PS V Band (HIGH PRESSURE) GENERAL INSTALLATION, OPERATING & MAINTENANCE DETAILS

The details below are additional to the Operation & Maintenance details for flues for gas appliances in industrial and commercial premises, which give guidance on pre-commissioning inspection, commissioning (smoke test and spillage testing), air leakage testing, competence, maintenance, etc. which is also applicable to PS systems. See also " PS Technical Notes 2009".

GENERAL INSTALLATION DETAILS

Products are to be stored in a suitable location (dry conditions on a level floor), and left in their packaging until immediately prior to installation. Products should be stored in a vertical position. On cold hard floors, polythene or pallets should be located underneath stored items to avoid damp damaging the packaging.

If items are being delivered by transport other than that of Midtherm, special care should be taken to ensure that damage is not caused during transit.

CLEARANCE

The installer should ensure that all electrical cabling, pipe work and any other obstructions are located so as not to disrupt the flue route.

Any structural alterations that may be required, should be carried out by a competent person to the relevant standard and allowing a minimum of 50mm clearance from combustibles.

STABILITY OF EXPOSED SECTIONS

External lateral supports may be required if the chimney projects above the roof. If the chimney projects 1.5m or more then supports must be used. Additional support may be required in areas that are exposed to high winds. Reinforced flue sections can be supplied on request.

OPENINGS

An opening into the chimney is necessary where it cannot be inspected through the appliance. This can be via a Tee piece or an inspection length, depending on the take off route from the appliance, and the product range.

Openings may be required for: -

- Cleaning and maintenance.
- Appliance performance testing.
- Draught control.

ASSEMBLY

The following assembly instructions are recommended: -

- Assemble the product following its designed route,
- Allow 150mm chimney projection below the ceiling level,
- Secure all locking bands and brackets,
- Locate the chimney termination components and fix,
- Apply suitable weather proofing.

Also ensure that: -

- There are no joints where the product penetrates floors or walls
- Access doors are easily accessible for cleaning etc.
- Lightning protection is fitted where necessary.

FLASHINGS

Where a flue penetrates a roof, weather protection must be provided. The flue must be sealed above the flashing plate by means of a storm collar, which is simply clamped into place onto the outer skin of the flue directly above the flashing plate. Waterproof silicone based sealant must be used to seal the collar.

CONDENSING APPLICATIONS

For condensing applications, a fall should be maintained back to the appliance. Special fittings are available on request.

TEES

Tees are not load bearing and a support plate should always be installed either directly above a tee or a maximum of 4 lengths above the tee.

Where the V Band System is used a support plate is required bellow the tee as well as above, to carry the weight of the tee to avoid the V Band joint being pulled apart.

FURTHER INSTALLATION DETAILS (and details to be used as pre-commissioning checks)

APPLICATION & FLUE GAS VELOCITY

The flue shall be sized to suit the appliance and the route ensuring that the flue gas velocity is no greater than 40m/s (30m/s recommended max). The flue shall be designed to ensure the safe dispersal of combustion gases in accordance with the Clean Air Act.

JOINTS

Flanged and V Band products shall be installed to suit the pressure of the system as appropriate.

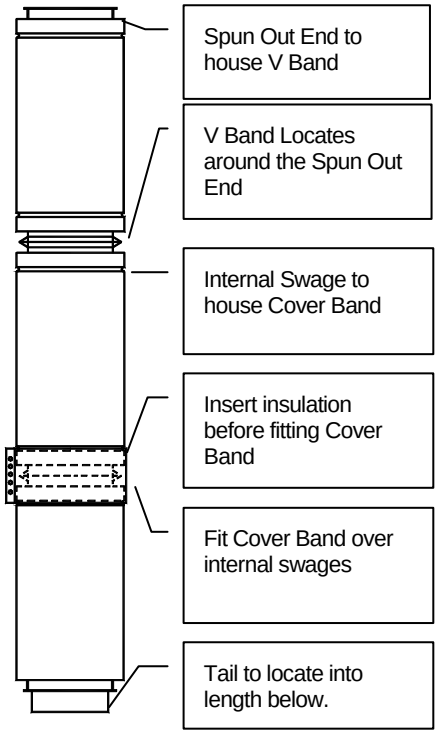
Where V Band product has been installed the joints will be as Midtherm V Band sealing detail depending upon the expected flue gas temperature.

Where Flanged product has been installed, all flanged joints shall house a suitable gasket, and all holes shall be bolted securely.

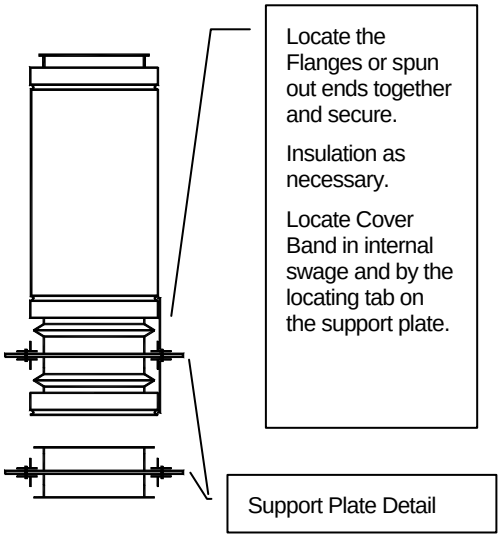
FLUE ROUTE

1. The flue route shall be suitably supported to ensure that expansion will not distort components such as bends. Support plates shall be fixed in place using suitable fixings to take the load for which the support plate is designed to carry. (More supports may be required for larger systems or where the flue route necessitates this.)
2. Although it is recommended that they be avoided on medium to high pressure applications, when they are used, any Expansion/Adjustable lengths shall be set to length and fully welded on site (where medium and high pressure are as defined in DW/144). On low pressure systems these lengths can allow for some expansion in the system.
3. Bellows shall be installed to allow for the expansion in the system. (See additional details for bellows.)
4. Explosion relief doors shall be set up correctly so as to allow sufficient pressure relief.
5. Draught stabilizers should be set so as to allow sufficient draft for the appliance to maintain efficient combustion.

METHOD OF V BAND CONNECTION



SUPPORT PLATE DETAIL

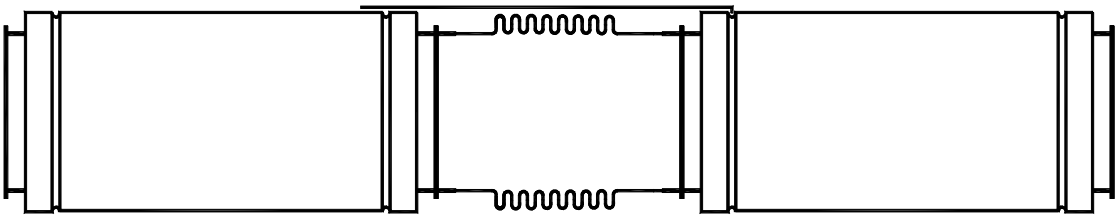


SEALANT IS TO BE APPLIED IN ACCORDANCE WITH THE "MIDTHERM APPLICATION METHOD FOR SEALANT AS A JOINTING COMPOUND FOR PS V BAND PRODUCTS".

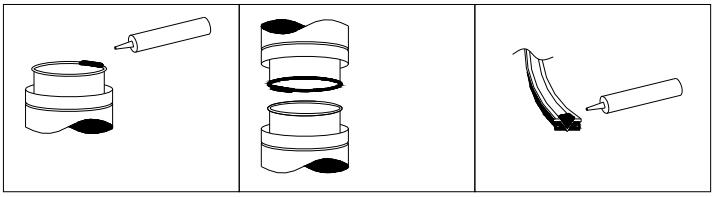
BELLOWS INSTALLATION DETAIL

GENERAL DETAILS

- Cover band left free to move at one end and located in internal swage at the other end.
- Insulate as necessary but do not restrict movement of convolutions.
- The bellows is attached to the system by the spun out flange and V Band as with other lengths and fittings.
- Ensure that the bellows are installed so that the inner liner will allow condense to flow down the system in the opposite direction to the flue gases.

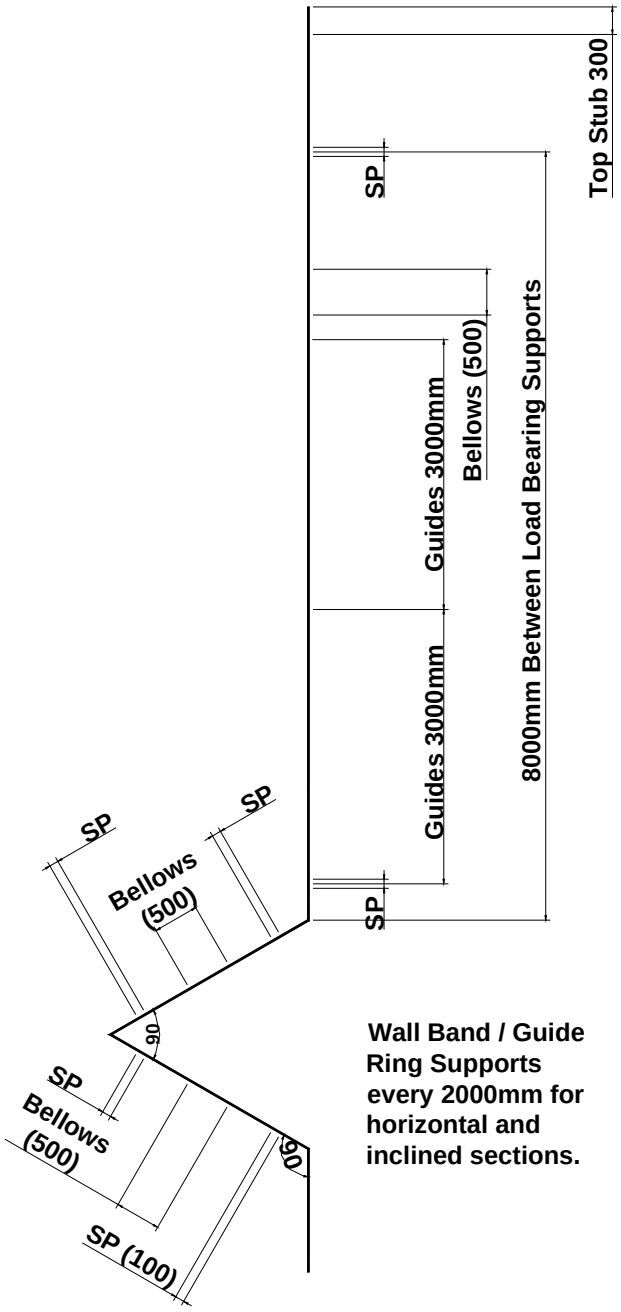


SEALANT APPLICATION DETAIL



Please refer to the guide "Application method for sealant as a jointing compound for PS V Band Product". Silverseal is the recommended sealant for V Band joints serving diesel generator appliances. Silverseal should be applied in the same manner as Silicone and Dunseal Sealant but typical cure times are 60mins at 400°F. Where Silverseal is used there is no requirement for Silicone or Dunseal Sealant.

TYPICAL PS INSTALLATION



Wall Band / Guide Ring Supports every 2000mm for horizontal and inclined sections.

Tees

Tees are not load bearing and a support plate should always be installed either directly above a tee or a maximum of 4 lengths above the tee.

Where the V Band System is used a support plate is required bellow the tee aswell as above, to carry the weight of the tee to avoid the V Band joint being pulled apart.

Bellows

Bellows are required between each set of anchored points to allow the lengths to expand without damaging support plates and elbows. Bellows should also be installed with a length on either side to provide location for the cover bands.

Generally the expansion (mm) can be worked out from the following equation: -

[Temperature (^{o}C) / 50] x Length (m)

By installing bellows with *Cold Pull* an extra 25mm of expansion within a system can be catered for. However this only applies to Flanged systems as the spin out on V Band systems would be distorted on installation.

Insulation Thickness

The insulation thickness is usually determined by the external surface temperature requirements and condensation consideration.

Where a Flanged system is required the insulation thickness will be a minimum of 50mm thick to allow enough room for the flange.

FURTHER INSTALLATION DETAILS (and details for inspection prior to start–up or pressure test)

Expansion joints are usually considered to be non-repairable items and generally do not fall into a category for which maintenance procedures are required. However, immediately after the installation is complete a careful visual inspection should be made of the entire piping system to ensure that there is no evidence of damage, with particular emphasis on the following:

1. Are anchors, guides, and supports installed in accordance with the system drawing?
2. Is the proper expansion joint in the proper location?
3. Are the expansion joint's flow directions and pre-positioning correct?
4. Have all of the expansion joint shipping devices been removed?
5. If the system has been designed for gas, and is to be tested with water, has provision been made for proper support of the additional dead weight load on the piping and expansion joint? Some water may remain in the bellows or system operation, means should be provided to remove this water.
6. Are all guides, pipe supports and the expansion joints free to permit pipe movement?
7. Has any expansion joints been damage during handling and installation?
8. Has any expansion joint misaligned? This can be determined by measuring the joint overall length, inspection of the convolution geometry, and checking clearances at critical points on the expansion joints and at other points in the system.
9. Are the bellows and other movable portions of the expansion joint free of foreign material?

Bellows - INSPECTION DURING AND IMMEDIATELY AFTER PRESSURE TEST

A visual inspection should include the following:

1. Evidence of leakage or loss of pressure
2. Distortion or yielding of anchors, expansion joint hardware, the bellows and other piping due to pressure.
3. Any un-anticipated movement of the piping due to pressure.
4. Evidence of instability in the bellows.
5. The guides, expansion joints, and other movable parts of the system should be inspected for evidence of binding.
6. Any evidence of abnormality of damages should be reviewed and evaluated by a competent design authority.

BELLOWS - PERIODIC INSERVICE INSPECTION

Immediately after placing the system in operation, a visual inspection should be conducted to insure that the thermal expansion is being absorbed by the expansion joints in the manor for which they were designed.

The bellows should be inspected for the evidence of unanticipated vibration.

A program of periodic inspection should be planned and conducted throughout the operating life of the system. The frequency, of these inspections should be determined by the service and environmental conditions involved. Such inspections can spot the more obvious potential problems such as external corrosion, loosening of threaded fasteners and deterioration of anchors, guides and other hardware.

It must be understood that this inspection program, without any other back-up information, cannot give evidence of damage due to fatigue, stress corrosion or general internal corrosion.

These can be the cause of sudden failures and generally occur without any visible or audible warning.

When any inspection reveals evidence of malfunction, damage or deterioration, this should be reviewed by a competent design authority for resolution. Additionally, any changes in the system operating conditions such as pressure, temperature, movement, flow, velocity, etc. that may adversely affect the expansion joint should be reported to and evaluated by a competent design authority.

COMPETENCE

It is important that any personnel carrying out work or maintenance on appliances and flues is suitably qualified and competent to do so. More frequent maintenance may be required dependent upon the environment in which the plant is operated and the nature of the operation. Maintenance should be monitored on a regular basis and logged.

Any fan diluted flue shall be commissioned by a suitably competent person who is trained and experienced in the design and correct operation of such systems.

Note: In some cases, the Local Environmental Health Office will require a statement (Clean Air Act Approval Form) of the correct commissioning of such systems, including test results on the diluted exhaust gas concentrations.

Following commissioning, a record of the settings of all safety controls and fuel flows, combustion conditions, flue damper/suction settings and any modifications from existing drawings etc., shall be left with the client.

All user instructions shall be left with a client and, as far as is practicable, the client should be instructed in the correct and safe operation of the appliance. For larger plant and steam boilers, an operating log shall be kept on site showing details of safety tests, for example blowdown, checks of safety controls, etc. Reference should be made to such as the Guide to Steam Plant Operation, CEA and the Boiler Log Book, BCEMA.

The client shall be made aware of the need for regular maintenance by persons competent to carry out such work.