BARTEC

Installation and Operation

Self-Limiting Parallel Heating Tapes and Installation Systems **on Tanks and Vessels**

Introduction

This BARTEC instruction manual for installation and operation is intended to give you important information on electric trace heating systems for pipes. Reference is made here only to the use of BARTEC self-limiting parallel circuit tapes. The contents of this manual are intended mainly for persons who are familiar with the plans, installation, operation and maintenance of electric trace heating systems.

Reservation

Technical data are subject to change without notice. Changes, errors and printer's errors do not justify claims for damages. For safety components and systems the relevant standards and regulations are to be observed, as well as the corresponding operating and installation instructions.

Contents

1. Installation and operation

NOTICE

Under all circumstances the following instructions must be heeded during the mounting and maintenance of BARTEC self-limiting heating tapes and their installation systems. Disregarding these instructions can lead to serious danger for personnel and installation equipment.

BARTEC´s guarantee will be valid only if all instructions and recommendations in this manual and the installation and mounting instructions enclosed with the product are followed exactly.

The correct installation of BARTEC heating tapes requires the use of BARTEC connections, tape-to-tape joining and remote-end termination sets. These were developed specially for BARTEC heating tapes and tested and approved by various testing institutes.

- An incorrect installation of the trace heating and the adjoining system parts or damage to the heating tape can cause short-circuiting and the risk of fire during operation.
- Never connect the heating tape´s two live conductors. - Risk of short circuit!
- The self-limiting heating element surrounding the two supply conductors must be protected from environmental influences. This black plastic element is electrically conductive and must be treated accordingly.
- Do not use self-adhesive tape containing PVC/VC to fix the self-limiting heating tapes in place.
- The relevant currently applicable national regulations and the respective currently applicable safety regulations must be observed during the installation and maintenance of electric heating tapes.
- Examples of the valid standards and directives which apply to the use of electric trace heating systems in hazardous areas are

  IEC or EN 60079-30-1 Explosive Atmospheres - Part 30-1: Electrical resistance trace heating - General and testing requirements.

  IEC or EN 60079-30-2 Explosive Atmospheres - Part 30-2: Electrical resistance trace heating - Application guide for design, installation and maintenance.

  IEC or EN 60079-14 Explosive Atmospheres - Part 14: Electrical installations design, selection and erection

  IEC or EN 61241-14 electrical apparatus for use in the presence of combustible dust -0 Part 14: Selection and installation.

2. Selection of the heating tape and project engineering

Before installing any electric trace heating, the person installing must check if the trace heating has been designed and planned correctly. It is particularly essential to verify the following points:

- complete project planning documentation, operating instructions and installation instructions.
- correct selection of the heating tape and accessories with respect to:
  - calculation of heat losses
  - max. permissible operating temperature
  - max. permissible ambient temperature
  - temperature class
  - length

3. Storage

Incoming goods inspection

- Compare the delivery note with the delivered goods.
- Inspect the delivered heating tapes and accessories for possible transport damage.
- Insulation measurement must be carried out on the heating tapes.

Storage

- The heating tapes and connecting components must be stored in a clean, dry place.
- During storage contact with chemicals and petrochemical products in particular must be effectively avoided.
- It should be ensured that the heating tapes are protected against mechanical damage during storage.
- The storage temperature must not exceed +60 ° C or drop below -40 ° C.
- If heating tapes and connecting components are stored only for a short time in damp rooms, or on the construction site, it is essential that they are effectively protected from moisture (e. g. by mounting a remote end termination).

4. Installation

4.1 Installation and preparation

4.1.1 Time schedule

- Time scheduling of installation of the electric trace heating system must be coordinated with other installation work, particularly with work on the tank or vessel, electrical installation and thermal insulation.
- All installation work on the tank or vessel and the pipe systems connected to these must have been completed.
- Pressure tests and material tests on the tank or vessel and the pipe systems connected to these must have been completed before installation of the electric trace heating system is started.
- Lacquered and painted pipes and surfaces must be completely dry before installation is commenced. Complete drying and outgassing takes about 3 weeks.

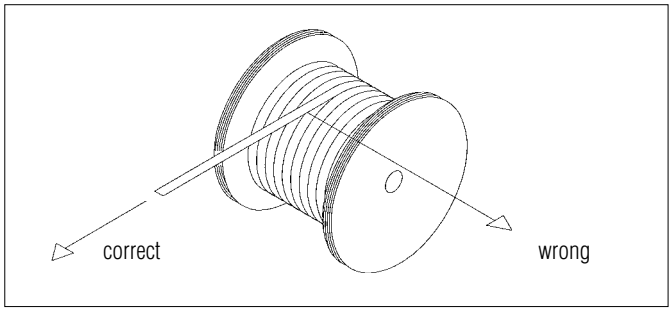
4.1.2 Tests before installation

- Measure the heating tape's insulation resistance before starting installation (recommended testing voltage DC 1500 V, insulation resistance at least 20 MΩ).
- Check whether the material which you require for installing the electric trace heating system is all available on the construction site, and is undamaged.
- It is particularly important to check whether the marking on the heating tape and components agrees with the project planning documents (material list) and test certificates.
- With the aid of the installation instructions accompanying the product check whether all the tools required are completely available.
- Plan installation of the heating tapes by inspecting the pipe system to be heated.
- At the same time pay attention to sharp edges and unevenness which could damage the heating tapes, and remove these.

4.2 Installation of the self-limiting parallel circuit heating tape

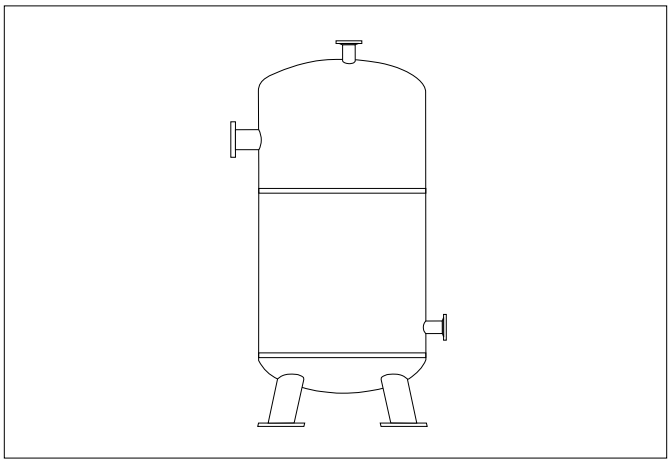
4.2.1 Handling the heating tape

- Use a stable holding device for unwinding the heating tape from the coil.
- Remove the heating tape in a straight line from the coil.
- Do not bend or pinch the heating tape, or pull it over sharp edges.
- Do not tread on or drive over the heating tape; do not use it as a loop for stepping on.
- The ends of the heating tape are always fitted with a protective cap.



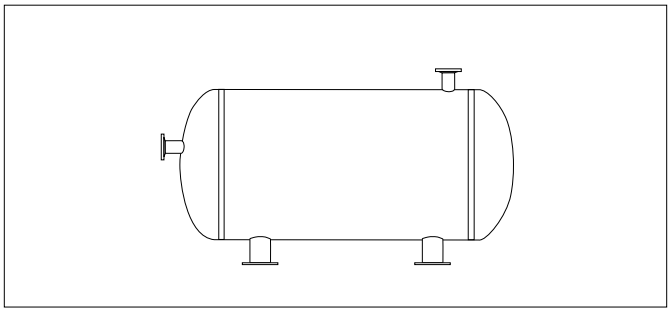
4.2.1a Upright tank

- For tank diameters of up to 2 metres the heating tape is fastened with a clamping ring. This is mounted on the tank using a clamping tool. To fasten the heating tape prefix a polyester clamping ring with slight tension both to the upper position of the surface to be heated and just over the lower base using a turnbuckle.



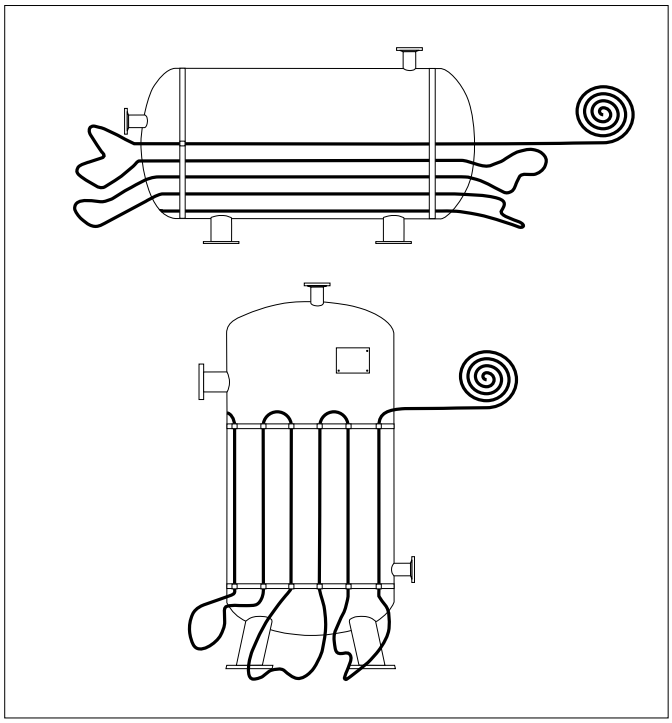
4.2.1bHorizontal tank

- Using a turnbuckle fasten a clamping ring with slight tension both at the beginning and end of the tank, just near the base.



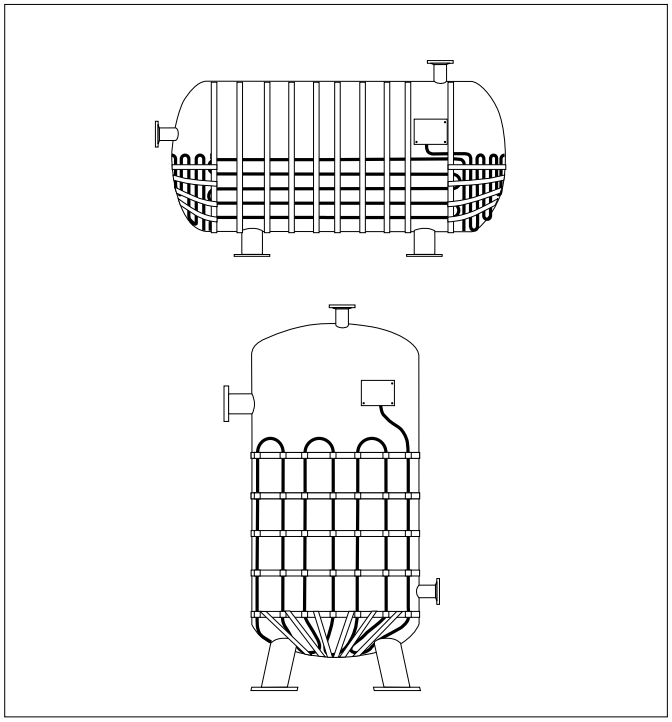
4.2.2 Installing the heating tape

Install the heating tape, beginning at the supply point, and fix it at the distances specified in the project planning documentation with the aid of the premounted clamping rings. Please also allow for material addition for the base (bases).



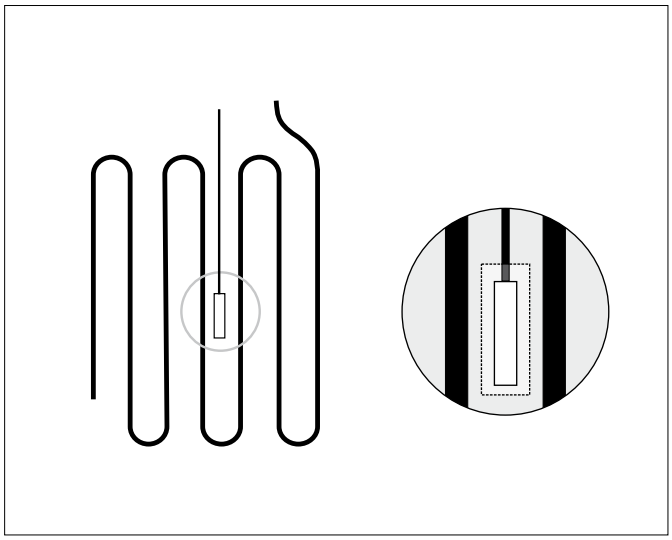
After installing the heating tape, this is then aligned exactly according to the project planning specifications and fixed firmly to the bases and the cylinder using the clamping rings provided. In doing so care should be taken that the clamping rings are not tightened too firmly so as not to damage the heating tape. It should be possible to move the heating tape slightly under the clamping ring.

The distances between the clamping ring fixture should not exceed 250 mm. If necessary the distances should be reduced.



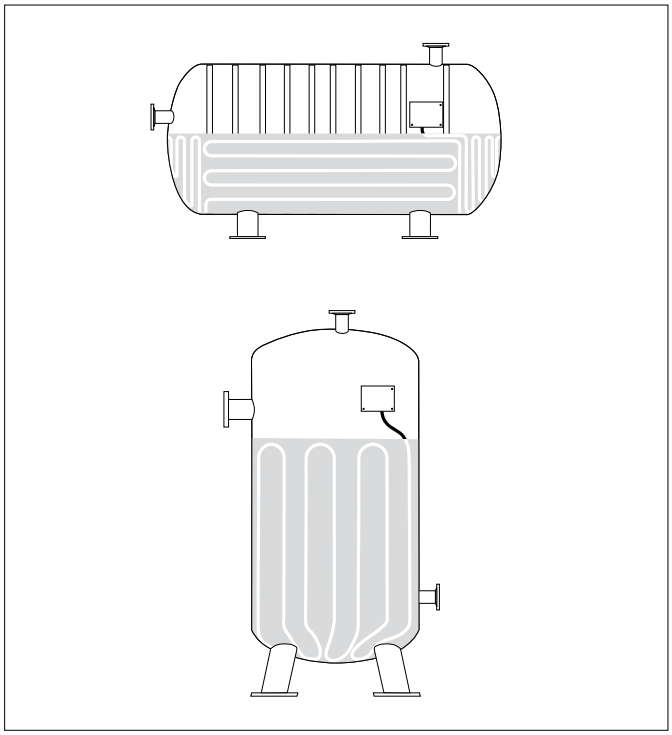
4.2.3 Sensor position

The sensors of the capillary tube thermostats or the PT100 temperature sensor should be fitted closely onto the surfaces to be heated. All sensors must be fitted centrally between the heating tapes and glued over with aluminium self-adhesive tape.



After completing installation of the heating tape this is glued over with aluminium self-adhesive tape or the tank is wrapped in aluminium foil.

In this way heat transmission is improved and at the same time penetration of insulating material between the heating tape and tank wall is prevented.



4.2.4 Installation of fittings, flanges and pumps

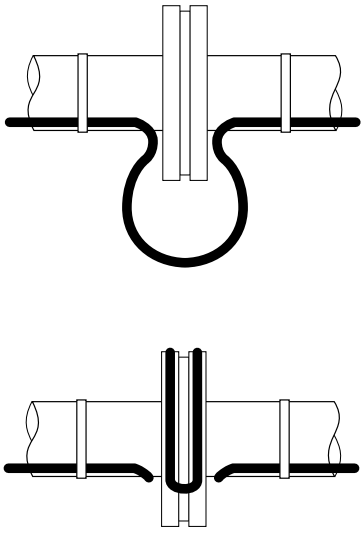
- When installing the heating tape always ensure that the minimum permissible bending radii (PSB = 25 mm/HSB = 25 mm) are observed.

WARNING

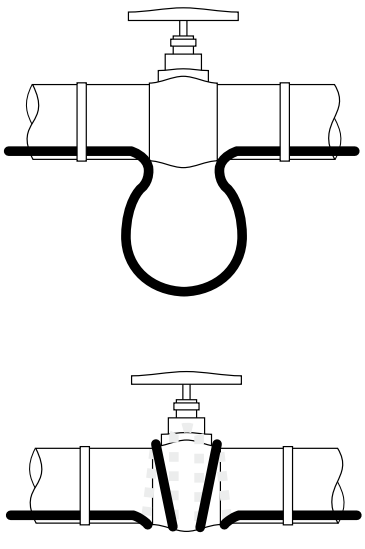
Bending the heating tape on edge is not allowed.

- Always install the heating tape on fittings, valves etc in such a way that these are easily accessible and replaceable during maintenance and repair work, and heating circuits do not have to be cut up. This is most easily achieved using a sufficiently large heating tape loop.
- Through the higher heat losses from fittings, valves, flanges etc a greater length of heating tape is required. This additional requirement is given in the project planning documents.
- The following illustrations show typical types of installation:

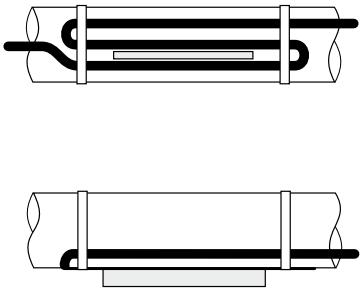
Installation on flanges



Installation on valves



Installation on fixed points



CAUTION

Do not connect the two supply wires as that would cause a short circuit!

4.3 Installation of accessories

4.3.1 BARTEC system accessories

For complete installation of a heating circuit the following system accessories are normally required in addition to the heating tape:

- Powered end connection
- Power supply cable
- Remote end termination
- Fixing accessories for the heating tape
- Heat insulation bushings
- Identification plate “Electrically heated“

The following further system accessories may also be required:

- Tape-to-tape splice connection
- Heating tape tee branch
- Junction box/tee branch junction box
- Mounting bracket and mounting panel for junction box or tee branch junction box
- BARTEC-automatic controllers

NOTICE

To ensure compliance with the existing technical regulations, use only original accessories from BARTEC.

The use of original accessories from BARTEC is a precondition for the consideration of any claims under guarantee.

Comply exactly with the mounting directions and technical instructions on the leaflets enclosed in the respective accessory package. This is essential to prevent errors in installation

4.3.2 Mounting the accessories

- Install the heating tape remote end termination and tape-to-tape splice connection before you install the power supply connection.
- Mount the junction box so that it is easily accessible.
- When positioning the junction box ensure that the box bushings with threaded glands for cable and heating tape do not point upwards.
- When installing the connections establish whether existing cable routes can be used.
- Keep the junction box closed for as long as possible during installation, in order to prevent penetration of dirt and moisture.
- Check whether installation of the remote end termination, tape-to-tape splice connection, tee branch and connection have been carried out correctly by subsequently measuring the insulation resistance.

After installing junction boxes check:

- whether correctly fitting and approved glands and blanking plugs have been used and that these have been mounted properly,
- firm fitting of glands and blanking plugs,
- firm fitting of the junction box on the mounting bracket.
- Make sure that the requirements given in the test certificates have been fulfilled.

4.4 Acceptance and acceptance testing

Procedure

CAUTION

The installed heating circuits must be tested before fitting the thermal insulation.

The following procedure should be followed here:

- Make sure that the heating tape has been correctly installed, in particular that
  - the heating tape has a flat, flush fit on the pipe or tank,
  - a sufficient additional length of heating tape has been installed on flanges, valves, pumps and other fittings,
  - the heating tape is not damaged and has not been laid under pipe clips.
- Check that connections, remote end terminations, tee branches and junction boxes, as well as temperature regulators and sensors, have been properly installed (visual check).
- Supplement the pipe system documentation by adding the position of heating tape, connections, remote end terminations, tape-to-tape splice connections and tee branches.
- Measure the insulation resistance of all heating circuits before installing the thermal insulation.
- The correct installation and functioning of the electric trace heating must be confirmed by an acceptance report (section 11).

NOTICE

Claims under warranty will, not be considered if the acceptance report is not filled in completely.

5. Temperature regulation

NOTICE

BARTEC self-limiting heating cables were tested to meet the requirements of performance after thermal aging test which can be interpreted as service life performance benchmark test (IEEE 515, CSA) suitable for devices intended for industrial and hazardous location applications. The purpose of this test is to ensure a minimum level of heating device performance. A loss in power output in W/m and not exceeding the designed temperature is the consequence if the BARTEC self-limiting heating cables are used above the technical limits shown in the data sheets.

Suitable test are recording the temperature, voltage and current to counter-check with the power output of the data sheet.

Selection of temperature regulator

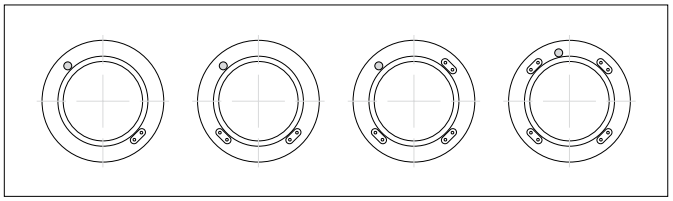
- Use of a temperature regulator is always recommended. The data given documents are decisive for this.
- If exact requirements are set on the temperature use of a regulator is esential.
- When selecting a suitable temperature regulator the following technical data in particular must agree with the respective application:
  - Operating voltage
  - Rated current
  - Temperature regulating range
  - Max. permissible temperature/max. permissible sensor temperature
  - IP protection
  - Explosion protection, if necessary
  - Test certificate
- Use of a regulator with contact sensor is always to be recommended, since this is most economical with regard to energy utilisation.
- Before installation make sure that the temperature regulator used fulfils the technical requirements and agrees with the project planning documentation.

Ambient temperature regulator

- Always mount the ambient temperature regulator at the coolest position in the environment (e.g. north side).
- Follow the installation instructions for the respective ambient temperature regulator.

Temperature regulator with sensor cable

- For electric trace heating systems for pipes the temperature sensor should not be fitted in the mmediate vicinity of the heating tape.



- When mounting the temperature sensor it should be ensured that there is good heat transmission between the sensor and pipe (for example by using aluminium self-adhesive tape or a heat conducting paste).
- As a rule the temperature sensor is fitted at a distance of at least 2 metres from fittings, flanges, pumps and brackets.

- Follow the installation instructions for the respective temperature regulator.
- Keep the enclosure of temperature regulators closed for as long as possible during installation, in order to prevent penetration of dirt and moisture.
- Ensure that the enclosure cover is fitted perfectly and properly sealed.
- Use fitting threaded glands and blanking plugs, according to the technical requirements and test certificates, and make sure that they are properly sealed.

6. Thermal insulation

NOTICE

Before fitting the thermal insulation, check if an acceptance test has been conducted on the installation and a report drawn up.

Installation of the thermal insulation

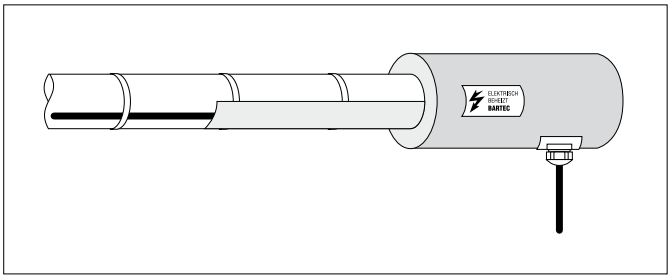
Reliable functioning and effectiveness of an electric trace heating system depends to a considerable extent on correct, expert installation of the thermal insulation.

Particular attention should be paid to the following factors:

- Check that the thermal insulation (type, thickness of insulation) agrees with the project planning documentation. Thermal insulation deviating from the project planning documentation must on no account be installed, since otherwise correct functioning of the trace heating system is no longer guaranteed.
- Install the thermal insulation immediately following installation of the trace heating system if possible, in order to minimise the potential risk of damaging the heating tape.
- Use only dry insulating material since this loses its efficiency through moisture and therefore impairs functioning of the trace heating system.
- When installing the thermal insulation always take care that the heating tape is not damaged.
- Use only BARTEC thermal insulation bushings for lead-through of heating tapes and power supply cables.
- Seal the thermal insulation at all seams of the steel sheet jacket and at bushings (valve bushings, suspension brackets). The complete insulation must be reliably waterproof.
- After installing the thermal installation measure the insulation resistance of each heating circuit again, in order to ensure that the heating tape has not become damaged during installation.

Marking

- Mark the outside casing of the thermal insulation with identification plates “Electrically heated“ at intervals of maximum 3 metres, in order to warn maintenance personnel of the electric trace heating system.



7. Voltage supply and electrical protective equipment

Rated voltage

- BARTEC heating tapes are available for various rated voltages. Information on this is obtainable from the BARTEC technical literature and from your BARTEC technical office.
- Operate the respective heating tape only at the specified rated voltage.

Overcurrent protection

- For overcurrent protection please use only automatic circuit breakers in agreement with the project planning and technical documents of BARTEC. Deviations from this can lead to faulty triggering of automatic circuit breakers or to impairment of the effectiveness of the overcurrent protection device.
- If fuse protective devices other than those given in the project planning or the technical documentation of BARTEC are to be used, please contact your BARTEC technical office.

Fault current protective system

- For limiting heating up as a result of abnormal earth terminating currents and earth discharge currents the following protective system must be installed, in addition to overcurrent protection:

  In a TT or TN system a fault current protective system must be used, the rated current, minimum operating current of which does not exceed fault current of 100 mA. Fault current protective systems with 30 mA are preferable. The maximum switch-off time of the system must not exceed 5 sec for rated current, minimum operating current fault current and 0.15 sec for 5 times the rated curent, minimum operating current fault current (see EN 60079-14, 1997 and IEC 60755).
- To make this protective measure effective a heating tape with protective braiding should generally be used. This protective braiding should be included in the protective system. This applies particularly to all trace eating systems on non-electrically conducting pipes (plastic pipes, coated pipes) and surfaces.

CAUTION

Always comply with the respective national technical regulations when implementing the electrical preventive measure.

8. Tests and putting into operation

Tests

Progressive tests on the trace heating system during installation and operation serve to avoid additional costs through not recognising installation and assembly faults early enough. Since the installation costs for the trace heating system and thermal insulation exceed the costs for the heating tape to a considerable extent, the following test sections should be strictly observed.

Measurement of the insulation resistance is carried out at the following times:

a) **Preliminary test**
Shortly before beginning installation of the heating tape on the construction site

b) **Acceptance test**
Following complete installation of the heating circuit or fitting of the thermal insulation

c) **Final inspection**
Immediately after completion of work on the thermal insulation

d) **Commissioning test**
Before switching on the installation

Measurement of the insulation resistance

- This test method is used to determine damage to the heating tape and possible installation faults in connections, remote end terminations, tape-to-tape splice connections and tee branches
- Use an isolation tester with a minimum testing voltage of DC 500 V and a maximum testing voltage of DC 2500 V (recommended testing voltage DC 1500 V, insulation resistance at least 20 MΩ).
- Die Messung ist wie folgt durchzuführen:
  - **Heating tape without protective braiding**
    Measurements are carried out between each supply conductor of the heating tape and the earthed pipe, or the earthed steel jacket of the heat insulation.
  - **Heating tape with protective braiding and outer jacket**
    Measurements are carried out between each supply conductor of the heating tape and the protective braiding, as well as between the protective braiding and the earthed pipe.
  - **Acceptance and acceptance test report**
    Die Messungen erfolgen zwischen jedem Versorgungsleiter der Heizleitung und dem Schutzgeflecht, sowie zwischen Schutz-geflecht und der geerdeten Rohrleitung.

Acceptance and acceptance test report

- After completion of the installation work (before fitting the thermal insulation) each heating circuit must be accepted, if possible in the presence of the client. Acceptance must be documented (acceptance test) according to the enclosed sample acceptance report.
- All tests going beyond this must also be documented in an acceptance test report.
- After completion of work on the thermal insulation final inspection and acceptance of the individual heating circuits is recommended. As a rule carrying this out is incumbent on the client or the final customer (= final inspection).

Putting into operation

- Each trace heating system can be put into operation only if
  - the acceptance test reports for each heating circuit are available and the perfect state of the trace heating system has been confirmed,
  - the thermal insulation has been completely installed and is in a dry condition
  - it has been ensured that the heating circuit is operated within the data specified by BARTEC.

Note

Additional heating power, which is required for heating up empty or already filled tanks/pipes, is normally not taken into consideration in the project planning. Therefore for cold starting of the system you should allow sufficient time so that the pipe can reach the required temperature.

⚠ CAUTION

In hazardous areas only electrical apparatus that has the appropriate test certificates or certificates from a notified inspection body may be put into operation.

9. Operation and maintenance

Operation

- During operation of the electric trace heating system it must be ensured that all components of the system are operated within the operating data specified by BARTEC. This applies particularly to observation of the maximum temperature. Operation within these operating data is a precondition for possible later guarantee claims.

Systemdocumentation

- Complete documentation must be carried out for each system, from the project planning stage, through installation and putting into operation up to periodic maintenance of the trace heating system.
- This documentation should include the following:
  - Project planning documents
  - Heat loss calculation
  - Selection of the heating tape
  - Piping plans with division of heating circuits
  - Circuit diagrams
  - Up to date piping plans
  - Acceptance reports
  - Reports on repair work and any operations carried out on the tank/pipe system, trace heating system and thermal insulation
  - Inspection reports

NOTICE

For a trace heating system to provide the best possible safety and reliability, it is necessary to introduce a maintenance program of visual, functional and electrical inspections at prescribed time intervals.

Visual and functional inspection

- Check the thermal insulation for possible damage, missing seals, cracks, damage to the outer jacket, missing thermal insulation bushings for heating tapes and cables, penetrated water or chemicals.

  If the thermal insulation is damaged the heating tape should be checked for possible damage.

  ➔ Damaged heating tapes should be replaced by new ones.

  ➔ Parts subject to wear should be replaced (e.g. seals, locking plates etc).

- Check the junction box, connection enclosure and enclosures of temperature regulators for corrosion damage and possible mechanical damage. Make sure that all enclosure covers are properly closed.
- Check the temperature regulator connecting cables and capillary tube systems for damage and that their installation is protected against mechanical damage.
- Check temperature regulators for operatability.

Electrical inspection

- Measurement of the insulation resistance should be seen as a permanent part of regular maintenance.

Inspection intervals

- For frost protection installations inspections should be carrried out annually before the heating period begins.
- For plants designed to maintain process temperatures, inspections should be carried out at regular intervals, but at least twice a year.

Personnel training courses

- Regular maintenance should be carried out by trained, experienced maintenance personnel.
- It is recommended that maintenance personnel are supported in learning new developments in application technology and maintenance by regular training.

BARTEC Service

- Apart from the installation of complete heating circuits, BARTEC also offers its experienced service personnel for maintenance work.

Repair work on thermal insulation or piping

- Ensure that the plant is isolated for safety before all repair work.
- Take care that the trace heating system is not damaged during repair work on the pipe system or thermal insulation.
- Ensure that at the end of all repair work the heating circuits plus thermal insulation are properly installed again in accordance with the project planning documentation.
- Carry out a visual, functional and electrical check on the trace heating system at the end of all repair work.
- Remember that self-limiting heating tapes are designed only for installing once.

NOTICE

Responsible persons must be able to prove their competence and provide evidence that they have acquired the skills and specialised knowledge relating to the types of protection and/or types of devices concerned. At the very least, they must have

- *a general understanding of the relevant electrical engineering*
- *a practical understanding of the principles and techniques of explosion protection*
- *a working knowledge and understanding of the relevant standards of explosion protection*
- *a basic knowledge of quality assurance, including the principles of auditing documentation, traceability of measurements and calibration of measuring instruments.*

10. Procedure when faults occur

Instructions for remedying faults

- If faults occur in a trace heating system we recommend that fault finding is carried out according to the instructions below and, if necessary, the fault then remedied.
- If the attempt to remedy the fault according to the instructions below is not successful, please contact your BARTEC technical office immediately.

⚠ CAUTION

Never try to repair a damaged heating tape!
Replace the damaged piece of heating tape immediately with a new piece (Fire risk!).

10.1 Automatic circuit breaker is triggered

Possible causes	Measures
1. Automatic circuit breaker is under dimensioned 2. Heating circuit is too long 3. Switch on at too low temperatures (See project planning data)	Check current loading, check overcurrent protection and max. current-carrying capacity of the power supply cable.
4. Defective FI protective switch	Replace FI protective switch
5. Short circuit/earth fault at connections, tape-to-tape splice connections, remote end termination or power supply cables 6. Short circuit/earth fault on heating tape	Defective connections, remote end termination, localise connection and repair or localise defective heating tape and replace.
7. Supply conductors of heating tape have been connected together at the remote end termination (short circuit/earth fault)	Shorten defective remote end termination, check remaining heating circuit for possible further damage, install a new remote end termination.

10.2 Fault current circuit breaker (FI) is triggered

Possible causes	Measures
1. Automatic circuit breaker is underdimensioned 2. Defective FI protective switch 3. Short circuit/earth fault at connection, tape to-tape splice connections, remote end termination or power supply cables 4. Short circuit / earth fault on heating tape through damage 5. Supply conductors of heating tape have been connected together at the remote end termination (short circuit / earth fault)	Check current loading, overcurrent protection and max. current-carrying capacity of the electric power supply cable.
6. Excess moisture in the connection, remote end termination or tape-to-tape splice connections through improper installation	Localise moist parts, renew terminal block and dismantle affected parts. First check the enclosure part outside the thermal insulation, and, if necessary, repair this – then the part below the heat insulation.
7. Damage to heating tape or power supply cable	Localise damaged parts and replace with new heating tapes or power supply cable.

10.3 No, or too low heating power

Possible causes	Measures
1. No, or too low supply voltage	Check the mains voltage at the supply point of the heating circuit and remedy any faults here.
2. Heating circuit length is shorter than specified in the project planning documentation – recalculate. a) Supply cables or tee branches have not been connected. b) Heating tape is disconnected (interrupted).	Check heating circuit distribution, installation and length, recalculate required heating power. a) Connect tape-to-tape splice connections and branches, and recheck heating power. b) Localise interruption and remedy this, then recheck the heating power.
3. High transition resistance through faulty connection, supply cable	Reinstall affected connection, supply cable, tape-to-tape splice connection and at the same time ensure that connecting or crimping is correct.
4. Temperature regulator has been incorrectly connected, incorrectly adjusted or the sensor has been positioned incorrectly.	Correct wiring or position sensor correctly.
5. The maximum permissible temperature of the pipe has been exceeded.	Check pipe temperature.
6. Heating tape has become too moist (e.g. faulty supply cable or damage to heating tape).	Replace faulty components
7. Heating tape has been subjected to too high temperatures.	Replace connection, remote end termination, heating tape

10.4 Heating power appears to be correct, but pipe temperature is below the required value

Possible causes	Measures
1. Moist thermal insulation	Replace moist thermal insulation with dry insulation and make sure that sealing is correct.
2. Inadequate covering with heating tape on flanges, valves and fittings	Install additional heating tape using tape-to-tape splice connections, but do not exceed the max. permissible heating circuit length.
3. Incorrect adjustment of temperature regulator	Correct regulator setting
4. Inadequate thermal design concept	Check project planning documentation together with your BARTEC office, and follow the recommendation of the BARTEC project planning department.
5. Cross-section of power supply cable is below the permissible value (too high voltage drop)	Use power supply cable with approved cross-section
6. Sensor wrongly positioned	Position sensor correctly

11. Acceptance report

The supplier can fill in an acceptance report form as shown in the following section.

- Standard acceptance report - BARTEC

NOTICE

Claims under warranty will ,not be considered if the acceptance report is not filled in completely.

Abnahme- und Prüfprotokoll Acceptance Report

Record of Inspection according to §19 BetrSichV

BARTEC

Elektrische Rohrbegleitheizung Electric Trace Heating Pipe ☐	**Blatt** Sheet ☐ **von** of ☐	**Bemerkungen/Anlage** Comments/Appendixes ☐
Behälterbeheizungen Electric Trace Heating Tank/Vessel ☐	**Datum** Date	
Auftraggeber Customer	**Best.-Nr./Komm.-Nr.** Order Comm. No.	
	Projekt Project	
	BARTEC Auftrags-Nr. BARTEC Order No.	
Ex-Bereich Ex version **ja** yes ☐ **nein** no ☐	**Zone** Zone ☐	**Temperaturklasse T** Temperature class T ☐ **Explosionsgruppe** Ex group ☐
Prüfung vor Erstinbetriebnahme §14 (1) Betr.SichV Inspection before initial operation ☐	**Prüfung nach Änderung** §14 (2) Betr.SichV Inspection after modification ☐	**Wiederkehrende Prüfung** §15 Betr.SichV Periodic inspection ☐
Sichtprüfung Visual inspection ☐	**Nahprüfung** Close inspection ☐	**Detailprüfung** Detailed inspection ☐

Heizkreis-Nr. Heating circuit No.				
Teilheizkreis Sub-Heating circuit **ja** yes ☐ **nein** no ☐ **Menge** quantity ☐				
Rohr-/Behälter-Nr. Pipe-/Vessel No.				
Gebäude Building				
Produkt Product				
Heizkabel/Typ Heating cable/type				
Charge-Nr. Heizkabel Charge No. Heating cable				
Heizkabellänge Heating cable length	_____m	_____m	_____m	_____m
Fertigungs-Nr. Anschluss Serial No. Connection kit				
Fertigungs-Nr. Gehäuse Serial No. Junction box				
Spannung Voltage	_____V	_____V	_____V	_____V
Strom (Einsch./Betrieb) Current (Switch on/operation)	_____/_____A	_____/_____A	_____/_____A	_____/_____A
Leistung Heizkabel Output Power heating cable	_____W/m	_____W/m	_____W/m	_____W/m
Heizkabelwiderstand Resistance heating cable	_____Ω	_____Ω	_____Ω	_____Ω
Isolationswiderstand bei Isolation resistance at _____V	>_____MΩ	>_____MΩ	>_____MΩ	>_____MΩ
Temperatureinstellung Temperature setting	ja yes ☐ nein no ☐	ja yes ☐ nein no ☐	ja yes ☐ nein no ☐	ja yes ☐ nein no ☐
Regler Controller	_____°C ☐ ☐	_____°C ☐ ☐	_____°C ☐ ☐	_____°C ☐ ☐
Begrenzer Limiter	_____°C ☐ ☐	_____°C ☐ ☐	_____°C ☐ ☐	_____°C ☐ ☐
Untertemperatur Low temperature	_____°C ☐ ☐	_____°C ☐ ☐	_____°C ☐ ☐	_____°C ☐ ☐

Schaltanlage/Unterverteiler Switchgear/Distribution Panel	im Leistungsumfang enthalten Included in the scope of supply **ja** yes ☐ **nein** no ☐	Name der Schaltanlage/UV Name ESS/LDP _____ Abnahmeprotokoll Test report ☐
Wärmedämmung Thermal insulation	Wärmedämm-Material Thermal insulation material	Wärmedämm-Dicke in mm Thermal insulation thickness in mm ☐
	Prüfung erfolgte **vor** Montage der Wärmedämmung check **before** installation insulation ☐ Datum/Name/Unterschrift Date/Name/Signature_____	Prüfung erfolgte **nach** Montage der Wärmedämmung check **after** installation insulation ☐ Datum/Name/Unterschrift Date/Name/Signature_____

Bemerkungen Comments

Ort/Datum City/Date	BARTEC GmbH - Contractor Name/Unterschrift „Bef. Person" §2(7) BetrSichV - Name/Signature	Auftraggeber - Customer Name/Unterschrift - Name/Signature

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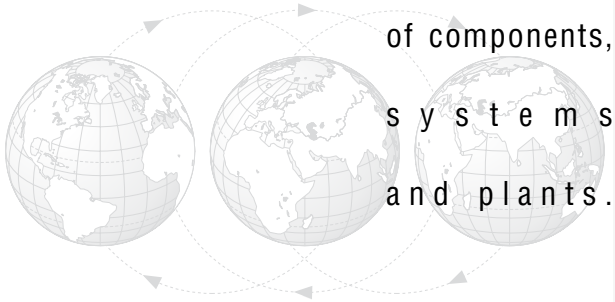
BARTEC protects people and the environment by the safety of components, systems and plants.



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