



SAFETY SYSTEMS

BIO-SAF

S Y S T E M

Catalog
77-4015
Section D



BIO-SAF SYSTEM™

BS&B's comprehensive range of sanitary rupture disks and holders has been specially designed with a uniformly smooth internal finish in non-contaminating materials for overpressure protection in sanitary/aseptic applications. The Bio-Saf range meets the demanding sanitary criteria necessary in today's pharmaceutical, biotechnology and food processing industries.

All BS&B sanitary disk holders are designed with a standard sanitary clamp fitting to permit easy and fast disk installation. The holders may be connected to other sanitary tubing or fittings using standard clamps and sanitary gaskets. Holders are also available with butt, tank weld end connections or a flush mounted option.

SURFACE FINISH

All sanitary disks and holders may be polished or electro-polished to meet our customer's surface specifications. Our standard surface finish on rupture disk holders is 20-25Ra on all wetted parts.

REVERSE BUCKLING AND COMPOSITE DISK NOMENCLATURE

Reverse buckling and composite disks are offered in type -S or type -ST (e.g. RLS-S, RLS-ST) to permit the use of a smaller sanitary connection.

MANUFACTURING RANGE OF REVERSE BUCKLING DISKS

All reverse buckling disks may be offered with a 0%, 5% or 10% manufacturing range. The range is applied to the minus side of the requested burst pressure.

Example: If a disk is ordered with 75 psig (5.17 barg) burst pressure and a 10% manufacturing range, it will be tagged at a burst pressure between 67.5 psig (4.65 barg) and 75 psig (5.17 barg).

BURST TOLERANCE OF REVERSE BUCKLING DISKS

Burst tolerance is the maximum variation from the tagged burst pressure.

Disk tagged above 40 psig/2.76 barg.....±5%

Disk tagged at 40 psig/2.76 barg and below.....±2 psig/0.138 barg

Sanitary Rupture Disk Specifications							
TYPE	NOMINAL SIZE inch (mm)	BURST PRESSURE psig (barg)	MAXIMUM OPERATING PRESSURE (7)	CYCLE LIFE RESISTANCE TO FATIGUE	SERVICE	HOLDER TYPE (8)	PAGE
GFR-S (5)	1.0 (25) - 3 (80)	11.5 (0.79) - 300 (20.68)	90%	GOOD	GAS/LIQUID (1)	GR-C	3
JRS-S (2) JRS-ST	1.0 (25) - 4 (100)	16 (1.10) - 180 (12.40)	90%	GOOD	GAS (3)	SR-C	5
GLR-S (5) RLS-S (2) RLS-ST	1.5 (40) 1.0 (25) - 4 (100)	175 (12.0) - 350 (24.13) 65 (4.48) - 275 (18.96)	90%	GOOD	GAS/LIQUID (4)	GR-C SR-C SR-C	6
D-ST DV-ST DD-ST (6)	1.0 (25) - 4 (100)	8 (0.55) - 275 (18.96)	80%	GOOD	GAS/LIQUID	FF-C	8
AV-ST (6)	2 (50) - 4 (100)	4.25 (0.29) - 40 (2.76)	60%	FAIR	GAS/LIQUID	FF-C	9
VKB (6) P/VKB	2 (50) - 8 (200)	5.50" WC - 44" WC 13.75mbarg - 110mbarg 7 (0.48) - 170 (11.70)	80%	FAIR	GAS/LIQUID	KB-C PKB-C	10
AVB-ST (6)		1 (0.07) - 10 (0.69)		FAIR		VB-C	

Other sizes available for JRS, RLS and D type disks.

Notes:

- For full liquid service contact BS&B
- Standard material for JRS and RLS type disks is 316 SS. Contact BS&B for other materials and burst pressures.
- May be used in liquid service with adequate volume of gas/vapor above liquid and below disk.
- For full liquid or gas/vapor service.
- GFR-S and GLR-S disks fit GR-C, FM-C and FT-C holders.
- Two-way acting disk for vacuum relief and over pressure relief.
- Recommended maximum operating pressure as a percentage of burst pressure.
- SR-C, GR-C, FF-C, KB-C, PKB-C, VB-C and PVB-C disk holders are also available with butt or tank weld end connections.



Type GFR-S Disk and GR-C Holder

FEATURES AND BENEFITS:

- Lowest burst pressure in a reverse buckling type disk.
- Operating pressures up to 90% of rated pressure.*
- Suitable for liquid/gas service; for full liquid service contact BS&B.
- Resists full vacuum without vacuum support.
- Designed for non-fragmentation.
- Ideal for CIP/SIP service.
- Minimum dead space between process fluid and the disk.

MANUFACTURING RANGE

The GFR-S is available in 0%, -5% or -10% manufacturing range.

GASKETS

The GFR-S is supplied with FDA approved silicone, Viton, (white or black) or EPDM (white or black) gaskets ensuring correct and leak-tight installation in type GR-C, FM-C or FT-C disk holders. An FEP/PTFE liner is available to cover both the disk and gasket on the process side. (Not available for all burst pressures.)

Sanitary GR-C Holder Dimensions for Types GFR-S, GLR-S							
NOMINAL DISK SIZE		CLAMP CONNECTION SIZE / TUBE O.D. (inch)		(A)*		(B)	
inch	mm	@ Disk	@ Outlet	inch	mm	inch	mm
1.0	25	1	1	1.62	41	1.98	50.4
1.5	40	1.5	1.5	1.62	41	1.98	50.4
2.0	50	2.0	2.0	1.62	41	2.52	63.9
3.0	80	3.0	3.0	1.81	46	3.58	90.9

* Outlet only, disk is installed directly on equipment ferrule. An inlet ferrule with butt or tank weld end connections is also available. Standard holder material 316 SS or 304 SS.

Types GFR-S Disk Specifications - Standard Material 316/316LSS* Minimum-Maximum Burst Pressure @ 72°F (22°C)							
NOMINAL SIZE		RELIEF AREA		MINIMUM		MAXIMUM	
inch	mm	in ²	mm ²	psig	barg	psig	barg
1	25	0.2	129	45	3.1	300	20.68
1.5	40	0.79	510	13.5	.93	300	20.68
2	50	1.77	1142	11.5	.79	275	18.96
3	80	4.91	3167	11.5	.79	160	11.03

* Other materials are available on request.

TYPE GLR-S REVERSE BUCKLING DISK

The type GLR-S is available in 1.5" (40mm) nominal size for use in 1.5" GR-C, FM-C or FT-C holders. The type GLR-S disk is available with burst pressures as shown on page 6.

TYPE GFR-S REVERSE BUCKLING DISK

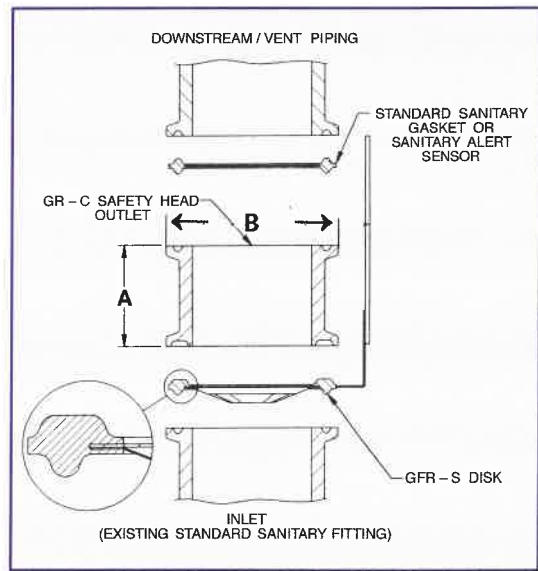
The GFR-S reverse buckling disk is the first rupture disk designed specifically for the pharmaceutical, biotechnology and food processing industries. The disk is unique in design, supplied with an integral sanitary gasket and is installed directly on to an existing standard sanitary inlet ferrule.

- Typical disk surface finish is 8-16 microinch (0.2-0.4 microns).
- Damage ratio of 1.0 or less available. If damaged when installed, the disk will burst at or less than its rated pressure.
- Attached or loose disk tag.
- Ideal for Relief Valve Isolation.
- Innovative gasket design ensures correct disk installation.

* At rated burst pressures of 40 psig (2.76 barg) and below, the recommended maximum operating pressure is 90% of the rated burst pressure less 2 psig (0.138 barg) tolerance.

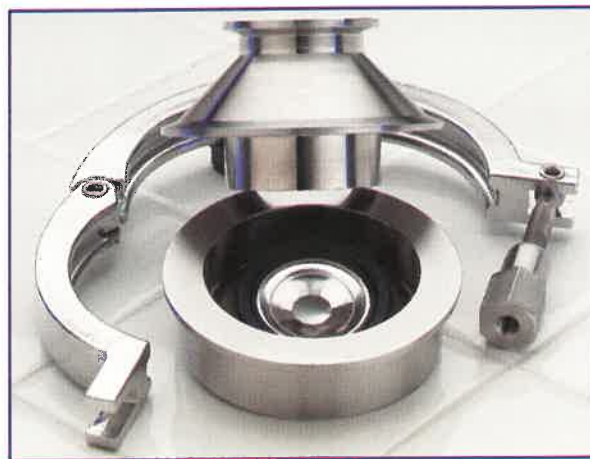
Gasket Service Temperature		
MATERIAL	MINIMUM Service Temperature	MAXIMUM Service Temperature
Silicone	-67°F (-55°C)	450°F (232°C)
Viton	-40°F (-40°C)	400°F (204°C)
EPDM	-67°F (-55°C)	300°F (149°C)

For operating temperatures above 350°F (177°C) consult BS&B.



TYPE FM-C RUPTURE DISK HOLDER

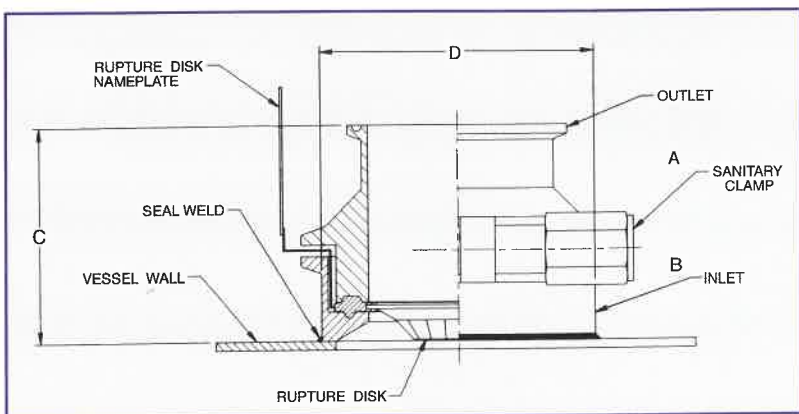
The inlet of the FM-C disk holder is welded to the vessel wall, and permits the rupture disk to be installed flush with the interior wall of the vessel. As the dead leg is eliminated, the space between the process fluid and the disk is minimized. The holder is available in 316L SS; clamp 304 SS and for disk/clamp sizes 1"-3".



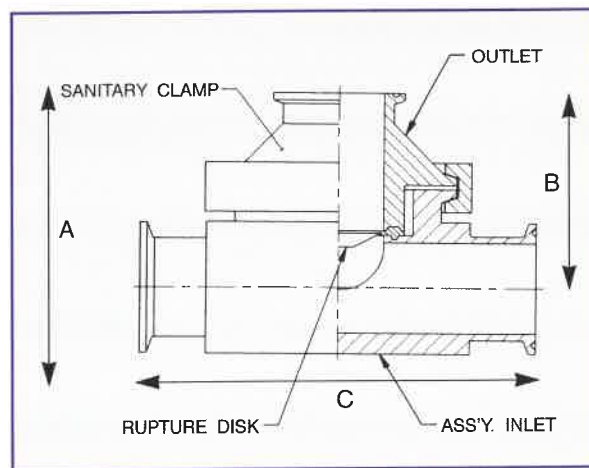
Type GFR-SE Disk and FM-C Holder

THE FT-C RUPTURE DISK HOLDER

The FT-C holder may be used to replace a conventional sanitary fitting "Tee" on which a GFR-SE disk is installed with the advantage of minimizing the dead space between the process fluid and the rupture disk. The FT-C holder permits the rupture disk to be located adjacent to the process flow. The self-cleaning and sweeping action of the fluid minimizes possible product accumulation on the surface of the disk. The FT-C holder is available in 316 SS, clamp 304 SS, for 1" - 3" disk/clamp sizes.



FM-C Type Safety Head

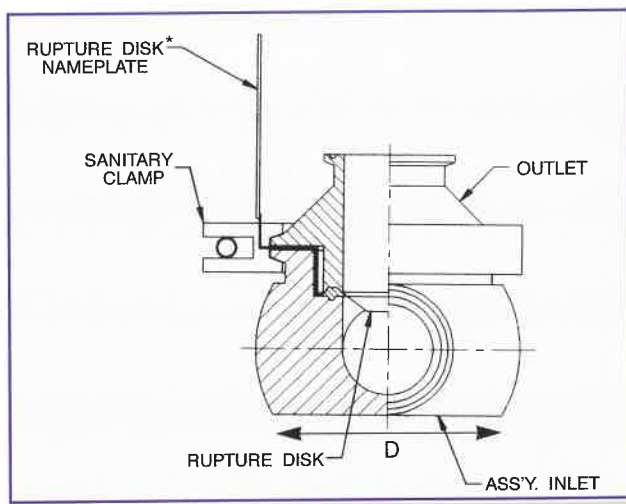


FT-C Holder

Type FM-C							
Disk Size		Clamp Size		C		D	
inch	mm	A	B	inch	mm	inch	mm
1"	25	1"	3	2.470	62.7	3.224	81.9
1.5"	40	1.5"	3	2.470	62.7	3.224	81.9
2"	50	2"	3	2.470	62.7	3.224	81.9
3"	80	3"	4	2.470	62.7	4.256	108.1

Type FT-C									
DISK/CLAMP CONNECTION SIZE		A		B		C		D	
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
1	25	3.97	101	3.0	76	4.0	102	6.00	152
1.5	40	3.97	101	3.0	76	4.0	102	6.00	152

For larger disk and alternative sanitary fitting sizes, consult BS&B.



FT-C Holder

*An attached disk nameplate lies parallel to outlet piping with clear data identification. Standard finish of wetted parts of GR-C, FM-C and FT-C holders is 20-25Ra.

TYPE JRS-S & JRS-ST REVERSE BUCKLING DISKS

The JRS-S and JRS-ST are reverse buckling disks which incorporate a teeth ring attached to the downstream side of the disk. When overpressure occurs, disk rupture is achieved by the disk reversing and opening on the teeth-ring providing full relief opening.



Type JRS-S Disk and SR-C Holder

FEATURES AND BENEFITS:

- For low burst pressures.
- Excellent for gas/vapor service*.
- Operating pressures up to 90%[†] of rated pressure.
- Designed for non-fragmentation.
- Excellent in pressure cycling or pulsating conditions.
- Withstands full vacuum without vacuum support.
- Damage ratio of 1.5 or less. If damaged when installed, it will burst at or less than 1.5 times its rated pressure.

* May be used in liquid service provided there is an adequate volume of vapor above the liquid and below the disk.

† At rated burst pressures of 40 psig (2.76 barg) and below, the recommended maximum operating pressure is 90% of the rated burst pressure less 2 psig (0.138 barg) tolerance.

MANUFACTURING RANGE

Disks in sizes from 1.5" (40mm) are available with a 0%, -5% and -10% manufacturing range, and the 1" (25mm) disk is available with a -2%, -5% and -10% manufacturing range.

Note: Refer to SR-C holder details on page 7 to define when JRS-S and JRS-ST are to be selected.

Types JRS-S & JRS-ST Disk Specifications Standard Material 316* Minimum-Maximum Burst Pressure @ 72°F (22°C)						
inch	SIZE		MINIMUM		MAXIMUM	
	mm	psig	barg	psig	barg	
1	25	24	1.65	180	12.40	
1.5	40	22	1.52	150	10.34	
2	50	20	1.38	120	8.27	
3	80	18	1.24	80	5.52	
4	100	16	1.10	70	4.82	

* Other disk sizes and materials available on request.

FEP/PTFE liners are available on the process side of the disk in sizes from 2" (50mm) and above. Maximum temperature for FEP/PTFE is 500°F (260°C), maximum temperature for 316 SS is 750°F (399°C).

TYPE RLS-S & RLS-ST REVERSE BUCKLING DISKS

The RLS-S and RLS-ST are reverse buckling disks with a circular score-line around the circumference of the disk on the downstream side. A metal hinge is attached to the disk on the downstream side to prevent fragmentation. When overpressure occurs disk rupture is achieved by reversing and opening along the circumferential score-line providing full relief opening.



Type RLS-S Disk and SR-C Holder

FEATURES AND BENEFITS:

- Excellent for *full* liquid or gas/vapor service.
- Operating pressure up to 90% of rated pressure.
- Designed for non-fragmentation.

- Excellent in pressure cycling or pulsating conditions.
- Withstands full vacuum without vacuum support.
- Damage ratio of 1.5 or less. If damaged when installed, it will burst at or less than 1.5 times its rated pressure.

MANUFACTURING RANGE

The disks are available with -5% and -10% manufacturing range; 0% manufacturing range is available for certain rupture pressures and sizes. Note: Refer to SR-C holder details on page 7 when RLS-S and RLS-ST are to be selected.

Types RLS-S, RLS-ST Disk Specifications Standard Material 316* Minimum-Maximum Burst Pressure @ 72°F (22°C)					
SIZE		MINIMUM		MAXIMUM	
inch	mm	psig	barg	psig	barg
1	25	175	12.00	275	18.96
1.5	40	145	10.00	225	15.51
2	50	115	7.93	175	12.06
3	80	75	5.17	125	8.61
4	100	65	4.48	100	6.89

Other disks sizes and materials available on request.

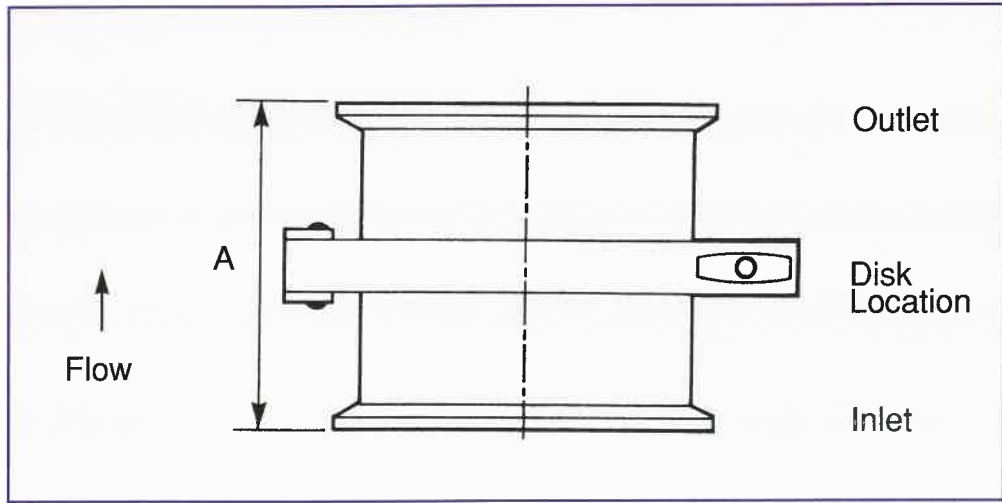
FEP/PTFE liners are available on the process or downstream side of the disk in all sizes. Maximum temperature for 316 SS is 750°F (399°C), maximum temperature for FEP/PTFE is 500°F (260°C).

TYPE GLR-S REVERSE BUCKLING DISK

This is a type RLS reverse buckling disk supplied with an integral sanitary gasket of FDA approved silicone, Viton or EPDM. The unique design of the gasket ensures correct and leak-tight installation in the GR-C, FM-C and FT-C disk holders. The type GLR-S disk is available for high burst pressure applications above 300 psig (20.68 barg) which cannot be met by the type GFR-S disk. It is available in 1 1/2" (40mm) size. The disk is available with an FEP/PTFE liner which covers the disk and gasket on the process side.

Type GLR-S Disk Specifications							
SIZE		RELIEF AREA		MINIMUM		MAXIMUM	
inch	mm	in ²	mm ²	psig	barg	psig	barg
1.5	40	0.79	510	175	12.0	350	24.13

SANITARY SR-C HOLDER SPECIFICATIONS



SR-C Holder

Sanitary SR-C Holder Dimensions for Types JR-S/JRS-ST, RLS-S/RLS-ST Reverse Buckling Disks							
DISK/HOLDER SIZE		CLAMP CONNECTION SIZE/TUBE O.D. (inch)			DISK TYPE	HEIGHT *A	
inch	mm	@ Inlet	@ Disk	@ Outlet		inch	mm
1.0	25	1.5	2.0	1.5	-S	3.25	83
		2.0	2.0	2.0	-S	3.0	76
1.5	40	2.0	2.0	2.0	-ST	3.0	76
		2.0	2.5	2.0	-S	3.0	76
2.0	50	2.0	3.0	2.0	-ST	4.19	106
		3.0	3.0	3.0	-ST	3.69	94
		3.0	4.0	3.0	-S	4.0	102
3.0	80	3.0	4.0	3.0	-ST	4.0	102
		4.0	4.0	4.0	-ST	4.0	102
4.0	100	4.0	6.0	4.0	-S	5.5	140
		6.0	6.0	6.0	-S	5.5	140

*JRS-ST not available in 1.5" size for 2" clamp size. Consult BS&B for alternative inlet/outlet clamp size options and for sizes above 4" (100mm). Standard SR-C holder material is 316 SS with 304 SS clamp.

TYPE D-ST & DV-ST COMPOSITE RUPTURE DISKS

The D-ST composite rupture disk consists of a domed slotted metal top section and a plastic or metal seal located on the concave or process side of the top section.

FEATURES AND BENEFITS:

- Excellent for liquid or gas/vapor service.
- Operating pressures up to 80% of rated pressure.
- FEP/PTFE liner provides a seal and corrosion resistance.



Type D-ST, DD-ST and DV-ST Disks with FF-C Holder

TYPE DV-ST* DISK

When vacuum is present, the disk is fitted with a vacuum support and a DV-ST type disk must be specified.

TYPE DD-ST* DISK

The type DD-ST may be used where two-way relief is required. This disk consists of two slotted metal sections with a plastic seal that floats between both sections. The burst pressure in one direction may be up to twice the burst pressure in the opposite direction with full relief opening in both directions when bursting occurs. The available burst pressures are the same as those of the equivalent size D-ST disk, and has identical performance features.

* The DV-ST and DD-ST construction may not be suitable for all sanitary applications, consult BS&B.

Types D-ST & DV-ST Disk Specifications Standard Material 316 SS FEP/PTFE Seal Minimum-Maximum Burst Pressure @ 72°F (22°C)							
inch	SIZE		MINIMUM			MAXIMUM	
	mm	psig	barg	psig	barg		
1	25	44	3.03	275	18.96		
1.5	40	31	2.14	225	15.51		
2	50	15	1.03	175	12.06		
3	80	11	0.76	125	8.61		
4	100	8	0.55	100	6.89		

Other sizes and materials available upon request. Temperature range minimum -40°F (40°C), maximum 500°F (260°C) with FEP/PTFE seal.

MANUFACTURING RANGE AND BURST TOLERANCE

Example: If a disk is requested with 17 psig (1.17 barg) burst pressure, the disk will be tagged at a burst pressure between 15 psig (1.03) and 21 psig (1.45 barg).

Marked Rupture Pressure	Rupture Tolerance
2 psig (0.14 barg)- less than 15 psig (1.03 barg)	± 1.5 psig (0.1 barg)
15 psig (1.03 barg)- less than 40 psig (2.76 barg)	± 2 psig (0.14 barg)
40 psig (2.76 barg) and above	± 5%

Manufacturing Range					
Specified Pressure Rating		Test specimens must rupture within limits shown below of the specified pressure			
psig	barg	plus		minus	
		psig	barg	psig	barg
2.5 - 3.5	0.17 - 0.24	1	0.07	1	0.07
4 - 6	0.27 - 0.42	2	0.14	1	0.07
7 - 10	0.48 - 0.69	2.5	0.17	1.5	0.10
11 - 16	0.76 - 1.1	3	0.21	2	0.14
17 - 25	1.17 - 1.72	4	0.28	2	0.14
26 - 40	1.79 - 2.76	5	0.35	3	0.21
41 - 65	2.82 - 4.48	6	0.42	4	0.28
66 - 100	4.55 - 6.89	9	0.62	5	0.35
101 - 150	6.96 - 10.34	12	0.83	6	0.41
151 - 200	10.41 - 13.79	16	1.10	9	0.62
201 - 350	13.86 - 24.13	23	1.59	12	0.83

Reduced manufacturing ranges of zero, 1/4 and 1/2 are available upon request.



Type AV-ST Disk and FF-C Holder

TYPE AV-ST COMPOSITE RUPTURE DISK

The AV-ST is a flat composite disk designed to relieve overpressure in both directions at the same burst pressure. The disk may be used in either gas or liquid service.

FEATURES AND BENEFITS:

- For low burst pressures.
- Operating pressures up to 60% of the minimum burst pressure.
- FEP/PTFE seal.

BURST PRESSURE RANGE

All AV-ST* type disks are marked on the disk tag with a minimum/maximum burst range. In the case of a requested burst pressure up to 25 psig (1.72 barg) the burst range will be ± 1.25 psig (0.09 barg) of the requested burst pressure, and above 25 psig (1.72 barg) ± 3 psig (0.21 barg). The manufacturing range and burst tolerance are included in this minimum/maximum burst range.

Example: Type AV-ST burst range minimum 6 psig (0.41 barg)-maximum 8.5 psig (0.59 barg) at 72°F (22°C), 3 inch (80mm).

AV-ST Composite Disk Standard Material 316 SS FEP/PTFE Seal Minimum-Maximum Burst Pressure @ 72°F (22°C)								
inch	SIZE	mm	psig	MINIMUM	barg	psig	MAXIMUM	barg
2		50	6.25		0.43	40		2.76
3		80	5.25		0.36	35		2.41
4		100	4.25		0.29	30		2.10

Temperature range minimum -40°F (-40°C) to maximum 500°F (260°C), with FEP/PTFE seal. Other sizes and materials available on request. * The construction of the disk may not be suitable for all sanitary applications, consult BS&B.

Sanitary FF-C Holder Dimensions For Types D-ST, DV-ST, DD-ST & AV-ST Composite Disks						
DISK/HOLDER SIZE		CLAMP CONNECTION SIZE/TUBE O.D. (inch)			HEIGHT	
inch	mm	@ Inlet	@ Disk	@ Outlet	inch	mm
1.0	25	1.5	1.5	1.5	3.0	76
1.5	40	2.0	2.0	2.0	3.0	76
2.0	50	3.0	3.0	3.0	3.0	76
3.0	80	4.0	4.0	4.0	4.0	102
4.0	100	6.0	6.0	6.0	5.5	140

Consult BS&B for alternative inlet and outlet clamp size options. Type AV-ST available in sizes 2" (50mm) and above sizes only. Standard holder material is 316 SS with 304 SS clamp.

TYPE VKB & P/VKB TWO-WAY RELIEF DISK

The VKB rupture disk is a two-way acting disk designed to prevent implosion under vacuum or overpressure. The disk may be used in either gas or liquid service. The VKB rupture disk installed in the KB-C holder meets the requirements of the American 3A sanitary standards.



Type VKB Disk and KB-C Holder

VACUUM RELIEF

At the rated vacuum relief pressure the disk seal separates from the perforated metal section to snap against a set of knifeblades located in the disk holder inlet cutting the seal into three segments. The perforated metal section remains intact, and flow through the holes in the metal section relieves the vacuum.

BURST RANGE

The disks are available with a burst range of +/-1.5 in WC (3.75 mbarg) for pressure up to 8.0 in WC (20 mbarg) and +/-20% for higher pressures. All tolerances are included in the burst range. Example: a disk with a specified vacuum relief pressure of 7.0 in WC (17.5 mbarg) will be marked on the disk tag as minimum 5.5 in WC (13.75 mbarg) - maximum 8.5 in WC (21.25 mbarg).

OVERPRESSURE RELIEF

The disk relieves overpressure by opening fully along the metal slits in the perforated section. The disk offers a smooth surface towards the process which prevents product accumulation.

Pressure Range for Vacuum and Over-Pressure Relief for Disk Type VKB at 72°F (22°C)											
DISK SIZE		VACUUM RELIEF				VACUUM RELIEF AREA		OVERPRESSURE RELIEF*			
inch	mm	Minimum in WC	Maximum mbarg	Minimum in WC	Maximum mbarg	in ²	mm ²	Minimum psig	Maximum barg	Minimum psig	Maximum barg
2.0	50	7.5	18.75	44.0	110.0	1.5	967	18	1.24	170	11.7
3.0	80	6.5	16.25	30.0	75.0	3.57	2303	16	1.10	170	11.7
4.0	100	5.5	13.75	30.0	75.0	5.93	3825	13	0.9	119	8.2
6.0	150	5.5	13.75	30.0	75.0	12.30	7935	13	0.9	90	6.2
8.0	200	5.5	13.75	20.0	50.0	18.50	11936	7	0.48	55	3.8

* In overpressure relief the disk opens fully.

Above burst pressures are at a 72°F (22°C). Consult BS&B for other burst temperatures.

Temperature range minimum -40°F (-40°C) to maximum 250°F (120°C) in overpressure conditions, maximum 175°F (80°C) in vacuum operating conditions. Standard materials are 316 SS with a FEP/PTFE seal. Other materials available upon request.

MANUFACTURING RANGE

The disks are available with a +/- 2 psig (0.138 barg) or minus 10% manufacturing range depending on the burst pressure.

<u>TAGGED BURST PRESSURE</u>	<u>MANUFACTURING RANGE</u>
up to 40 psig (2.76 barg)	± 2 psig (0.138 barg)
above 40 psig (2.76 barg)	-10%

Example: A burst pressure of 58 psig (4 barg) is requested with a 10% manufacturing range. The values of the burst tests carried out during manufacture will lie between the 52.2 psig (3.6 barg) and 58 psig (4 barg). The average of the test values will be marked on the disk tag.

BURST TOLERANCE

Tolerances are the maximum variation from the burst pressure shown on the disk tag.

<u>TAGGED BURST PRESSURE</u>		<u>BURST TOLERANCE</u>
psig	barg	
6 - 8	0.41 - 0.55	± 20%
9 - 12	0.62 - 0.83	± 15%
13 - 17	0.90 - 1.17	± 10%
18 - 25	1.24 - 1.72	± 7%
26+	1.79 and above	± 5%

OPERATING PRESSURE

The rupture disks may be subjected to the following operating pressures without affecting the disk's service life.

Vacuum Relief: up to 80% of the minimum of burst range.

Overpressure Relief: up to 80% of the tagged burst pressure.

TYPE P/VKB RUPTURE DISK

Type P/VKB rupture disk is a two-way acting disk designed to relieve light overpressure or prevent implosion under vacuum. The disk may be used in either gas or liquid service. The type P/VKB is the inverted style of the type VKB disk.

OVERPRESSURE RELIEF

At the rated burst pressure the disk's seal separates from the perforated metal section to snap against the knife-blades located in the disk holder outlet, cutting the seal into three segments. The perforated metal section remains intact and flow through the holes in the metal section relieves the overpressure.

Pressure Range for Light Overpressure and Vacuum Relief for Disk Type P/VKB at 72°F (22°C)							
DISK SIZE		OVERPRESSURE RELIEF				RELIEF AREA	
		MINIMUM		MAXIMUM			
inch	mm	in WC	mbarg	in WC	mbarg	in ²	mm ²
2.0	50	7.5	18.75	44.0	110.0	1.5	967
3.0	80	6.5	16.25	30.0	75.0	3.57	2303
4.0	100	5.5	13.75	30.0	75.0	5.93	3925
6.0	150	5.5	13.75	30.0	75.0	12.30	7935
8.0	200	5.5	13.75	20.0	50.0	18.50	11936

Above burst pressures are at 72°F (22°C), consult BS&B for other burst temperatures. Standard materials are 316 SS with a FEP/PTFE seal. Other material available upon request. Temperature range -40°F (-40°C) to maximum of 175°F (80°C).

BURST RANGE

The disks are available with a burst range of +/- 1.5 in WC (3.75 mbarg) for pressure up to 8.0 in WC (20 mbarg) and +/-20% for higher pressures. All tolerances are included in the burst range. A disk with a specified burst pressure of 16.0 in WC (40 mbarg) will be shown on the disk tag as minimum 12.8 in WC (32 mbarg) - maximum 19.2 in WC (48 mbarg).

OPERATING PRESSURE

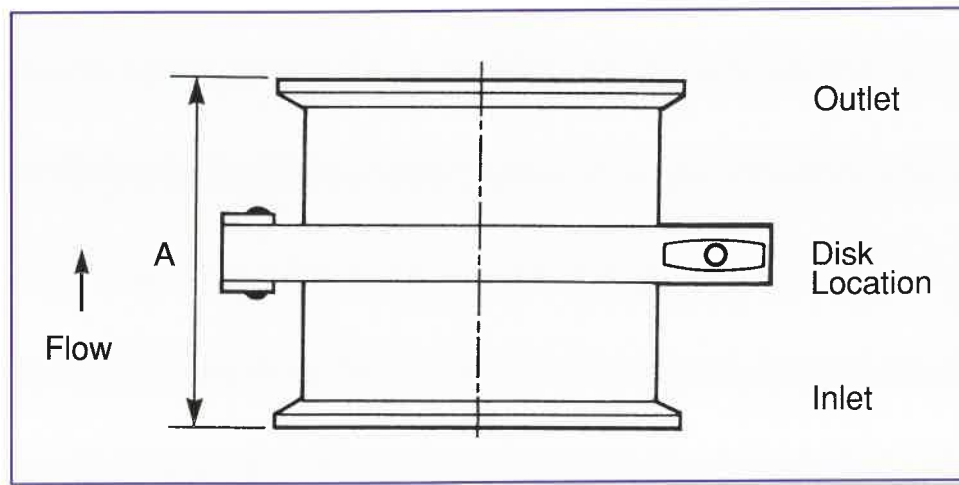
The system may operate up to 80% of the minimum of the burst range without affecting the service life of the disk.

VACUUM RELIEF

The disk may be used also to relieve vacuum depending on specific requirements.

KB-C AND PKB-C HOLDERS

Asymmetric alignment pins in the holder mate with locating holes in the rupture disk for proper installation. The standard holder material is 300 series stainless steel, the knife blade material 301 SS.



Sanitary KB--C/PKB-C Holder Dimensions For Types VKB, P/VKB Vac-Saf Rupture Disks						
DISK/HOLDER SIZE		CLAMP CONNECTION SIZE/TUBE O.D. (inch)			HEIGHT A	
inch	mm	@ Inlet	@ Disk	@ Outlet	inch	mm
2	50	3	3	3	3	76
3	80	4	4	4	3	76
4	100	6	6	6	4	102
6	150	8	8	8	4	102
8	200	10	10	10	4.5	114.3

Consult BS&B for alternative clamp size options.



Type AVB-ST Disk and VB-C Holder

TYPE AVB-ST & P/AVB-ST TWO-WAY RELIEF DISKS

The type AVB-ST rupture disk, like the VKB disk is a two-way acting disk designed to prevent implosion under vacuum or overpressure. This disk meets the medium range vacuum and overpressure relief requirements that cannot be met by the VKB disk.

VACUUM RELIEF

BURST RANGE

The disks are available with a minimum/maximum burst range which includes the manufacturing range and burst tolerance. A 4" (100mm) disk with a specified vacuum relief pressure of 5 psig (0.34 barg) will be marked on the disk tag as minimum 4.5 psig (0.31 barg) to maximum 5.5 psig (0.38 barg).

OVERPRESSURE RELIEF

MANUFACTURING RANGE

The disks are available with a 0%, -5% or -10% manufacturing range. If a disk is ordered with a 50 psig (3.45 barg) burst pressure and -10% manufacturing range, it will be tagged at a burst pressure between 45 psig (3.1 barg) and 50 psig (3.45 barg).

Pressure Range for Vacuum and Overpressure Relief for Disk Type AVB-ST at 72°F (22°C)														
DISK SIZE inch mm		VACUUM RELIEF (psig/barg)								OVERPRESSURE RELIEF (psig/barg)				
		MINIMUM psig barg		MAXIMUM psig barg		BURST RANGE psig barg		RELIEF AREA in ² cm ²		MINIMUM psig barg		MAXIMUM psig barg		RELIEF AREA
2	50	5	0.345	10	0.689	± 5	±.0345	1.98	12.8	8	0.552	100	6.89	Full
3	80	3	0.206	10	0.689	±.5	±.0345	2.03	13.1	5	0.345	100	6.89	Full
4	100	2	0.138	10	0.689	± 5	±.0345	3.58	23.1	5	0.345	100	6.89	Full
6	150	1.5	0.103	6	0.413	±.25	±.0172	5.93	38.25	3	0.207	85	5.86	Full
8	200	1	0.069	6	0.413	± 25	±.0172	9.25	59.68	3	0.207	65	4.48	Full

Standard material is 316 SS with a PTFE seal and Kapton vacuum control ring. Other materials available on request. Temperature range minimum -40°F (40°C), maximum 400° F (204° C).

BURST TOLERANCE

Tolerances are the maximum variation from the rated burst pressure shown on the tag.

Tagged Burst Pressure Rating		
PSIG	BARG	BURST TOLERANCE%
3 - 5	0.21 - 0.35	± 25
6 - 8	0.41 - 0.55	± 20
9 - 12	0.62 - 0.83	± 15
13 - 17	0.9 - 1.17	± 10
18 - 25	1.24 - 1.72	± 7
26 - up	1.8 - up	± 5

OPERATING PRESSURES

The rupture disks may be subjected to the following operating pressures without affecting the disk's service life.

Overpressure Relief: up to 70% of the disk's tagged burst pressure.

Vacuum Relief: up to 60% of the minimum of the burst range.

TYPE P/AVB-ST DISK

The P/AVB-ST disk is the inverted form of the type AVB-ST disk, and meets the medium range of overpressure and vacuum relief requirements that cannot be met by the P/VKB disk.

OVERPRESSURE RELIEF

BURST RANGE

The disks are available with a minimum - maximum burst range which includes the manufacturing range and burst tolerance. A 3" (80mm) disk with a specified burst pressure of 7 psig (0.48 barg) will be marked on the disk tag as minimum 6.5 psig (0.45 barg) maximum - 7.5 psig (0.52 barg).

OPERATING PRESSURE

The system may operate up to 60% of the minimum of the burst range without affecting the service life of the disk.

VACUUM RELIEF

The disk may be used also to relieve vacuum depending on specific requirements.

Pressure Range for Light Overpressure Relief for Disk Type P/AVB-ST at 72°F (22°C)									
DISK SIZE		MINIMUM		MAXIMUM		BURST RANGE		RELIEF AREA	
inch	mm	psig	barg	psig	barg	psig	barg	in ²	cm ²
2	50	5	0.345	10	0.689	±.5	±.0345	1.98	12.8
3	80	3	0.206	10	0.689	±.5	±.0345	2.03	13.1
4	100	2	0.138	10	0.689	±.5	±.0345	3.58	23.1
6	150	1.5	0.103	6	0.413	±.25	±.0172	5.93	38.25
8	200	1	0.069	6	0.413	±.25	±.0172	9.25	59.68

Temperature range minimum -40°F (-40°C), maximum 400°F (204°C).

VB-C

Asymmetric alignment pins in the holder mate with locating holes in the rupture disk for proper installation. The standard holder material is 316 SS.

Sanitary VB-C Holder Dimensions for Types AVB-ST and P/AVB-ST Rupture Disks						
DISK/HOLDER SIZE		CLAMP CONNECTION SIZE/TUBE O.D. (inch)			HEIGHT	
inch	mm	@ Inlet	@ Disk	@ Outlet	inch	mm
2	50	3	3	3	4.0	102
3	80	4	4	4	4.0	102
4	100	6	6	6	5.5	140
6	150	8	8	8	*	*
8	200	10	10	10	*	*

*Consult BS&B for alternative clamp size options and height dimensions.



Explosion Vents

VSP & VSE EXPLOSION VENTS

Explosion vents protect against damage in the event of deflagrations of combustible materials. These explosion vents of single section steel construction are supplied with a smooth internal surface finish. Solid white silicone gaskets are fixed to the vent flange area and FDA approved RTV sealing material applied to the vent perimeter to achieve a sanitary/aseptic construction.

The vents are available in a wide range of sizes in either circular or rectangular designs. For more information, see catalog 77-8015.

Typical equipment protected includes silos, spray dryers, dust collectors conveyors.



SAS Sanitary Alert Sensor

SAS SANITARY ALERT SENSOR

The SAS Sanitary Alert Sensor provides immediate warning of a ruptured disk when used with a BS&B Burst Disk Monitor (Catalog 77-1009) or other suitable electrical equipment. The sensor is supplied with gaskets for installation between sanitary fittings on the downstream side of the rupture disk. Gasket materials available are Viton (white or black), EPDM (white or black) and silicone. Leaking disk detection is also available, contact BS&B for details.

The sensor is classified as a simple apparatus, and is suitable for use in hazardous locations provided it is used with other certified electrical apparatus (i.e. a Zener barrier) and properly installed and maintained. Maximum voltage 24Vdc. Maximum current 500mA.

SANITARY CLAMPS & ACCESSORIES

BS&B rupture disks are installed between sanitary holder fittings and fixed in position using Tri-Clover clamp model 13 MHHS (or equivalent) with a hexagonal torque nut. A two-piece high pressure clamp model 13 MHP will be used with high burst pressure disks. Spool, tank or butt weld ferrule accessories are available.



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ISO 9001 Quality System

