

GRAPHILOR®

www.serviceprocess.net

Service Process Equipment, Inc.

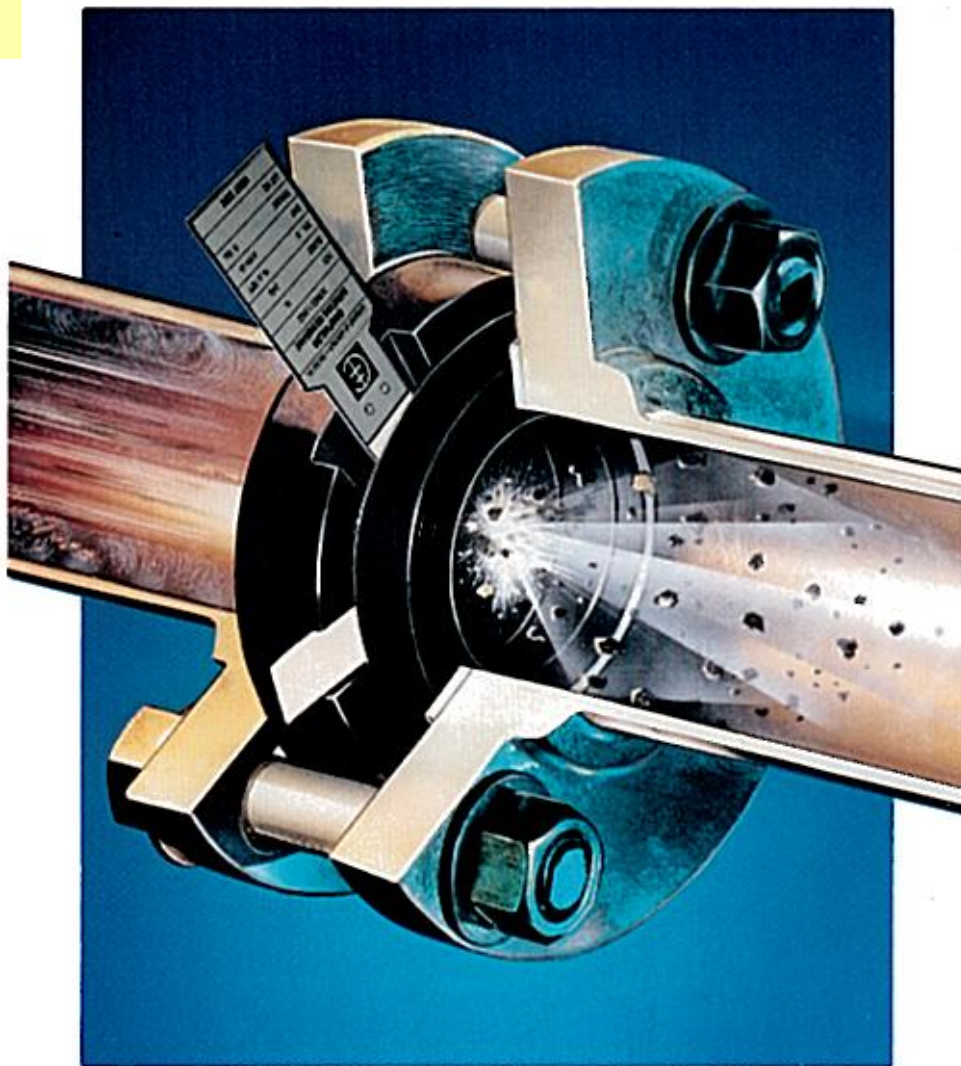
PO Box 850908

Mobile AL 36685-0908

251.342.1313 • Fax 251.342.1377

Email msellers@serviceprocess.net

GRAPHITE BURST DISCS



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GRAPHITE BURST DISCS

WHY BURST DISCS?

Burst discs are an accepted pressure relief device utilized to protect equipment, vessels, piping, and personnel wherever pressurized equipment is used. They are a cost effective method of providing safe and immediate venting of liquids and vapors. They may also be used in series with relief valves in which case they provide a corrosion resistant barrier protecting the relief valve.

WHY GRAPHITE BURST DISCS?

Unlike other materials such as metals, graphite is a unique material because it is not affected by thermal shock, is inert to corrosive atmospheres, is unaffected by material fatigue due to pressure cycling, and is accurate at pressures as low as 0.5 psig.

WHY GRAPHILOR DISCS?

GRAPHILOR is a resin-impregnated graphite which is virtually impervious to most corrosive liquids and vapors within its temperature/pressure rating. They are tested in accordance with the ASME Code, Section VIII, Division 1, as such, they are destructively tested to confirm the burst pressure at ambient temperature and records are maintained for traceability of each lot.

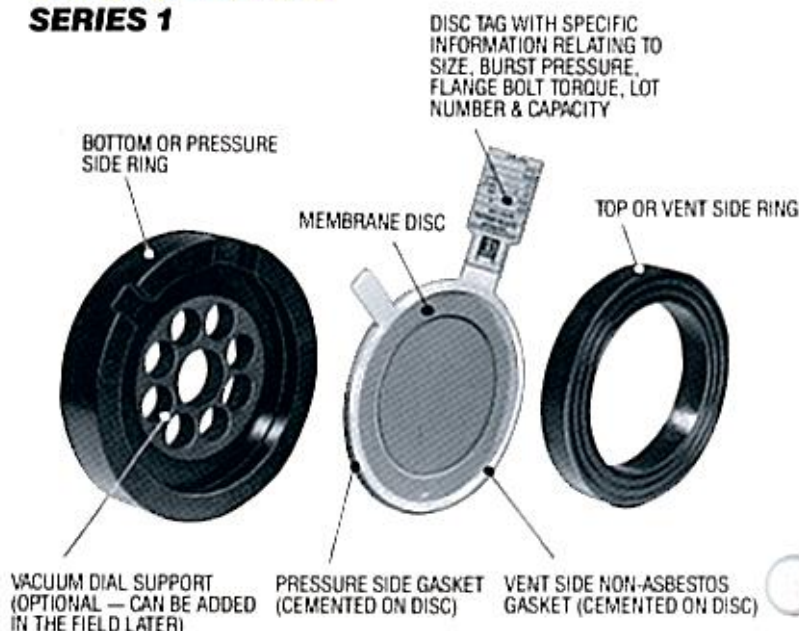
GRAPHILOR BURST DISCS HAVE THE FOLLOWING FEATURES:

- Inert to most acids and corrosive compounds.
- Burst pressure independent of temperature.
- No fatigue failure — Pressure cycles to 75% of rated burst pressure without premature burst.
- Accuracy to within plus or minus 5% of rated burst pressures at 15 psig and above.
- Disc size, burst rating, venting capacity, bolt torque, temperature, and lot number clearly marked on each disc.
- Full size range 1" - 24" nominal pipe size.
- Standard burst ratings 5 psig through 150 psig — higher burst ratings upon request.
- Standard dimensions for 150 psig ANSI flanges.
- Computerized inventory for immediate shipment.
- Over 8000 discs in stock.

GRAPHILOR is a registered trademark of

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MEMBRANE TYPE DISC SERIES 1



SINGLE PIECE DISC SERIES 3



MEMBRANE TYPE DISCS

MEMBRANE TYPE DISCS SERIES 1

GRAPHILOR 3 piece design with graphite membrane type discs offer maximum plant protection utilizing a cost effective design unique to the industry.

Expendable, self-aligning, burst membranes are easily replaced in the reusable holders which leads to lower inventory costs.

GRAPHILOR discs conform to ASME Code test requirements.

These discs are inert to most acids and corrosive compounds.

DESIGN FEATURES:

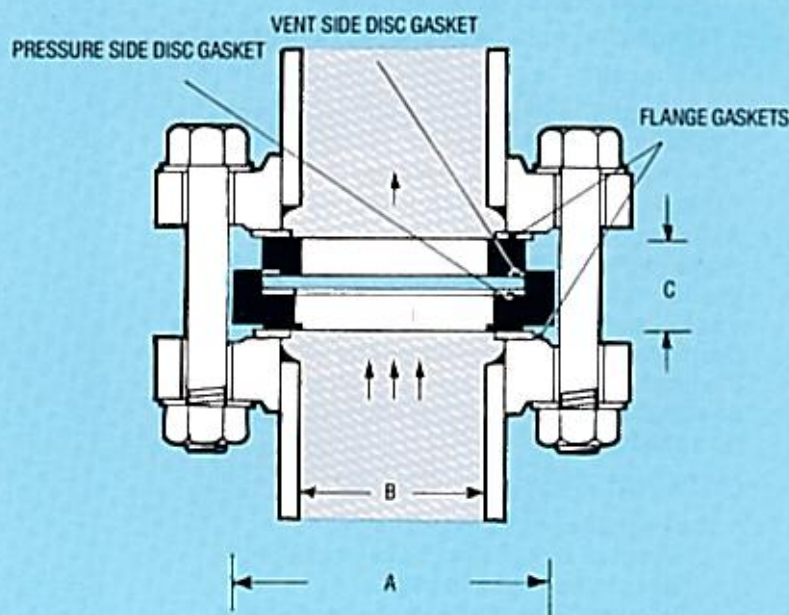
- **Fluoropolymer coating** of discs and holders available for additional corrosion resistance.
- **Vacuum Supports:** (See Page 5).
Vacuum Dial — Implosion protection for discs rated below 10 psig.
Vacuum Bar — Implosion protection for discs rated 10 to 20 psig.
- Discs are clearly labeled with size, burst rating, venting capacity, temperature, and torque rating.
- Holders fit standard 150 psig ANSI flanges. Holders for 300 psig ANSI flanges available on special order.
- Disc holders available in the following standard materials — graphite, molded phenolic, and 316 stainless steel. Other alloys upon request.
- **High temperature:** Special high temperature resins and spacers are available for operating temperatures from 300°F to 700°F.
- All membrane discs are gasketed with non-asbestos materials. TFE gaskets available on request.
- Flange gaskets furnished upon request.

LOW PRESSURE BURST DISC

SIZE	LOWEST BURST RATINGS AVAILABLE	LOW PRESSURE DISC ACCURACY
1"	15 psig	± 5%
1½"	10 psig	± .75 psig
2"	4 psig	± .75 psig
3"	3 psig	± .75 psig
4"-6"	2 psig	± .75 psig
8"-10"	1.0 psig	+ .75 psig - 0 psig
12"-14"	0.5 psig	+ .75 psig - 0 psig

TYPICAL INSTALLATION OF 3-PIECE MEMBRANE ASSEMBLY

SERIES 1



A. OVERALL DIAMETER OF ASSEMBLY
B. NOMINAL INSIDE DIAMETER
C. OVERALL ASSEMBLY HT.

MEMBRANE DISC ASSEMBLY FOR 150# ANSI FLANGES STD. RATINGS 5, 10, 15, 20, 25, 30, 40, 50, 75, 100, 125, 150 PSIG

NOMINAL PIPE SIZE	DIMENSIONS IN INCHES		
	A	B	C
1	2 1/2	1	1 1/8
1 1/2	3 1/4	1 1/2	1 1/8
2	4	2	1 1/4
3	5 1/4	3	1 9/16
4	6 3/4	4	1 15/16
6	8 5/8	6	2 3/8
8	10 7/8	8	3 5/16
10	13 1/4	10	3 1/2
12	16	12	3 5/8
14	17 5/8	13 1/4	3 7/8

SINGLE PIECE DISCS

SINGLE PIECE DISCS

SERIES 3

GRAPHILOR single piece graphite discs are inexpensive burst discs which can be utilized in a variety of applications especially in the chemical and pharmaceutical industries.

They have the following typical characteristics:

- Inert to most acids and corrosives.
- Burst pressures independent of temperature.
- Standard burst ratings 5 psig to 150 psig, higher on request. See chart below.
- Standard dimensions for 150 psig ANSI flanges.
- Size range 1" to 24" nominal pipe size.
- Accuracy to within $\pm 5\%$ of rated burst pressure for 15 psig and above. Below 15 psig through 2 psig the disc accuracy is $\pm .75$ psig. See chart below, for other tolerances.

A vent side gasket is cemented in place on each single piece disc and is included in the price of the disc. It should not be removed because it ensures proper burst pressure. Similar gaskets have been used in the testing of discs for establishing the burst pressures. The process side gasket is to be supplied by customer or can be provided with disc at additional cost.

OPTIONAL DESIGN FEATURES:

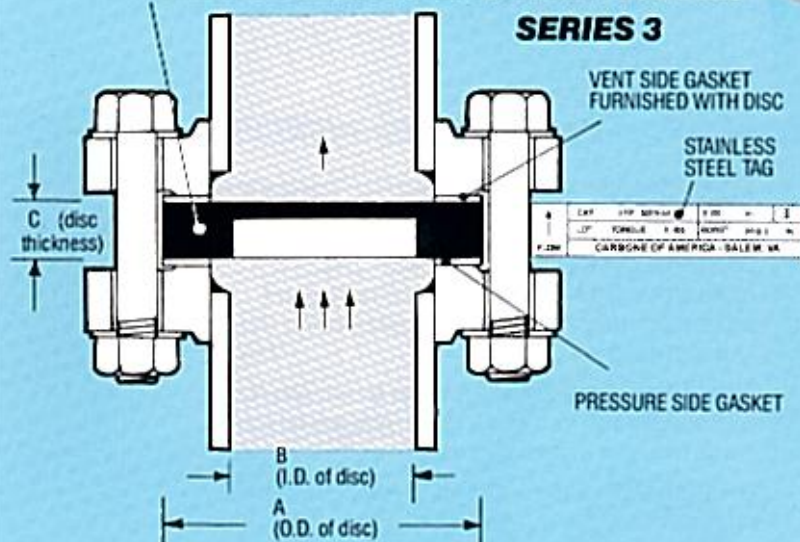
- **Vacuum Supports:** (See Page 5).
Vacuum Dial — Implosion protection for discs rated below 10 psig.
Vacuum Bar — Implosion protection for discs rated 10 to 20 psig.
- **Fluoropolymer coating or TFE shield** for additional corrosion resistance and non-stick surface characteristics.
- **Steel armoring:** Can be provided when specified and is generally used for higher pressure for additional safety (See Page 5).
- **High temperature:** Special high temperature resins and spacers are available for operating temperatures from 300°F to 700°F.
- **Low Pressure Series:** Burst rating as low as 0.5 psig, depending upon size.
- Discs sized for 300 psig ANSI flanges are available.

LOW PRESSURE BURST DISC

SIZE	LOWEST BURST RATINGS AVAILABLE	LOW PRESSURE DISC ACCURACY
1"	15 psig	$\pm 5\%$
1 1/2"	10 psig	$\pm .75$ psig
2"	4 psig	$\pm .75$ psig
3"	3 psig	$\pm .75$ psig
4"-6"	2 psig	$\pm .75$ psig
8"-10"	1.0 psig	$\pm .75$ psig
12"-14"	0.5 psig	- 0 psig

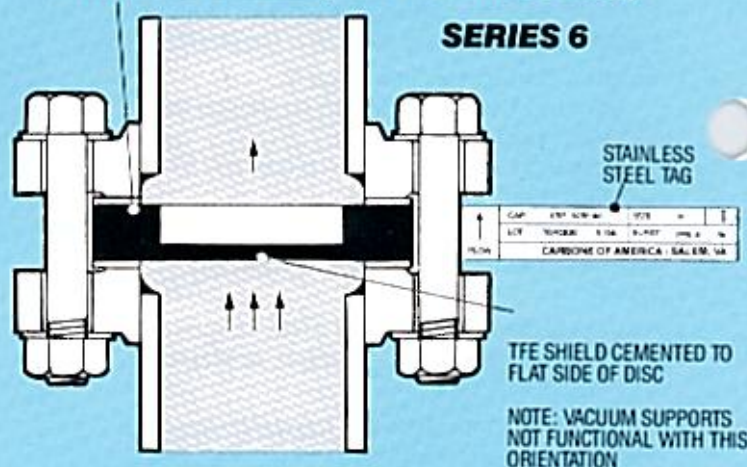
TYPICAL INSTALLATION OF SINGLE PIECE DISC

SERIES 3



TYPICAL INSTALLATION OF SINGLE PIECE DISC WITH TFE SHIELD (REVERSE BURSTING)

SERIES 6



SINGLE PIECE DISCS FOR CLASS 150 ANSI FLANGES

STD. RATINGS 5, 10, 15, 20, 25, 30, 40, 50, 75, 100, 125, 150 PSIG

CLASS 300 ANSI FLANGES

STD. RATINGS 175, 200, 225, 250, 300 PSIG

NOMINAL PIPE SIZE	DIMENSIONS IN INCHES				
	150# A	150/300# B	150# C	300# A	300# C
1	2 1/2	1	7/8	2 3/4	1
1 1/2	3 1/4	1 1/2	7/8	3 5/8	1
2	4	2	7/8	4 1/4	1
3	5 1/4	3	7/8	5 3/4	1 1/4
4	6 3/4	4	7/8	7	1 1/4
6	8 5/8	6	7/8	9 3/4	1 3/4
8	10 7/8	8	1 1/8	12	2 1/4
10	13 1/4	10	1 1/2		
12	16	12	2		
14	17 5/8	13 1/4	2 1/4		
16	20 1/8	15 1/4	2 1/2		
18	21 1/2	17 1/4	2 3/4		
20	23 3/4	19 1/4	3		
24	28 1/8	23 1/4	3		

*Larger sizes available upon request.

VACUUM SUPPORTS:

Membrane and discs with burst ratings of 20 psi or less that operate under vacuum conditions require supports to prevent implosion of graphite discs. Discs operating above 20 psi are self-supporting and do not require additional support, for vacuum service. Vacuum supports are supplied in two types, vacuum bar and vacuum dial and are used under the conditions as described on Page 4 of this brochure. The supports are cemented to the single piece discs at the factory and **cannot** be added in the field if required at later date.

In the case of membrane type discs, vacuum supports **can** be added in the field at a later date since the holder is designed to accommodate them as a separate item.

HIGH TEMPERATURES:

For applications where disc exposure is in excess of 300°F the use of an insulating spacer is recommended.

ARMORING:

A steel armor ring can be provided on the outer circumference of single piece discs and is generally used for higher pressure applications. A disc with burst ratings greater than those listed below must be armored. Both carbon and stainless steel material is available for armoring.

SIZE DISC	BURST RATING
1" thru 3"	150 psig
4" thru 6"	100 psig
8" thru 10"	75 psig
12" thru 24"	50 psig

FLUOROPOLYMER COATING:

Temperature fused coating on the process side or both sides of single or membrane discs is available for additional corrosion protection, as well as providing a non-stick surface to assist in preventing chemicals from adhering to discs and altering the burst pressure.

TFE SHIELD:

If single piece discs are to be used in a highly corrosive service, particularly in the presence of oxidizing chemicals such as sodium hypochlorite, sulfur trioxide, sodium chlorate, then a TFE Shield should be specified (see disc drawing on Page 4).



SINGLE PIECE DISC WITH INTEGRAL VACUUM BAR SUPPORT



SINGLE PIECE DISC WITH FLUOROPOLYMER COATING ON PROCESS & VENT SIDES



SINGLE PIECE DISC WITH ARMOR RING



SINGLE PIECE DISC WITH HIGH TEMPERATURE SPACER DESIGN



MEMBRANE TYPE DISC WITH SEPARATE VACUUM DIAL SUPPORT

VENTING CAPACITY

THEORETICAL VENTING CAPACITY FOR BURST DISCS

The values shown are calculated in SCFM air at standard conditions. Capacities are given for discs with and without vacuum supports.

ADDITIONAL APPROPRIATE SAFETY FACTORS ARE LEFT TO THE CUSTOMER IN DETERMINATION OF PROPER DISC SIZE FOR HIS APPLICATION.



WITHOUT VACUUM SUPPORT

BURST RATING PSIG	DISC DIAMETER - INCHES								
	1	1 1/2	2	3	4	6	8	10	12
5			1,090	2,470	4,350	9,780	17,600	27,600	39,200
10		750	1,390	3,130	5,560	12,500	22,100	34,000	48,400
15	400	900	1,690	3,820	6,790	15,200	26,300	41,500	59,000
20	470	1,060	1,990	4,500	7,960	17,900	30,700	48,500	68,500
25	540	1,230	2,290	5,170	9,150	20,600	35,100	55,100	78,200
30	610	1,370	2,590	5,840	10,300	23,300	39,500	62,000	88,000
40	740	1,680	3,190	7,190	11,900	28,700	48,500	76,000	107,500
50	880	1,990	3,520	8,520	14,100	34,000	57,000	89,500	127,000
60	1,010	2,300	4,100	10,100	16,300	39,900	65,600	104,000	147,000
70	1,150	2,600	4,640	10,400	18,500	41,500	74,600	117,000	167,000
75	1,220	2,750	4,900	11,100	19,500	44,000	78,900	124,500	175,500
80	1,290	2,900	5,150	11,700	20,600	46,500	83,200	132,000	184,000
90	1,4200	3,220	5,700	12,800	22,700	51,800	92,000	145,000	204,000
100	1,560	3,520	6,220	14,100	24,700	56,200	100,000	159,000	223,000
125	1,900	4,300	7,700	17,400	31,000	69,500	124,000	194,000	278,000
150	2,300	5,200	9,300	21,000	37,100	84,000	149,000	229,000	328,000



WITH VACUUM BAR SUPPORT

BURST RATING PSIG	DISC DIAMETER - INCHES								
	1	1 1/2	2	3	4	6	8	10	12
5	—	—	687	1,827	3,132	5,868	12,672	20,120	27,600
10	—	472	876	2,316	4,003	7,700	15,910	24,800	35,330
15	—	567	1,065	2,827	4,700	9,420	18,940	30,250	43,100
20	—	668	1,253	3,330	5,430	11,250	22,100	35,400	50,000



WITH VACUUM DIAL SUPPORT

BURST RATING PSIG	DISC DIAMETER - INCHES								
	1	1 1/2	2	3	4	6	8	10	12
5	—	—	380	815	1,522	3,422	6,160	9,660	13,720
10	—	225	480	1,032	1,946	4,375	7,735	11,900	16,940
15	—	270	590	1,260	2,376	5,320	9,205	14,525	20,650

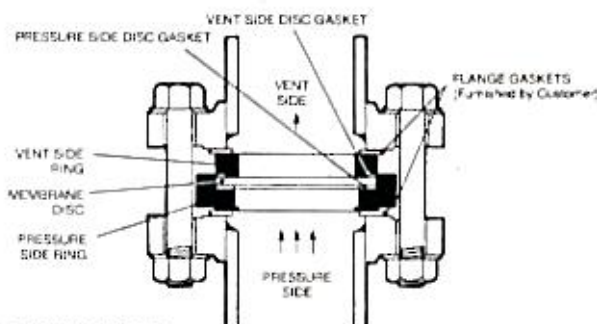
CAUTION: Vent lines must be secure and suitable for dynamic loads resulting from venting liquids or gases. Membrane fragments can discharge at high velocity and a safety shield may be required.

INSTALLATION INSTRUCTIONS

MEMBRANE BURST DISC INSTRUCTIONS

SERIES 1

TYPICAL INSTALLATION OF MEMBRANE DISC ASSEMBLY



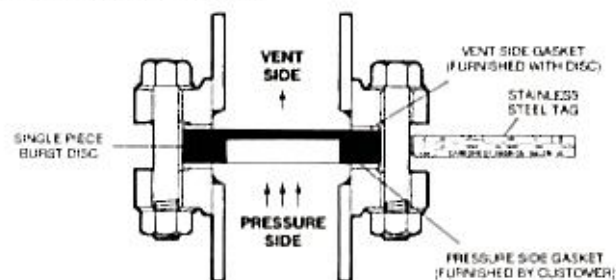
IMPORTANT NOTES:

- The **GRAPHILOR MEMBRANE DISC ASSEMBLY** consists of:
 - A two piece reusable holder, vent and pressure side rings, made of impregnated graphite, molded phenolic/graphite, or stainless steel.
 - A membrane disc which fits between the vent and pressure side rings.
 - A vacuum dial or vacuum bar support if required by the specific application.
- Holders are designed to fit within the bolt circle of 150# or 300# ANSI flanges. Make sure holder is properly centered between flanges during installation.
- It is important to install the disc in the correct flow direction. This is noted by an arrow on the holder label.
- Flange faces should be parallel to each other in order to eliminate excessive bolting forces when installing membrane disc assembly.
- Burst pressure shown on label has been established at ambient temperature. Elevated temperatures may cause a reduction in the actual burst pressure of the disc.

SINGLE PIECE DISC INSTRUCTIONS

SERIES 3

TYPICAL INSTALLATION



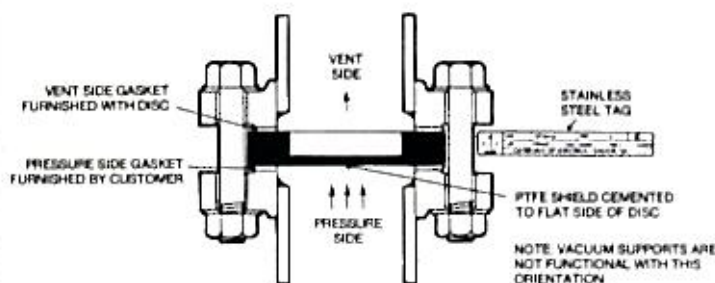
IMPORTANT NOTES:

- Discs are designed to fit within the bolt circle of 150# or 300# ANSI flanges. Make sure disc is properly centered between flanges during installation.
- It is important to install the disc in the correct flow direction. This is noted by an arrow on the label.
- Flange faces should be parallel to each other in order to eliminate excessive bolting forces when installing disc.
- The **vent side gasket** is furnished with the disc because the gasket material and inside diameter are critical to the burst disc accuracy.
- The **process (or pressure) side gasket**, furnished by customer, must be compatible with the process fluid and therefore the preferred type is a standard 150# ANSI TFE envelope gasket with a soft 1/8" thick filler. **Do not** use a gasket having a metal insert.
- Burst pressure shown on the label has been established at ambient temperature. Elevated temperatures may cause a reduction in the actual burst pressure of the disc.

SINGLE PIECE REVERSE BURSTING DISC WITH PTFE SHIELD

SERIES 6

TYPICAL INSTALLATION



IMPORTANT NOTES:

- Discs are designed to fit within the bolt circle of 150# or 300# ANSI flanges. Make sure disc is properly centered between flanges during installation.
- It is important to install the disc in the correct flow direction. This is noted by an arrow on the label.
- Flange faces should be parallel to each other in order to eliminate excessive bolting forces when installing disc.
- The **process (or pressure) side gasket**, is furnished by customer. It must be compatible with the process fluid and therefore the preferred type is a standard 150# ANSI TFE envelope gasket with a soft 1/8" thick filler. **Do not** use a gasket having a metal insert.
- Burst pressure shown on the label has been established at ambient temperature. Elevated temperatures may cause a reduction in the actual burst pressure of the disc.

FLANGE BOLT TORQUE

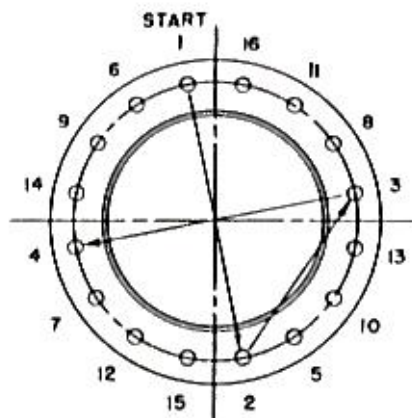
Tighten flange bolts using a diagonal pattern gradually increasing the torque to the value indicated on the disc label or the chart shown to the right. Torque values are based upon ANSI standards for size and number of bolts and the use of clean, lubricated nut and bolt threads. The gasket used for these torque loadings has a 4400 "Y" value or minimum design seating stress.

DISC SIZE (INCHES) TORQUE (FT./LBS.)
For 150# ANSI Flanges

1	10
1.5	15
2	25
2.5	30
3	30
4	35
6	45
8	65
10	55
12	70
14	100
16	80
18	100
20	80
24	120

For 300# ANSI Flanges

1	20
1.5	40
2	20
3	40
4	60
6	60
8	100



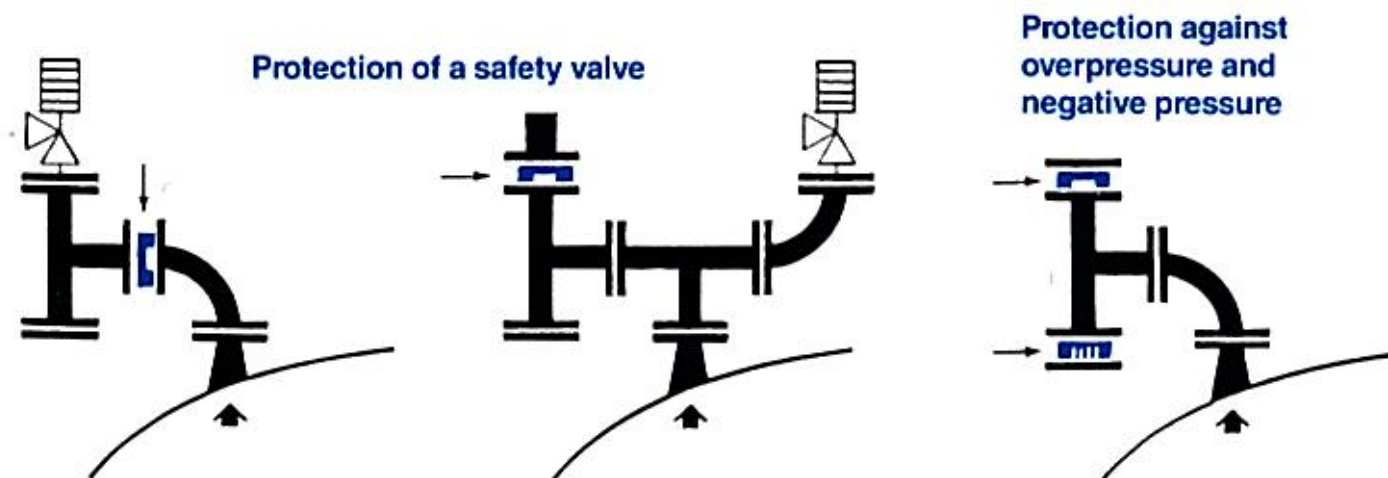
Improper installation can cause discs to break outside of specified burst pressure. Potential causes are:

- Misaligned flanges
- Excessive or uneven bolt torque
- Improper centering of disc
- Incorrect vent side gasket material or dimensions
- Discs with cracks or surface imperfections due to mishandling

PRECAUTION

Upon rupture, fragments of the graphite burst disc are propelled into vent line; toxic or flammable materials may be vented; blow-down may be at very high velocity; discharge from the vent opening can be hazardous. Safety provisions should be undertaken to prevent possible damage to plant equipment and injury to operating personnel.

Graphite particles generated by ruptured discs can be trapped by utilization of screens and or diversion traps as shown below. See disc installation instructions which accompany all disc shipments or contact Carbone's Engineering Department for further details.



In series

The effective burst pressure of the disc should be more than the opening pressure set for the valve. The safety valve would operate after the bursting of the safety disc.

In parallel

The effective burst pressure of the disc should be higher than the opening pressure of the valve. The safety disc operates only when the safety valve fails.

The upper disc insures the protection against over-pressure. The lower disc insures the protection against negative pressure.

WARRANTY

Carbone of America Corp. warrants its products to be free of any defects in material or workmanship for a period of 12 months from date of installation or 18 months from shipment, whichever comes first.

However, Carbone of America Corp. shall have no liability whatsoever for units which fail due to mechanical damage, misuse or abuse. Except for this warranty, Carbone of America Corp. makes no warranty, expressed or implied, and expressly excludes any warranty of application or fitness for a particular service. Carbone's maximum liability hereunder shall be limited to the repair or replacement of any defective product, if appropriate. Carbone of America Corp. shall, under no circumstances, be liable for any incidental, consequential, or other damages, including, but not limited to, loss of business or profits, based on any alleged negligence, breach of warranty, strict liability or other theory, arising out of the use or handling of these products.