

- 1.14 **Vertical mounted, close coupled pumps**, the flywheel must be prevented from pulling the motor shaft to the containment shell and touching the surface of the containment shell. Therefore these pumps are only permitted to be powered by **motors with fixed bearing on the drive end!**

Noise emissions

- 1.15 **CP-pumps are of low-noise design. The A-rated equivalent continuous noise pressure level at the work place of the operating personnel is equal to or lower than 70 dB(A).**

The principal source of noise with pumps powered by an electric motor is the motor itself. The continuous noise pressure level is dependent on the speed, size and manufacturer of the motor. The noise emissions of four-pole motors typically do not exceed 70 dB(A). And those of two-pole motors of up to IEC-frame size 132 typically do not exceed 70 dB(A) either.

The following typical levels apply for IEC-motor frame sizes 160 and above:

Frame Size	Noise pressure
160	72 dB(A)
180	73 dB(A)
200	75 dB(A)

Frame Size	Noise pressure
225	76 dB(A)
250	76 dB(A)
280	78 dB(A)

The following measures are to be taken to reduce the noise emissions:

- Use high efficiency, low noise motors.
- Acoustic cover over pump and motor, but do not impair the flow of cooling air or exceed the permissible rise in temperature.
- If pumps are installed on vibratory foundations (e.g. metal structures), fit vibration dampers between the base plate and foundation.
- Fit compensators between pump and pipe work to prevent the noise conducted by solids from being transmitted to the pipe work.

Directions for the use of the pumps in explosive atmospheres

- 1.16 **The pumps are suitable for the intended use in potentially explosive atmospheres!**

Operating the pump only partially filled or completely without liquid is not allowed!

According to 94/9/EC-directive the pumps are to be classified as non-electrical equipment, group II. The category is specified by the pump data sheet and the marking on the pump.

Drive unit, accessories and auxiliary equipment have to be approved for such conditions and to fulfil the valid explosion prevention regulations!

To avoid hazards due to static electricity, pumps constructed in non-conductive materials are to be bonded to earth following valid installation regulations!

During normal operation pump surfaces are heated by the inlet temperature of the medium or an auxiliary heating system!

The temperature class of the pump is depending on the inlet temperature of the medium or an auxiliary heating system; the range is T1 – T4, with specification on the pump data sheet T1 – T6.

The maximum permitted temperature of the liquid in the pump or an auxiliary heating system is dependent on the respective existing temperature class! In all cases operators must make sure that the permitted temperature limit of the temperature class will not be exceeded!

When determining the maximum permitted temperature of the liquid in the pump or an auxiliary heating system for pumps **with metallic containment shell** it is to be considered that eddy currents are induced in the containment shell as soon as the pump rotates.

The eddy current power losses during normal operation are indicated on the pump data sheet; they cause an additional heating of the containment shell which is normally cooled by the liquid in the pump.

If liquids with physical properties similar to water are pumped, a temperature rise of the containment shell surface of 5-10 K per kW eddy current losses is to be expected!

On metallic containment shells with leakage monitoring the temperature rise is higher; these containment shells are only permitted in pumps with closed driver lanterns and only for the use in Ex-zones 2 and/or 22!