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OPERATING INSTRUCTIONS
FOR HOSE LINES

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Operating instructions for hose lines

Manufacturer

Grüning & Loske GmbH, Magdeburger Straße 1, D-30880 Laatzen, www.gruelo.de

Phone.: +49 5102 9199-01, E-mail: info@gruelo.de

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1. General information

Note: In accordance with the law regarding safety and health protection when using work equipment, the hose assembly can be both work equipment and a system part requiring monitoring (German Ordinance on Industrial Safety and Health, the Betriebssicherheitsverordnung or BetrSichV). The guidelines of the BetrSichV must be observed by the owner/operator and the employer and a risk assessment must be created for the hose assembly in use. These operating instructions take precedence for all hose assemblies as defined in DGUV Information 213-053 (T002). In addition to these hose assemblies, supplementary operating instructions are available on request for special hose assemblies (e.g. hydraulic hose assemblies).

2. Proper use

- **Pressure:** Do not allow the pressure to exceed the maximum permitted positive operating pressure of the hose assembly (see Labeling (volume 1)).
- **Vacuum:** Do not allow the pressure to drop below the maximum permitted negative operating pressure of the hose assembly.
- **Temperature:** Do not allow the temperature to exceed the maximum permitted operating temperature of the hose assembly based on the medium. This must be checked for all hose assembly components using the available list of resistance characteristics.
- **Resistance:** Hose assembly materials must be resistant to the flowing media under operating conditions. This must be checked using the available list of resistance characteristics. Changes to the medium concentration, the duration of operation and the temperatures affect the safe operation of the hose assembly. This absolutely must be taken into account during operation.
- In the event of any **abrasion**, the wear on the hose assembly must be taken into account and checked regularly.
- If the customer does not provide **any specific operating parameters** according to which the manufacturer can carry out a conformity assessment in accordance with the Pressure Equipment Directive (2014/68/EU), the classification of the hose assembly manufacturer shall apply.
- So that hose assemblies can be operated safely, **technical, organizational and personal protective measures** must be carried out. Technical and organizational measures are always take priority. If this does not make it possible to avoid all dangers, effective personal protective equipment must be provided and used.

3. Responsibility of the employer (owner/operator)

Hose assemblies are work equipment where the testing requirements and inspection intervals must be determined by the employer (owner/operator) in a risk assessment (see BetrSichV).

Observe the trade association data sheet T002 (= DGUV information 213-053) of the Raw Material and Chemical Industry Trade Association (BG RCI), in the currently valid version.

4. Transport and storage

Hose assemblies must not be damaged during transport or because of storage.
It is particularly important to make sure that

- They are stored in a cool, dry and dust-free place out of direct sunlight or UV light and shielded from nearby heat sources. Hose assemblies must not come into contact with substances that could cause damage.
- Hose assemblies are stored lying down at all times with no tension or kinks. If stored wound in rings, the radius of the hose must not be less than the minimum bending radius specified by the hose manufacturer.
- Hoses ends are sealed to protect the inside of the hose from contamination, ozone and corrosion (after cleaning and after the hose assembly has cooled down).
- Influencing factors that could damage the hose assemblies (e.g. effects of halides, extraneous rust or flash rust, mechanical stress) are eliminated.
- Appropriate transport packaging is used.

DIN 7716, T002 (DGUV Information 213-053) and DGUV regulation 113-015 are among the regulations to be observed.

5. Installation and commissioning

In order to ensure the functional capability of the hose assemblies and to avoid reducing their operating life through excessive stress, the following are to be observed:

- Perform "testing before commissioning" (in accordance with T002, §§ 14 and 15 BetrSichV).
- Do not operate the hose assembly if there is visible damage.
- Do not operate hose assemblies that have exceeded their inspection intervals.
- Hose assemblies must be installed in such a way that their natural positioning and movement are not impaired.
- Hose assemblies must never be subjected to tension, torsion or compression unless they were specifically designed for such use.
- The radius of the hose must not be less than the minimum bending radius specified by the hose manufacturer.
- Hose assemblies must be protected against damage due to mechanical, thermal or chemical effects.
- All separable connections must be checked to ensure that they are firmly seated.
- Before commissioning, hose assemblies must be cleaned in an appropriate manner if necessary.
- With regard to electrostatic hazards, the TRGS 727 "Avoiding ignition hazards due to electrostatic charges" must be observed and complied with.

6. Maintenance, repair and inspection

Cleaning: In the event of cleaning with steam or chemical additives, the resistance characteristics of the hose assembly components must be observed. Note: The use of steam lances is prohibited.

The hose assembly must be cleaned properly before each recurring inspection.

Inspection intervals: The inspection intervals for hose assemblies are to be determined by the employer (operator) in accordance with the specifications of the BetrSichV as part of the risk assessment in accordance with § 3 BetrSichV. The safe working condition of hose assemblies is to be checked regularly by a qualified person in the sense of § 2 paragraph 6 BetrSichV:

- At regular intervals after the initial operation: The inspection period is determined by the employer's risk assessment – e.g. at least every 12 months for thermoplastic and elastomer hoses and at least every 6 months for steam hoses. Higher loads (e.g. mechanical, dynamic, thermal and chemical) require shorter inspection intervals.
- Regardless of the recurring inspection periods, the hose assembly must always be inspected after a repair or a longer storage period.

Testing pressures for the strength test (medium: cold water):

- Hose assemblies: max. permissible pressure (PS) x 1.5 (excluding steam hose assemblies according to ISO 6134)
- Steam hose assemblies made of elastomers: max. permissible pressure (PS) x 5
  In the case of metal corrugated tubes, the chlorine content of the test water must not exceed the level specified by DIN EN ISO 10380.

Scope of testing: Type and scope of testing (visual check, strength test, test of electric conductivity, etc.) are regulated in BetrSichV, TRBS 1201, T002 (DGUV Information 213-053) and TRGS 727. The test is to be performed in accordance with BetrSichV § 14, Paragraph 2, by an individual qualified to perform the test in accordance with TRBS 1203. The result of the test is to be documented.

Repairs: In the event of damage (leaks, cracks in the cover, kinks, abrasion points, etc.), the hose assembly must be taken out of operation immediately and further use must be prevented. Repairs to hose assemblies must be performed only using original replacement parts from the hose assembly manufacturer and by its qualified personnel and must be followed by testing by an individual qualified to perform the testing in accordance with the BetrSichV. The result of the test is to be documented.

7. Expected useful life

Hose assemblies are wearing parts with a limited service life. The expected useful life is influenced by storage conditions, the amount of strain placed on each hose assembly and the operating factors. It is impossible to make a general statement regarding the expected useful life. Depending on the hazard potential, load and economic relevance, the determination of fixed recurrent testing and replacement intervals is strongly recommended.

The extent to which a hose assembly is still usable under given operating conditions is decided as part of recurrent testing performed by an individual qualified to perform such testing. **If damage is detected on a hose assembly between testing intervals, the hose assembly must be taken out of operation immediately and further use must be prevented.**

8. Damage prevention

- Hose assemblies may be used only in accordance with their intended purpose and must not be misused (e.g. used as pulling cables, climbing aids, etc.):
- Hose assemblies must not be disconnected while under pressure (exception: coupling systems intended for this use, e.g. dry clutches).
- Heat sources must be kept away from hose assemblies.
- Hose assemblies must be properly cleaned before a change of medium to avoid cross-contamination.
- Do not place hose assemblies in the path of vehicles (protect them from being driven over).
- Movable loading and tank containers or similar must be fixed for the loading process or the hose assembly must be secured by a breakaway coupling (e.g. tank wagons, ships, tankers).
- Only valves permitted by the DIN EN 14423 are to be used for steam hose assemblies made of elastomers.
- Classification systems can be used to eliminate any confusion of hose assemblies (e.g. lock-and-key principle, encoding, color-coding, engravings).
- Hose assemblies must be subjected to recurring testing at regular intervals in accordance with their risk assessments.

9. Disposal

Hose materials and valves that are no longer usable must be disposed of properly in accordance with the regulations of the respective municipality.

10. Special features

Special features apply, among other things, to the following hose assembly types:

Steam hose assemblies

- Ensure complete emptying of condensation in order to prevent structural damage to the elastomer hose (popcorning), which is caused by water penetrating into the inner layer and evaporating when steam is applied to the hose assembly again.
- Do not use steam hose assemblies for other media.
- Avoid the negative pressure that occurs from the cooling of a hose hose assembly closed off on both ends.
- Take protective measures with respect to surface temperatures (risk of burns).
- Narrowing cross-sections are to be avoided (risk of overheated steam).

Metal corrugated tubes

- For metal corrugated tubes that are not furnished with a heat-insulating exterior shell, there is an increased risk of injury at higher temperatures due to heat conductivity.
- Pay particular attention to damage to the wire braid and to deformation of the tube, e.g. kinks.
- There must never be any exposure to halogens, extraneous rust or flash rust at any time.
- The PT value (test pressure) indicated on the hose assembly must be taken into account.
- When using, dynamic reductions (pressure) due to movement and flow must be taken into account.

Food hose assemblies

- Food hose assemblies must be properly cleaned before use.
- Only cleaning agents suitable for the inside and outside of the hose assemblies may be used (pay attention to resistance characteristic, temperature and cleaning duration). The provisions of the hose assembly component manufacturer must be observed.
- Food hose assemblies must be steamed exclusively in open systems.

Other special hose lines

For hose lines of special design or for applications that could not be taken into account here, the additional instructions enclosed must be observed (e.g. sandblasting, liquid gas, heatable hose lines, hydraulic hose lines).

Operating conditions

The information in these operating instructions describes use under "normal" operating conditions. Operation with trailing cables is excluded from any warranty. Furthermore, hose assemblies should not be used in the direct vicinity of powerful electric motors (or electric fields), as this can destroy the hose material. Such uses, as well as uses in other special environments (radiation, pharmaceuticals, food, etc.) must be agreed in advance with the manufacturer of the hose assembly.

11. Closing remarks

For the intended use of hose assemblies, the comprehensive instructions of the employers' liability insurance association leaflet T002 (DGUV Information 213-053), the Pressure Equipment Directive (PED), the Industrial Safety Regulation (BetrSichV), TRBS 1201 "Testing of work equipment and systems requiring monitoring" and TRGS 727 "Avoiding ignition hazards due to electrostatic charges" must be observed and, if applicable, other relevant regulations must be taken into account.

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