Hygienic Pumps

ATEX - GEA Hilge TP/Ex, TPS/Ex

Addendum to the operating instructions (Translation from the original language)

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LEGAL NOTICE

These instructions are part of the technical documentation for the scope of delivery. They contain important information to ensure safe and proper transportation, mounting, commissioning, economic operation, maintenance, and repair of the pump. Following these instructions will help you avoid risks, reduce repair costs and downtime and increase the pump's reliability and service life.

These instructions are aimed at users of the pump and are intended in particular for the operator and its operating and maintenance personnel.

It is mandatory for the operator and its operating and maintenance personnel to read these instructions prior to transport, installation, commissioning, use, maintenance, repair, disassembly and disposal of the pump. The obligation to read these instructions applies also to persons responsible for carrying out activities in the phases of the life of the pump.

The operator is required to complement these instructions with information based on existing national regulations for occupational safety, health protection, and environmental protection.

In addition to these instructions and the mandatory regulations for accident prevention applicable in the country and place of use, the recognised technical rules for safe and proper work must be observed.

These instructions are part of the pump. The entire documentation consists of these instructions and any additional instructions provided. It must always be kept within reach at the pump’s location of use. When moving the pump to a different site and upon selling the pump, the entire documentation must be passed on as well.

These instructions were written to the best of our conscience. However, the manufacturer is not liable for any errors that may be contained in this document or for any resulting consequences.

The manufacturer reserves the right to make technical changes by further development of the pump described in these instructions.

Illustrations and drawings in these instructions are simplified representations. Due to enhancements and changes, it is possible that the illustrations do not exactly match the pump used by you. The technical data and dimensions are not binding. Claims cannot be derived from them.

The manufacturer assumes no liability for damages

- arising within the warranty period due to

  - unintended operation and usage conditions,
  - insufficient maintenance,
  - improper operation,
  - incorrect installation,
  - incorrect or improper connection of electrical components.
- resulting or arising from unauthorised modifications or failure to follow the instructions,
- caused by use of accessories / spare parts that have not been supplied or recommended by the manufacturer.

LAYOUT INFORMATION

Bullet points and numbered list characters

Bullet points are used to separate logical contents within a section:

- Bullet point 1

  Types of bullet point 1.

- Bullet point 2

  Types of bullet point 2.

Numbered list characters are used to separate enumerations within a descriptive text:

Descriptive text with consecutive numbering:

– Numbered list point 1

– Numbered list point 2

Handling instructions

Handling instructions require you to do something. Several consecutive steps result in a handling sequence that should be run in the specified order. The handling sequence can be divided into separate steps.

Handling sequence

1. Handling sequence step 1
   - step 1,
   - step 2,
   - step 3.
2. Handling sequence step 2

The subsequent handling sequence is the expected result:

→ Result of the handling sequence.

Individual handling steps

Individual handling steps are marked thus:

– Individual work steps

TABLE OF CONTENTS

1 General

1.1 Information on the document

Target group

These operating instructions are intended for:

- the operating personnel of the pump
- the maintenance and service personnel.
- System planners and system builders

A general common technical understanding, which is necessary for commissioning, maintenance and repair of pump units, is assumed.

Technical changes

Types, technical data and spare part numbers are subject to technical change.

Subject to change due to continuous technical development.

1.1.1 Applicable Documents

These operating instructions contain important information concerning the installation, use, monitoring, and maintenance for TP and TPS centrifugal pumps used in potentially explosive areas. This document is a supplement to the general standard operating instructions for TP and TPS centrifugal pumps and is therefore to be considered part of it. Read this supplementary information before assembly and commissioning of the pump and always keep it close at hand at the assembly site.

1.2 Manufacturer address

GEA Hilge
Niederlassung der GEA Tuchenhagen GmbH
Hilgestraße 37-47
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Fax +49 6135 1737
hilge@gea.com
gea.com

1.3 Customer service

Phone +49 6135 7016 100 (Sales support)
Phone +49 6135 7016101 (Service)
spareparts.hilge@gea.com

1.4 Declaration of conformity GEA Hilge TP/Ex and TPS/Ex

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EU-Konformitätserklärung nach ATEX 2014/34/EU

Hersteller: **GEA Hilge**
Niederlassung der GEA Tuchenhagen GmbH
Hilgestraße 37-47
D 55294 Bodenheim

Hiermit erklären wir, dass die nachfolgend bezeichneten Geräte

Modell: GEA Hilge TP/Ex
GEA Hilge TPS/Ex

Typ: TP 1020, TP 1540, TP 2030, TP 2050, TP 3050, TP 5060, TP 7060, TP 2575, TP 8050, TP 8080, TP 16040
TPS 2030, TPS 3050

aufgrund ihrer Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführungen den grundlegenden Sicherheits- und Gesundheitsanforderungen der folgenden Richtlinie entsprechen:

Einschlägige EG-Richtlinien: 2014/34/EU ATEX-Richtlinie

Kennzeichnung: CE Ex II 2G Ex h IIB T4 Gb
CE Ex II 2D Ex h IIIB T130°C Db
-20°C ≤Ta≤40°C
T_{Medium} ≤ 100°C

Angewandte harmonisierte Normen, insbesondere:
EN 1127-1:2011
EN ISO 80079-36:2016
EN ISO 80079-37:2016

Andere angewandte Normen und technische Spezifikationen:
TRGS 727:2016

Bemerkungen:
- Die ATEX Betriebsanleitung einschließlich der darin definierten bestimmungsgemäßen Verwendung und Sicherheitshinweise muss beachtet werden.
- Elektrische / elektronische sowie andere Geräte und Komponenten in Verbindung mit den o.g. Geräten müssen einer eigenen Konformitätsbewertung nach ATEX unterzogen werden.
- Es sind Gleitringdichtungen des Typs SHJ in den Paarungen Siliziumkarbid/ Siliziumkarbid (SIC/SIC) als auch Kohle/ Siliziumkarbid (C/SIC) zulässig.

Bevollmächtigte Person für die Zusammenstellung und Übergabe von technischen Unterlagen:

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Büchen, 16 April 2019

Michael Wulle
Managing Director

i.V. Matthias Südel
Senior Director
Product Development Flow Components

20181219_Konformitätserklärung_TP_TPS.docx
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2 Safety

2.1 Safety precautions for the operator / operating personnel

The safety precautions contained in these operating instructions, precautions of the pump operating instructions, the relevant national accident prevention regulations, as well as any internal working, operating, and safety provisions of the operator must be observed.

2.2 Intended use

The pump is only intended for the purpose described. Using the device for any other purpose is considered contrary to its designated use. Tuchenhagen will not accept any liability for damage resulting from improper use: the risk lies entirely with the operator of the facility. Prerequisites for trouble-free, safe operation of the pump are proper transport and storage as well as proper installation and assembly. The intended use also includes compliance with the operating, maintenance and service requirements.

2.3 Personnel

The operating and maintenance personnel must be suitably qualified for this work. It must receive special instructions on any hazards that may occur and must be familiar with the safety instructions mentioned in the documentation and observe the same. Work on the electrical system must only be carried out by qualified electricians.

2.4 Modifications, spare parts, accessories

Unauthorised modifications and alterations which impair the safety of the pump are not permitted. Protective devices and safety systems may not be bypassed, arbitrarily removed, or made inoperative. Only use original spare parts and accessories approved by the manufacturer.

2.5 Safety instructions for cable glands

Cable glands may only be installed, commissioned and serviced by qualified technicians. They must be used as intended in an undamaged and clean condition. The cable glands used mus have an ATEX approval that corresponds to the terminal box protection class.

If a motor other than that supplied by GEA Hilge is used, the appropriate cable gland must be used. For the use of motors for potentially explosive atmospheres, please pay attention to chapter “motor”.

No changes may be made to the cable gland which are not expressly listed in these operating instructions. In particular, the replacement of the standard sealing insert with a different size is not permitted.

The cables used must be approved for the ATEX area, they must not have any kinks, damage and must match the available size of the cable glands.

Pay attention to the national installation, safety and accident prevention regulations and the safety instructions in these operating instructions for all work related to cable glands.

The specified tightening torques must be observed to prevent excessive crushing of cables and seals.

2.6 General regulations

The user is obliged to operate the pump only in perfect condition. In addition to the instructions in this documentation the following also has to be observed:

- pertinent accident prevention regulations,
- generally accepted safety rules,
- national regulations applicable in the country of use,
- work and safety instructions applicable in the facility,
- installation and operating regulations for use in potentially explosive areas.

It is imperative to read and follow the safety information. Ignoring the safety information leads to loss of any and all claims for damages. It may also lead to personal injury and environmental hazards. This is especially the case in potentially explosive areas.

3 Intended Purpose

GEA Hilge Centrifugal Pumps TP and TPS with IEC standard motor (type B35) are suitable for the proper hygienic conveyance of biologically complex and expensive liquids up to a viscosity of 1000 mPas = 1000 cP.

Therefore they can be used as product pumps in the food industry, pharmaceutical industry and as cleaning agent pumps in CIP cleaning circuits.

4 Design

The TP/Ex and TPS/Ex type centrifugal pump for use in potentially explosive areas is based on the standard version and has been especially configured for use in such areas. It varies from the standard version since it is equipped with a motor for use in potentially explosive areas (Ex-motor) and does not have a protective covering for the motor.

In addition, the Ex-version has a corresponding ATEX marking and can be traced back by the system for use in Ex-areas.

The Ex-versions of the pumps are accompanied by this document with diverse safety-related instructions as well as the EU declaration of conformity required for operation.

Only original GEA spare parts are permitted for use in potentially explosive areas.

The material combinations of SHJ mechanical seals approved for Ex application are limited to silicon carbide/silicon carbide (SIC/SIC) and silicon carbide /carbon (C/SIC). The combination carbon/stainless steel (C/SS) is not permitted.

Before commissioning, a flow monitoring system must be installed (see chapter monitoring system - flow switch)

4.1 Identification

The TP/Ex and TPS/EX type centrifugal pump for use in potentially explosive areas are identified according to Directive 2014/34/EU. This additional identification is located next to the other identification information on the even surface of the pump housing inclined toward the motor. The identification is for the pump unit; the motor has its own identification.

The identification is

II 2G Ex h IIB T4 X Gb
II 2D Ex h IIIB T130°C X Db
-20°C ≤Ta≤40°C
T_{Medium} ≤ 100°C

The TP centrifugal pump may be used for the following:

- II 2: Group II equipment, equipment category 2 (according to ex-zone 1/2)
- G: suitable for areas with gases
- D: suitable for areas with dust
- Ex h: Includes ignition protection type, design safety and ignition source monitoring
- IIB: for gases in substance class IIB
- IIIB: for non-conductive combustible dust in substance class IIIB
- T4 - temperature class for gases T4 with max. permissible surface temperature of the device of 135°C
- T130°C - actual max. surface temperature for the permissible use of dust
- Gb - device protection level Gb (high protection level) for gases

- Db - device protection level Db (high protection level) for dust
- Ta - ambient temperature range between -20°C and 40°C
- T_{Medium} - permissible medium temperature of 100 °C must not be exceeded

4.2 Temperature limits

The maximum permissible surface temperatures depend on the ambient temperature and the temperature of the flow medium. Using the pump creates additional heat. Therefore, the heat transfer to the motor must receive special attention. The Ex-motors used have temperature limits that may not be exceeded during operation.

The temperature limits listed in the following table result from the temperature classes of DIN EN ISO 80079-36 and the boundary conditions listed:

temperature limits for gases		
temperature class gases according to DIN EN ISO 80079-36	Max. surface temperature according to DIN EN ISO 80079-36	Max. perm. flow medium temperature
T4	135 °C	100 °C

The actual maximum surface temperature is specified for the explosive area “dust”:

temperature limit for dust	
actual max. surface temperature	Max. perm. flow medium temperature
130 °C	100 °C

Permissible ambient temperature of GEA Hilge centrifugal pump TP/Ex and TPS/Ex: -20°C … +40°C

The listed temperature limits must be observed. The system operator is responsible for complying with the temperature limits.

4.3 Motor

The TP/Ex and TPS/Ex centrifugal pump must be operated with a suitable Ex-motor of protection type “pressure-resistant casing”.

Example of an Ex-identification of a suitable motor:


II 2G Ex d IIB T4

The system operator must observe the motor classification relevant to potentially explosive areas. It can deviate from the classification of the pump (compare chapter “Identification”).

It is also important to ensure that the surface area temperatures of the motors do not exceed the permissible values at any point. The “pressure-resistant casing” ignition protection on the motors used by Tuchenhagen is guaranteed when the temperature limit values listed in the table are followed.

Permissible ambient temperatures of the motors: -20 to +40°C

Temperature limits for motors with “increased protection (letter e)” ignition protection are considerably lower.

In any case the following applies: If the operator uses different motors, other temperature limits are possible. The operator is responsible for observing the maximum permissible surface temperatures.

The operating instructions of the motor must be observed.

5 Assembly and connection

5.1 Assembly

The pump must be assembled by a qualified professional and connected to the piping. During installation, ensure that:

- the installation has been carried out without any tension,
- self-venting is possible and any remaining of gas/air bubbles is not possible.

Therefore, the pressure-pipe tube must always be at the top (vertical or horizontal).

5.2 Electrical connections

Only qualified personnel may make the electrical connection. Be sure to observe the information found on the motor's nameplate and in the motor's operating instructions. It is imperative to observe the special requirements for electrical installation in potentially explosive areas (IEC 60079-14).

No spots with kinks or chafing are permitted in the cable.

The GEA Hilge motors are equipped with PTC thermistors to monitor the winding temperature. These must be connected to suitable motor isolators. The documents supplied with the motor contain detailed information on this.

5.3 Earthing

Equipotential bonding according to DIN EN ISO 80079-36

In order to avoid dangerous charges, the pump must be earthed or provided with earth contact.

If devices consist of several conductive components, these must be earthed individually or must be connected electrically to each other and earthed together.

6 Commissioning and operation

6.1 Impermissible operating methods

The pump may only be operated within the permissible operational parameters specified in the operating instructions and data sheets. Exceeding the permissible values can lead to personal injury, environmental hazards, and damage to the machine.

6.2 Rotational direction inspection

If there is no flow medium in the pump, the rotational direction must be inspected when the pump is decoupled (only the motor). Do not carry out a rotational direction inspection when the pump is empty.

6.3 Foreign objects

No foreign objects such as tools, screws, nuts etc. must remain in the pump. During commissioning and operating it must be ensured that no foreign objects are present. In the event of unusual noises, the pump must be switched off immediately.

The openings of the lantern must be closed with the standard plugs.

By cleaning the system before commissioning it must be ensured that no foreign objects can get from the product to the pump. If necessary by the process, filters must be used.

6.4 Pump fluid status

⚠ Caution!

Dry running!

► The pump may only be operated when it is filled completely with fluid.

Before starting the pump, be sure that the system is filled with fluid between the suction pipe and pressure pipe. It is not permissible to operate the machine without fluid.

The operator is responsible for ensuring that the stopcocks are in the required positions. If the operator cannot do this himself, he must provide suitable measures for monitoring.

GEA Hilge offers for this a flow switch as part of its VARINLINE product line for measuring and control (see chapter *“monitoring system – flow switch”*).

6.5 Handling chargeable liquids

according to TRGS 727

Liquids or the inside of containers can become dangerously charged by filling and emptying containers with liquids, pumping, stirring, mixing and spraying of liquids, however also when measuring and sampling and during cleaning operations.

The amount of charge generated and the level of charge depends on the properties of the liquid, its flow velocity, the working method as well as the size and geometry of the container and the container materials.

All relevant standards and regulations regarding the pumping of chargeable liquids must be observed.

6.6 Blocking the pump

The pump may not be operated when the stopcock is closed in the suction pipe and/or pressure pipe. The stopcockmust be completely open on the suction side and at least slightly opened on the pressure side every time the pump is turned on.

The operator is responsible for ensuring that the stopcocks are in the required positions. If the operator cannot do this himself, he must provide suitable measures for monitoring. GEA Hilge suggests for this a suitable flow switch (see chapter "*monitoring system – flow switch"*).

6.7 Monitoring system – flow switch

In order to ensure that the pump is always filled with fluid and can only be briefly run (problem-free time span ≤ 10 seconds) despite a closed stopcock, the operator must use a suitable monitoring system.

Recommended by GEA Hilge:

Flow switch type SF311A

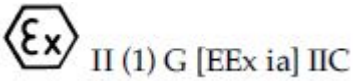
Manufacturer: ifm electronic gmbh, Teichstraße 4, 45127 Essen

Device identification:

Signal processor 24 V DC type SR2301

Manufacturer: ifm electronic gmbh, Teichstraße 4, 45127 Essen

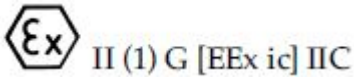
Device identification:



Signal processor 230 V AC , type SN2301

Manufacturer: ifm electronic gmbh, Teichstraße 4, 45127 Essen

Device identification:



A type test has proven the flow switch, along with its evaluation electronics, to be suitable and effective. Installation in the pressure pipeline is recommended. The clearance between flow switch and outlet connection should be 3 time the pipe diameter. Adjust the sensor in such a manner that the pump is switched off after 10 seconds at the latest, if the fluid flow has stopped.

6.8 Requirements for flow switches of other manufacturers

- The monitoring of ignition sources must be of ignition protection level b1 (EN ISO 80079-37) and must be checked for functionality annually. Only proven components with proven reliability may be used.

- The flow switch with its signal processor must itself be used for use in the present potentially explosive atmosphere and meet all corresponding requirements of the ATEX guideline.

Technical data (only for liquid media):

- Temperature according to pumped medium
- Setting range: 3 … 300 cm/s
- Highest sensitivity: 3 … 60 cm/s
- Response time: 1 … 10 s
- The combination of flow switch / signal processor must be carried out in a tamper-proof manner so that the set parameters cannot be changed.

6.9 Maintenance of the flow switch

Required annual inspections:

- Sensor function

  Disconnect/switch off the pump motor:

  The flow switch unit (sensor and signal processor) still in operation must react at the latest after 10s and interrupt the power supply to the motor.

- Cable break, other malfunction

  Disconnect the sensor:

  The signal processor must interrupt the power supply to the motor immediately.

6.10 Mechanical seals

⚠ Caution!

Dry run

► The axial face seal may only be used so that no dry run occurs. The operator is responsible for ensuring this.
► If the pump is only operated with a fluid as stated in chapter “Pump fluid status”, this is automatically the case when a single acting axial face seal (type EW) is used.
► When a quenched mechanical seal (type QU) and a double acting axial mechanical seal (type DW) is used, it is imperative to ensure that the secondary seal on the atmospheric side is permanently subject to filling. Otherwise, an impermissible rise in temperature would occur.
► The following combinations of materials for the mechanical seals are permitted: Silicon Carbide/Silicon Carbide (SIC / SIC)
► Carbon/Silicone Carbide (C/SIC)
► The following combinations of materials for the mechanical seals are not permitted: Carbon/Chromium Molybdenum Cast Iron (C/ED)
► Therefore, the operator must be sure that the axial face seal is supplied with sufficient amounts of fluid by using suitable monitoring systems and safety measures.

6.11 Pumped fluids

When conveying flammable liquids, be sure that the flow medium does not contain abrasive constituents. Using abrasive flow mediums leads to the risk of abrasion of pump components: the wall strength decreases and walls become weak. The operator must avoid this risk and take appropriate monitoring measures.

Adhesive pumped media must not be used since the adhesion might generate friction and heat. The pump must be regularly checked for residues.

The pump may only be operated with media that do not have any exothermic chemical reaction and which cannot react thermally at the specified proper temperatures.

The pump may only be used in connection with dust that cannot ignite itself.

7 Maintenance

Secure and reliable operation can only be guaranteed when the pump remains in perfect working order. The maintenance criteria listed in the standard operating manual are also valid for the Ex-version TP centrifugal pump.

Watch for leaks and listen for unusual running noises. Should either occur, the machine should be inspected immediately.

If assembly work is done during a prevailing Ex-ambience, all necessary legal and operative measures and rules are to be followed.

We recommend developing a maintenance schedule that takes both the operating mode and conditions into account.

Only use original spare parts and accessories approved by the manufacturer.

Information on individual components that should receive special attention when in Ex-operation follows.

Welding and assembly work that generate sparks is prohibited in potentially explosive atmospheres. For certain tasks there are tools available that are approved for work in potentially explosive atmospheres.

7.1 Mechanical seal

The axial face seal is a part subject to wear that is relevant for safety. Therefore, it should be inspected regularly. If leaks or unusual noises occur, inspect immediately.

7.2 Static seals and screw connections

- Regularly check the tightness of all static seals (O-rings) seals!
- Regularly check that all screw connections are tight!

7.3 Monitoring systems

Regularly check the function of the monitoring systems (flow switches), see chapter “Monitoring system- flow switches”!

7.4 Motor

The motor is subject to its manufacturer’s specifications concerning maintenance and wear. If unusual noises are heard, inspect immediately. Defective and/or damaged motors (e.g. bearing damage, broken fan wheel) must never be operated.

7.5 Foreign objects

See chapter “Commissioning and operation”.

7.6 Tools

The tools used in Ex areas must comply with the guidelines of ATEX. The operator is responsible for this.

8 Appendix

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GEA is a global technology company with multi-billion euro sales operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA is listed in the STOXX® Europe 600 Index. In addition, the company is included in selected MSCI Global Sustainability Indexes.

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