ATEX Instruction manual addendum sheet

Pump ranges: H, CH, D, GP, CF & CR

AT1

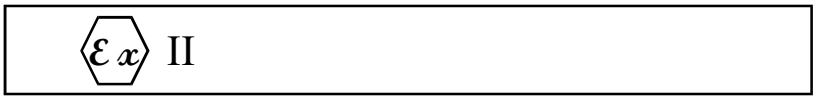
Serial no.
Pump

Introduction

This pump has been designed for use in potentially explosive atmospheres and conforms with the EU directive 2014/34/EU ('ATEX' - Atmosphères Explosibles). This sheet should be kept with the instruction manual. **Please retain it safely for future reference.**

The user must fully comply with the instructions given in this sheet and the instruction manual. Furthermore, the user must ensure that only authorised and trained personnel install, operate, inspect and maintain the pump. Failure to comply with the above will invalidate any guarantee and absolves MDM PUMPS LTD of any responsibility.

Application

The pump has been marked: 

which means that the pump has been specifically designed for use in a potentially explosive atmosphere which is Group II, Category 2 or 3 (as stated), Gas 'G' and / or Dust 'D' (as stated), with protection by constructional safety 'c' and with a maximum surface temperature as stated.

Notes: category 2 is for equipment providing a high level of protection when used in areas where an explosive atmosphere is likely to occur.

category 3 is for equipment providing a normal level of protection when used in areas where an explosive atmosphere is less likely to occur.

the maximum surface temperature is either a specific temperature or T1 to T6 (see table).

AT01 is the MDM Pumps Ltd reference number for the technical documentation.

The ambient temperature, Ta is a minimum of -20^{O}C and maximum +40^{O}C, unless otherwise stated.

The X means that the maximum surface temperature depends mainly on operating conditions, eg temperature of the fluid entering the pump.

Max surface temp ^{O}C	
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

The operating conditions, ambient conditions and fluids to be pumped are as stated in the data sheet. It is assumed that:

a) the user will ensure that there are no sources of ignition inside the pump. In particular, the mechanical seal must not run dry or suffer from poor seal lubrication. Where there is a risk of dry running or lubrication failure, a quenched mechanical seal must be fitted.

Poor seal lubrication will arise from, for example, excessive fluid temperature (note that during normal operation, the temperature of the mechanical seal faces may be up to 20°C higher than the temperature of the pumped fluid), pump cavitation, insufficient fluid in the pump (the pump cover must be fully flooded before starting the pump), or for a flooded suction pump, air entrainment (via a tank vortex or an incorrectly fitted suction connection).

b) the fluids pumped will not corrode the pump head and are compatible with the mechanical and static seals.

Operating the pump at different duties (flows, pressures, motor speeds, temperature of the fluid entering the pump), in different ambient conditions, or with different fluids may increase the risk of an explosion. Similarly rough handling of the pump, excessive vibration and corrosion must be avoided.

Installation

Please ensure the complete pump is suitably earthed to minimise the electrostatic risk. The pump base (where supplied) has been fitted with an earthing point.

Operation

In normal operation there are no ignition sources. It has been assumed that the pump has been installed and operated correctly according to the instruction manual. Where replacement parts have been used they have been correctly specified, purchased from MDM PUMPS LTD, suitably stored and the pump correctly reassembled.

The user must ensure that:

1) There is always sufficient fluid in the pump. Operating the pump with no or insufficient fluid will cause the mechanical seal to overheat.

   Where this is not possible a quenched seal must be fitted, with the quench system designed to ensure the sufficient presence of lubricant or monitored for the continued presence of the lubricant.

2) The pump must not be operated against a closed outlet. If the pump is operated whilst the outlet is closed or severely restricted, the temperature of the fluid in the cover will increase, as will the pump surface temperature.

3) If the pump is operated at flows lower than the duty point, check that the temperature of the fluid in the cover does not become too hot.

4) If the pump is operated at flows higher than the duty point, check that the motor does not overload, as this could lead to excessive surface temperatures. (As the flow increases in a centrifugal pump, the power required from the motor also increases). One solution is to set the motor overload protection device to the full load amps of the motor.

5) The pump must only be operated at the designed speed. At speeds faster than designed, the motor could be overloaded, leading to excessive surface temperatures. At speeds slower than designed, motor cooling can be significantly reduced. One solution is to set a maximum and minimum frequency on the inverter (where applicable).

6) The fluids pumped must be compatible with the seals. Swelling or degradation of the seals could allow the fluid to escape.

7) Foreign bodies in the fluid (eg nuts and bolts) must not enter the pump as they could cause damage to the pump and motor. In some cases this can cause the impeller to contact the cover leading to localised overheating, damage to the motor bearings and possible overheating of the motor. One solution is to fit a strainer before the pump.

8) The pump must rotate in the correct direction (clockwise looking at the fan end, as indicated by the label on the motor fan cowl) and there must be no back flow through the pump. The locknut can become unscrewed if the pump rotates in the wrong direction - if the motor is incorrectly wired up or if the fluid is allowed to flow back though the pump.

9) To avoid overheating the motor, the number of stop-starts per hour must not be excessive.

10) Cavitation must be avoided as it will shorten the motor bearing life and could cause the mechanical seal to overheat and fail.

Maintenance

1) Although the mechanical seal life is difficult to predict and depends on the operating conditions of the pump, the normal period for replacement of mechanical seals is 2 years. Failure of the mechanical seal could:

   a) for single seals give rise to local overheating and loss of pumped fluid.

   b) for quenched seals give rise to local overheating and loss of quench fluid. Where the quench pressure is greater than the pressure at the inner seal, there will not normally be leakage of the pumped fluid. The user should monitor the quench pressure or level to ensure it has not dropped.

2) Failure of the static seals, could allow the fluid to escape. The user is to ensure that the seals are not damaged or degraded, are not too 'old' (a seal has a limited life from its cure date), have been correctly fitted and have been replaced at the recommended interval which is normally 2 years.

3) The motor bearings need to be regularly inspected and / or monitored in order to prevent risk of ignition. The user is to replace the motor bearings at the recommended intervals based on motor bearing life or after unacceptable wear. Unless stated otherwise bearing life is 2 years. Failure of the motor bearings will lead to increased motor surface temperatures (from increased friction and increased load) and possibly contact between the impeller and cover leading to a temperature rise in the pump head. Bearing life cannot be accurately predicted, although the basic rating life corresponds to a probability of failure occuring during operation, L_{10} means that 10% of bearings will have failed by then. Note that the bearings need to be protected from vibration, especially at standstill. If the bearings have been exposed to excessive temperatures (where the grease lubricant has melted), they must be replaced.

4) When the motor is replaced, it should be ATEX approved.

CR liquid ring pumps (additional comments)

Operation

1) The maximum suction pressure is 3 bar.

2) The pump is designed to run at 1450 rpm, with a maximum speed of 1750 rpm. At speeds less than 1000 rpm, the ability to prime is considerably reduced.

3) The pump should be installed in a horizontal position.

4) The pump is designed with small clearances and is therefore not suitable for fluids with solid suspensions. A suction filter is recommended to prevent foreign material, eg slag and impurities from entering the pump.

5) Abrasive fluids can rapidly wear the seals and pump, in which case reduce the maintenance and inspection intervals.

6) Excessive forces and moments on the inlet and outlet connections can cause deformation of the pump body, leading to contact with rotating parts and overheating.

7) The suction valve must always be open when operating the pump.

8) The pump must NOT be operated against a closed outlet valve.

9) The pump must not be run in an unprimed condition for more than 60 seconds to avoid overheating and damaging the pump and seal.

10) Very low flows can lead to excessive loads on the bearings and overheating of the fluid. The minimum recommended flows are:

Pump	CR40	CR50	CR60	CR65	CR80
Minimum flow	1.5 m^3/h	2.0 m^3/h	5.0 m^3/h	6.0 m^3/h	10 m^3/h

Maintenance

The pump bearings life is typically 20,000 hours, although this will depend on the pump operation and environmental conditions.

For motors upto 132 frame (7.5kW), the bearings are lubricated for life.

For motors of 160 to 180 frame (11kW to 22kW) the bearings should be re-lubricated at the recommended intervals.

EU DECLARATION OF CONFORMITY for complete pumps

We hereby declare that the following machinery complies with:

- the relevant essential health and safety requirements of the EU Machinery Directive 2006/42/EC,
- the relevant Union harmonisation legislation: ATEX Directive 2014/34/EU (equipment and protective systems intended for use in potentially explosive atmospheres).

Machine description	STAINLESS STEEL PUMPS.
Make	MDM PUMPS LTD
Type	H, CH, D, GP, Two-Way, CF & CR.
Serial number	Supplied from 20/04/16 onwards.
Manufactured by	MDM PUMPS LTD Spring Lane Malvern *Tel:* +44 (0)1684 892678 Worcs. WR14 1BP *Fax:* +44 (0)1684 892841 England.

Mr D N Petersen, Managing Director (based at the above address) has been authorised to compile the technical file.

This machinery has been designed and manufactured in accordance with the following transposed harmonised European standards:

Type A standards:

BS EN ISO 12100:2010, Safety of machinery - General principles for design - Risk assessment and risk reduction

Type B standards:

BS EN ISO 13857:2008, Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs.

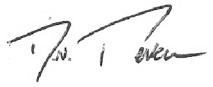
BS EN 349: 1993+A1:2008, Safety of machinery - Minimum gaps to avoid crushing of parts of the human body.

ATEX standards:

BS EN 13463-1:2009, Non-electrical equipment for use in potentially explosive atmospheres Part 1: Basic method and requirements.

BS EN 13463-5:2011, Non-electrical equipment intended for use in potentially explosive atmospheres
Part 5: Protection by constructional safety ‘c’.

The ATEX technical documentation file, reference number AT01 is retained at the manufacturer’s address and has been lodged with a notified body in the UK.

Signed:  *Place:* Malvern, England. *Date:* 20/04/16

Name: Mr D N Petersen *Position:* Managing Director

Issue 5, April 2016