INSTRUCTIONS 1050 e

Section	
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Original instructions

C and A series

Additional instructions for ATEX certified equipment

a DOVER company

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Your distributor :

ECCENTRIC PISTON PUMPS
MOUVEX PRINCIPLE
ADDITIONAL INSTRUCTIONS FOR ATEX CERTIFIED EQUIPMENT
MODELS : C and A series

The following instructions must be read at the same time as:

1. standard NF C 15 100,
2. standard NF EN 60 079-14 (electric installations in explosive gaseous atmospheres),
3. standard NF EN 60 079-17 (inspection and maintenance in dangerous locations),
4. rulings, orders, laws, directives, circulars for application, standards, professional practices and any other document related to its place of installation.

We disclaim any responsibility in the case of non-conformity with these documents.

This manual is an addition to our general manual.

For equipment other than the pump (probe, motor, etc.), the instructions in this manual are intended to help during assembly, but shall in no way replace the specific instruction manuals of equipment manufacturers. These specific instruction manuals must be read before assembling the equipment.

The equipment must be installed by qualified, skilled and authorised personnel.

Our equipment is labelled CE by virtue of directive ATEX 2014/34/EU.

It is designed for use in explosive gaseous atmospheres :

A Series :
- group..... IIA or IIB
- category ..... 2GD or 3GD
- zone .....1, 21, 2 or 22

C Series :
- group.....IIA or IIB or IIC
- category ..... 2GD or 3GD
- zone ..... 1, 21, 2 or 22

Check the compatibility between the informations on the rating plate, the explosive atmosphere present, the area of use and the ambient and surface temperatures.

According to the directive 2014/34/EU, the accessories or (and) components assembled and equipping the motors of our pumps must have a standard CE declaration of inspection.

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1. CATEGORY 2 AND 3 CERTIFICATION FOR MOUVEX PUMPS AND UNITS

MOUVEX pumps and units carry category 2 certification (high level of protection). They are, therefore, obviously suited to category 3 uses (standard level of protection).

In the case of equipment with category 3 certification, the required level of protection does not take the expected malfunctions into account. Recommendations concerning the following points can then not be applied :

- controlling the product temperature (§ 4),
- running without product in the pump (§ 5),
- pumping against a blocked discharge orifice (§ 6), (CAUTION : This recommendation remains compulsory under certain operating conditions, please refer to the corresponding § for further details),
- leaking of the pumped product (§ 9),
- insufficient lubrication of the pump (§ 10).

All other recommendations remain applicable.

2. TABLE OF PUMP CHARACTERISTICS

C series pump	C4 A	C8 A	C12 A	C18 A	C4 A HT	C8 A HT
Max. flow ($m^3.h^{-1}$)	4,5	8	12	18	4,5	8
Acceptable continuous max. speed (rpm)	750	750	530	530	750	750
Maximum suction pressure acceptable (bar)	1	1	1,5	1,5	1	1
Acceptable maximal differential pressure (bar)	9	5	9	6	9	5
Maximum temperature of product pumped (°C)	100				160	

A series pump	AZ O	AD O
Max. flow ($m^3.h^{-1}$)	1,2	2,3
Acceptable continuous max. speed (rpm)	1500	750
Maximum suction pressure acceptable (bar)	1	1
Acceptable maximal differential pressure (bar)	5	
Maximum temperature of product pumped (°C)	150	

Minimum running temperature : See pump Instructions manual.

3. REPLACEMENT OF PARTS

Parts can only be replaced by MOUVEX parts corresponding to the original configuration of the pump. If this is not the case, the pump's characteristics will be modified and its ATEX certification will no longer be applicable.

All operations on MOUVEX ATEX equipment must be carried out by MOUVEX personnel or by personnel specifically authorised to carry out such operations.

Non-conformity with this rule will result in the loss of the MOUVEX ATEX certification.

4. CLASSIFICATION OF PUMP TEMPERATURES

4.1 Pumps

Pumps are devices whose surface temperatures greatly depend on the products they pump. Thus the temperature classifications of MOUVEX pumps are obtained with the temperature limits of the product pumped :

Maximum temperature of the product pumped

Temperature class	T5	T4	T3 [d]	T2 [d]
C Series (except Micro C) T° max pomped product : 100°C Normal operation	-	80°C	100°C	-
C HT Series Normal operation	-	80°C	160°C	-
A Series	60°C	80°C	150°C	-

Pumps equipped with heating jackets are also devices whose surface temperatures greatly depend on the temperatures of the heating products circulating in the heating jacket. Thus the temperature classifications of the MOUVEX are obtained with the temperature limits of the heating product :

Maximum temperature of the heating product

Temperature class	T5	T4	T3 [d]	T2 [d]
C Serie and C HT Serie Normal operation	-	80°C	160°C	-
A Serie	60°C	80°C	150°C	-

Any overshooting of the maximum temperature of the product pumped or the heating product (in the case of a pump equipped with a heating jacket) is considered as abnormal operation of the pump (according to the pump's temperature classification), that can lead to surface temperatures higher than the classification temperature T for which the pump is certified. The user of the pump must ensure that the temperature of the product pumped and/or the temperature of the heating product must never exceed the maximum temperature specified. This can be done, for example, by installing a temperature sensor upstream of the pump. This maximum temperature is also written on the pump rating plate as "max flow temp :".

4.2 Special temperature limits - Pumps

	A series		
Maximum temperature of the pumped product or the heating product	Maximum temperature of surface	Classification of pump temperature	Observations
85°C	140°C	T3	All pumps
90°C	145°C	T3	
195°C	150°C	T3	
100°C	155°C	T3	
105°C	160°C	T3	
110°C	165°C	T3	
115°C	170°C	T3	
120°C	175°C	T3	
125°C	180°C	T3	
130°C	185°C	T3	
135°C	190°C	T3	
140°C	195°C	T3	
145°C	200°C	T3	
150°C	200°C	T3	

	C series (except Micro C)		
Maximum temperature of the pumped product or the heating product	Maximum temperature of surface	Classification of pump temperature	Observations
85°C	140°C	T3	All pumps
90°C	145°C	T3	
195°C	150°C	T3	
100°C	155°C	T3	
105°C	155°C	T3	All pumps [e]
110°C	155°C	T3	
115°C	155°C	T3	
120°C	160°C	T3	
125°C	165°C	T3	HT construction pumps only
130°C	170°C	T3	
135°C	175°C	T3	
140°C	180°C	T3	
145°C	185°C	T3	
150°C	190°C	T3	
155°C	195°C	T3	
160°C	200°C	T3	

[d] For temperature classes T2 and T3, it is possible to provide a pump certified for intermediate temperature values (see the table for the various possibilities).

[e] Non HT pumps :
100°C : maximum temperature of product pumped / heating product

5. OPERATION WITHOUT ANY PUMPED PRODUCT

Pumps using the MOUVEX principle, C and A series, can be run dry, without any pumped product in the pump, throughout the pump priming time without causing the temperature to exceed the temperature T classification (for example during the priming or emptying of pipes). However, this is allowed only on condition that the following restrictions are complied with :

5.1 Operation on a product that does not generate its own explosive atmosphere or generate an explosive atmosphere with an ignition temperature that is higher than 160°C

- the temperature of the external surfaces of the pump at start-up is within the application limits for standard NF EN 13463-1 [f],
- the differential pressure when the pump works without the pumped product is limited to 3 bars (2 bars in the case of A Series pumps),
- running time does not exceed 3 minutes [g],
- the pump can be operated a second time without the pumped product only after thirty minutes have passed. To operate the pump for the third time running without the pumped product will first require a thorough inspection of the equipment, or even dismantling to make sure that the pervious operations have not added risks of ignition (remember, in particular that temperatures inside the pump can continue to be high, even when outside temperatures have returned to the limits defined above).

Special case : A Series pump with bronze sleeve bearings

The following condition comes to add to the conditions defined earlier on :

- the differential pressure when the pump is operated without any pumped product must be limited depending on the continious running speed of the pump. The differential pressure must be less than the ratio of [maximum admissible continuous speed] / [actual continuous speed of the pump] expressed in relative bars.

5.2 Operation on a product that generates its own explosible atmosphere and with an ignition temperature of less than 160°C or T5 certified equipment

- It is forbidden to operate without the pumped product.

Consequently, every time the pump is started, an operator must check that there is a flow through the pump, for example, by checking that the applications that depend on the pump are working. This operation can be automated by using a flow detector placed as close as possible to the pump discharge orifice. This device must comply with current standards and, in particular, standards relating to electric equipment in explosive atmospheres.

In cases where there is a risk of clogging the suction pipes (for example when a filter is used), the user should take the necessary steps to ensure that the pump running without product remains in the limits defined above.

It is strictly forbidden to operate the pump without observing these recommendations.

When a specific instruction manual is provided for mechanical seals, please read it to know the usual precautions recommended by the manufacturer.

[f] Special arrangements have to be made for cases where the pumped product requires that the pump be reheated before it is started up. Please contact our technical department for more information.

[g] It is also possible to run for five 5 minutes, on the express condition that the pump is not operated a second time without pumped product if a thorough inspection or even dismantling of the equipment is not carried out.

6. DISCHARGE PRESSURE RELIEF

When a bypass is used as a pump protection device against accidental and non-repetitive overpressure, and the pump carries category 3 certification, it is possible for the shut-off device not to be fitted if the pump has a category 3 certification.

Under all other circumstances (category 2 certification, category 3 certification with repetitive use of the bypass in the process, regardless of whether this use is voluntary or not...), the shut-off device is compulsory.

6.1 For pumps equipped with an integrated bypass

Since the pressure relief is incorporated in the pump, the product is recirculated directly via the discharge orifice to the suction orifice. The short length of the recirculation circuit means that if the pump operates with a blocked discharge orifice, the bypass (and thus the pump) can reach very high temperatures quickly according to the pump operating conditions.

A shut-off device activated by a rise in temperature (two in case of double bypass) in an emplacement provided for this purpose in order to conform to the classification temperature T, the activation threshold being defined by the temperature classification (see § 6.3). The shut-off device cuts the power supply to the pump and controls any safety measures required by the installation in the event that the maximum surface temperature corresponding to the temperature T classification is exceeded (the wiring used by the device to control the shutting off of the system shall be carried out in accordance with good trade practises). This equipment must conform to current standards and especially with standards related to electric equipment in explosive atmospheres.

6.2 For pumps without an integrated bypass

The pump must be protected against overpressure.

In particular we recommend installing a pressure switch that cuts off the power supply to the pump in case of overpressure. For safety reasons, the cut-off pressure must be less than the pump's maximum discharge pressure, and less than the lowest pressure admissible by the components of the circuit.

This equipment must conform to current standards and in particular to those for electric equipment in explosive atmospheres.

The pump can also be fitted with an external bypass with a return to the tank. As with the integrated bypasses of the MOUVEX pumps, it is vital to install a shut-off device activated by a rise in temperature (two in case of double bypass) at the bypass valve in order to control possible heating due to recirculation of the product. This shut-off device cuts the power supply to the pump and controls any safety measures required by the installation in the event that the maximum surface temperature corresponding to the temperature T classification is exceeded (the wiring used by the device to control the shutting off of the system shall be carried out in accordance with good trade practises). This equipment must conform to current standards and in particular to standards for electric equipment in explosive atmospheres.

6.3 Detection threshold of bypass temperature shut-off devices

Temperature classification	Detection threshold of the temperature shut-off devices
T5 (100°C)	90°C ± 5°C
T4 (135°C)	120°C ± 5°C
T3 (200°C)	175°C ± 5°C
T2 (300°C)	265°C ± 5°C

<u>Caution</u> : The shut off device is not designed to control the pumped product temperature as required in the section CLASSIFICATION OF PUMP TEMPERATURES, but to be triggered when a malfunction could raise the temperature to a level higher than what is acceptable for the ATEX area. The temperature must be checked using a device that is separate from the shut off device.

7. SOLVENTS NOT COMPATIBLE WITH PUMP SEALS

The user must ensure that the seals equipping the pump are compatible with the product pumped.

8. POSSIBLE RISKS OF EXOTHERMIC REACTION

When the pump is operated successively on different products, the user must make the necessary arrangements to avoid heating through an exothermic reaction between the various products pumped.

9. POSSIBLE LEAKS OF THE PUMPED PRODUCT

Possible leaks of product via the pump seals or mechanical seals do not lead to risks of fire provided that the explosive atmosphere surrounding the equipment corresponds exactly to the type of atmosphere for which it was selected.

Make sure to check that the products pumped do not generate an explosive atmosphere, for which the equipment has not been designed, when coming into contact with the atmosphere surrounding the pump or with material located near it.

C Serie pumps must be stopped if product leaks via the pump drive breather.

For a A Serie pump equipped with a drain cap or a drain cock on the pump casing, when starting the pump, check that the drain cap or drain valve acts as a seal between the product pumped and the outside of the pump (Caution : The pump casing is under discharge pressure condition).

10. CHECKING THE OIL LEVEL IN THE PUMP

10.1 A Series

The pump does not contain oil so checking is not necessary.

10.2 C Series (except Micro C)

Before starting the pump for the first time, or after any operation on the pump drive, the oil level must be checked at ambient temperature (non-emulsified oil).

The user must follow the values provided by the manufacturer and stated in the pump Instructions.

Then the drive shaft seals must be inspected regularly after every 1,000 hours operation.

In the case of loss of lubricant, the user must make the necessary repairs (see the maintenance instructions for the C Series pump concerned).

11. PAINT

If the painting on the pumps is retouched, the user must make sure that the recommendations of standard NF EN 13463-1 are being complied with regard to non-conductive coatings on metal surfaces(total thickness of non-conductive coating not exceeding 2 mm for group IIA and IIB gas and vapours or 0,2 mm in the case of group IIC gas and vapours).

To do this, it may be necessary to sand the pump before doing any paint retouches.

12. DUST

To prevent any risk of dust igniting, the user must check that the layer of dust on the pump is no more than 5 mm thick.

13. PUMP DRIVE

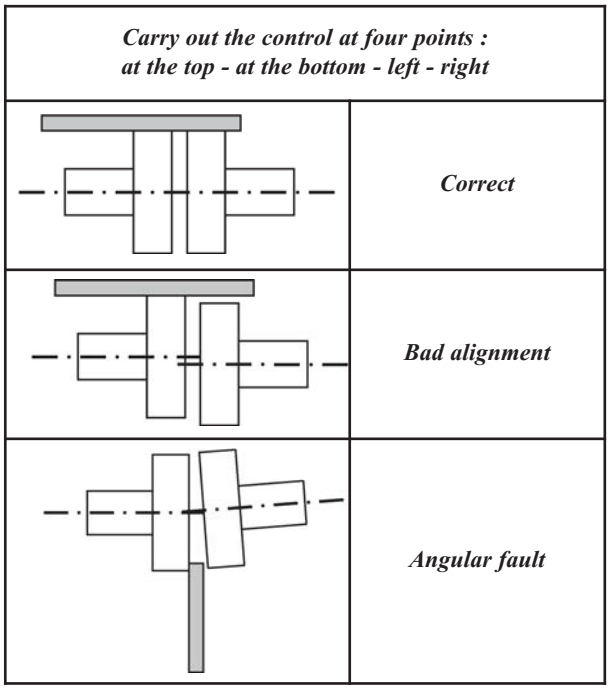
The maximum rotation speed of the pumps must be conformed to (see table of pump characteristics). At first start-up or after any modification of the pump unit, the rotation speed of the pump must be checked and be less than the maximum speed indicated in the instructions.

13.1 Alignment of the pump and drive

To carry out alignment and coupling, use a perfectly straight steel rule to control misalignment and feeler gauges for angular misalignment.
The operation is shown clearly in the 3 figures opposite.
It is important to control the alignment of each step of the installation in order to ensure that none of the steps lead to stresses on the unit or the pump :

- after fastening on the foundations
- after fastening the piping
- after the pump has operated at normal operating temperature.

Reminder : A flexible coupling does not avoid to do a good alignment.



13.2 Elastic coupling

ATEX certified elastic couplings must be used. These couplings must have a level of protection equivalent or better than that of the pump unit. Please refer to the technical manual on coupling for the maintenance instructions relative to the ATEX certified elastic couplings of the MOUVEX pump units.

13.3 Electric installation of the pump motor or gear motor

Check that the indications on the pump rating plate and the supply voltage match.

Comply with the instructions of the manual accompanying the pump to connect the motor to the mains supply.

Refer to the wiring diagram, use wires adapted to the power and ensure that the contacts are tightened vigorously.

Motors must be protected by appropriate circuit breakers and fuses.

Connect the regulatory earthing connections.

Start the pump up empty to check that the connections are correct and check that the direction of rotation corresponds well with the direction of suction and discharge of the installation.

13.4 ATEX characteristics of the pump motor or gear motor

The motor or gear motor used must carry ATEX certification. The level of protection selected has to be equal to or greater than that of the pumping unit. Please refer to the motor and gear motor instruction manual for maintenance instructions relating to motors or gear motors for MOUVEX pump units.

14. ATEX CHARACTERISTICS OF THE PUMPING UNIT

A pumping unit can be composed of components (motor, gear motor, sensors, etc.) whose ATEX characteristics are different to those of the pump.

In this case, the ATEX characteristics of the unit will correspond to those of the component with the lowest level of protection.

15. PUMP MARKING

The marking of the A series pumps is as follows :

MOUVEX F89 AUXERRE
Ppe A + Short description of the pump

⟨Ex⟩ **II 2GD c II B** T5 or T4 or T3 or T2 - Max Temp Flow ...°C
or
⟨Ex⟩ **II 3GD c II B** T5 or T4 or T3 or T2 - Max Temp Flow ...°C

Serial no.
Year
INERIS 02 ATEX 3007 X

The marking of the A series pump units is as follows :

MOUVEX F89 AUXERRE
Gpe A + Short description of the pump unit

⟨Ex⟩ **II 2GD c II B** T5 or T4 or T3 or T2 - Max Temp Flow ...°C
or
⟨Ex⟩ **II 3GD c II B** T5 or T4 or T3 or T2 - Max Temp Flow ...°C

Serial no.
Year
INERIS 02 ATEX 3007 X

The marking of the C series pumps (exept Micro C) is as follows :

MOUVEX F89 AUXERRE
Ppe C + Short description of the pump

⟨Ex⟩ **II 2GD c II B** T4 or T3 or T2 - Max Temp Flow ...°C
or
⟨Ex⟩ **II 3GD c II B** T4 or T3 or T2 - Max Temp Flow ...°C
or
⟨Ex⟩ **II 2GD c II C** T4 or T3 or T2 - Max Temp Flow ...°C
or
⟨Ex⟩ **II 3GD c II C** T4 or T3 or T2- Max Temp Flow ...°C

N° Serie
Year
INERIS 02 ATEX 3007 X (exept HT pumps)
64140 X . . . . . .(HT pumps)

The marking of the C series pump units (exept Micro C) is as follows :

MOUVEX F89 AUXERRE
Gpe C + Short description of the units

⟨Ex⟩ **II 2GD c II B** T4 or T3 or T2 - Max Temp Flow ...°C
or
⟨Ex⟩ **II 3GD c II B** T4 or T3 or T2 - Max Temp Flow ...°C
or
⟨Ex⟩ **II 2GD c II C** T4 or T3 or T2 - Max Temp Flow ...°C
or
⟨Ex⟩] **II 3GD c II C** T4 or T3 or T2- Max Temp Flow ...°C

N° Serie
Year
INERIS 02 ATEX 3007 X (exept HT pumps)
64140 X . . . . . .(HT pumps)

In the case of a pump unit, the ATEX certified components retain the marking intended for the unit.