



BS&B SAFETYSYSTEMS, INC.  
BS&B SAFETYSYSTEMS LTD.

# Installation Instructions

Bulletin 77-30011

## Type B™ and D™ Rupture Disks FA-7R™, Bolted, Union and Screw Type Safety Head Assemblies

**DANGER:** Rupture disks re intended to provide a pressure relief opening. This rupture disk is designed to burst at a specified temperature and pressure, thereby relieving excess pressure or preventing excessive vacuum in a system. **A RUPTURE DISK BURST COULD CAUSE SEVERE BODILY INJURY OR DEATH, COULD RESULT IN PROPERTY DAMAGE, AND MAY RESULT IN THE RELEASE OF PRODUCT INTO THE ATMOSPHERE OR SURROUNDING AREA. IT IS IMPERATIVE THAT THIS RUPTURE DISK BE PROPERLY INSTALLED AND SAFELY VENTED IN ORDER TO AVOID BODILY INJURY, DAMAGE TO PROPERTY, POLLUTION AND LOSS OF PRODUCT.** BS&B supplies disks selected by its customers which are manufactured in reliance upon information and specifications supplied by the customer. BS&B is not liable for any damage resulting from improper installation, improper system design, unsafe venting, or other factors beyond BS&B's control

### ORDER REPLACEMENT DISKS BY LOT NUMBER (shown on disk tag).

### Safety Precautions

**WARNING:** Do not locate the rupture disk where personnel will be exposed to released product and pressure through the disk

**CAUTION:** Provide adequate support for piping and connections to absorb recoil/reaction forces when the disk ruptures. If the discharge is free vented, a baffle plate may be mounted downstream of the outlet companion pipe flange with extra length studs to minimize recoil.

**CAUTION:** The rupture disk and Safety Head should not be subjected to bending stresses.

**CAUTION:** Do not locate the disk where it may be subjected to thermal shock. Moisture, rain, condensation or snow may cause a thermal shock to the disk causing the disk to burst below its rated burst pressure. A protector is recommended for temperature above 212°(100°C), consult BS&B.

**CAUTION:** When the disk ruptures, the resulting shock wave may affect the operating performance of downstream equipment.

Type B Series  
Solid Metal  
Rupture Disks



Type D Series  
Composite  
Rupture Disks



### BEFORE YOU INSTALL A RUPTURE DISK: Inspect Safety Head

1. Inspect Safety Head's mating surfaces for foreign material. Pits dirt or grit can damage the rupture disk affecting disk performance or cause leakage. Clean if necessary. If the metal-to-metal contact surfaces are nicked, lightly stone prior to installation.
2. The Safety Head size and rating must match the companion flange size and rating.
3. The rupture disk and Safety Head must not be machined or modified in any way except with the approval of BS&B. Failure to obtain such approval voids the warranty on this product

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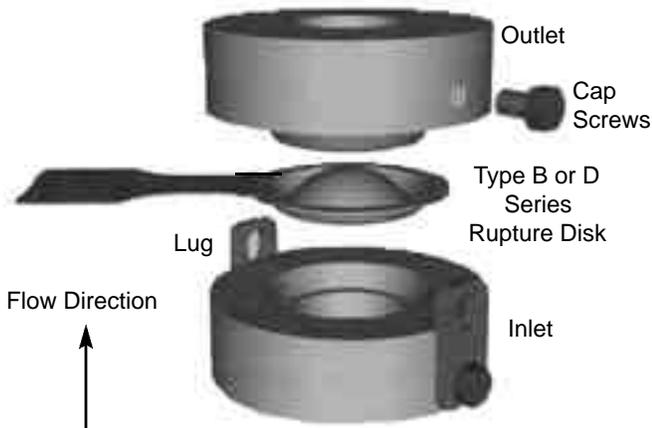
### Inspect the Rupture Disk

1. Handle the rupture disk carefully holding the disk by the tag **and the perimeter only**. Examine seating and domed surfaces for nicks, dents, scratches and foreign material which can damage the disk or cause leakage or affect the burst pressure. **Do not install a damaged disk**. Installation of a damaged disk may result in a premature bursting of the disk. Vacuum supports, when specified, are permanently attached to the concave side of disk.

**CAUTION:** Do not reinstall a disk that had been removed from a Safety Head even if it has not ruptured. When stresses in the disk are relieved by unbolting, the impression in the seating area taken by the disk during its original installation may prevent sealing and affect disk performance if reinstalled.

**Note:** Corrosion and process conditions may affect disk deterioration and necessitate more frequent replacement.

### Installation of Rupture Disk in FA-7R QuikSert Safety Head



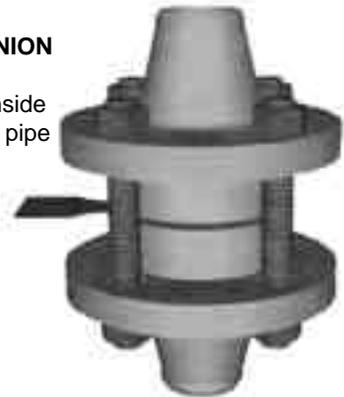
1. Place inlet of Safety Head on a work surface in position shown in diagram with **flow arrows up**.
2. Place NEW, UNDAMAGED rupture disk on inlet flange with dome facing up. System pressure must be against concave side of disk.
3. Carefully place outlet flange in position as shown. **Flow arrows on both flanges must point in the same direction.**
4. Assemble unit with alignment lugs and capscrews. Tighten capscrews only sufficiently to hold disk snugly in place between the two flanges.

### Installation of Safety Head FA-7R Assembly in Pressure System

1. Insert the Safety Head assembly into the pressure system between companion flanges. **Ensure flow arrows on the Safety Head point in the desired flow direction upon disk rupture.** System pressure must be against concave side of disk.
2. Install gaskets between FA-7R Safety Head and mating pipe flanges. BS&B recommends a hard compressed fiber gasket no greater than 1/32in. thick for all Type B's and Type D's of metal construction and 1/8in. thick for Type D's with plastic seals. However, the user is cautioned to select gasket materials adequate for the service conditions and the ability of the gasket to resist "cold flows." Gaskets that "cold flow" will allow torque relaxation which will cause low bursts. **Contact BS&B if an alternative gasket type is used.**
3. Install studs with nuts. Studs with nuts should be free running with lightly oiled threads. Tighten all nuts finger tight. Torque the nuts to the value shown in Table I. **Torque evenly in a diagonal pattern** by applying 1/4 of the recommended torque to each stud. Repeat pattern by torquing to 3/4 of the recommended torque value. Then using same pattern torque to full specified torque value.

#### FA-7R INSTALLED BETWEEN COMPANION PIPE FLANGE

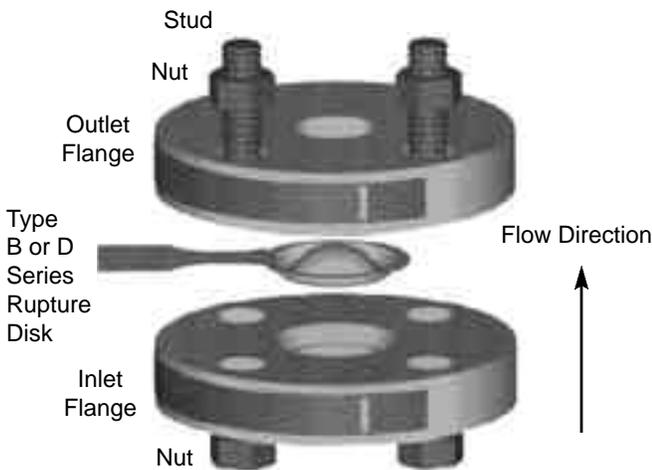
The FA-7R nestles inside the bolting pattern of pipe flanges.



4. Make sure flanges are not "cocked". Use feeler gauge if necessary to assure even spacing all around. **DO NOT OVERTORQUE**. Angular seating surfaces help to seal disk with minimum bolt loading. Excessive tightening may damage the rupture disk.
5. The torque value on the companion flange nuts should be verified periodically at the system service temperature.

**Note:** All torque values are for compressed fiber gaskets. **DO NOT USE SPIRAL WOUND GASKETS.**

# Bolted Type Safety Heads



1. Place inlet of Safety Head on work surface as shown, with **flow arrow up**.
2. Place NEW, UNDEMANAGED rupture disk on inlet flange with dome facing up. System pressure must be against concave side of disk.
3. Carefully place outlet flange in position as shown. **Flow arrows on both flanges must point in the same direction.**

4. Install compressed fiber gaskets between Safety Head and mating pipe flanges. See page 2 for BS&B gasket recommendations. System pressure must be against concave side of disk. **Ensure flow arrows on the Safety Head point in the desired flow direction upon disk rupture.**

**Contact BS&B if an alternative gasket type is used.**

5. Install studs with nuts. Studs with nuts should be free running with lightly oiled threads. Tighten all nuts finger tight. Torque the nuts to the value shown in Table I. **Torque evenly in a diagonal pattern** by applying 1/4 of the recommended torque to each stud. Repeat pattern by torquing to 3/4 of the recommended torque value. Then using same pattern torque to full specified torque value.

Make sure flanges are not "cocked". Use feeler gauge if necessary to assure even spacing all around. DO NOT OVERTORQUE. Angular seating surfaces help seal disk with minimum bolt loading. Excessive tightening may damage rupture disk.

**If using a Full Bolted Type Safety Head which is not placed between companion pipe flanges, select torque from Torque Table I by using the Safety Head size and flange rating.**

**TORQUE TABLE I**  
**TYPE B OR D SERIES IN FA-7R AND BOLTED TYPE SAFETY HEAD ASSEMBLIES**  
(Angular Seat, Light and Heavy Lip)\*\*

SIZE	SAFETY HEAD RATING	TYPE D		TYPE B		
		METAL WITH PLASTIC SEALS TORQUE (FT-LB)	ALL METAL CONSTRUCTION TORQUE (FT-LB)	INCONEL, MONEL, HASTELLOY AND 316SS		NICKEL, ALUMINUM & DISKS WITH PLASTIC LINERS
				LIGHT (L) LIP	HEAVY (H) LIP	
IN.	ANSI	(FT-LB)	(FT-LB)	(L) LIP	(H) LIP	
1	150	7	14	25	25	7
	300	9	18	31	31	9
	600	9	18	31	31	9
1.5	150	10	20	30	30	10
	300	15	30	45	45	15
	600	15	30	45	45	15
2	150	36	50	50	50	36
	300	18	36	42	42	18
	600	18	36	42	42	18
3	150	49	80	80	80	49
	300	29	58	69	69	29
	600	29	58	69	69	29
4	150	24	48	48	48	24
	300	29	58	95	95	29
	600	33	66	153	153	33
6	150	45	90	90	-	45
	300	30	60	104	-	30
	600	40	80	139	-	40
8	150	82	125	125	-	82
	300	64	128	153	-	64
	600	82	164	262	-	82
10	150	81	153	153	-	81
	300	69	138	185	-	69
	600	95	190	*	-	95
12	150	95	145	145	-	95
	300	90	200	250	-	90
	600	80	160	*	-	80
14	150	120	230	230	-	120
	300	80	180	*	-	80
	600	105	210	230	-	105
16	150	105	210	255	-	105
	300	105	210	320	-	105
	600	150	300	465	*	150
18	150	115	226	350	-	115
	300	105	210	320	-	105
	600	150	300	465	*	150
20	150	115	226	350	-	115
	300	105	210	320	-	105
	600	150	300	465	*	150
24	150	150	300	465	*	150
	300	150	300	465	*	150
	600	190	380	590	*	190
***30	150	135	270	420	*	135
	300	190	380	590	*	190
	600	165	330	480	*	165
***36	150	165	330	480	*	165
	300	220	440	700	*	220
	600	225	450	560	-	225
***44	150	225	450	560	-	225
	300	330	660	815	-	330

SIZE	SAFETY HEAD RATING	TYPE D		TYPE B		
		METAL WITH PLASTIC SEALS TORQUE (NT-M)	ALL METAL CONSTRUCTION TORQUE (NT-M)	INCONEL, MONEL, HASTELLOY AND 316 SS		NICKEL, ALUMINUM, & DISKS WITH PLASTIC LINERS
				LIGHT (L) LIP	HEAVY (H) LIP	
MM	DIN	(NT-M)	(NT-M)	(L) LIP	(H) LIP	
25	10	10	19	32	32	10
	16					
	25					
	40					
40	10	17	34	50	50	17
	16					
	25					
	40					
50	10	49	75	75	75	49
	16					
	25					
	40					
80	10	33	67	79	79	33
	16					
	25					
	40					
100	10	32	65	65	65	32
	16					
	25					
	40					
150	10	64	128	152	-	64
	16					
	25					
	40					
200	10	77	154	266	-	77
	16					
	25					
	40					
250	10	117	135	135	-	117
	16	78	155	155	-	78
	25	94	188	263	-	94
	40	106	210	335	-	106
300	10	99	152	152	-	99
	16	118	236	263	-	118
	25	133	266	390	-	133
	40	148	296	440	-	148
350	10	120	160	160	-	120
	16	135	215	215	-	135
	25	115	230	320	-	115
	40	130	255	350	-	130
400	10	100	150	150	-	100
	16	120	235	260	-	120
	25	145	290	375	-	145
	40	160	320	410	-	160
450	10	135	270	270	-	135
	16	150	300	365	-	150
	25	185	370	450	-	185
	40	200	400	490	-	200
500	10	130	260	260	-	130
	16	160	320	420	-	160
	25	180	360	560	-	180
	40	210	420	660	-	210
600	10	175	350	390	*	175
	16	210	420	580	*	210
	25	230	460	720	*	230
	40	200	400	580	*	200
900	16	240	480	700	*	240
	25	300	600	800	*	300

\*Consult BS&B for torque.

\*\*For Flat Seat (F) Disks consult BS&B for torque values.

\*\*\*Flange diameter and stud size per MSS Specification SP-44.

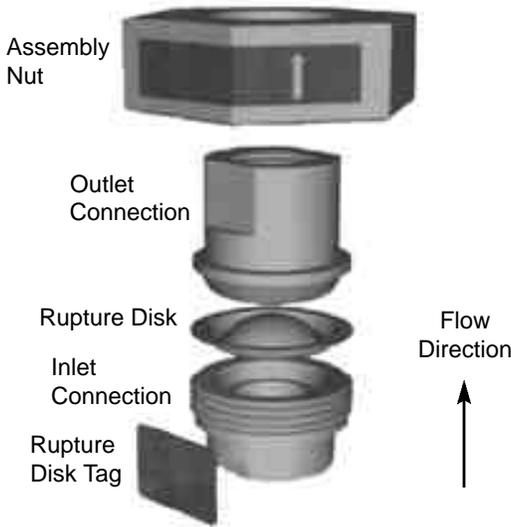
Notes:

- 12 inch pounds = 1 Foot Pound.
- Torque values are based on free running and lightly oiled threads.
- Torque values are for use with companion flanges that have a minimum yield strength of 25,000 PSI. Consult BS&B when using other flange material such as glass lined, when suppliers recommend a maximum torque value which is lower than BS&B required torque value.
- If using a Full Bolted Type Safety Head which is not placed between companion flanges, select torque from Torque Table I by using the Safety Head flange rating.

\*Consult BS&B for torque.

\*\*For Flat Seat (F) Disks, consult BS&B for torque values.

# Union Type Installation Instructions



1. Place inlet connection in position as shown, with **flow arrow up.** (Flow arrow on Union Type Safety Head is on the assembly nut.)
2. Place NEW, UNDAMAGED rupture disk on inlet connection with dome facing up. System pressure must be against concave side of disk.
3. Carefully place outlet connection in position as shown.
4. Slip assembly nut over outlet connection as shown. Torque to the values in Table II.
5. Insert the Safety Head in the pressure system. **Ensure flow arrows on the Safety Head point in the desired flow direction upon disk rupture.**
6. Affix rupture disk tag to Safety Head Assembly after installation to identify disk in service.

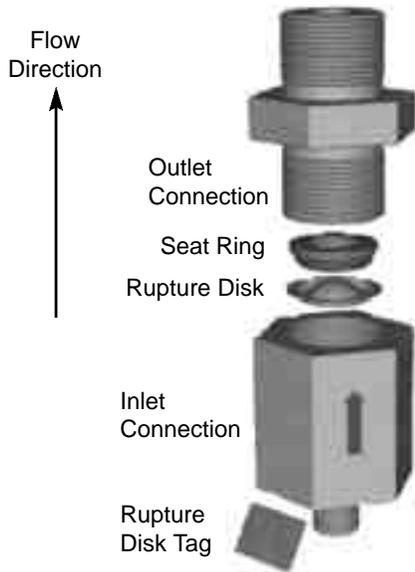
**TORQUE TABLE II**  
TYPE B or D SERIES IN UNION TYPE SAFETY HEAD ASSEMBLIES

SIZE	MAXIMUM RATING	TORQUE FT-LBS.				
		DISK PRESSURE PSID				
IN	LBS.	0-55	501-1000	1001-2000	2001-3000	OVER 3000
0.5	3000	50	50	50	50	-
	6000	50	50	50	80	120
1	1500	100	100	150	-	-
	3000	100	100	150	150	-
	6000	120	120	150	175	240
1.5	3000	150	250	300	350	-
2	1200	200	600	600	-	-

**TORQUE TABLE II**  
TYPE B or D SERIES IN UNION TYPE SAFETY HEAD ASSEMBLIES  
*METRIC UNITS*

SIZE	MAXIMUM RATING	TORQUE NT-M				
		DISK PRESSURE BARG				
MM	BARS	0-34	35-69	70-138	139-207	OVER 207
13	207	68	68	68	68	-
	414	68	68	68	108	163
25	103	136	136	203	-	-
	207	136	136	203	203	-
	414	163	163	203	237	325
40	207	203	339	407	475	-
50	83	271	813	813	-	-

# Screw Type Installation Instructions



1. Place inlet connection in position as shown, with **flow arrow up**.
2. Place NEW, UNDAMAGED rupture disk on inlet connection with dome facing up. System pressure must be against concave side of disk.
3. Insert seat ring on top of rupture disk before placing outlet connection in position.
4. Screw outlet connection to inlet connection as shown. Torque to the values in Table III.
5. Insert the Safety Head in the pressure system. **Ensure flow arrows on the Safety Head point in the desired flow direction upon disk rupture.**
6. Affix rupture disk tag to Safety Head Assembly after installation to identify disk in service.

**TORQUE TABLE III**  
TYPE B or D SERIES IN SCREW TYPE SAFETY HEAD ASSEMBLIES

SIZE	MAXIMUM RATING	TORQUE FT-LBS.				
		DISK PRESSURE PSID				
IN	LBS.	0-1000	1001-3000	3001-6000	6001-10,000	OVER 10,000
11/16 (F)	1000	50	-	-	-	-
1/2 (A)	3000	50	50	-	-	-
1/2 (F)	10,000	50	80	120	200	-
7/16 (F)	20,000	50	60	100	150	200

**TORQUE TABLE III**  
TYPE B or D SERIES IN SCREW TYPE SAFETY HEAD ASSEMBLIES  
*METRIC UNITS*

SIZE	MAXIMUM RATING	TORQUE NT-M				
		DISK PRESSURE BARG				
MM	BARS	0-69	70-207	208-414	415-689	OVER 690
17 (F)	69	68	-	-	-	-
13 (A)	207	68	68	-	-	-
13 (F)	689	68	108	163	271	-
11 (F)	1379	68	81	136	203	271

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### ISO 9001 Quality System



Patent number 4819823 and other international patents



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BS&B Safety Systems, Inc. and BS&B Safety Systems Ltd. are here to assist you in providing a safe and efficient work place. For assistance on installation, audits, training or technical advice, please contact our Customer Service Department.

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