

# Installation and Operating Instructions Welded Rupture Disk Assemblies

## Welded Rupture Disk Assemblies

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# Operating Instructions

1. Burst pressure / temperature relationship: the burst pressure of a rupture disk assembly is calibrated at a coincident temperature that must relate to the application conditions you have specified. Subjecting the rupture disk device to a higher temperature will typically lower the burst pressure from its intended value & a lower temperature will typically increase the burst pressure. The coincident temperature will be identified in at least one of the following locations; burst test certificate supplied with our product, or the product marking, or the drawing (if supplied).
2. Test media: when a rupture disk assembly has been ordered for gas service it shall be tested with a compressed gas. If ordered for liquid service, the rupture disk assembly shall be tested with a non-compressible fluid. Burst performance testing with the wrong fluid type will lead to unexpected performance characteristics for which we are not responsible.
3. Operating ratio: all rupture disk types have a maximum recommended operating pressure, typically expressed as a percentage of the marked burst pressure. Exceeding the recommended operating ratio will lead to unexpected performance characteristics for which we are not responsible.
4. Influence of fixturing on performance: the desired rupture disk performance requires that installation is according to the conditions advised by you at time of inquiry and order.
5. Rate or pressure rise, instrumentation and its location: rupture disk assemblies have a very fast response time when an overpressure arises – usually faster than standard instrumentation and / or data logging equipment can capture. If a fast rate of pressure rise is going to be applied in the testing and evaluation of a rupture disk device, pressure sensing and data capture should occur at a rate of 100,000 data points per

second or faster. The location of sensing instruments must be proximate to the rupture disk device and able to sense the same dynamic pulses generated from the users pressure system; a pressure sensor installed at right angles to the plane of a rupture disk will typically not see the same conditions as the rupture disk.

6. Fragmentation and Safe Pressure Release: ensure that you have selected a rupture disk device that is designed for non-fragmentation and that you have advised us correctly regarding your application conditions. In all cases, ensure that the pressure released by the activation of a rupture disk is directed to a safe location. It is imperative that the rupture disk be properly installed and safely vented in order to avoid bodily injury, damage to property, and / or pollution.
7. Assembly torque: whether installing a bolted flanged, screw threaded rupture disk assembly, sanitary fitting device, or customized installation configuration, ensure that the correct assembly torque and practices are followed for the fasteners used. Exceeding recommended torque values or otherwise applying abnormal loads to a rupture disk device may lead to unexpected performance characteristics such as leakage, damage to the assembly or unwanted activation. If in doubt, contact us before use.
8. Change of Duty / Management of Change: if your application conditions are changed from the purchasing specifications, you must ask for a management of change review to ensure the suitability of the purchased items.
9. Marking – do not obliterate / traceability: Product marking typically includes a traceability lot number. If this is removed or rendered unreadable we shall not be able to trace the item you have purchased back to our design and manufacturing records.
- 10.No rework: we do not accept any modification or rework of our

products by the user or a third party. Such action voids product warranty and may introduce the user to risk if such product is used.

11. Handling (do not touch the disk): while it is tempting to touch our interesting rupture disk domed structures please do not! Contact may alter the expected performance.
12. Back pressure influence: rupture disk devices are typically differential pressure sensitive and therefore a back pressure will increase the pressure required from the system that is being protected to activate the disk.
13. No dome contact: the disk dome & the user's equipment shall not come into contact as this will corrupt the proper function of the rupture disk device.
14. Drop it / scrap it: the intended function of a rupture disk assembly depends upon the relationship between the rupture disk membrane and the assembly holder. If an assembly is dropped, consider it damaged and do not use it. This is a safety device!

## **Before Installing a Welded Assembly**

### **Inspection and Replacement**

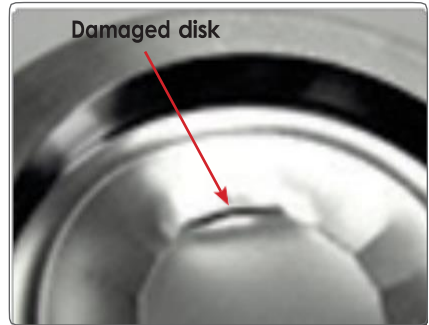
Welded rupture disk assemblies are comprised of a disk component, an inlet and outlet welded together to form a prefabricated rupture disks device (assembly). The inlet and outlet or holder is generally referred to as the assembly "body". A vast majority of welded assemblies are intended to be a one-time use device (ie. once the disk activates, the entire assembly is discarded). Common welded assemblies can be fabricated with various threaded or tube stub connections on either the inlet, outlet or both sides. Another common style of welded assemblies is the Cassette. Cassettes (as shown below) are designed with a simple inlet and outlet allowing them to be quickly installed.

However, various methods may exist for installing a Cassette assembly.

### Inspect Safety Head



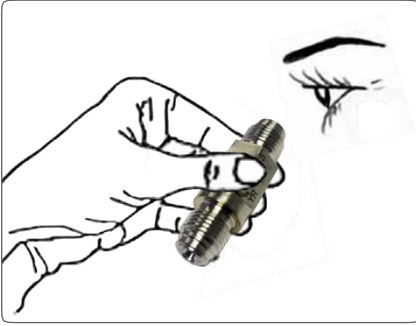
- Handle carefully holding the disk by the perimeter only. Examine disk surfaces (if visible) for nicks, dents, scratches and foreign material which can damage the disk.



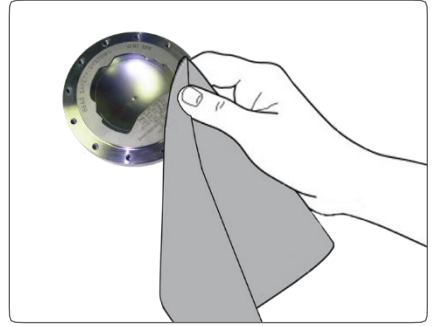
- **Do not install a damaged disk -** Burst pressure may be affected by damage or disk could leak. Contact BS&B if you believe to have a damaged product. Most damage is visible by photograph. Installation may result in leakage or affect burst pressures.

# Before Installing a Welded Assembly

- Continued



- Inspect body surfaces or connection threads for damage avoiding contact with the disk membrane - dirt or grit can impede the installation.



- Clean if necessary. If metal-to-metal contact surfaces are nicked, an emery or crocus cloth may be used prior to installation.



- The rupture disk and safety head must not be machined or modified in any way.



- Ensure the area where the rupture disk assembly will be installed is cleaned and free from debris. Depending on the type of installation you perform, additional actions may be required.

**CAUTION:** It is important to recognize the direction or orientation in which a welded assembly is installed. Depending on the product size and confirmation, the "Flow" or arrows will be marked on the body to indicate the direction of flow for the process media. In the instance where the welded assembly is too small to have marked indicators, please see supplemental installation instructions, drawings or other specifications for more information on product orientation to your system.

# Installation

Care should be taken when installing the assembly to ensure the disk membrane is not wrinkled or dented throughout the process. If this occurs remove the assembly from the system and install a new one.

## **Flange Mounting**

Welded assemblies that are installed between flanges shall be torqued to proper values for that flange size and rating. Proper gaskets, rings, etc. shall be used to ensure a leak free seal. Bolts or studs shall be torqued in a cross-diagonal pattern in increments of  $\frac{1}{4}$  the total torque until proper torque is reached. Be sure to verify flow direction before securing bolts.

# Inspection and Replacement

Rupture disks and safety heads are neither designed nor intended to be “permanent” products. Periodic inspection and replacement of disks are strongly recommended. A rupture disk should be replaced, for example, if damaged, corroded, subject to excessive cycling or fatigue, pitted, accumulating customer product, or otherwise subject to any condition that may impair or impede the operation of the disk.

## **Damaged disk should not be subject to further use.**

Due to varying customer applications and processes, we are unable to provide a uniform inspection and replacement period recommendation for disks and holders. At the outside, we recommend an inspection cycle of no longer than 24 months or the standard inspection cycle of the owner / operator of the facility, whichever is more frequent.

Process pressure and / or temperature fluctuations may cause

a rupture disk to activate prematurely due to excessive cycling and characteristic fatigue. To minimize potential releases and / or downtime associated with cycle fatigue activations, we recommend a maximum replacement cycle of 36 months from the date of installation unless a real-time monitoring system is used that is capable of sampling and identifying pressure spikes or excursions occurring in the single millisecond range.





## Safety and Caution

Only competent, trained personnel should install rupture disk safety devices in accordance with these installation instructions.

**DANGER:** To avoid a hazardous or fatal situation, please ensure all pressure or vacuum is released from your process/system/equipment

before installation of any rupture disk device.

**DANGER:** Do not locate the rupture disk where personnel will be exposed to discharged process media and/or disk fragmentation. Consult us for more information on disk fragmentation. Ensure that the rupture disk and your system provide for venting in a safe manner, direction and location, to avoid bodily injury or death, damage to property, and / or pollution.

**CAUTION:** Provide adequate support for piping and connections to absorb recoil/reaction forces when the disk ruptures.

**CAUTION:** Rupture disks exposed to high temperature gases or liquids on the process side of the disk are extremely hot. When these hot disks are introduced to fluids cooler than the disk temperature (example: rain, sleet, snow in atmospherically vented applications), thermal shock may occur, resulting in premature and incomplete openings (well below the rated burst pressure). A suitable pipe cover or piping design is required to protect atmospherically-exposed rupture disks.

**CAUTION:** Corrosion and process conditions may affect disk performance and necessitate more frequent replacement.

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

**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.

**CAUTION:** Do not add any coatings such as paint or liners to either side of the

rupture disk.

**Note:** Do not remove rupture disks from packaging for inspection until ready to install.

**Note:** Only threaded inlet/outlet configured rupture disk assemblies may be removed from service for inspection and re-installed provided the disk and threads are in good condition.

**Note:** Welded assemblies come in various configurations. Multiple methods for installation may apply. Please adhere to any supplemental special instructions that may have been provided with this product.

**Note:** Disassembling, reworking, or remarking the disk and / or assembly, in any way, voids the warranty of the welded assembly.