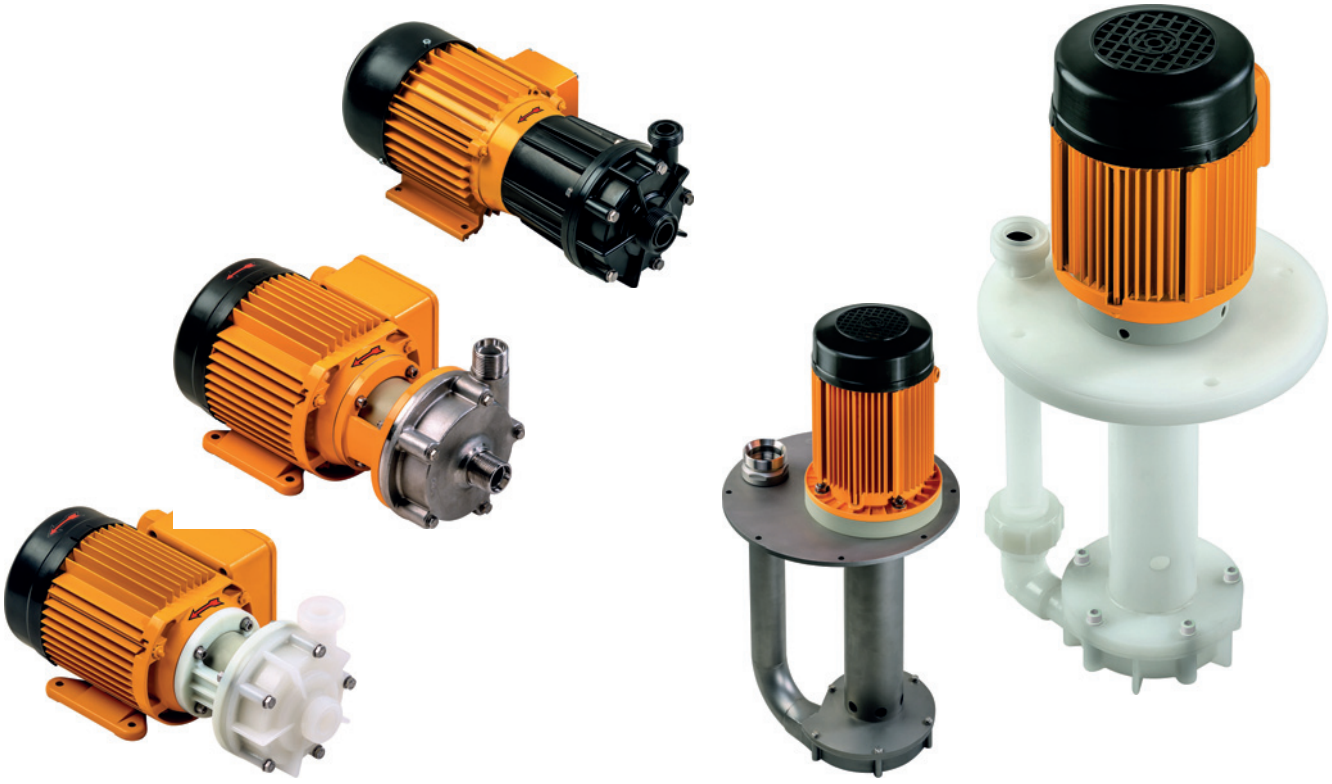
SCHMITT
chemical resistant pumps

Pumps

ATEX additional instructions Centrifugal pumps



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Subject to technical modifications.

Read carefully before use.
Save for future use.

Table of contents

List of figures

List of tables

1 About this document

These additional instructions on ATEX are only valid together with the operating manual for the pump and other related documents listed there.

1.1 Warnings and symbols

Warning sign	Level of risk	Consequences if disregarded
⚠ DANGER	immediate acute risk	Death, serious bodily harm
⚠ WARNING	potentially acute risk	Death, serious bodily harm
⚠ CAUTION	potentially hazardous situation	Minor injury
NOTE	potentially hazardous situation	Material damage

Tab. 1 Warning signs and consequences if disregarded

Symbol	Meaning
⚠	Safety warning sign ► Take note of all information highlighted by the safety warning sign and follow the instructions to avoid injury or death.
►	Instruction
1., 2., ...	Multiple-step instructions
✓	Precondition
→	Cross reference
ℹ	Information, notes

Tab. 2 Symbols and their meaning

1.2 Scope

Pump type	Pump series
Horizontal centrifugal pumps	U-EX, UP-EX, UP-DO-EX
Magnetically coupled centrifugal pumps	MPN-EX
Magnetically coupled impeller-type peripheral pump	P-EX
Sump pumps	T-EX, TE-EX

Tab. 3 Scope

2 Safety

2.1 Intended use

Transportation of permissible fluids (→ Data sheet).
Compliance with the rated speed (→ data sheet).

Pump not operated with

- valves closed
- at values deviating from the working range (→ data sheet)
- if the maintenance intervals are exceeded

2.2 Obligations of the operating company

- Evaluate and document the operating areas of the system for danger of explosions in accordance with Directive 99/92/EC, appendix I.
- Ensure that directive 99/92/EC, to protect the health and safety of the employee in potentially explosive atmospheres, is maintained.
- Use only pumps that satisfy the Directive 2014/34/EU and carry the appropriate explosion protection categorization mark.
- Always ensure that the following is maintained:
  - the pump is earthed
  - pump interior, seal chamber, auxiliary systems and vacuum and pressure pipes are always completely filled with the liquid being transported
  - Auxiliary operating systems must always be completely filled with seal medium
  - Comply with the permissible surface temperature of the pump and temperature of the conveyed fluid
  - armatures on the input and output of the pump are set correctly
  - the pump must be regularly maintained and monitored
  - it must be impossible for the pump to run dry e.g. by monitoring levels, flow measurements
  - all monitoring and safety devices must be fitted and operational
  - do not permit any deposits of dust to build up on the pump
- Ensure that the motors and monitoring units supplied on site actually correspond to the category and temperature class of the associated zone.
- Ensure that maintenance and repair work are only carried out by authorized personnel who:
  - know the standards and regulations for devices for use in potentially explosive atmospheres
  - possess the required knowledge and experience for handling devices when used in potentially explosive areas
- After maintenance and repair work, the pump unit may only be released for operation by authorized personnel, an officially appointed person or the pump manufacturer.
- Ensure that the following actions are carried out following significant modifications to the pump unit (e.g. seal materials, seal versions, auxiliary seals, hydraulics):
  - A new ignition hazard assessment is carried out.
  - The pump unit is inspected according to the state of the art and the requirements of Directive 2014/34/EU
  - The changes are documented in the explosion protection document of the operator, as required by the Directive 99/92/EC or in the conformity evaluation procedure as required by the Directive 2014/34/EU, with issuing of a Declaration of Conformity

2.3 Materials and liquids

Ensure that

- all components are electrically conductive
- for classes T-EX, TE-EX the mating flange above the container cut-out is covered with an electrically conductive coating and is earthed
- the build up of static electricity is avoided
- the relaxation time before working on the pump is complied with

3 Explosion protection labelling

3.1 Marking

This section provides information applicable to all explosion protection labels.
The temperature class for operation and the ignition protection type are documented on the explosion protection categorization mark on the pump.

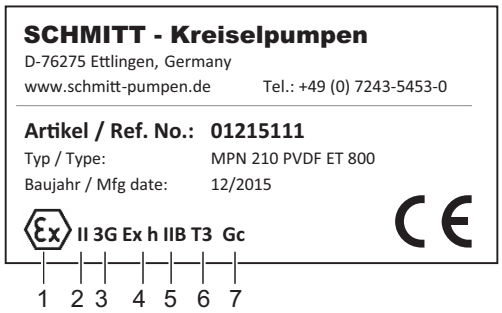


Fig. 1 Explosion protection labelling at the pump (example)

1 Symbol for explosion protected equipment
2 Equipment group according to Directive 2014/34/EU
3 Equipment categories according to Directive 2014/34/EU
4 Symbol Ex and ignition protection type
5 Equipment group with subgroup
6 Temperature class
7 EPL equipment protection level

3.2 Temperature class

Flammable gases and vapors are divided into temperature classes for their inflammability on hot surfaces.

The surface temperature of the pump must always be less than the lowest ignition temperature for the temperature class.

Temperature class	Lowest ignition temperature of the mixture [°C]	Maximum surface temperature [°C]
T1	450	< 450
T2	300	< 300
T3	200	< 200
T4	135	< 135

Tab. 4 Temperature class

3.3 Type of protection against ignition

The **type of protection against ignition** describes the type of measures used to prevent ignition in a potentially explosive atmosphere.

The marking consists of the symbol Ex (explosion protection against ignition), followed by letters which describe the type of type of protection against ignition.

Type of protection against ignition	Meaning	For an area	
		without electrical equipment	with electrical equipment
Ex h	Ignition source monitoring	X	–
	design safety	X	–
	Liquid encapsulation	X	–
Ex d	Pressure tight encapsulation	X	X
Ex e	Enhanced safety	–	X
Ex I	Intrinsic safety	X	–
Ex o	Oil encapsulation	–	X
Ex p (xb, yb, zc)	Over pressure encapsulation	X	X
Ex q	Sand encapsulation	–	X
Ex m	Cast encapsulation	–	X
Ex I	Intrinsic safety	–	X
Ex t	Protection provided by the casing	–	X

Tab. 5 Type of protection against ignition

3.4 Ex atmosphere

The **Ex atmosphere** describes the type of potentially explosive atmosphere in a zone.

Ex atmosphere	Meaning
G	Flammable gases and vapours
D	Flammable dusts

Tab. 6 Ex atmosphere

3.5 Equipment group / Area of use / Zone / Category

Pumps are divided by area of use into **Groups** or **Equipment groups** and **Equipment Protection Levels (EPL)** or **Categories**. The **zone** depends on the probability of the formation of an explosive atmosphere and differentiates between gases (G) and dusts (D).
The **Category** or the **Equipment Protection Level (EPL)** describes the design safety of the pump and is dependent on the Zone.

Zone	Frequency of formation of dangerous explosive atmospheres	Classification according to EN 80079-36		Classification according to 2014/34/EU		Design safety
		Group	EPL	Equipment group / Area of use	Category	
–	–	I	Ma	I / underground	M1	very high
–	–	I	Mb	I / underground	M2	high
0	constantly or over long periods or frequently	II	Ga	II / other	1G	very high
1	occasionally (any faults occurring may not become source of ignition)	II	Gb	II / other	2G	high
2	unlikely; if they do, only infrequently and for a short period (surface temperature must not become a source of ignition in normal operation)	II	Gc	II / other	3G	normal
20	constantly or over long periods or frequently	III	Da	II / other	1D	very high
21	occasionally (any faults occurring may not become source of ignition)	III	Db	II / other	2D	high
22	unlikely; if they do, only infrequently and for a short period (surface temperature must not become a source of ignition in normal operation)	III	Dc	II / other	3D	normal

Tab. 7 Zone / Equipment group / Area of use / Category

The pumps are approved exclusively for the temperature classes T3 and T4 in the categories 2G and 3G.

4 ATEX measures

4.1 Installation and connection

4.1.1 Check the explosion protection label

► Compare the explosion protection categorization mark on the pump with the data on the data sheet and make sure that both data comply with the explosion protection requirements at the installation site.

4.1.2 Performing basic measures

Application

1. Check whether pump and motor are suitable for use in the selected area.

Technical documentation

2. Observe the operating manuals for the motor and monitoring devices.

Lubricants

3. Use suitable lubricants.

Heating

4. Agree the electrically powered heating system with the manufacturer.

Avoid foreign bodies

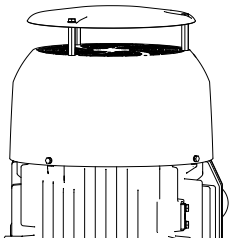
5. Prevent uptake of foreign bodies (for example, by using a separator, starting strainer).

Inverter operation

6. Only use motors that are approved for this type of operation.
7. Ensure nominal speed of pump is maintained (→ Data sheet).
8. Observe standards and regulations for installation and operation with an inverter.

Motor

9. For pumps with flanged motors:
   – Avoid axial thrusts which place an impermissible loading on the motor bearings: Operate the pump only up to the maximum permissible system pressure.



10. If installed vertically (submerged pumps)
    – Employ a motor with a protective roof

Earthing and potential equalization

11. Ensure potential equalization:
    – Integrate the pump into the lightning protection concept
    – Connect the potential equalization to inner earthing terminal in the motor junction box
    – if necessary, connection additional potential equalization (> 4 mm^2) to the outer earthing terminal of the motor
12. Earthing and potential equalization of baseplate pumps:
    – Ensure potential equalization of the pump unit
    – Identify the earthing cable as required by local regulations
13. Earthing and potential equalization of pumps with flanged motors:
    – Ensure that mounting flange of the motor is bright metal
14. Establish proof by measurement of effective earthing, and document this in the final acceptance report.

4.1.3 Performing measures for category 2

1. If installed vertically: Comply with the minimum depth of submersion of the pump.
2. Ensure that there are monitoring systems to avoid overheating, using the following table.

Parameters[1)]	Action
Constant	► Make provision for appropriate monitoring – the pump parameters – the characteristic curve of the pump – the motor manufacturer's specifications
At least one is not constant	► Make provision for monitoring and/or measurement of the characteristic values according to – the pump parameters – the characteristic curve of the pump – the necessary level in the tank

Tab. 8 Monitoring equipment to avoid overheating

1) e.g. flow rate, delivery height, density, viscosity, rotational speed, delivery quantity, temperature, fill level, pressure, motor current, motor power, torque

3. Take measures as shown in the table below to ensure self-heating due to dry running is avoided.

Condition	Action
Conveyed fluid Gas content < 1 %	► Ensure compliance with Q > 3 x Qmin. If necessary, install a bypass pipe. ► Make provision in the pipework for venting.
Conveyed fluid 1 % < gas content < 3 %	► Ensure compliance with Q > 3 x Qmin. If necessary, install a bypass pipe. ► Use double mechanical seals. ► For sealing operating mode install a pressure sensor for the seal medium (if necessary). ► For quenching operating mode: – if necessary, fit level measurement device for the supply container. – if the temperature difference between sealing medium and temperature class < 15 Kelvin, fit a temperature gauge for the sealing medium. ► Make provision in the pipework for venting.
Vertical installation (submerged pumps)	► Make provision for fill level monitoring. ► Where there is a switch-on point, comply with the minimum depth of submersion of the pump: – (→ Operating manual). – (→ Data sheet). – (→ Dimension sheet).

Tab. 9 Measures to ensure self-heating due to dry running is avoided

4.2 Operation

⚠ WARNING

Risk of explosion due to vapors of the pumped medium!

► Collect leaking liquid safely and damage fitting in accordance with local regulations.

4.2.1 Commissioning

1. Ensure the correct direction of rotation of the drive (→ see the pump operating instructions).
2. Ensure correct venting (→ see the pump operating instructions).

4.2.2 Performing basic measures

Take special measures for operation in the area subject to explosion hazards

1. Observe the operating manuals for the motor and monitoring devices.
2. Consult the manufacturer regarding each operation of the pump (including test runs).
3. Following an emergency stop, have recommissioning carried out by authorized personnel.
4. Ensure protection against dry running in accordance with the ignition protection system b1 to EN 80079-37:
   – by monitoring the seal barrier liquid
   – and by monitoring the minimum flow rate
5. Ensure evaluation of the monitoring device:
   – according to the operational reliability
   – to DIN EN ISO 13849-1 (for monitoring devices not certified to EN 80079-37)

Comply with the maximum permissible temperatures

Irrespective of the specified temperatures of the conveyed fluid, comply with the maximum permissible temperature range for the class of equipment.

6. For operation without a mechanical seal: Comply with maximum permissible temperature of the pump medium (→ Data sheet).
7. For operation with a mechanical seal: Comply with the maximum permissible temperature of the conveyed fluid according to the table below.

Temperature class	Class of medium	Maximum permissible temperature of the conveyed fluid[1] [°C]
T4 (135 °C)	Oils	105
	Hot water or liquids similar to water	115
	liquids not similar to water	110
T3 (200 °C)	Oils	150
	Hot water or liquids similar to water	150
	liquids not similar to water	150

Tab. 10 Maximum permissible temperature of the conveyed fluid for operation with a mechanical seal

1) based on the temperature classes, e.g. for the main stainless steel material of the pump

8. For operation with plain bearings: Comply with a maximum permissible temperature of the conveyed fluid 20 °C lower than the specified temperature class:
Tmax = Temperature class – 20 °C

4.2.3 Performing measures for category 2

Avoid overheating

Relevant only to operation in category 2.

► Monitor system according to the behavior of the parameters:

Parameters[1]	Action
Constant	► Set the monitoring according to – the pump parameters – the characteristic curve of the pump – the motor manufacturer's specifications
At least one is not constant	► Monitor the characteristics and/or measure and adjust them according to – the pump parameters – the characteristic curve of the pump – Tank level

Tab. 11 Measures to prevent overheating

1) e.g. flow rate, delivery height, density, viscosity, rotational speed, delivery quantity, temperature, fill level, pressure, motor current, motor power, torque

Avoid running dry

Relevant only to operation in category 2.

► Take measures according to the following table.

Type and design of the mechanical seal	Action
Single mechanical seal	► Regularly vent mechanical seal cavity (if present). ► Ensure that the mechanical seal cavity (if present) is always filled.
Mechanical seal, operation in quench mode	► If the temperature difference between sealing medium and temperature class < 15 Kelvin: Monitor temperature of the sealing medium. ► Monitor the level in the supply container.

Tab. 12 Measures to prevent running dry

4.3 Maintenance

⚠ WARNING

Risk of explosion due to vapors of the pumped medium!

- ▶ Empty the pump before maintenance and repair work and flush it, when necessary.
- ▶ Collect leaking liquid safely and damage fitting in accordance with local regulations.

Further technical information and advice is available on request from the pump manufacturer. Be ready to quote the item number and provide a description of the fault.

Maintenance intervals are reduced under extreme operating conditions or for use in an aggressive environment.

1. Observe the operating manuals for the motor and monitoring devices.
2. Before working on the pump, comply with the relaxation time.
3. Change the motor roller bearings as specified by the manufacturer.
4. Check at appropriate intervals:
   – Motor according to manufacturer manual
   – the functioning of the monitoring devices

5 Appendix

5.1 Declaration of conformity in accordance with the EU directive

SCHMITT
chemical resistant pumps

EU-Konformitätserklärung
gemäß Richtlinie 2014/34/EU (ATEX)

EU-Declaration of Conformity
according to directive 2014/34/EU (ATEX)

Der Hersteller / The manufacturer

Schmitt-Kreiselpumpen GmbH & Co. KG
Einsteinstraße 33
D-76275 Ettlingen, Germany

erklärt hiermit in alleiniger Verantwortung die Übereinstimmung der folgenden Geräte

hereby declares under sole responsibility the compliance of the following devices

Kreiselpumpen der Baureihen

Centrifugal pumps of the series

- **MPN-EX**
- **U-EX**
- **UP-EX / UP-DO-EX**
- **P-EX**
- **T-EX / TE-EX**

mit der Richtlinie 2014/34/EU (ATEX).

with the directive 2014/34/EU (ATEX).

Die entsprechenden Unterlagen sind bei der benannten Stelle 0408 TÜV AUSTRIA Deutschland hinterlegt.

The relevant documents are deposited with the notified body 0408 TÜV Austria Deutschland.

Kennzeichnung der mechanischen Ausrüstung

Marking of the mechanical equipment

Ex II 2G Ex h IIC T4 Gb oder / or
Ex II 2G Ex h IIC T3 Gb oder / or
Ex II 3G Ex h IIB T4 Gc oder / or
Ex II 3G Ex h IIB T3 Gc

Die jeweilige Kennzeichnung und die Seriennummer sind auf dem Typenschild angegeben.

The specific identification and serial number is indicated on the nameplate.

Angewandte harmonisierte Normen der EU

EN 1127-1:2011 Explosionsschutz, Teil 1: Grundlagen und Methodik

EN 80079-36:2016 Nichtelektrische Geräte für den Einsatz in explosionsgefährdeten Bereichen, Grundlagen und Anforderungen

EN 80079-37:2016 Nicht-elektrische Geräte für den Einsatz in explosionsfähigen Atmosphären - Schutz durch konstruktive Sicherheit, Zündquellenüberwachung, Flüssigkeitskapselung

Applied EU harmonized legislation

EN 1127-1:2011 Explosion prevention and protection, Part 1: Basic concepts and methodology

EN 80079-36:2016 Non-electrical equipment for explosive atmospheres - Basic method and requirements

EN 80079-37:2016 Non-electrical type of protection constructional safety, control of ignition sources, liquid immersion

Die Sicherheitshinweise der Betriebsanleitung sind zu beachten.

The safety instructions of the manual must be observed.

Änderungen und Reparaturen an den Geräten sind nicht zulässig, außer mit ausdrücklicher schriftlicher Zustimmung des Herstellers. Werden die genannten Geräte in eine übergeordnete Maschine eingebaut, so müssen die durch den Einbau entstehenden neuen Risiken durch den Hersteller der neuen Maschine beurteilt werden.

Changes and repairs to the equipment are not permitted, except with the written consent of the manufacturer. If the devices are installed into another machine, the new risks arising from the installation must be assessed by the manufacturer of the new machine.

Schmitt-Kreiselpumpen GmbH & Co. KG

Detlef Brandt, Geschäftsführer / General Manger

Ettlingen, Juli 2019