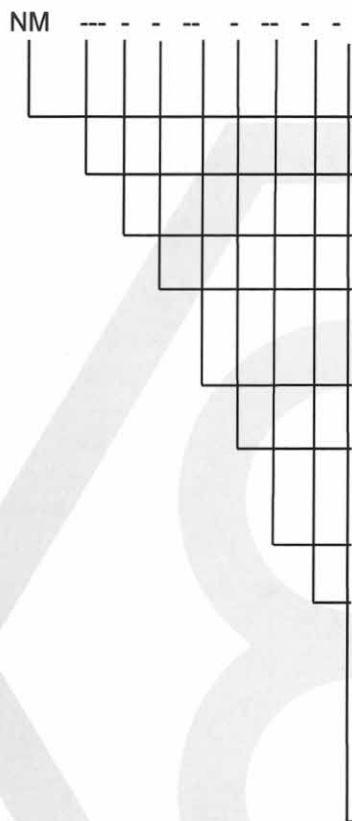




- [4] [4a] Product: **Type: NEMO®-Pumps**
in the designs as per the following type code



FSIP 1 = FSIP®.ready
 2 = FSIP®.advanced
 3 = FSIP®.pro


- Types: NM015SO... to NM180SO...
 NM015BO... to NM180BO...
 NM038SS... to NM090SS...
 NM038BS... to NM090BS...

- [4c] Product: **Type: NEMO® pumps Submerged pumps ST/BT**
 of series NM015ST... to NM180ST...
 NM015BT... to NN180BT...
 with joint types:
 B = Pin joint
 K = Gear joint
 F = Nemo® Flextec flexible rod
 V = Pin joint with wear sleeve
 Z = Cross pin joint
- [4d] Product: **Type: NEMO®-Pumps**
 in the designs according to the type code from [4a] with the
 Type: M = Magnetic coupling,
 Joint type: R = Flexible joint

The aBP-Module® attachment can be installed on the products listed under [4a] to [4c].

- [5] Manufacturer: NETZSCH Pumpen & Systeme GmbH
- [6] Address: Geretsrieder Straße 1
 84464 Waldkraiburg
 GERMANY
- [7] This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
- [8] IBExU Institut für Sicherheitstechnik GmbH certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014.
- The examination and test results are recorded in the confidential test report IB-24-2-0125 from 2025-04-02.
- [9] Compliance with the essential health and safety requirements has been assured by compliance with:
 EN 1127-1:2019
 EN ISO 80079-36:2016
 EN ISO 80079-37:2016
 EN ISO/IEC 80079-38:2016
except in respect of those requirements listed at item [18] of the schedule.
- [10] If the sign "X" or "U" is placed after the certificate number, it indicates that the product is subject to the specific conditions of use specified in the schedule to this certificate.
- [11] This type examination certificate relates only to the design of the specified equipment and not to specific items of equipment subsequently manufactured or supplied.
- [12] The marking of the product shall include the following:

Products in [4a] for use in mining:

 **M2 Ex h I Mb X**
+5 °C ≤ T_a ≤ +40 °C

Products in [4a] and [4c] with an electrically non-conductive coating with a thickness of ≤ 0.2 mm or a dissipative coating:

Gas (inside and outside):

Ex II 2 G / 2 G Ex h IIC T6...T1 Gb / Gb X
 $-20\text{ °C} \leq T_a \leq +60\text{ °C}$

Gas (inside) and dust (outside):

Ex II 2 G / - Ex h IIC T6...T1 Gb / - X
Ex II - / 2 D Ex h IIC T80°C...T440°C - / Db X
 $-20\text{ °C} \leq T_a \leq +60\text{ °C}$

Dust (inside) and Gas (outside):

Ex II 2 D / - Ex h IIC T80°C...T440°C T6...T1 Db / - X
Ex II - / 2 G Ex h IIC T6...T1 - / Gb X
 $-20\text{ °C} \leq T_a \leq +60\text{ °C}$

Products in [4a], [4b] and [4c] with an electrically non-conductive coating with a thickness between 0.2 mm and ≤ 2 mm:

Gas (inside and outside):

Ex II 2 G / 2 G Ex h IIC / IIB T6...T1 Gb / Gb X
 $-20\text{ °C} \leq T_a \leq +60\text{ °C}$

Gas (inside) and dust (outside):

Ex II 2 G / - Ex h IIC T6...T1 Gb / - X
Ex II - / 2 D Ex h IIC T80°C...T440°C - / Db X
 $-20\text{ °C} \leq T_a \leq +60\text{ °C}$

Dust (inside) and Gas (outside):

Ex II 2 D / - Ex h IIC T80°C...T440°C Db / - X
Ex II - / 2 G Ex h IIB T6...T1 - / Gb X
 $-20\text{ °C} \leq T_a \leq +60\text{ °C}$

Products in [4a], [4b] and [4c] for conveying an explosive dust/air atmosphere (inside and outside):

Ex II 2 D / 2 D Ex h IIC T80°C...T440°C Db / Db X
 $-20\text{ °C} \leq T_a \leq +60\text{ °C}$

Products in [4d] with an electrically non-conductive coating with a thickness of ≤ 0.2 mm or an dissipative coating:

Gas (inside and outside):

Ex II 2 G / 2 G Ex h IIC T6...T1 Gb / Gb X
 $-20\text{ °C} \leq T_a \leq +60\text{ °C}$

Gas (inside) and dust (outside):

Ex II 2 G / - Ex h IIC T6...T1 Gb / - X
Ex - / 2 D Ex h IIC T80°C...T440°C - / Db X
 $-20\text{ °C} \leq T_a \leq +60\text{ °C}$

Products in equipment group II with an electrically non-conductive coating with a thickness between 0.2 mm and ≤ 2 mm:

Gas (inside and outside):

Ex II 2 G/2 G Ex h IIC / IIB T6...T1 Gb / Gb X
 $-20\text{ °C} \leq T_a \leq +60\text{ °C}$

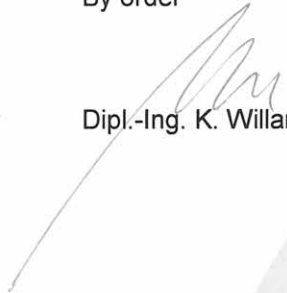
Gas (inside) and dust (outside):

 II 2 G / - Ex h IIC T6...T1 Gb / - X
 II - / 2 D Ex h IIC T80°C...T440°C - / Db X
- 20 °C ≤ T_a ≤ +60 °C

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By order


Dipl.-Ing. K. Willamowski

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Certificates without signature and stamp are not valid. Certificates may only be duplicated completely and unchanged. In case of dispute, the German text shall prevail.

Freiberg, 2025-04-16

[13] **Schedule**

[14] **Certificate number IBExU23ATEXB017 X | Issue 2**

[15] **Description of product**

The products in [4] are rotating positive displacement pumps. The main components of the products are a rotating part, the rotor and a stationary part, the stator. The rotor is designed as a round thread screw and rotates in the stator. Thereby, conveying spaces are created between the stator and the rotor which rotates inside and moves additionally radially. These conveying spaces move continuously rotating forward. The rotor is driven by a coupling rod. The coupling rod and the joints on both sides run in the conveyed medium.

The FSIP® pumps ("Full Service in Place") are modified versions of the SY... and BY... pump types. On these pumps, maintenance has been significantly simplified through constructive measures.

The hopper pumps listed under [4b] are equipped with an open hopper and a coupling rod with integrated feeding or a filling screw, via which the products to be conveyed are fed into the displacement system (stator/rotor). The hopper pumps are not intended for conveying liquids, i.e. media of low viscosity. The joint designs of the coupling rod are the same as for the standard pump (including flexible rod).

The SP pumps in [4b], additional rotating paddles (usually arranged on two parallel shafts) are arranged in the hopper housing above the pump inlet.

The SF and SP pumps listed in [4b] are mainly intended for pumping sewage sludge, which may contain solvents. The SO and BO pumps can be used to pump pasty (salve-like) and highly viscous media of any kind. The media to be conveyed always have a residual moisture content and the dry matter content (solid or fibrous particles) is a maximum of 40 %. Depending on the size of the pump, the manufacturer specifies a maximum pumpable particle or ball diameter for the pumped medium.

The BF pumps listed under [4b] are modified versions of the SF... hopper pumps. The technical difference lies solely in how the drive is connected to the pump. For BF pumps, the drive is connected directly to the pump.

The SM and BM pumps listed under [4b] are modified SF and BF hopper pumps. The technical difference is in the design of the hopper housing, which features an additional lateral inlet and two side covers for cleaning and maintenance. The feed screw has a contour adapted to the conveying requirements. In SM pumps, the drive is connected via a coupling to the bearing housing, while in BM pumps, the drive is connected directly to the pump.

The BP pumps listed under [4b] are modified SP hopper pumps with a paddle unit above the feed screw. The drive of the BP pumps is connected directly to the pump, whereas in SP pumps, the drive is connected via a coupling to the bearing housing.

The SS and BS pumps listed under [4b] are modified SO and BO hopper pumps. The technical difference lies in the design of the hopper housing, which is equipped with a square hopper and an additional cleaning cover. In BS pumps, the drive is connected directly to the pump, while in SS pumps, the drive is connected via a coupling to the bearing housing.

The submerged pumps in [4c] are installed in a vertical mounting position. Media is always conveyed from below to top (suction at the pump base). The products are intended for conveying flammable liquids in accordance with GHS H phrases H 224 to H 227, which are assigned to Explosion Group IIA, IIB and IIC of Temperature Class T4 or dust Explosion Group IIIC with Temperature Class T130 °C, from stationary or portable vessels. The pump drive is always outside this zone.

The ST pumps listed under [4c] are modified BT pumps (submersible pumps). The technical difference lies in how the drive is connected to the pump. In the case of ST pumps, the drive is connected via a coupling to the bearing housing.

The products in [4d] are manufactured in a special configuration consisting of an alloy steel rotor or ceramic rotor, optionally a flexible joint made of PA, a magnetic coupling with a containment barrier (separating pot / canister) made of different materials (optionally metallic canister, CFRP canister with PTFE incliners and PEEK canister, ceramic canister) and ceramic bearings. The products in [4d] are used to convey corrosive, flammable liquids. The conveying of flammable dusts inside is excluded due to the intended use. This means that there are no markings for Equipment Category 2 D inside. Use underground, Equipment Group I, is excluded, as the magnetic coupling (component as defined by Directive 2014/34/EU) on products in [4d] does not have an attestation of conformity from the supplier for underground use.

The following materials can be used for the housing:

Grey cast iron (GG 25), spheroidal graphite iron (GGG 40.3), St, CrNi or CrNiMo steel, as well as special stainless steel (1.4462, 1.4539) or Hastelloy (2.4610) and also cast aluminium for the stator casing.

The material GENAKOR 022 is electrically conductive and suitable for coating metallic housing parts.

The operating requirements specified in the operating and maintenance manuals, as well as, the equipment prescribed in these manuals for metrological monitoring of the conveying process, take into account the different operating conditions.

The products can be used at ambient and conveyed media temperatures from -20 °C to +60 °C.

The inner part of the product was tested for dry running. Dry running is defined in this product as a break in the media flow, e.g. for draining the media storage container. The manufacturer has determined the heat build-up inside the product during dry running using its own measurements. If the specifications in the operating instructions are adhered to, dry running is permitted for a limited period of time, without reaching critical surface temperatures.

The interior of the product has been tested for conveying explosive dust/air atmosphere. Based on manufacturer's temperature measurements and constructive protective measures, the interior of the product can be used for conveying explosive dust/air atmosphere. Instructions from the operating manual must be observed.

The temperature class of the product depends on the temperature of the conveyed medium and the operating status (dry running / no dry running).

The pumps listed in [4a], [4b] and [4c] can optionally be fitted with the aBP-Module® attachment.

The aBP-Module® attachment consists of a housing that is open at the top and bottom, in which a so-called spoke wheel rotates at low speed on each long side of the housing. Each spoked wheel is driven by an explosion-proof electric motor (purchased part) in conjunction with an explosion-proof gear unit (purchased part). The aBP-Module® attachment is mounted on the inlet of the products and thus forms a defined feeding area for the media to be conveyed. The spoked wheels of the aBP-Module® are arranged close to the wall and low down, to ensure effective bridge avoidance thanks to "moving shaft walls". The different basic speeds of the two drives create a shearing effect on the conveyed product. This reliably prevents bridging in the pump housing. Selected parameters for the aBP-Module® attachment are listed below:

| | Drive 0600 | Drive 0605 |
|---|--|-------------------|
| Speed | 7-8 1/min | 5-6 1/min |
| Drive power | 0.18 – 0.22 kW | |
| Peripheral speed at max. speed 8 1/min | 0.23 m/s | |
| Materials | Steel, CrNiMo17-12-2, 1.4301, 1.4408, NBR, EPDM, FPM, Aramid | |

The speed varies with the mains frequency of the drive motors (50 Hz and 60 Hz AC voltage).

[16] Test report

The test results are recorded in the confidential test report IB-24-2-0125. The test documents are part of the test report and they are listed there.

Summary of the test results

The products of the types mentioned in [4] fulfil the requirements of non-electrical equipment in type of protection "c" (protection by constructional safety) of Equipment Group II, Category 2 G and 2 D and fulfil the requirements for use in Explosion Groups IIA, IIB and IIC and dust groups IIIA, IIIB and IIIC.

The products are intended and suitable for use at ambient temperatures T_a from -20 °C to +60 °C.

The pumps can also be used to convey media with temperatures above +60 °C. If the risk of dry running cannot be ruled out, the media temperature must be reduced to a safe level in order to comply with the maximum permissible surface temperatures for the respective temperature class.

The temperature class is determined by the permissible conveying medium temperature specified in [17].

Information about the limits of use for the conveying of explosive dust/air-atmospheres are given within the specific conditions of use in [17].

The equipment mentioned in [4a] fulfil the requirements of Equipment Group I, Equipment Category M2, type of protection "constructional safety" (c). The maximum surface temperature is lower than +150 °C if the maximum ambient and conveyed medium temperature specified (under Point 5 of the specific conditions of use) is observed.

Due to the type of protection, the aBP-Module® attachment fulfils the requirements of Equipment Group I and Equipment Category M2 or Equipment Group II and Equipment Category 2 G and 2 D with regard to the outside and inside of the equipment. T4 can be assigned, as the temperature class. Heating is mainly caused by the conveyed medium.

Note

The manufacturer must ensure that each product manufactured complies with the conditions in the type examination and that the relevant requirements of Directive 2014/34/EU are met.

Variations compared to issue 1 of this certificate:

Variation 1

The type key was extended.

[17] Specific conditions of use

1. The products may only be used if their materials and lubricants resist, under the respective operating conditions, the mechanical and/or chemical effects and corrosion so that the explosion protection, is always maintained.
2. Each product must undergo a pressure test for assessing the pressure resistance and leakproofness.
3. The products must be adjusted to the power parameters of the respective drive.
4. The maximum permissible conveying media temperatures T_{FM} is dependent on the materials used for the construction of the products and gear units as well as the lubricants and the temperature class of the flammable media contained in the conveyed media. The following conditions must be observed:

Maximum conveying medium temperature $T_{FM} = 100\text{ °C}$

- a. The products fulfil the requirements of Temperature Class T4 (130 °C).
- b. The conveying medium can belong to Temperature Class T4, T3, T2 or T1.
- c. The ignition temperature of occurring dusts must not fall below 195 °C.
- d. The ignition temperature of the occurring dusts must be not below 205 °C.
- e. Operation as a Category M2 product is permitted with the cut-off device in accordance with the operating instructions.

or

Maximum conveying medium temperature $T_{FM} = 165\text{ °C}$

- a. The products fulfil the requirements of Temperature Class T3 (195 °C).
 - b. The conveying medium can belong to Temperature Class T3, T2 or T1.
 - c. The ignition temperature of occurring dusts must not fall below 293 °C.
 - d. The ignition temperature of occurring dusts must not be below 270 °C.
 - e. Operation as a Category M2 product is not permitted.
5. The ignition temperature of the applied lubricants must be minimum 50 K above the maximum surface temperatures of the product. If there is no information about the ignition temperature of the lubricants, then, as a precaution, the flash point of the applied lubricants must be 15 K above the maximum surface temperature of the product.

6. Before commissioning, the products must be filled with medium.
7. Operation of the product without conveying medium and without dry-running protection is not part of the intended use, see operating instructions.
8. If there is an interruption in media conveyance during operation, the maximum rotation speed of the product must be limited to 400 1/rpm and the equipment must be switched off after 5 seconds. If the risk of dry running cannot be ruled out, the media temperature must be reduced to a safe level in order to comply with the maximum permissible surface temperatures for the respective temperature class.
9. To fulfil the requirements of Explosion Group IIC, the housing of the products may only be coated with insulating paints or powder coatings up to a thickness of 0.2 mm. To fulfil the requirements of Explosion Groups IIA and IIB, the housing of the products may only be coated with insulating paints or powder coatings up to a thickness of 2 mm.
10. The products must not convey against closed fittings.
11. The instructions given in the user information regarding the provision of lubricant must be strictly observed by the operating company.
12. No accumulations of dust with a layer thickness > 5 mm may form on the product exterior (except in the feeding area), of products for use in explosive dust-air atmospheres. Rotating parts of the products (e.g. the drive shaft) may only run in a dust bed if the parts are designed for operation in dust. Other product parts must be checked for dust contamination, at regular intervals and if necessary, the accumulations of dust must be removed.
13. During operation of the products, it must be ensured that no potentially explosive atmospheres of flammable gases/vapours/mists and potentially explosive atmospheres of combustible dusts are present at the same time.
14. The products must be included in the equipotential bonding of the entire machine or plant.
15. To prevent the ignition of an explosive atmosphere, the formation of sparks caused by e.g. hard objects falling onto the housing must be avoided. Furthermore, the formation of sparks due to friction and grinding of objects on the product must be avoided. Appropriate safety measures must be taken by the operating company.
16. Highly charged processes in the vicinity of the product, e.g. stronger rubbing than manual rubbing, with simultaneous occurrence of an explosive atmosphere must be avoided. Or the insulating coatings must exhibit a breakdown voltage of 4 kV.
17. When using the IFD - PE dirt protection strip or the storage containment, avoid highly charging and manual rubbing in the vicinity of the product and at the product, respectively.
18. When using an electrically insulating stator, e.g. PA stator, the discharge of static electricity must be ensured by a conveying liquid with a high conductivity of at least 10.000 pS/m. The conveying liquid must be connected to an equipotential bonding or an earthing point. The conveying liquid must be connected to a potential equalisation or earthing point.
19. Only dusts that are suitable for conveying in the product may be conveyed. Dusts with hazardous properties, e.g. due to increased friction, pressures, etc., are excluded from conveying.
20. The dusts must have a sufficiently high electrical conductivity in order to exclude a dangerous electrostatic charge in the dust layer.
21. The manufacturer applies sufficient high conductive materials to exclude dangerous electrostatic charges between dust and material.
22. The conveying velocity of the dusts must be sufficient below the dust -specific properties to prevent high -charging mechanisms and to prevent the formation of propagating brush discharges.
23. Products that are not manually operated must also be fitted with an overpressure safety device.
24. The relevant instructions in the operating and maintenance manual must be observed when operating hand-held portable products.
25. Hand-guided transportable products must be permanently labelled with a reference to the required testing prior to commissioning.

Additionally for products of Equipment Group I:

26. It must be possible to shut down products if an explosive atmosphere occurs. Shutting off the products must not create an ignition hazard, nor must shutting off the conveying system disable a function that is absolutely necessary to ensure explosion safety.
27. The requirements of the national mining regulations applicable to the respective area of use must be observed.

Additionally for NEMO® hopper pumps:

28. By the selection of materials and/or appropriate monitoring equipment (see operating and maintenance instructions of the pumps), it must be ensured that no light metal parts (e.g. particles in the pumped product, hand tools for feeding) or rusty steels can collide with each other in the event of insufficiently moist surfaces. This must be considered when selecting the material for the paddles, screw and hopper/pump housing (e.g. use of stainless steel).
29. It must be ensured when using non-stainless steel as a material,
 - a. that the internal surfaces of the feed hopper, including paddles, paddle shafts and screw conveyor, are kept permanently moist; and/or
 - b. that the entry of light metal parts in the conveyed goods and from the light metal feeder is excluded.
30. The paddles must be adjusted to the power parameters of the respective drive.

In addition, the following Specific Conditions must be complied with for products from [4d]:

31. The hardness of the conveyed particles must not be higher than the hardness of the bearings used in order to avoid dangerous wear.
32. In the case of a wearing medium, the bearings must be monitored more closely, for example by continuous vibration measurement, in order to rule out bearing failure within the maintenance interval. The characteristic values of the vibration measurement on the bearings depend on the boundary conditions (pressure, speed, medium, gas content, etc.). For this reason, no fixed limit values can be specified by the manufacturer. Nominal values of the vibration measurements must be recorded after commissioning or after maintenance and these must be defined as limit values. Alternatively, the maintenance interval should be shortened, according to operational experience.
33. The separating can on the magnetic coupling must be equipped with a temperature monitor if the separating canister material is not ceramic. Further information can be found in the manufacturer's documentation for the magnetic coupling.
34. Parts in the vicinity of the magnetic coupling can be damaged by spark erosion. Pay attention to corresponding damage during maintenance and replace the affected parts.
35. When using a ceramic rotor, only liquids with a high electrical conductivity of $>10,000 \text{ pS/m}$ should be used.
36. When using a flexible joint made of electrically insulating materials, only fluids with a high electrical conductivity of $>10,000 \text{ pS/m}$ should be used.

[18] Essential health and safety requirements

In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item [9], the following are considered relevant to this product, and conformity is demonstrated in the test report:

| Clause | Subject |
|--------|---------|
| - | - |

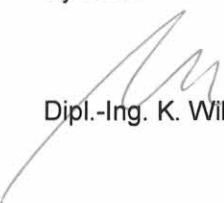
[19] **Drawings and Documents**

| <i>Number</i> | <i>Sheet</i> | <i>Issue</i> | <i>Date</i> | <i>Description</i> |
|---------------|--------------|--------------|-------------|--------------------|
| - | - | - | - | - |

The documents are listed in the test report.

IBExU Institut für Sicherheitstechnik GmbH
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09599 Freiberg, GERMANY

By order


Dipl.-Ing. K. Willamowski

Freiberg, 2025-04-16