elastomer gaskets and weld ferrules properly aligned and assembled with the clamps tightened to the required torques. Tests are done hydrostatically with no water hammer or shock loads. Please note the pressure ratings of the described unions are above the recommended pipe line operating pressures.



Single Pin Heavy Duty Clamps with Cross Hole Wing Nut - 13MHHM

Tube OD	Service Pressure Rating @ 70°F *	Service Pressure Rating @ 250°F *	A	Part Number	List Price
1/2" - 3/4"	1500	1200	1.062	13MHHM50-75	
1" - 1 1/2"	500	300	2.122	13MHHM100-150	
2"	450	250	2.654	13MHHM200	
2 1/2"	400	200	3.185	13MHHM250	
3"	350	175	3.717	13MHHM300	
4"	300	150	4.820	13MHHM400	

* wing nut tightened to 25 in. lb. of torque



PTFE (Teflon®) Gaskets

- color code: no dot
- meets 21CFR 177.1550
- passed U.S.P. Class VI Cytotoxicity testing
- not recommended for use with bolted clamps

Size	Part Number	List Price
1/2"	42MP-G50	
3/4"	42MP-G75	
1"	40MP-G100	
1 1/2"	40MP-G150	
2"	40MP-G200	
2 1/2"	40MP-G250	
3"	40MP-G300	
4"	40MP-G400	



CAUTION

PTFE (Teflon®) is a material subject to plastic flow. When cycled through heat and then cooled down in process lines, PTFE gaskets will not return to the original configuration and it will continue to compress as the cycling continues. This plastic flow will allow leakage if clamp torques are not maintained.

Hex Hanger with Nitrile Grommets - B24RG

- Nitrile grommets maximum temperature: **230°F**
- All hex hangers can be equipped with the following coupler options:
 - 3/8 NPT
 - all thread: 3/8-16 or 1/2-13

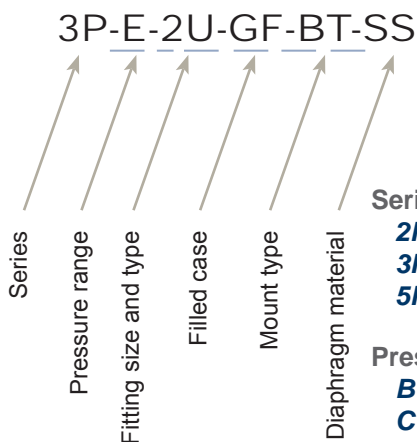
Tube OD	A	B	Part Number	List Price
1/2" - 3/4"	3.425	1.450	B24RG-G75	
1"	3.425	1.450	B24RG-G100	
1 1/2"	4.000	2.125	B24RG-G150	
2"	4.500	2.500	B24RG-G200	
2 1/2"	4.950	3.125	B24RG-G250	
3"	5.500	3.750	B24RG-G300	
4"	6.950	4.750	B24RG-G400	



** Please note: other styles, sizes and materials are available, please contact Dixon Sanitary

Bradford™ Pharmaceutical Gauges

Model Number Breakdown



Series
Pressure range
Fitting size and type
Filled case
Mount type
Diaphragm material

Series

- 2P**.....2½" Pharmaceutical pressure gauge
- 3P**.....3½" Pharmaceutical pressure gauge
- 5P**.....5" Pharmaceutical pressure gauge

Pressure Range *

- B**.....0 to 30 PSI (2 BAR)
- C**.....0 to 60 PSI (4 BAR)
- D**.....0 to 100 PSI (7 BAR)
- E**.....0 to 160 PSI (11 BAR)
- F**.....0 to 200 PSI (14 BAR)
- G**.....0 to 300 PSI (21 BAR)
- H**.....0 to 400 PSI (28 BAR)
- I**.....0 to 600 PSI (41 BAR)
- K**.....0 to 1,000 PSI (70 BAR)

* Standard scales are in PSI only. For dual scales, add the letter B for PSI/BAR after the pressure range letter.

Product Specifications

Size range:

- 1½", 2", 2½" or 3"

Material:

- 316L stainless steel

Finishes:

- pharmaceutical

Ordering Information

Fitting Type *

specify size in inches: 1.5, 2, 2.5 or 3

- I**.....male I-Line
- J**.....female I-Line
- R**.....RJT
- S**.....#15 Bevel Seat sanitary male thread
- T**.....#13H captive nut and #14 Bevel Seat
- U**.....clamp
- DIN**.....DIN according to DIN 11851 (specify DIN40 or DIN50)
- SMS**.....SMS (specify SMS38 or SMS51)

* specify size then type, i.e. 1.5U

Filled Case

- GF**.....glycerine filled

Mount type

- BT**.....bottom
- RT**.....right side
- LF**.....left side
- TP**.....top
- BK**.....back

Diaphragm Material

- SS**.....stainless steel

Pharmaceutical Pressure Gauges

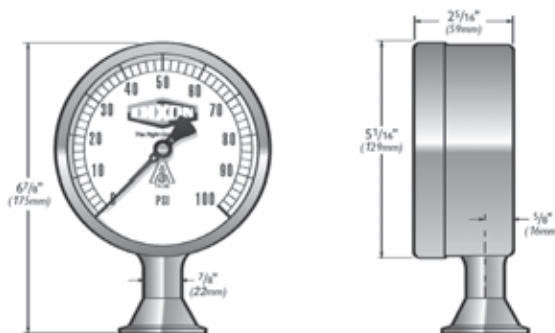
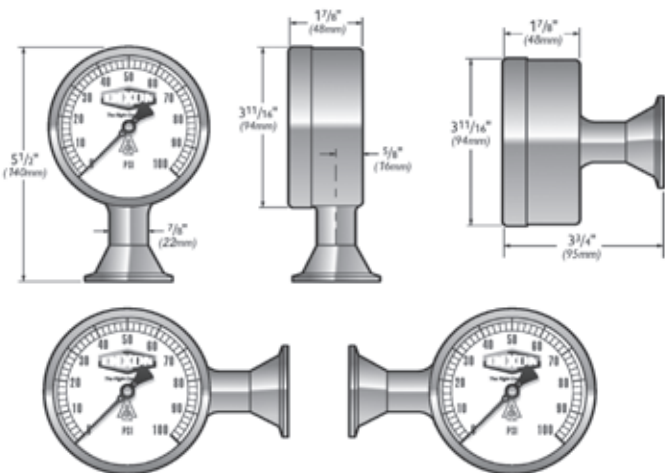
- accuracy: ± 0.75% of full scale
- over range capacity: 30%
- wetted surfaces: 316L stainless steel
- surface finishes (wetted parts): R_a max = 8 microinches
- case material: 304 stainless steel
- dial size: 2½", 3½" or 5" diameter



- lens material: polycarbonate
- temperature limits: 0°F (-18°C) to 250°F (121°C)
- standard fill: food grade glycerin
- rezero feature: standard on pointer
- shipping weight: approximately 3 lbs. (1.3 kg)

3½" Gauge - (90 mm)

5" Gauge - (120 mm)



MTR's will be supplied by the gauge manufacturer.

All fittings Comply with ASME BPE-2009 - Table DT-5-1

Final Tolerances for
Mechanically Polished Fittings and Process Components (inches)

Nominal Size	O.D.	Wall Thickness	Squareness Face to Tangent	Off Angle	Tolerance on End-to-End & Center-to-End	Off Plane
1/2"	±0.005	+0.005/-0.008	0.005	0.014	0.050	0.030
3/4"	±0.005	+0.005/-0.008	0.005	0.018	0.050	0.030
1"	±0.005	+0.005/-0.008	0.008	0.025	0.050	0.030
1 1/2"	±0.008	+0.005/-0.008	0.008	0.034	0.050	0.050
2"	±0.008	+0.005/-0.008	0.008	0.043	0.050	0.050
2 1/2"	±0.010	+0.005/-0.008	0.010	0.054	0.050	0.050
3"	±0.010	+0.005/-0.008	0.016	0.068	0.050	0.050
4"	±0.015	+0.008/-0.010	0.016	0.086	0.050	0.060



Squareness to Face



Off Angle



End-to-End



Off Plane



Off Angle



Center-to-End

Technical Specifications

Weld End chemical analysis (%) per ASME BPE 2009 Table DT-3

Element	C	Mn	P	S	Si	Cr	Ni	Mo
minimum	---	---	---	0.005	---	16.00	10.00	2.00
maximum	0.030	2.00	0.045	0.017	1.00	18.00	15.00	3.00

BPE Surface Finish Requirements

Surface designation	Mechanically Polished ID and OD		Bradford™ High Purity code
	R _a Maximum		
	ID μ-in.	OD μ-in.	
SF0	no finish requirement	no finish requirement	
SF1	20	32	PL
SF2	25	32	
SF3	30	32	

Surface designation	Mechanically Polished OD and Electropolished ID		
	R _a Maximum		
	ID μ-in.	OD μ-in.	
SF4	15	32	PM
SF5	20	32	
SF6	25	32	

Acceptance Criteria for Stainless Steel and Higher Alloy Mechanically Polished Product Contact Surface Finishes

Anomaly or Indication	Acceptance Criteria
Pits	If diameter <0.020 in. and bottom is shiny [Notes (2) and (4)]. Pits <0.003 in. Diameter are irrelevant and acceptable.
Cluster of pits	No more than 4 pits per each 1/2 in. x 1/2 in. inspection window. The cumulative total of all relevant pits shall not exceed 0.040 in.
Dents	None accepted [Note (1)].
Finishing marks	If R _a max. is met.
Welds	As welded shall meet requirements of MJ-6. If welds are finished, then shall be smooth and blended.
Nicks	None accepted.
Scratches	For tubing, if cumulative length is <12.0 in. per 20 ft tube length or prorated and if depth is <0.003 in. For fittings, valves and other process components, if length is <0.25 in. cumulatively, depth <0.003 in. and R _a max. is met. For vessels, if length <0.50 in. at 0.003 depth and if <3 per inspection window [Note (3)].
Surface cracks	None accepted.
Surface inclusions	If R _a max. is met.
Surface residuals	None accepted, visual inspection
Surface roughness (R _a)	See Table SF-3 (request from Dixon Sanitary)
Weld slag	For tubing, up to 3 per 20 ft length or prorated, if <75% of the width of the weld bead. For fittings, valves, vessels and other process components, none accepted (as welded shall meet the requirements of MJ-6 and Table MJ-3).
Porosity	None open to the surface.

*Notes:

- (1) For Vessels, dents in the area covered by and resulting from welding dimple heat transfer jackets are acceptable.
- (2) Black bottom pit of any depth is not acceptable.
- (3) An inspection window is defined as an area 4 in. x 4 in.
- (4) Pits in super-austenitic and nickel alloys may exceed this value. Acceptance criteria for pit size shall be established by agreement between owner/user and manufacturer. All other pit criteria remain the same.

Packaging

Product markings per ASME BPE 2009 DT-14.1

- Bradford™
- Job number
- 316L
- Bradford™ part number
- Heat number(s)
- Surface finish code
- ASME BPE

Per the specification, the size of the fitting may limit the space available for markings. When that occurs, the markings starting at the bottom of the list are not applied. The Bradford™ part number will describe the part configuration and size.

MTR certifications are included inside the resealable bag with each fitting. The MTRs are traceable through the Job Number found on each fitting. All fittings are capped to prevent damage and contamination.

For easy identification each finish will have a different color cap.

*Finish	Color Caps
PL/SF1	blue
PM/SF4	white

* See page 10 for R_a standards

Bradford™ High Purity

BioPharm Fittings

316L Stainless Steel Material Test Report

Job Number **AA158**

Bradford™ Part Number	Description	Size	Surface finish
T16W-200PL	BPE auto weld cap Table DT-30	2"	SF1

Chemical analysis (%) per ASME BPE 2009 Table DT-3

Item	Heat number	C	Mn	P	S	Si	Cr	Ni	Mo	
					0.005		16.00	10.00	2.00	min.
		0.030	2.00	0.045	0.017	1.00	18.00	15.00	3.00	max.
M	823310	0.014	1.40	0.034	0.012	0.44	16.30	10.10	2.07	
B	823707	0.014	1.49	0.033	0.010	0.38	16.20	10.10	2.08	

Mechanical Test Results

Item	Yield Strength (0.2%), MPa	Tensile Strength, MPa	Elongation, %	Hardness, HRB	Specification
	170 minimum	485 minimum	35 minimum	90 maximum	
M	378	624	46.1	88	ASTM A269
B	358	586	43.9	83	ASTM A269

Product of Thailand

We certify that the above is a true copy of the test results issued by the material supplier. This MTR conforms to EN10204-3.1. All fittings supplied by Dixon Sanitary conform to the requirements of the European Union Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

Bruce Anderson
Technical Director

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