Procedure for the installation of CMP Barrier Glands using CMP RapidEx & EP2122 Epoxy Compound in Temperatures below +5° C (41°F)

The following two procedures are for the installation of CMP Barrier Glands, using either RapidEx Liquid Resin or EP2122 Epoxy Compound, when the general temperature is below 5°C (41°F). **Procedure 1** is for where it is common practice to erect heated tents or shelters around equipment to locally raise the temperature. **Procedure 2** is for where it is only practical to apply localised heating where heated shelters cannot be used for operational reasons.

General notes

The optimum temperature range for the storage of the barrier resins is +5°C (+41°F) to +25°C (+77°F). The RapidEx Liquid Resin or EP2122 Epoxy Compound must be at a temperature above 5°C (41°F) prior to mixing.

It is essential that the temperature of the cable gland is raised above 5°C (41°F) prior to installing the RapidEx Liquid Resin or EP2122 Epoxy Compound and the temperature is maintained throughout the curing time.

When RapidEx Liquid Resin or EP2122 compound is mixed, it undergoes an exothermic reaction and this continues until the material is cured. If heat is drawn away from the barrier material, for example by the cold metal of the gland, the curing time will be longer and in extreme cases the RapidEx Liquid Resin may not cure effectively. Conversely if heat is added, the curing time will be reduced.

Before mixing the EP2122 Epoxy Compound or RapidEx Liquid Resin, examine the internal barrier tube to ensure that there are no visible signs of condensation. If condensation is present this must be removed with a dry cloth or tissue paper. The presence of condensation will adversely affect the curing and adhesion process and ultimately the performance will be affected.

All site Health & Safety procedures must be followed. A risk assessment or job safety analysis (JSA) may need to be carried out.

PROCEDURE 1 – USING HEATED TENTS OR SHELTERS.

CMP recommends that the shelter be heated to a temperature of >10°C (50°F) for a period of at least 5 minutes prior to work commencing, to ensure that the gland temperature is also >10°C (50°F). This can be achieved by using a space heater that is designed and approved for the application.

Figure 1 – Space Heater example

Terminate the cable gland onto the cable in readiness for application of the barrier material, in accordance with the installation fitting instructions supplied.

Leave the terminated cable gland and cable undisturbed in the heated work environment until the barrier material has cured. At 10°C (50°F) this should be 100 minutes.

PROCEDURE 2 – USING LOCALISED HEATING

Heating the Cable gland – there are three methods of achieving this (detailed on page 3 and 4)

Terminate the cable gland onto the cable in readiness for application of the barrier material, in accordance with the installation fitting instructions supplied with the cable gland.

The cable gland should be heated prior to installing the barrier material. The gland should be protected from cold drafts and can be heated using a CMP Industrial Gland Warmer (RapidEx only), a hot air gun, or heated electric blankets (Details of the localised heating methods are in the appendix on page 3 and 4).

The use of naked flames is not allowed and care must be taken to apply heat so that the gland is warmed evenly. As a guide, the temperature of the gland should be raised above 5°C (41°F) but not any higher than it is comfortable to touch by hand.

The time needed to warm the gland will depend upon the heating method used and the surrounding temperature, but for example a size 20 gland in an environment at -10°C (14°F) can be warmed sufficiently in less than a minute using a heat gun or in less than 5 minutes using a heating blanket or CMP Industrial Gland Warmer.

Mix and install the barrier material

Ensure that the RapidEx Liquid Resin or EP2122 Epoxy Compound is warmed to between 5°C (41˚F) and 25°C (77˚F) prior to mixing. This can be achieved by storing it in a warm environment. The compound should be mixed thoroughly, following the installation fitting instructions supplied with the cable gland. (In the case of RapidEx Liquid Resin, it should be possible to feel that it is generating some heat.) Install the barrier material in accordance with the installation fitting instructions supplied with the gland.

After installing the barrier material, there remains a need to continue applying heat to the cable gland. Failure to do this will significantly slow down the cure process. The time for which heat must be applied will vary according to the heat source, the surrounding temperature and whether RapidEx Liquid Resin or EP2122 Epoxy Compound is being used. (RapidEx Liquid Resin cures 15 times faster than EP2122 Epoxy Compound)

RapidEx Liquid Resin – cure times

If a CMP Industrial Gland Warmer is being used to warm the gland, it should be left in place until it stops generating heat (typically 30 minutes) and then removed. Similarly a heating blanket should be applied for 30 minutes. If a hot air gun is being used to warm the gland, then continue to warm the gland after installing the resin for a period of approximately 5 minutes. If this procedure is followed, the RapidEx Liquid Resin will cure in approximately 30 minutes, even when the surrounding temperature is as low as -10°C (14°F).

Note: A hot air gun can be used again at any time during the curing process, to add more heat and so accelerate the curing process.

EP2122 Epoxy Compound – cure times

EP2122 Epoxy Compound has a longer cure time than RapidEx Liquid Resin and so requires that the gland is heated for a longer period. For this reason, the heat source must be electric heating blankets or a hot air gun (CMP Industrial Gland Warmers typically only last for 20 to 30 minutes). The electric heating blanket can be used continuously during the cure time. The heat gun can be used intermittently to maintain the temperature of the gland between 5°C (41°C) and approximately 60°C (140°F).

Appendix

Localised Heating methods

Where it is not feasible or possible to erect a tent or other temporary shelter for the installation of EP2122 Epoxy Compound and RapidEx Liquid Resin it is recommended that a CMP Industrial Gland Warmer, a hot air gun or an electric heating blanket be used for localised heating of glands. CMP Industrial Gland Warmers should be used when installers do not have access to hot air guns or electricity on site for the electric heating blankets.

1. CMP Industrial Gland Warmer (IGW)

RapidEx Liquid Resin installers are recommended to utilise a CMP Industrial Gland Warmer: a self-contained heat pack which has been designed to fit the entirety of the CMP barrier gland range. The Industrial Gland Warmer operates using crystallisation of supersaturated Sodium Acetate to raise the temperature of the bag and the gland up to 60°C (140°F). NOTE: Only suitable for use with RapidEx Liquid Resin, **not suitable for use with EP2122 Epoxy Compound due to the extended cure times.**

The CMP Industrial Gland Warmer is activated by bending a metallic disc within the pack to start the crystallisation process. An example of a CMP Industrial Gland Warmer is shown below.

Figure 2 - CMP Industrial Gland Warmer

Figure 3 - RapidEx installation with Industrial Gland Warmer in position

As the Industrial Gland Warmer releases heat for a limited time, it is important that they are used in the most effective manner; this involves wrapping the heat packs around the cable gland so that heat is transferred directly from the heat packs to the gland, specifically the barrier tube which contains the Liquid Resin. The heat packs should be secured in place using the attached Velcro strip. Once the heat packs have cooled (and the resin has cured) they can be removed and prepared for re-use by placing them in boiling water for around 10 minutes or until all crystals have dissolved. Full instructions for the installation of RapidEx using a CMP Industrial Gland Warmer (FI181) are supplied with the IGW, along with the RapidEx installation Instructions (FI320).

2. Hot air guns

Hot air guns can be either electric or gas power. The latter has the advantage of being more portable, but it is essential that flameless hot air guns are used. An example is shown in the pictures below.

Figure 2 – Hot air gun examples

The hot air gun should be used to heat the gland by directing the hot air towards the gland from a distance of between 150mm and 300mm (6" to 12") and continually moving the gun to heat the gland from all sides as evenly as possible. Take care to avoid applying too much heat in any one place and avoid directing heat at the cable or the thread protector shield if using RapidEx Liquid Resin. (The thread protector can be removed during the heating process prior to installing the Liquid Resin to avoid the risk of damage.)

3. Heating blankets

An electric heating blanket may be used to ensure that the cable gland and cable assembly absorb sufficient heat to aid rapid curing. Wrap the heater blanket around the cable gland and set the heater blanket thermostat to a minimum of +10°C (+50°F). When this minimum temperature has been reached and maintained for at least 5 minutes the RapidEx Liquid Resin or EP2122 Epoxy Compound resin barrier can be applied.

Figure 3 – Heating blanket example