

**BS&B**  
SAFETY SYSTEMS LTD.  
**INSTRUCTION  
MANUAL**

Bulletin 77-80101  
II-RZ-5000 Rev A

Types VSM™, VSP™ and VSE™ Explosion Vents.

**Warning:** Explosion Vents are non-reclosing pressure relief devices and are intended to provide a pressure relief opening in the event of a rapid rise in pressure resulting from a deflagration of dust, mist or gasses. This explosion vent is designed to open at a specified pressure and temperature, thereby relieving the rapid rise in pressure in the structure to be protected. It is imperative that this explosion vent be properly installed and safely vented in order to avoid badly injured, damage to property, pollution and loss of product. BS&B Safety Systems L.L.C. and BS&B Safety Systems Limited supply explosion vents selected by their customers, which are manufactured in reliance upon information and specifications supplied by the customer. BS&B Safety Systems L.L.C. and BS&B Safety Systems Limited are not liable for any damage resulting from improper installation, improper system design, unsafe venting, or other factors beyond BS&B Safety Systems L.L.C. and BS&B Safety Systems Limited control. Do not locate the explosion vent device where personnel, equipment or property will be exposed to released product and pressure through the vent. Handle carefully, explosion vent and tag may have sharp edges. Final determination of the size and suitability of BS&B products for the use contemplated by the buyer is the sole responsibility of the buyer.

**NOTE: The Explosion Vent Burst Test Certificate and this Instruction Manual should be retained for future reference.**

Reorder Explosion Vents by Lot Number (shown on the vent's tag)

**BEFORE INSTALLING THE EXPLOSION VENT**

**1. Inspect Safety Frame.**

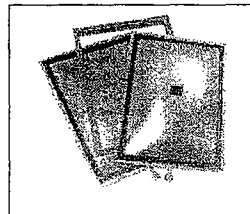
Prior to explosion vent installation the explosion vent specification shown on the tag must be checked to ensure it matches the Safety Frame size and type. An incorrect Frame will effect explosion vent performance.

- Ensure Safety Frame-mating surfaces are free of foreign materials, pits, dust or grit which can damage the explosion vent affecting vent performance or cause leakage.
- Ensure Safety Frame inlet and outlet faces are parallel.
- The frame opening must never be less than the vent size advised by BS&B Safety Systems Ltd, BS&B Safety systems L.L.C.

**2. Inspect Explosion Vent.**

Do not remove the explosion vent from its packaging until it is required for use. Handle the explosion vent carefully, holding the explosion panel by the flat flange face and the perimeter only. The explosion vent and tag may have sharp edges. Examine both the sides of the explosion vent checking the gasket and metal surface for tears, dents, scratches and foreign material, which can damage the explosion vent, cause leakage, vacuum failure, or affect the burst pressure.

- Do not install a damaged explosion vent. Installation of a damaged explosion vent may result in premature bursting of the explosion vent and impair explosion protection.
- The explosion vent should not be subjected to structural bending or thermal stresses.
- The user is cautioned to select vent, frame and gasket materials adequate for the service conditions and should not be such that it may be attacked by existing or foreseeable aggressive substances
- Check the burst pressure and temperature of the explosion vent to that required by the application. An incorrect burst pressure may result in a premature explosion vent opening, impair explosion protection, or cause the pressure capability of the vessel to be exceeded.



- The vent area of the explosion vent(s) selected must be according to applicable local standards to reduce the effects of an explosion to a sufficient level of safety.

**SAFETY PRECAUTIONS**

- Only competent, trained personnel should install/dismantle explosion vents and Frames in accordance with these installation instructions.
- A shackle and lifting gear should be used to lift vents and Frames should the size of the vent be too large or heavy to manoeuvre by hand. The shackle must be attached to the hinge side of the vent indicated by the notch on the side of the vent. In most cases, installation will be easier with two people. Two people are recommended for handling vents and safety frames sizes 920x586mm (36x24in) and larger.
- Explosion vents should be installed such that explosions are prevented from spreading through dangerous chain reactions or flashback and incipient explosions do not become detonations. Refer to applicable codes and standards for vent location.
- Check location where personnel or property could be endangered by flames, discharge and pressure on bursting. During a vented explosion, an extreme hazard exists for a distance of 60m (180 ft) or more
- If vents are liquid cleaned and a high velocity, particle spray or jet is used take care not to damage the vent.

- In the case of vent installations that are ducted, adequate support must be provided to ducting and connections to absorb the shock wave and recoil from the operation of the vent.
- In the case of horizontal or inclined vent installations, adequate drainage must be provided (via drain holes for example) to prevent water accumulation on explosion vent.
- The explosion vent must not be modified (except with the approval of BS&B Safety Systems Ltd.) as it may affect the performance of the explosion vent and impair explosion protection.
- Care should be taken to avoid sharp edges when handling vents especially after bursting.
- Care should be taken to avoid injury from falling into exposed openings when installing or dismantling explosion vents.
- Avoid accumulation of process material, dust, or debris on the surface of the vent. This may affect the explosion vent operating performance and impair explosion protection.
- Process conditions may cause deterioration of explosion vent performance and may necessitate vent replacement.
- Warnings to prevent personnel contacting very hot surfaces should be displayed (in high temperature applications). Contact BS&B Safety Systems Ltd for special vent designs.
- Warnings to prevent personnel from walking or standing on explosion vents should be displayed.
- Static build-up should be prevented by earthing/grounding the explosion vent/Safety Frame assembly.
- Do not reinstall an explosion vent that has been previously installed in a Safety Frame even if it has not ruptured. The impression in the gasket seating area taken by the explosion vent during its original installation may prevent proper seating and effect disc performance if re-installed.
- The burst pressure of a rupture disk is effected by temperature. Ensure that the disk burst pressure variation due to temperature is compatible with the system operating pressure & temperature conditions.
- A explosion vent is a differential pressure sensitive device. Where a back-pressure exists on a explosion vent, this must be considered during the specifying of the explosion vent burst pressure.

**INSTALLATION**

**BOLTED SAFETY FRAME INSTALLATION.**

**A Preparing the vessel for mounting the Safety Frame inlet**

- 1 Place the Safety Frame inlet in the desired location with the angle leg on the vessel surface. Draw a line on the vessel surface around the inside of the Safety Frame inlet.
- 2 Cut an opening in the vessel along the drawn lines. Flame cutting is recommended provided the vessel has been fully purged of flammable dusts and gases.
- 3 Place the inlet of the Safety Frame over the opening. Using the inlet of the Safety Frame as a template, mark all bolt locations on the vessel Surface. Remove Frame.
- 4 Drill 13mm (1/2") dia. Holes in the marked pattern.

**B Installing the Safety Frame inlet**

- 1 Place the inlet of the Safety Frame over the opening in the vessel and align with the bolt holes.
- 2 Put the bolts through the vessel wall and Safety Frame inlet with bolt heads inside the vessel. Install the Safety Frame outlet, add nuts and tighten finger tight. Tack weld the bolt heads to the vessel wall. Remove nuts and Safety Frame outlet. See FIG 1.



Fig 1

**WELDED SAFETY FRAME INSTALLATION.**

**A Preparing the vessel for mounting the Safety Frame with the inlet frame weld preparation on the vessel surface.**

- 1 Place the Safety Frame in the desired location with the angle on the vessel surface. Draw a line on the vessel surface around the inside of the Safety Frame inlet. Remove the Safety Frame.
- 2 Cut an opening in the vessel along the drawn line. Flame cutting is recommended provided the vessel has been fully purged of flammable dusts and gases.

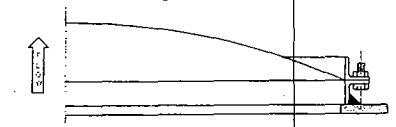


Fig 2

**B Installing the Safety Frame Inlet**

- 1 With the explosion vent removed, bolt the Safety Frame inlet and outlet together, tightening the nuts to approx. 14Nm (10ft.lb)
- 2 Butt the leg of the Safety Frame inlet against the outside of the vessel. Lightly tack weld only sufficiently to hold the Frame in place. See FIG2.
- 3 A welding should be carried out by a qualified welder and welding safety practices should be adhered to. Welding should be performed in the short arc mode (MIG). Helium, argon and carbon dioxide are all acceptable as the shield gas. Vessel, filler and frame material should be selected for welding compatibility and strength.
- 4 Weld the leg off the Safety Frame inlet to vessel using the skip weld method of 5mm (3/16in) welds. Weld 80mm(3in) long fillets on 450mm(18in) centres one pass around the outside of the Safety Frame inlet. Repeat a second time but with the fillets in the centre of the skips, which were omitted on the first pass. Allow welds to cool.
- 5 Fill in the remaining skips with 5mm fillets to produce a continuous seal weld around the outside of the Safety Frame inlet. Do not weld adjacent skips in order to limit local heat build-up and possible warping.
- 6 Unbolt and remove the Safety Frame outlet.