



FA-7R™ Safety Head

# Type D™

## Composite Forward Acting Rupture Disk





# Type D™ Composite Forward Acting Rupture Disks

Type D™ rupture disks consist of a slotted metal top section and a metal or fluorocarbon seal for low burst pressure. Since the top section has open slots, the seal isolates it from process media to prevent leakage. When in service, pressure is applied to the concave side of the disk, putting the disk in a tension loaded condition. When vacuum or back pressure are present, in any amount, the seal must have a structural support.

Available Sizes	1 - 44 inches (25 - 1,100mm)
Temperature	FEP fluoropolymer seal: -40°F to 400°F (-40°C to 204°C), PTFE fluoropolymer seal: -40°F to 500°F (-40°C to 260°C), PFA fluoropolymer seal: -40°F to 500°F (-40°C to 260°C), Metal seal: -320°F to 1000°F (-196°C to 538°C)
Top Section	Standard metals: 316ss, Inconel® (alloy 600), nickel (alloy 200), and Monel® (alloy 400), Hastelloy® C-276 (alloy C-276), titanium and tantalum
Seal	Standard materials: fluoropolymer film, PTFE, PFA, 316ss, nickel (alloy 200), Inconel® (alloy 600), Monel® (alloy 400), Hastelloy® C-276 (alloy C-276), silver, and aluminum, Special metals: platinum, titanium and tantalum
Vacuum Support	Standard materials: 316ss, Inconel® (alloy 600), nickel (alloy 200), Monel® (alloy 400), Hastelloy® C-276 (alloy C-276), titanium and tantalum
Protective Ring	Standard materials: 316ss, Inconel® (alloy 600), nickel (alloy 200), Monel® (alloy 400), Hastelloy® C-276 (alloy C-276), titanium and tantalum
Soft Gasket Ring	Aluminum or fluoropolymer film

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## Burst Pressure Tolerances

Marked Burst Pressure	Burst Tolerance
> 2 to < 15 psig ( > 0.14 to < 1.03 barg)	±1.5 psig (+0.1 barg)
15 to < 40 psig (1.03 to < 2.8 barg)	±2.0 psig (0.14 barg)
≥40	±5%

## Features

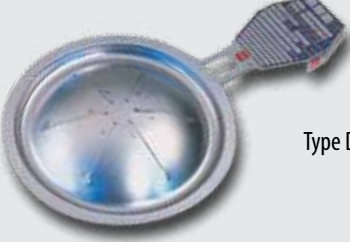








- Gas and liquid service
- Suitable for operating pressure to 80% of the marked burst pressure
- Designed for non-fragmentation
- Available in sizes 1 through 44 inches (25 through 1,100mm)
- Flange type installation in BS&B type FA-7R safety heads.
- Threaded union type installation in BS&B type UA safety heads

## Maximum Temperature for all Type D Disk Components

Disk Material	F°	C°
FEP	400	204
PFA	500	260
PTFE	500	260
Aluminum	800	427
Silver	800	427
Nickel alloy 200	1000	538
Monel® (alloy 400)	1000	538
Inconel® (alloy 600)	1000	538
316ss	1000	538
Hastelloy® B or C-276 (alloy C-276)	1000	538

## Manufacturing Design Range

Desired Burst Pressure		Standard Range			
psig	bar	Plus		Minus	
		psig	bar	psig	bar
2.5 - 3.5	0.2 - 0.3	1	0.1	1	0.1
4 - 6	0.3 - 0.4	2	0.1	1	0.1
7 - 10	0.5 - 0.7	2.5	0.2	1.5	0.1
11 - 16	0.8 - 1.1	3	0.2	2	0.1
17 - 25	1.2 - 1.8	4	0.3	2	0.1
26 - 40	1.8 - 2.8	5	0.4	3	0.2
41 - 65	2.9 - 4.6	6	0.4	4	0.3
66 - 100	4.6 - 7.0	9	0.6	5	0.4
101 - 150	7.1 - 10.6	12	0.8	6	0.4
151 - 200	10.6 - 14.1	16	1.1	9	0.6
201 - 350	14.1 - 24.6	23	1.6	12	0.8
351 - 500	24.7 - 35.2	-35.2	2.1	15	1.1
501 & up	35.2 & up	6%	6%	3%	3%

Disk Types	Description	
D	Type D rupture disks consist of a slotted metal top section and either a metal or fluorocarbon seal. Pressure is applied to the concave side, subjecting the disk to tension loading.	 <p>Type D™ Rupture Disk</p>
DV	When vacuum is involved in any amount, a vacuum support is required. Adding a ring to the outlet side aids handling and installation, and is a type DRV disk. Ring material is nickel, aluminum, Monel® or 316ss.	 <p>Type DV™ Rupture Disk</p>
DR	At low burst pressures a type DR rupture disk is recommended to aid handling and installation. The ring material is nickel, aluminum, Monel® or 316ss.	 <p>Type DR™ Rupture Disk</p>
DRR	The type DRR rupture disk is recommended for optimal handling and installation.	 <p>Type DRR™ Rupture Disk</p>
DRV	A type D disk with a protective ring attached to the top of the disk and a vacuum support attached below.	 <p>Type DRV™ Rupture Disk</p>
DSV	For strong vacuum service the type DSV rupture disk is recommended. The soft ring on the disk inlet side aids sealing to the safety head. Ring material is nickel, or aluminum. Adding a ring to the outlet side aids handling and installation and is a type DRSV disk.	 <p>Type DSV™ Rupture Disk</p>
DRSV	If a DR ring is also attached to the atmospheric side of a DSV disk, the assembly is called a Type DRSV Rupture Disk.	 <p>Type DRSV™ Rupture Disk</p>
PLD	A type D disk with fluoropolymer attached to top (atmospheric) side of the disk. Type PLDV rupture disk is similar in appearance. Vacuum support is integral to the PLDV disk.	 <p>Type PLD™ Rupture Disk</p>
PLDV	A plastic liner covering and isolating a built-in support from process media becomes a PLDV rupture disk. In severe applications, metal exposure may not be desirable, hence the plastic covering.	 <p>Type PLDV™ Rupture Disk</p>



### Composite Disks: Type D, DV, DR, DRR, DRV, DSV, PLD Disk Seal Material

Disk Size		Fluoropolymer Film				Aluminum				Silver				Nickel (alloy 200)			
in	mm	psig		barg		psig		barg		psig		barg		psig		barg	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	25	89	1000	6	70	50	1600	4	113	110	2000	8	141	180	2000	13	138
1.5	40	63	700	4	49	33	1300	2	91	73	1400	5	99	120	1400	8	99
2	50	31	555	2	39	20	960	1	68	43	1100	3	77	69	1100	5	77
3	80	25	450	2	32	15	730	1	51	32	650	2	46	52	900	4	63
4	100	19	415	1	29	12	630	1	44	24	600	2	42	39	830	3	58
6	150	13	320	1	23	9	485	1	34	18	500	1	35	29	640	2	45
8	200	11	295	1	21	7	420	0.5	30	14	400	1	28	23	590	2	42
10	250	7	240	0.5	17	5	340	0.4	24	12	200	1	14	18	480	1	34
12	300	5	200	0.4	14	5	290	0.4	20	-	-	-	-	15	400	1	28
14	350	5	170	0.4	12	4	270	0.3	19	-	-	-	-	14	350	1	25
16	400	5	150	0.4	11	4	250	0.3	18	-	-	-	-	12	300	1	21
18	450	5	135	0.4	10	4	225	0.3	16	-	-	-	-	10	270	1	19
20	500	5	120	0.4	8	3	200	0.2	14	-	-	-	-	10	240	1	17
24	600	5	100	0.4	7	3	170	0.2	12	-	-	-	-	-	-	-	-
30	750	5	80	0.4	6	3	140	0.2	10	-	-	-	-	-	-	-	-

Disk Size		Monel® (alloy 400)				Inconel® (alloy 600)				316ss				Hastelloy® B or C-276 (alloy c-276)			
in	mm	psig		barg		psig		barg		psig		barg		psig		barg	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	25	220	2000	16	138	285	2000	20	138	400	2000	28	138	680	2000	48	138
1.5	40	145	1400	10	99	185	1400	13	99	265	1400	19	99	265	1400	19	99
2	50	84	1100	6	77	109	1100	8	77	150	1100	11	77	260	1100	18	77
3	80	62	900	4	63	79	900	6	63	115	900	8	63	195	900	14	63
4	100	47	830	3	58	60	830	4	58	85	830	6	58	145	830	10	58
6	150	35	640	3	45	45	640	3	45	64	640	5	45	110	640	8	45
8	200	28	590	2	42	35	590	3	42	50	590	4	42	85	590	6	42
10	250	22	480	2	34	28	480	2	34	38	480	3	34	-	-	-	-
12	300	19	400	1	28	24	400	2	28	34	400	2	28	-	-	-	-
14	350	17	350	1	25	22	350	2	25	29	350	2	25	-	-	-	-
16	400	14	300	1	21	19	300	1	21	25	300	2	21	-	-	-	-
18	450	13	270	1	19	17	270	1	19	23	270	2	19	-	-	-	-
20	500	12	240	1	17	15	240	1	17	20	240	1	17	-	-	-	-
24	600	-	-	-	-	-	-	-	-	70	200	5	14	-	-	-	-
30	750	-	-	-	-	-	-	-	-	56	170	4	12	-	-	-	-

#### Notes

- If Type D, DR or PLD disk will be exposed to vacuum or back pressure, specify DV, DRV, DSV, DRSV or PLDV
- FEP fluoropolymer for seals is standard for 10 inches and larger except when temperature is over 400°F (204°C)
- Before specifying any disk, see table of manufacturing ranges

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Composite Disks: Type D, DV, DR, DRR, DRV, DSV, PLD Disk Seal Material (continued)

Disk Size		PLDV: Center Section Material: 316ss				PLDV: Center Section Material: Nickel			
		Disk Seal Material				Disk Seal Material			
		Fluoropolymer Film				Fluoropolymer Film			
in	mm	psig		barg		psig		barg	
		Min	Max	Min	Max	Min	Max	Min	Max
1	25	300	1000	21	70	230	600	16	42
1.5	40	92	700	7	49	140	700	10	49
2	50	100	555	7	39	75	395	5	28
3	80	65	450	5	32	45	315	3	22
4	100	60	415	4	29	35	300	2	21
6	150	75	320	5	23	45	225	3	16
8	200	75	295	5	21	55	200	4	14
10	250	60	240	4	17	35	160	2	11
12	300	45	200	3	14	30	140	2	10
14	350	40	170	3	12	30	120	2	8
16	400	35	150	2	11	25	105	2	7
18	450	35	150	2	11	25	80	2	7
20	500	35	150	2	11	25	80	2	7
24	600	35	150	2	11	25	70	2	6

Composite Disks for Bolted Flange and Union Type Safety Heads

Composite disk: PLD; Center Section Material 316ss					
Disk Size		Disk Seal Material			
		Fluoropolymer Film			
in	mm	psig		barg	
		Min	Max	Min	Max
1	25	130	1000	9	70
1.5	40	92	700	7	49
2	50	45	555	3	39
3	80	32	450	2	32
4	100	24	415	2	29
6	150	18	320	1	23
8	200	16	295	1	21
10	250	14	240	1	17
12	300	10	200	1	14
14	350	10	170	1	12
16	400	10	150	1	11
18	450	10	135	1	10
20	500	10	120	1	8
24	600	10	100	1	7

BS&B bolted and union type safety heads require rupture disks with angular seating design. All standard disks with angular seating are listed on the following pages. Listing is by sizes with a full selection of standard disks for each size.

Option: For available flat seat D type disks, consult BS&B.



# Bolted Type Safety Heads

for type D series rupture disks

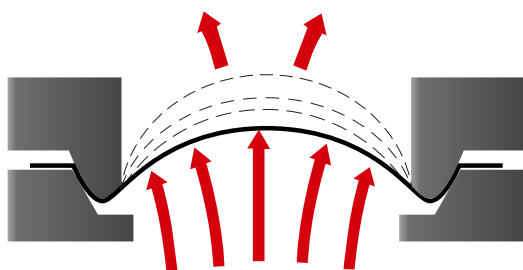
BS&B Safety Systems bolted type safety heads are constructed to be compatible with user pipe flanges connections. Safety head inlets and outlets feature angular seating design to accommodate both type B solid metal disks and type D composite disks.

BS&B bolted type safety heads are available in standard sizes ranging from 1/2 (12 mm) - 44 inches (1100 mm) nominal size.

Standard materials for bolted type safety heads are carbon steel, 304 and 316 stainless steel. Special materials include Monel®, nickel, Hastelloy® B and C, aluminum, brass and other types of stainless steel. Glass-lined base and plastic-coated are also available.



Quick-Sert installed between two ANSI (ASA) pipe flanges



**Example:** Cross-section diagram of a Type B tension loaded conventional rupture disk and FA-7R Quick-Sert safety head. With 30-degree angular seating, pressure loading is on concave side of disk. This puts the disk metal under tension. As pressure increases on a conventional disk in tension, the seating design allows the dome to thin out to a point where it can no longer withstand the pressure. The disk ruptures and metal segments fold back against the walls of the fitting in an irregular pattern to provide a full opening.

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## Maximum Temperature for all Components

Disk Material	F°	C°
FEP	400	204
PTFE	500	260
Aluminum	800	427
Silver	800	427
Nickel alloy 200	1000	538
Monel® (alloy 400)	1000	538
Inconel® (alloy 600)	1000	538
316ss	1000	538
Hastelloy® B or C-276 (alloy C-276)	1000	538



BS&B Quik-Sert safety head - flanges are assembled with bolted side lugs in sizes through 8 inches ID - with recessed cap screws in 10 inch size and up

Refer to catalog #77-1002 for additional safety head information.

# Worldwide Locations

## BS&B Offices and Manufacturing

BS&B companies' employees and representatives live and work in hundreds of cities in over 70 countries worldwide. Our commitment to thinking globally while acting locally shows every day within industrial process plants everywhere. We're available to you, on location, assisting you in selecting safe and reliable overpressure relief devices that protect personnel and equipment from the dangers of overpressure and explosion.

BS&B is the world leader in the design and manufacture of non-reclosing pressure relief devices. We set the standards in the pressure relief industry. BS&B has been responsible for



Refer back page for contact information.



**BS&B<sup>®</sup>**

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