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GENERAL POINTS REGARDING LONG TERM PUMP AND MOTOR STORAGE AND INSTALLATION

The handling and lifting of pump and motor units must only be undertaken by skilled personnel using the correct equipment. These notes apply to Brook Hansen manufactured motors but general note may be applicable to **all** electric motor manufacturers.

1) **Receipt**

Before any unit is accepted on site it should be inspected carefully for damage or loss incurred in transit. Packing materials may be damaged including sheeting and crate timers. Handling operations may have damaged motor fan cowls, terminal boxes or auxiliaries. Where an instance of droppage or loss is evident or suspected, it may be necessary to unpack the goods to establish the full extent of the problem. Wherever possible the damage should be recorder, photographed and witnessed. Report any damage to the carriers. The insurance company's agent as shown on the insurance certificate should also be advised.

2) **Lifting**

The lifting of equipment must be carried out by skilled personnel working in accordance with safe working practices. Before lifting units, the correct equipment must be available. Cranes, jacks, slings and lifting beams must be capable of carrying the weight of the unit to be lifted.

2.1) **Vertical Mounting**

Motors for vertical mounting positions are provided with sufficient lifting points, either fitted or loose, to aid controlled rotation from a horizontal to a vertical shaft position. On large motors it may be necessary to use several lifting points to provide stability, particularly for shaft down mountings.

2.2) **Inspection**

Eyebolts and lifting lugs should be inspected regularly. Attention should be paid to the following areas:-

- Legibility of markings.
- Threads free from wear and corrosion.
- No debris on the underside of the collar.
- No distortion of the eyebolt.
- No nicks, cracks or corrosion.

3) **Storage**

If motors have to be stored before installation, precautions should be taken to prevent deterioration.

3.1) **Environment**

Depending on the site conditions, it may be necessary to create a suitable stores area to hold the motor prior it installation. Packing cases are not waterproof. Motors should be stored in a dry vibration free and clean area at normal ambient (-20◦C to 40◦C). Where low temperature ambient storage is anticipated, special precautions should be taken with the type of grease, no plastic components etc. to ensure trouble free start up. Motors must be stored away from corrosive or chemically damaging fumes. Before placing motors into storage any exposed machine components should be carefully inspected. Bearings and shafts are normally covered with a corrosion resistant barrier. If this coating is damaged it should be made good. The component should be cleaned and the protective coating re-applied. Under no circumstances should rust be merely covered over.

3.2) **Drain Holes**

Motors provided with drain holes have the drain plugs provided loose in the terminal box up to frame size 180 and fitted on frame size 200 and above. Position the drain holes at the lowest point.

3.3) **Bearings**

To avoid static indentation the storage area should be free vibration. If this is not possible it is strongly recommended that the motors be stood on thick rubber blocks or other soft material. **Shafts should be rotated by hand one quarter of a revolution weekly.**

3.4) **Grease**

Factory fitted bearings use a lithium based grease with a recommended shelf life of two years. If stored for a longer period, grease may need to be replaced*. Shielded bearings have a storage life of approx five years and a further two years operational life following installation.

*Wash all bearing parts in solvent. Lightly pack the bearings with grease applying a 33% fill by volume into the bearing and housings.

3.5) **Heaters**

Where space heaters are fitted, and storage environment has wide humidity and temperature variations, it is strongly recommended they be energised. **Warnings should be placed on the motor to make operatives aware that the heaters are live!**

Supplies are normally 220-240 volt single phase, from a 380-420 three phase supply. See terminal box lid / rating plate for details.

3.6) **Insulation Resistance**

During extended storage a three monthly insulation test is recommended to avoid possible lengthy drying out periods when installing. Use a 500 volt d.c Megger. The insulation resistance between the phases and between the windings and the frame should be checked. The insulation resistance should be maintained above 10 megohm. If a lower reading is measured, use one of the drying out methods recommended until an acceptable reading is obtained. If heaters are fitted but nor energised, they should be used in future.

4) **Installation**

Work on Hazardous area motors should only be carried out by trained and authorised personnel or those trained to work on certified motors.

All warning instructions and labels must be observed and retained with the motor.

It is essential equipment is installed, earthed and guarded in accordance with current legislation.

4.1) **Checklist**

General	Location
	Nameplate details.

Mechanical

Drain holes
Alignment
Free rotation
Bearings and grease
Cable termination
Motor Bolts
Slide rails (where used)
Pulley fitment (where used)

Electrical

Insulation resistance
Drying out procedures
Supply
Earthing
Protection
Heater continuity
Thermistor continuity
Auxiliaries
Connection diagram
Rotation
Starting

4.2) General

4.2.1) Location

The motor must be provided with adequate access for operation and maintenance. The fan inlet must be at least 20mm from any obstruction on frame sizes up to 180 and 50mm on frame size 200 and above. A minimum working distance of 0.75m around the motor is also recommended. Where several motors are located together care must be taken to ensure that there is no re-circulation of exhausted warm air. Foundations must be rigid and level.

4.2.2) Nameplate details

The information on the nameplate should be checked to ensure that it is correct in all details i.e. kW, amps, volts, speed etc. it is a wise precaution to take nothing for granted.

4.3) Mechanical

4.3.1) Drain Holes

Prior to installation remove drain plugs if fitted. If any water has accumulated, the integrity of all gaskets, sealants etc should be checked. Drain plugs should be put back into place after draining.

4.3.2) **Free Rotation**

The rotor must be free to rotate in its housing. Where uneven or bumpy rotation occurs the bearings should be inspected to establish that they have not been damaged during transportation or storage.

4.3.3) **Lubrication**

Bearings are pre-packed with lithium or lithium complex based grease. Standard re-greasing facilities where provided are situated on the periphery of the drive end and non-drive end shields. Motors without grease nipples have sealed for life bearings and bearing replacement should be considered at normal re-lubrication intervals. An overgreased bearing will cause overheating of the bearing with the possible escape of grease, loss of lubrication qualities, leading to ultimate bearing failure.

4.3.4) **Cable Termination / Terminal Box Sealing**

All cable terminations must be screwed down tightly. Customers leads should be in face to face contact with the motor leads. Lockwashers and nuts should be screwed down over the connection. There should be no nuts or lockwashers between the mains and motor lead as these are not current carrying components. The installer must ensure maximum clearance is maintained between the cables in the terminal box by placing connections onto the studs carefully. Conduit and gland entries to the terminal box must be correctly fitted. The integrity of the terminal box gasket must be checked to ensure the terminal box lid can maintain the correct sealing level. **EEX d terminal boxes are despatched with a non- setting sealanc4 on the terminal box / lid faces to provide protection during transit and storage. All joint faces must be cleaned and a sealant applied after the fitting of the supply cables.**

4.3.5) **Motor Bolts**

All accessible motor bolts should be checked for tightness.

4.3.6) **Drying Out Procedures**

Consult manufacturers for recommendations regarding the drying out of motors.

4.3.7) **Supply**

It is important that a motor is operated within the limits of its specified design voltage and frequency. The supply cables must be capable of carrying the full load current of the motor (see motor nameplate) without overheating or excessive voltage drop under starting conditions.

4.3.8) **Earthing**

All motors are fitted with an earthing terminal, in or adjacent to the terminal box, to enable connection to an effective earthing bond. The terminal is designed for connecting the correct size of copper earth connector. If a different material is to be used consult manufacturer.

The motor must be earthed by connecting the shortest possible length of cable to the earth screws. The cable must have a capacity of at least that of the main connections up to $16mm^2$ phase conductors. Between 16 and $35mm^2$ phase conductors, the earth should be a minimum of $16mm^2$ Above $35mm^2$ phase conductors, the earth conductor should be a minimum of half the phase conductor.

4.3.9) **Notes**

For specific information regarding lubrication intervals or any other detailed information please consult the electric motor manufacturer or their authorised agents. Whilst the information given is of a general nature no liability is accepted whatsoever. **IF IN DOUBT – ASK!!!**

IMPORTANT NOTES

For general notes regarding the long term storage of pump units fitted with either single or double mechanical shaft seals – see specific notes regarding installation operation and long term storage.