

The background of the lower half of the page features a dark, semi-transparent image of two rupture disk devices. Each device has a red label with white text. The labels include fields for 'SIZE', 'MATERIAL', 'TYPE', 'RUPTURE PRESSURE', and 'TEMPERATURE'. The text on the labels is oriented vertically. Below the devices, there is a blue geometric pattern consisting of various shades of blue triangles and polygons.

RUPTURE DISK DEVICE QUICK REFERENCE GUIDE

Rupture Disk Guide




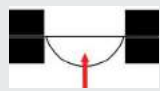
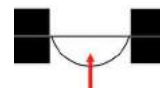
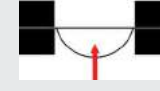
BS&B®

Sta-Saf® System

The Sta-Saf system is the combination of solid metal reverse buckling disks with pre-torqued safety heads.

Standard Features

- Operating ratio up to 100% (CE) / 95% (ASME)
- Full vacuum resistant
- SRB-7RS and SRB-7FS pre-torqued safety heads
- Solid metal construction enabling optimum leak tightness
- Designed for non-fragmentation
- Recommended for isolation of pressure relief valves
- Metal tag with product identification and traceability data, as well as code symbol stamps as appropriate

	Sigma™ and Sigma EXL™ <small>IP</small>	SK_R™ <small>IP</small>	LPS™ <small>IP</small>
			
Disk sizes	1-8 inches (25-200mm)	1-10 inches (25-250mm)	1-8 inches (25-200mm)
Burst pressures	15-500 psig (1-34.5barg)	15-500 psig (1-34.5barg)	5-70 psig (0.3-4.8barg)
Material	*Standard, except aluminum	*Standard, except aluminum	*Standard, except aluminum
Loading (direction of flow)			
Service phase	Gas or liquid	Gas or liquid	Gas or liquid
Manufacturing design range	5%, 0%	10%, 5%, 0%	10%, 5%, 0%
Cycle life (resistance to fatigue)	Best	Best	Best
Max operating pressure	95% ASME (100% PED)	90% ASME (95% PED)	90% ASME (95% PED)
Vacuum support required	No	No	No
Designed for non-fragmentation	Yes	Yes	Yes
Safety relief valve isolation	Yes	Yes	Yes

*Standard materials: aluminum, nickel alloy 200, Inconel® alloy 600, Monel® alloy 400, 316L ss, Hastelloy® alloy C-276, tantalum, titanium, Hastelloy® alloy C-22, Inconel® alloy 625, niobium
US patents 5996605, 6178983, 6321582 and 6446653; International patents apply

Rupture Disk Guide


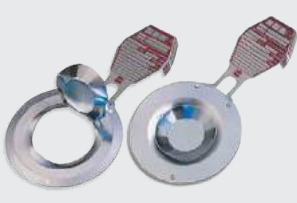
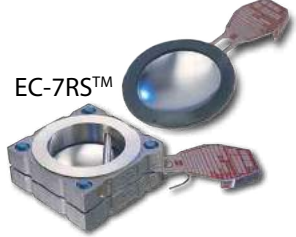
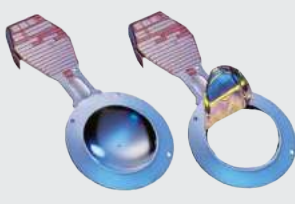

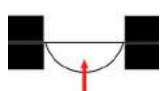

S-90™	RLS™	JRS™		Safety Heads
				 SRB-7RS™ pretorqued insert design
1-40 inches (25-1,000mm)	1-20 inches (25-500mm)	1-42 inches (25-1,070mm)	Disk sizes	 S90-7R™ pre-assembled insert design
20-1,000 psig (1.4-69barg)	20-2,000 psig (1.4-138barg)	5-180 psig (0.4-12.4barg)	Burst pressures	 SRB-7FS™ full bolted design
*Standard and Hastelloy® alloy C-276	*Standard, except aluminum	*Standard, except aluminum	Material	 SPR-7R™ extended outlet / disk petal containment
			Loading (direction of flow)	 SR-7R™ pre-assembled insert design
Gas or liquid with gas pocket**	Gas or liquid	Gas or liquid with gas pocket**	Service phase	
10%, 5%, 0%	10%, 5%, 0%	10%, 5%, 0%	Manufacturing design range	
Best	Best	Best	Cycle life (resistance to fatigue)	
90% ASME (95% PED)	90% ASME (95% PED)	90% ASME (95% PED)	Max operating pressure	
No	No	No	Vacuum support required	
Yes	Yes	Yes	Designed for non-fragmentation	
Yes	Yes	Yes	Safety relief valve isolation	

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Rupture Disk Guide

Alternative Reverse Buckling Disks

- **FRS™** - innovative frustum design disk providing overpressure relief at low pressure; the circular score line has an interrupted 'hinge' segment which retains the disk's central petal and prevents fragmentation
- **Eco-Saf® ECR™** - offers the lowest burst pressures available from a reverse buckling disk; The disk relieves overpressure or vacuum by reversing and opening at the perimeter of the dome
- **Sure-Saf® CSI™** - uses SAF technology (structural apex forming), which enhances accuracy of burst pressure
- **RB-90™** - provides overpressure protection by reversing and snapping against precision stainless steel knife blades
- **SVI™** - a single-use rupture disk assembly (no holder required) for isolating safety relief valves; For retrofit with fixed piping
- **SK_R-U™** - an all purpose SK_R rupture disk partnered with a threaded union-type holder

	FRS™	Eco-Saf® ECR™	Sure-Saf® CSI™ 
			
Disk sizes	1-2 inches (25-50mm)	1-24 inches (25-600mm)	1-8 inches (25-200mm)
Burst pressures	11.5-150 psig (0.8-10.3barg)	1-180 psig (0.07-12.4barg)	30-500 psig (2.1-34.5barg)
Loading (direction of flow)			
Material	*Standard, except aluminum	*Standard, except aluminum with gaskets	*Standard, except aluminum
Manufacturing design range	10%, 5%, 0%	10%, 5%, 0%	10%, 5%, 0%
Service phase	Gas or liquid	Gas or liquid	Gas or liquid
Cycle life (resistance to fatigue)	Best	Best	Best
Max operating pressure	90% ASME (95% PED)	90% ASME (95% PED)	90% ASME (95% PED)
Vacuum support required	No	***	No
Designed for non-fragmentation	Yes	Yes	Yes
Safety relief valve isolation	Yes	Yes	Yes

*Standard materials: aluminum, nickel alloy 200, Inconel® alloy 600, Inconel® alloy 625, Monel® alloy 400, niobium, 316L ss, Hastelloy® alloy C-276, tantalum, titanium, Hastelloy® alloy C-22

***Some pressure combinations may require a vacuum support

US patents 5996605, 6321582, 6446653

Rupture Disk Guide

RB-90™	SVI™	SK _R -U™ ®		
 RB-7R™				Safety Heads
1-36 inches (25-900mm)	1.5-6 inches (50-150mm)	1-2 inches (25-50mm)	Disk sizes	Eco-Saf ECR: EC-7RS™ and EC-7R™ safety heads
10-1,800 psig (0.7-124.1 barg)	3-125 psig (0.14-8.62 barg)	55-500 psig (3.8-34.5 barg)	Burst pressures	 preassembled design
			Loading (direction of flow)	Sure-Saf CSI: CSR-7RS™ safety head
*Standard	*Standard, except aluminum	*Standard, except aluminum	Material	
10%, 5%, 0%	10%, 5%, 0%	10%, 5%, 0%	Manufacturing design range	holder outlet design, uscored portion of disk prevents fragmentation
Gas or liquid with gas pocket**	Gas or liquid with gas pocket**	Gas or liquid	Service phase	RB-90: RB-7R™ safety head
Best	Best	Best	Cycle life (resistance to fatigue)	
90% ASME (95% PED)	90% ASME (95% PED)	90% ASME (95% PED)	Max operating pressure	insert type
No	No	No	Vacuum support required	
Yes	Yes	Yes	Designed for non-fragmentation	SK_R-U: U _R -2 safety head
	Yes	Yes	Safety relief valve isolation	 union holder

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US patents 5996605, 6178983, 6321582 and 6446653; International patents apply

Rupture Disk Guide

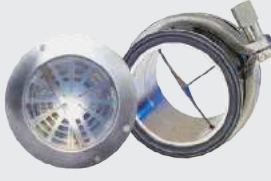


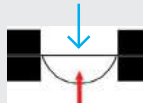
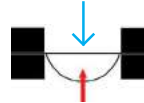
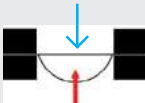
Vac-Saf® Rupture Disks

The Vac-Saf system offers two-way relief to provide maximum protection of gas or liquid storage vessels and plant from damage caused by excessive vacuum or overpressure. Also available in industrial versions for installation in standard companion flange safety head models.

Sanitary Rupture Disks

- **GCR-S™** - the leading sanitary / aseptic rupture disk with integral gasket, installed directly to tank fittings
- **GCR-N™** - installs in a NovAseptic NA-connect® holder; The disk is flush mounted with the interior wall of the vessel for easy cleaning and sterilization
- **SLP-S™** - provides the lowest burst pressure in each available size
- **GLP-S™** - alternative installation design with traditional safety head

***Vac-Saf® Rupture Disks

	HiLo™ ®	VKB and P/VKB™	AVB-ST™ and P/AVB-ST™
			
Disk sizes	2-12 inches (50-300mm)	2-12 inches (50-300mm)	2-8 inches (50-200mm)
Burst pressures	5-300 inches WC / 3-125 psi (9-560mm Hg / 0.2-8.6bar)	5.5-52 inches WC / 6-170psi*** (10-97mm Hg / 0.2-8.6bar)	3-40 psig (0.2-2.8barg)
Loading (direction of flow)			
Material	*Standard (not aluminum) and special	*Standard (not aluminum) and special	*Standard (not aluminum) and special
Manufacturing design range	10%, 5%, 0%	10%, 5%, 0%	10%, 5%, 0%***
Service phase	Gas or liquid with gas pocket**	Gas or liquid with gas pocket**	Gas or liquid
Cycle life (resistance to fatigue)	Better	Better	Better
Max operating pressure	80% ASME (90% for some designs) (85% PED)	80% ASME (90% for some designs) (85% PED)	80% ASME (85% PED)
Vacuum support required	No	No	No
Designed for non-fragmentation	Yes	Yes	Yes
Safety relief valve isolation	No	No	No

***The Vac-Saf system offers two-way relief to provide maximum protection of gas or liquid
US patents 7011104 and 7308903 apply

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Rupture Disk Guide




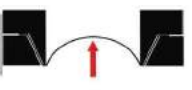
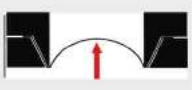

GCR-S™	GCR-N™	SLP-S™	GLP-S™	
				
1.5-4 inches (40-100mm)	1.5-2 inches (40-50mm)	1.5-4 inches (40-100mm)	1-4 inches (25-100mm)	Disk sizes
10-300 psig (0.7-20.7barg)	10-101 psig (0.7-7barg)	5-70 psig (0.3-4.8barg)	5-70 psig (0.3-4.8barg)	Burst pressures
				Loading (direction of flow)
*Standard (not aluminum) and special	*Standard (not aluminum) and special	*Standard (not aluminum) and special	*Standard (not aluminum) and special	Material
10%, 5%, 0%	10%, 5%, 0%	10%, 5%, 0%	10%, 5%, 0%	Manufacturing design range
Gas or liquid	Gas or liquid	Gas or liquid	Gas or liquid	Service phase
Best	Best	Best	Best	Cycle life (resistance to fatigue)
90% ASME (95% PED)	90% ASME (95% PED)	90% ASME (95% PED)	90% ASME (95% PED)	Max operating pressure
No	No	No	No	Vacuum support required
Yes	Yes	Yes	Yes	Designed for non-fragmentation
Yes	Yes	Yes	Yes	Safety relief valve isolation

*Standard materials: aluminum, nickel alloy 200, Inconel® alloy 600, Monel® alloy 400, 316L ss, Hastelloy® alloy C-276
 Special materials: tantalum, titanium, Hastelloy® alloy C-22, Inconel® alloy 625
 Gasket material options for the GCR series includes silicone, Viton®, EPDM and Tef-Steel®

Rupture Disk Guide

Forward Acting Tension Loaded Disks

- **DTM** - composite disk consisting of a slotted metal top section and a metal or fluoropolymer seal for low burst pressure
- **BTM** - prebulged, solid metal rupture disk; system pressure is applied to the dished or concave side, subjecting disk metal to tension loading
- **AVTM** - flat rupture disk for atmospheric vessels and isolating outlet port of relief valves; ready gasketed with fiber gaskets; direct installation between companion flanges
- **XN-85TM** - precision scored, high performance specially manufactured by forming the disk first and then scoring
- **XTTM** - advanced rupture disk performance with an 'X' shaped score pattern; Designed for non-fragmentation; Excellent for relief valve isolation
- **XBTM** - non-fragmenting rupture disk opens along pre-weakened score lines offers a broader range of burst pressures than the XN
- **LCNTM** - low pressure rupture disk with flat composite metal design that withstands full vacuum

	D TM	B TM	AV TM
			
Disk sizes	2-30 inches (25-750mm)	1/8-24 inches (3-600mm)	2-36 inches (50-900mm)
Burst pressures	20-1,000 psig (1.4-69barg)	2-100,000 psig (0.1-6,900barg)	1-25 psig (0.69-2barg)
Loading (direction of flow)			
Material	*Standard	*Standard	*Standard, except aluminum
Manufacturing design range	Full, 1/2, 1/4, 0%	Full, 1/2, 1/4, 0%	10%, 5%, 0%
Service phase	Gas or liquid	Gas or liquid	Gas or liquid
Cycle life (resistance to fatigue)	Good	Good	Good
Max operating pressure	80% ASME (85% PED)	70% ASME (75% PED)	60% ASME (65% PED)
Vacuum support required	Yes	Yes	Yes
Designed for non-fragmentation	***Yes	No	***Yes
Safety relief valve isolation	Not recommended	Not recommended	Yes (@ outlet)
Safety head	FA-7R TM Quick-Sert	FA-7R TM Quick-Sert	-

**Some seal material may be released

Fiber gaskets attach on both sides of the AV disk; Standard gaskets are Klingsil


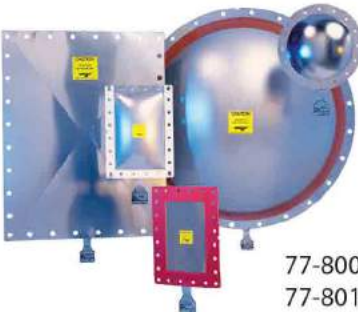

Rupture Disk Guide

XN85™	XT™	XB™ (Scored B or SCD B)	LCN™	
				
1-24 inches (25-600mm)	1-10 inches (25-225mm)	1-24 inches (25-600mm)	1-24 inches (25-600mm)	Disk sizes
30-1,800 psig (2.1-124.1barg)	40-1,450 psig (5.5-100barg)	60-6,000 psig (4.1-414barg)	3-188 psig (0.2-13barg)	Burst pressures
				Loading (direction of flow)
*Standard and special	*Standard and special	*Standard and special	*Standard (not aluminum) and special	Material
10%, 5%, 0%	10%, 5%, 0%	10%, 5%	10%, 5%, 0%	Manufacturing design range
Gas or liquid with gas pocket**	Gas or liquid	Gas or liquid	Gas or liquid	Service phase
Better	Better	Better	Better	Cycle life (resistance to fatigue)
85% ASME (90% PED)	85% ASME (90% PED)	85% ASME (90% PED)	80% ASME (85% PED)	Max operating pressure
No	No	No	No	Vacuum support required
Yes	Yes	Yes	***Yes	Designed for non-fragmentation
Yes	Yes	Yes	Not recommended	Safety relief valve isolation
NF-7RS™, NX-7R™, NXV-7R™ and NF-7R™	NF-7RS™, NX-7R™, NXV-7R™, NF-7R™ and TL-7R™	NF-7RS™ and NX-7R™	NF-7RS™, NX-7R™, NXV-7R™ and NF-7R™	Safety head

Standard materials: aluminum, nickel alloy 200, Inconel® alloy 600, Monel® alloy 400, 316L ss, Hastelloy® alloy C-276, tantalum, titanium, Hastelloy® alloy C-22, Inconel® alloy 625

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Saf-T-Graf® Monobloc and replaceable element Graphite Disks	Custom Engineered Products	Specialty Valves
 <p>77-8550</p>	 <p>77-7005</p>	 <p>77-1015</p>
<p>Convenient, Economic, Corrosion Resistant Graphite disks are made from impregnated graphite offering low burst pressure and excellent corrosion resistance. BS&B graphite disks are supplied with integral gaskets for direct installation between international pipe flanges. The replaceable element range is installed in graphite or stainless steel safety heads before installation between pipe flanges.</p>	<p>Combining Custom with Economy</p> <ul style="list-style-type: none"> • A wide range of standard and custom-designed rupture disk assemblies are available for your specific application • Assemblies are designed to be discarded after disk rupture; other designs permit the replacement of the ruptured disk • Customized designs are available for customer applications which cannot be met using standard assembly designs 	<p>Buckling Pin Pressure Relief Technology</p> <ul style="list-style-type: none"> • Fast acting, quick opening buckling pin activation pressure relief devices designed to protect personnel, equipment and the environment from danger of overpressure • Ability to 'field-reset' while remaining installed after an over pressure event
<ul style="list-style-type: none"> • 0.5-24 inches (15-600mm) • Burst pressures 0.25-1,000 psig (0.02-69barg) • Temperatures to 400°F (205°C) - higher operating temperatures to 800°F (427°C) are achieved using a 'high temperature assembly' 	<ul style="list-style-type: none"> • 1/8-6 inches (3-150mm) • Burst pressures from 1-100,000 psig (0.07-6,900barg) 	<p>BPRV™ - offers the highest flow capacity and convenient inline installation</p> <ul style="list-style-type: none"> • 2-60 inches (50-1,500mm) • ASME "UD" stamped • European Pressure Equipment Directive "CE" marked
<p>A steel Amoring ring around the disk for added safety and easier installation is recommended.</p>	<ul style="list-style-type: none"> • Disk assemblies include soldered, welded, crimped and threaded designs 	<p>BPAV™ - controlled by a precision buckling pin that is calibrated to respond to the forces generated by inlet pressure acting on the valve plug</p>
<p>Standard material for graphite disk gaskets is Klinger-Sil® C-4401; other material options include PTFE solid, neoprene, Garlock® 3000, Grafoil® and Gylon® 3510 Klinger-Sil® is a registered trademark of Thermoseal Inc. Garlock® 3000 and Gylon® 3510 are trademarks of Garlock Inc. Grafoil® is a trademark of GrafTech International Holdings Inc.</p>		

Industrial Explosion Protection	Vent-Saf [®] and Vent-Saf [®] Plus	BS&B FlameSaf [™]
 <p>77-8024</p>	 <p>77-8003 77-8015</p>	
<p>Type IPD system - explosion suppression and isolation systems detect the earliest stage of a deflagration by sensing the pressure wave that comes ahead of the flameball and uses the signal to activate delivery of an extinguishing agent</p> <p><i>A typical system consists of the following:</i></p> <ul style="list-style-type: none">• Sensor• Power supply module• System monitor• Several explosion suppression 'cannons'[™]	<p>Explosion Panels</p> <ul style="list-style-type: none">• Designed to protect equipment against damage in the event of deflagration of combustible materials• Explosion panels are low burst pressure membranes which are designed to be fastened over an opening of calculated size to provide rapid pressure relief• BS&B utilizes NFPA 68, EN 14491, and VDI-3673 venting guidelines, which are recognized worldwide	<p>BS&B FlameSaf Products</p> <ul style="list-style-type: none">• In-line flame arresters• End-of-line flame arresters• End-of-line breather vents• In-line breather vents• Arrester certified to EN / ISO 16852:2010
<p>BS&B is the fastest growing manufacturer of industrial explosion protection technology with products designed to meet the requirements of the United States OSHA Combustible Dust National Emphasis program, NFPA standards and European ATEX Directive.</p>	<p>BS&B offers a complete line of explosion vents including types VSP[™], VSS[™], VSE[™], VSB[™], EXP[™], EXP-DV[™], LCV[™] and HTV[™]. Most applications are served by the type VSP domed vent.</p>	<p>Flame arresters are used as secondary protection against explosions by preventing the transmission of flame and explosion transfer in machines, equipment and plant, containing inflammable gas or steam-air mixtures of inflammable liquids. These autonomous safety systems limit the effects of the explosions, rendering them harmless, they are intended to allow flow but prevent flame transmission.</p> <p>The BS&B FlameSaf product line includes arrester technology suited to safe management of deflagration and detonation risks in piping systems and equipment. End-of-line and in-line devices are available along with P/V vents that offer integral arresters.</p>
<p>US patents 5934381, 6269746 and patent pending</p>	<p>US patent 6792964</p>	
<p>Hastelloy[®] is a trademark of Haynes International Inc. Monel[®] and Inconel[®] are trademarks of Inco Alloys International, Inc Tef-Steel[®] is a registered trademark of Rubber Fab Molding and Gasket Viton[®] is a registered trademark of DuPont Dow Elastomers L.L.C.</p>		



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