

Regulus

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HSK 400 P+

Installation and Operation Instructions
THERMAL STORE
with stainless-steel DHW tube heat exchanger
HSK 400 P+

EN

HSK 400 P+

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1 - Description

HSK 400 P+ Thermal Stores are intended for storing and subsequent distribution of thermal energy of heating water. They are fitted with a stainless-steel tube DHW heat exchanger, permitting installation of electric heating elements and connection of other heat sources. For better thermal stratification of heating water, the tank is divided by a separating metal sheet.

1.1 - Models

One model of 408 litres total volume with stainless-steel tube DHW heat exchanger.

1.2 - Tank protection

The thermal store has no inner surface finish, the outer surface is painted in gray. The DHW heat exchanger is made of stainless steel.

1.3 - Thermal insulation

Thermal insulation is available as a separate item. For easier handling, the insulation shall not be fitted on the tank until it reaches its definite place of installation. The insulation is 100 mm thick, with a hard polystyrene surface. It is closed by quick locks.

1.4 - Packaging

Thermal stores are delivered standing, each screwed to its pallet, packed in bubble wrap.

It is forbidden to transport and/or store the thermal stores in a horizontal position.

2 - General Information

This Owners Manual is an integral and important part of the product and must be handed over to the User. Read carefully the instructions in this Manual as they contain important information concerning safety, installation, operation and maintenance. Keep this Manual for later reference. The appliance shall be installed by a qualified person according to valid rules and Manufacturer's Instructions.

This appliance is designed to accumulate thermal energy and distribute it subsequently. It must be connected to a heating system and heat sources. This appliance is designed for continuous DHW heating.

Using the thermal store for other purposes than above described is forbidden and the manufacturer accepts no responsibility for damage caused by improper or wrong use or filling procedure.

The appliance shall be installed by a qualified person according to valid rules, otherwise the warranty becomes null and void.

3 - Technical Data and Dimensions



| Code | |
|---------------|-------|
| Thermal Store | 19607 |
| Insulation | 19609 |

| Energy Efficiency Data (as per EC Regulation No. 812/2013) | |
|------------------------------------------------------------|-------|
| HSK 400 P+ with insulation | |
| Energy efficiency class | C |
| Standing loss | 81 W |
| Storage volume | 408 l |

| Technical Data | |
|---------------------------------------------------------------|------------------|
| Total tank volume | 408 l |
| Total fluid volume in tank | 387 l |
| Fluid volume above the separating plate | 220 l |
| Fluid volume below the separating plate | 167 l |
| Volume of DHW heat exchanger above the separating plate | 21 l |
| Surface area of DHW heat exchanger above the separating plate | 6 m ² |
| Max. working temperature in tank | 95 °C |
| Max. working temperature in DHW heat exchanger | 95 °C |
| Max. working pressure in tank | 4 bar |
| Max. working pressure in DHW heat exchanger | 10 bar |

| Tank Materials | |
|-----------------------------|------------|
| Tank material | S235JR |
| DHW heat exchanger material | AISI 316 L |

| Insulation Materials | |
|-----------------------------------------|------------------|
| Tank perimeter insulation | fleece |
| Tank perimeter insulation outer surface | hard polystyrene |
| Top and bottom tank insulation | fleece |

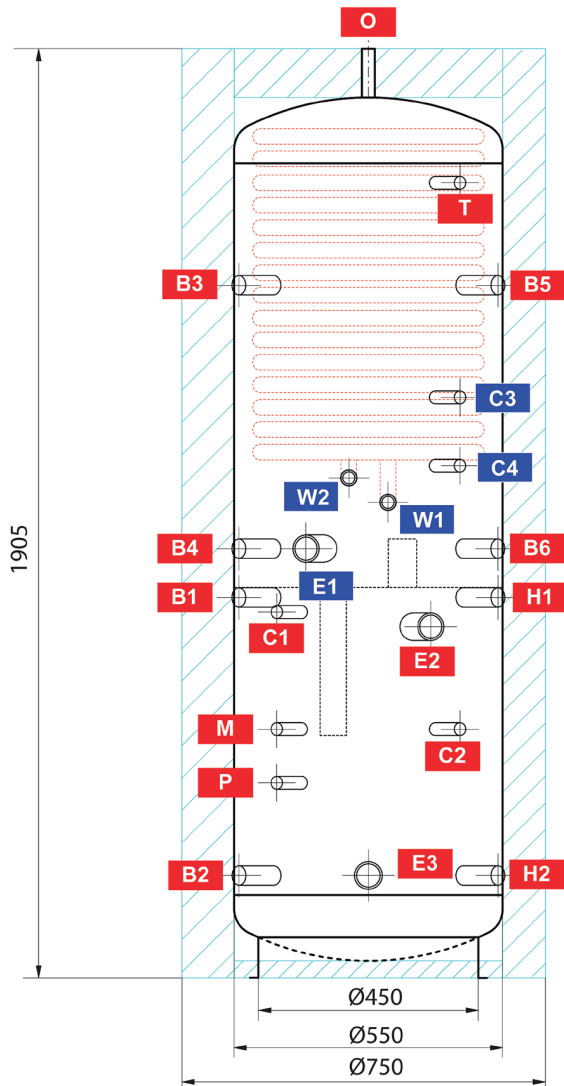
| Dimensions, Tipping height, Insulation thickness, Weight | |
|----------------------------------------------------------|---------|
| Tank diameter | 550 mm |
| Tank diameter with insulation | 750 mm |
| Tank overall height | 1905 mm |
| Tipping height without insulation | 1940 mm |
| Tank perimeter insulation thickness | 100 mm |
| Bottom insulation thickness | 50 mm |
| Top insulation thickness | 100 mm |
| Empty weight without insulation | 91 kg |

| Accessories | |
|------------------------------|----------------------|
| El. heating element (models) | ETT-A, C, D, F, M, P |
| Heating elem. max. length | 3x 555 mm |

| Volume of supplied DHW (heated from 10 °C to 40 °C) | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------------------------|--------|-----|-----|--------|-----|-----|-------------------|-----|-----|--------|-----|-----|--------|-----|-----|-------------------|-----|-----|--------|-----|-----|
| Heated volume | entire | | | entire | | | above metal sheet | | | entire | | | entire | | | above metal sheet | | | entire | | |
| Temperature in tank | 50 °C | | | 50 °C | | | 50 °C | | | 60 °C | | | 60 °C | | | 60 °C | | | 80 °C | | |
| Backup heater | 10 kW | | | none | | | 10 kW | | | 10 kW | | | none | | | 10 kW | | | none | | |
| Flow rate [l/min] | 8 | 12 | 20 | 8 | 12 | 20 | 8 | 12 | 20 | 8 | 12 | 20 | 8 | 12 | 20 | 8 | 12 | 20 | 8 | 12 | 20 |
| Hot water volume [l] | 363 | 237 | 120 | 222 | 187 | 101 | 195 | 132 | 106 | 534 | 359 | 268 | 321 | 290 | 266 | 253 | 235 | 208 | 567 | 528 | 516 |

Dimensions

Tipping height without insulation 1905 mm



CONNECTIONS

| pos. | description | connection | height [mm] |
|-----------------------------|--------------------------------------------|------------|-------------|
| Heat sources | | | |
| B1 | Incoming from heat source | G 1" F | 780 |
| B2 | Return to heat source | G 1" F | 210 |
| B3 | Incoming from heat source | G 1" F | 1420 |
| B4 | Return to heat source | G 1" F | 880 |
| B5 | Incoming from heat source | G 1" F | 1420 |
| B6 | Return to heat source | G 6/4" F | 880 |
| Heating system | | | |
| H1 | Flow to heating system | G 1" F | 780 |
| H2 | Return from heating system | G 1" F | 210 |
| El. heating elements | | | |
| E1 | Electric heating element for DHW heating | G 6/4" F | 880 |
| E2 | Electric heating element for space heating | G 6/4" F | 720 |
| E3 | Electric heating element for PV system | G 6/4" F | 210 |
| DHW heating | | | |
| W1 | Cold water | G 1" M | 975 |
| W2 | Hot water | G 1" M | 1025 |
| Control and safety | | | |
| C1 | Temperature sensor | G 1/2" F | 750 |
| C2 | Temperature sensor | G 1/2" F | 510 |
| C3 | Temperature sensor | G 1/2" F | 1190 |
| C4 | Temperature sensor | G 1/2" F | 1050 |
| T | Thermometer | G 1/2" F | 1630 |
| M | Pressure gauge | G 1/2" F | 510 |
| P | Safety valve | G 1/2" F | 400 |
| Air release | | | |
| O | Air vent valve | G 1/2" F | 1905 |

4 - Operation

This tank is designed to accumulate thermal energy for heating. Heating water transfers the accumulated heat to DHW via an integrated heat exchanger. Hot water is therefore heated in a continuous manner.

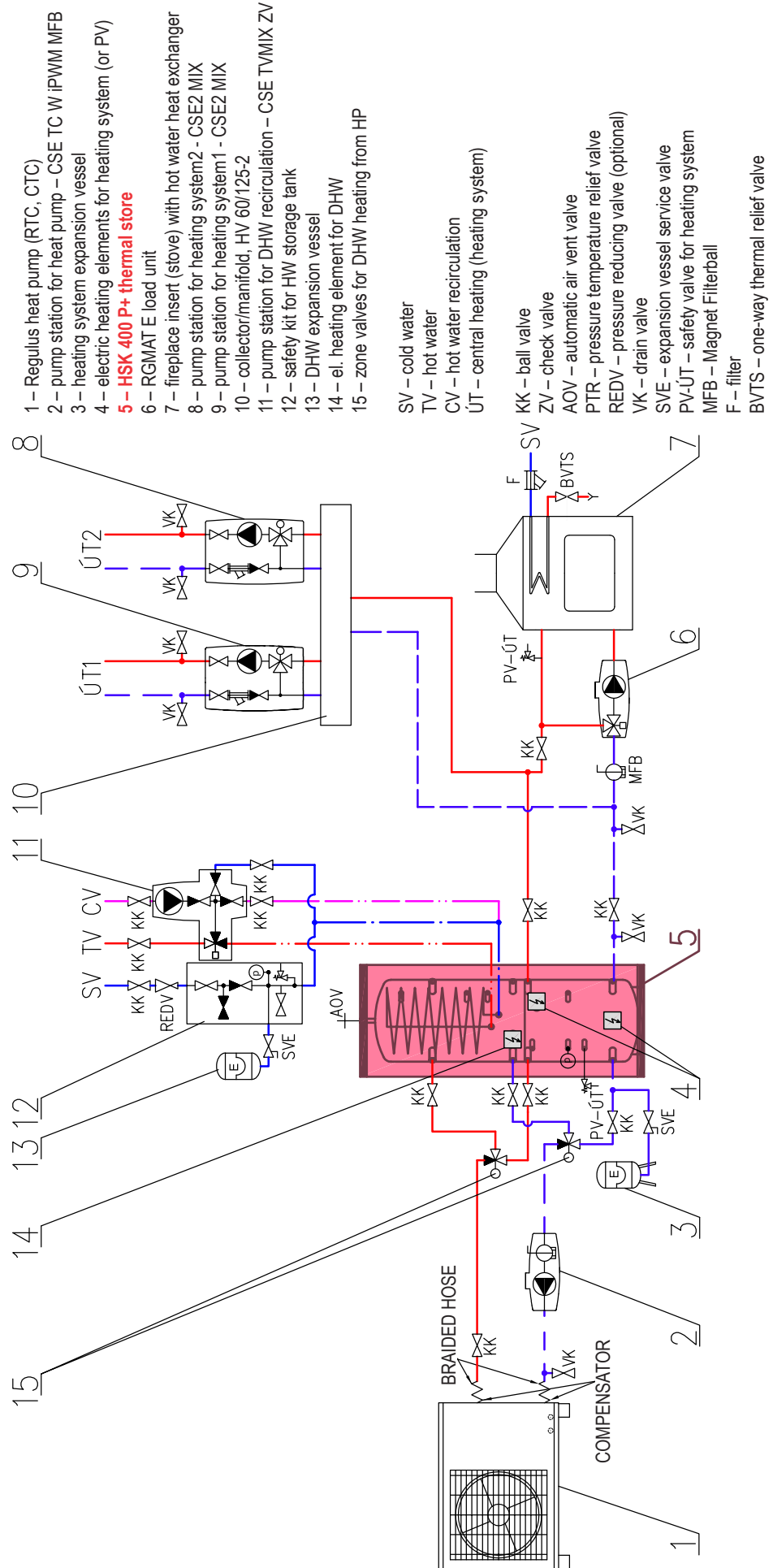
5 - Thermal Store Connection to a Heating System

Example I.

Heat pump + el. heating element
+ fireplace + PV possible

KEY

- 1 - Regulus heat pump (RTC, CTC)
- 2 - pump station for heat pump - CSE TC W iPWM MFB
- 3 - heating system expansion vessel
- 4 - electric heating elements for heating system (or PV)
- 5 - **HSK 400 P+ thermal store**
- 6 - RGMAT E load unit
- 7 - fireplace insert (stove) with hot water heat exchanger
- 8 - pump station for heating system 2 - CSE2 MIX
- 9 - pump station for heating system 1 - CSE2 MIX
- 10 - collector/manifold, HV 60/125-2
- 11 - pump station for DHW recirculation - CSE TVMIX ZV
- 12 - safety kit for HW storage tank
- 13 - DHW expansion vessel
- 14 - el. heating element for DHW
- 15 - zone valves for DHW heating from HP

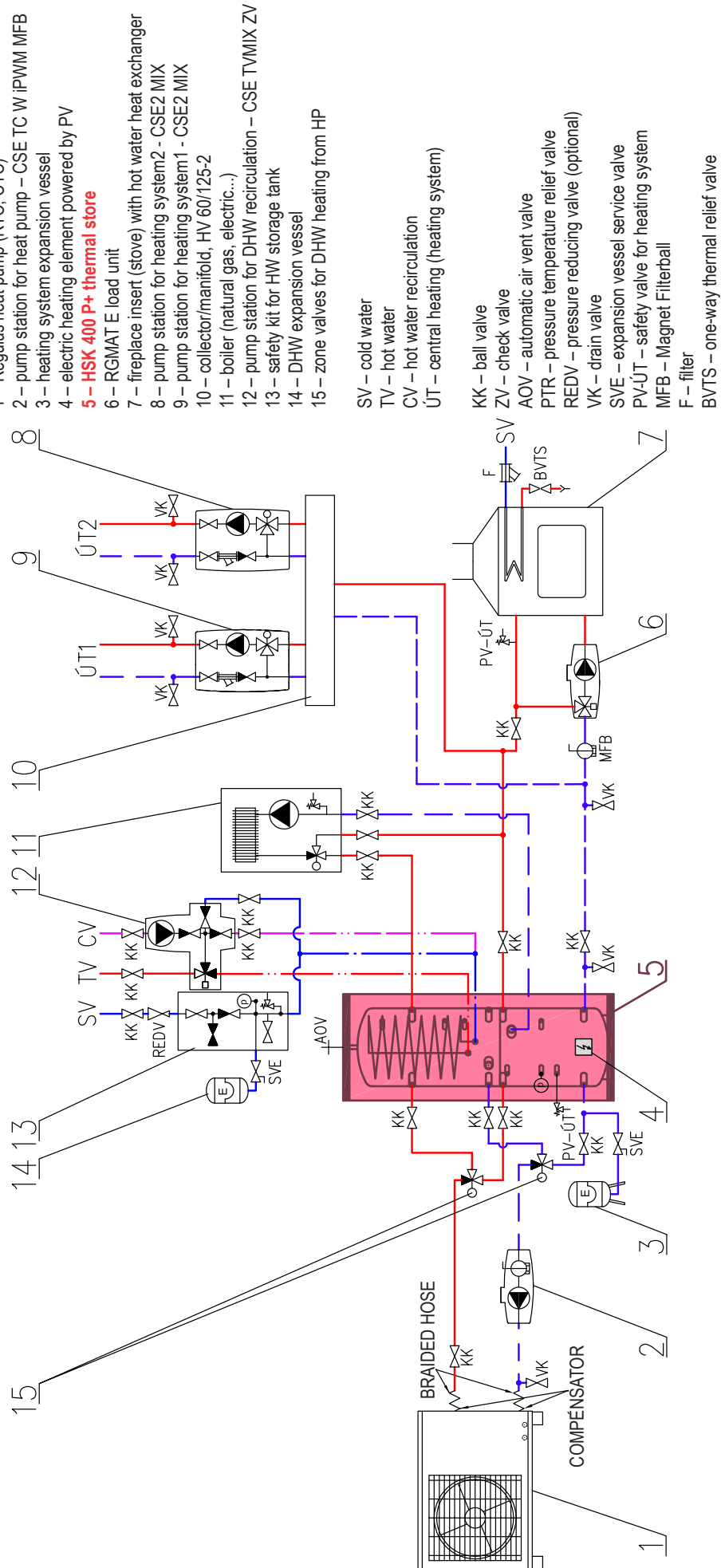


Example II.

Heat pump + gas-fired boiler + fireplace + PV possible

KEY

- 1 – Regulus heat pump (RTC, CTC)
- 2 – pump station for heat pump – CSE TC W IPWM MFB
- 3 – heating system expansion vessel
- 4 – electric heating element powered by PV
- 5 – **HSK 400 P+ thermal store**
- 6 – RGMAT E load unit
- 7 – fireplace insert (stove) with hot water heat exchanger
- 8 – pump station for heating system2 - CSE2 MIX
- 9 – pump station for heating system1 - CSE2 MIX
- 10 – collector/manifold, HV 60/125-2
- 11 – boiler (natural gas, electric...)
- 12 – pump station for DHW recirculation – CSE TVMIX ZV
- 13 – safety kit for HW storage tank
- 14 – DHW expansion vessel
- 15 – zone valves for DHW heating from HP



- SV – cold water
 TV – hot water
 CV – hot water recirculation
 UT – central heating (heating system)
 KK – ball valve
 ZV – check valve
 AOV – automatic air vent valve
 PTR – pressure temperature relief valve
 REDV – pressure reducing valve (optional)
 VK – drain valve
 SVE – expansion vessel service valve
 PV-UT – safety valve for heating system
 MFB – Magnet Filterball
 F – filter
 BVTs – one-way thermal relief valve

6 - Installation and Commissioning

Installation must meet valid rules and may be done only by qualified staff.

Defects caused by improper installation, use or handling are not covered by warranty.

After the tank is installed and connected to an existing heating system, it is recommended to clean the entire heating system using a suitable cleaning agent, e.g. BP 400.

Anti-corrosion protective liquid should be also used, e.g. BP 100 Plus.

6.1 - Connection to heat sources

Place the tank on the floor, as close to your heat source (heat pump, boiler) as possible. Fit the insulation, cf. Installing Insulation on the tank. Connect the heating circuits to inlets and outlets respecting the thermal stratification in the tank. Install a drain valve at the lowest point of the tank. Install an air vent valve at the highest point of the system. Insulate all the connection piping.

6.2 - Installation of an el. heating element

The thermal store can be equipped with el. heating elements. They can be power-supplied either directly (thermostat-equipped elements), or via a controller for the entire heating system.

Warning: Electric heating elements shall be protected by a safety thermostat.

The electric heating element shall be wired by a professionally qualified person only.

6.3 - Connection to water mains

DHW piping shall be done according to valid rules. Connections to the tank, including placing the components, is shown in the diagrams of the recommended connection in Chap. 5. Installation of a pressure reducing valve on the immersed tank inlet is recommended. For water mains pressure above 6 bar a pressure reducing valve is necessary. To prevent water loss, we recommend installing an expansion vessel at the cold water inlet with a minimum volume of 4% of the total volume of water in the DHW piping, including heat exchangers, circulation pipes, etc. (usually 8 l). Should the water be too hard, install a water softener before the tank. In case the water contains mechanical impurities, install a strainer.

Table of limit values for total dissolved solids in hot water.

| Description | pH | Total dissolved solids (TDS) | Ca | Chlorides | Mg | Na | Fe |
|-------------|-----------|------------------------------|---------|-----------|---------|----------|----------|
| Max. value | 6,5 - 9,5 | 600 mg/l | 40 mg/l | 100 mg/l | 20 mg/l | 200 mg/l | 0,2 mg/l |

6.4 - Commissioning

Ground the tank before commissioning.

The tank shall be filled up together with the heating system, respecting valid standards and rules. In order to minimize corrosion, special additives for heating systems should be used. The quality of heating water depends on the quality of filling water at commissioning, on the top-up water and on the frequency of topping up. This has a strong influence on the lifetime of heating systems. Poor quality of heating water may cause problems like corrosion or incrustation, esp. on heat transfer surfaces.

Quality of DHW shall meet the conditions shown in the Table of limit values for total dissolved solids in hot water on this page.

Fill the heating circuits with the appropriate fluids and air-bleed the entire system. Check all connections for leaks and verify the system pressure. Set the heating controller in compliance with the documentation and manufacturer's recommendations. Check regularly the proper function of all control and adjustment elements.

7 - Installing Insulation on the Tank

Product description

Thermal insulation is a part of thermal stores, preventing heat loss. For easier handling, the insulation shall not be fitted on the tank until it reaches its definite place of installation.

Warning

Insulation installation shall be done in two or three persons, depending on its size.

Do not use any tools for installation.

Keep away from open fire.

Installing Insulation

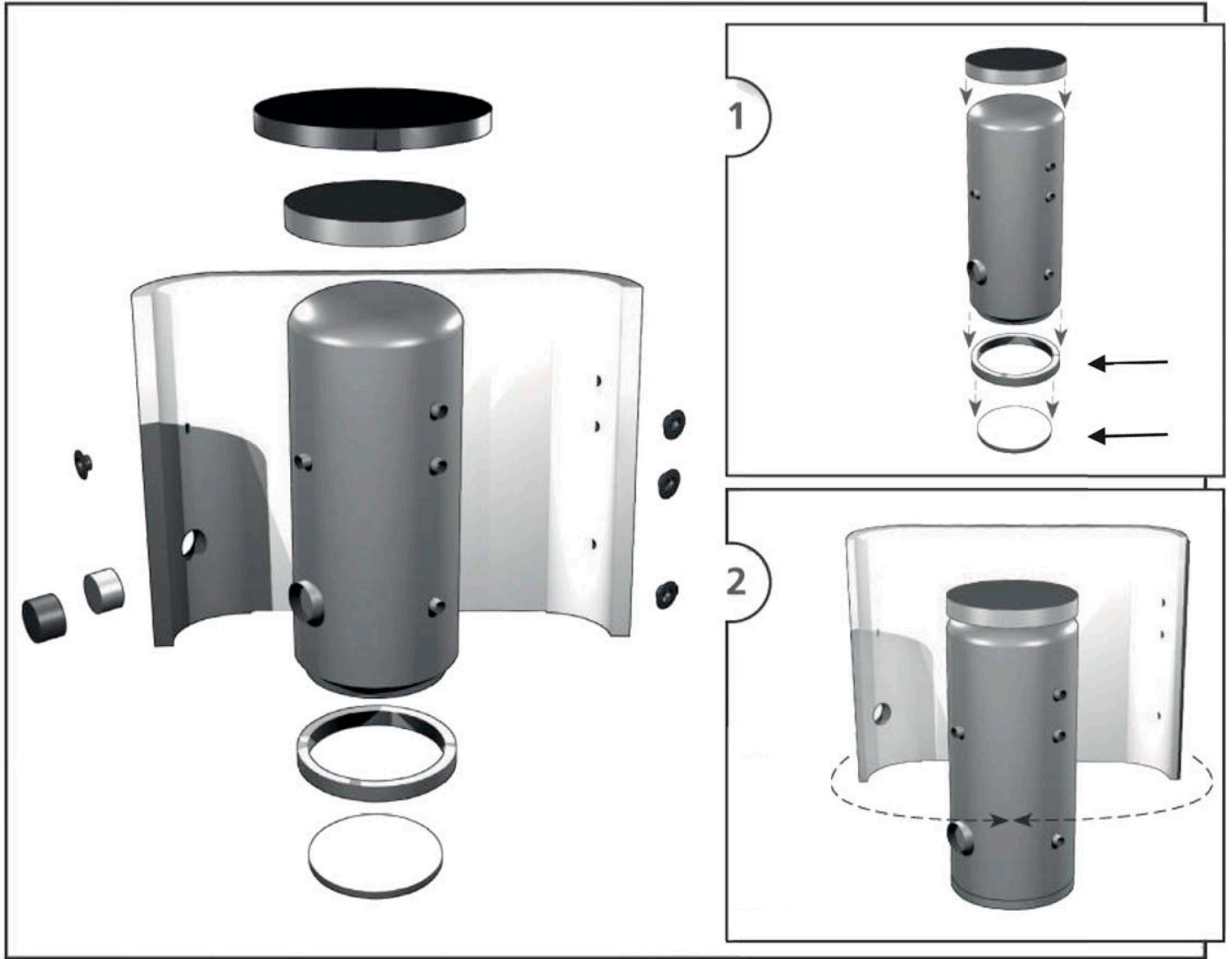
1. Fix the tank following installation instructions.
2. Wrap the insulation around the tank carefully. Check that the insulation adheres to its body perfectly. This can be reached by rubbing and patting the insulation by hand from its center evenly in both directions until the insulation adheres to the tank's surface completely and no bubbles are left.
3. Use the holes for connections as a rest during the insulation installation.
4. At least one person presses the insulation to the tank, pulling both ends together. The other person closes the insulation lock from the side.
5. Put on the upper insulation and cover
6. Push on the covering plastic rosettes depending on the size of connections.
7. Finish the tank installation in compliance with the respective instructions and valid standards and rules.

Warranty on insulation

- Warranty shall become null and void if:
 - the procedure described in the Installation Manual was not respected,
 - the product was used for other purposes than intended.
- Warranty does not cover:
 - usual wear and tear,
 - damage caused by fire, water, electricity or a natural disaster,
 - defects caused by failure to use the product in compliance with its intended purpose, by improper use and insufficient maintenance,
 - defects caused by mechanical damage to the product,
 - defects caused by tampering or incompetent repair.



+ 20.0° C
+ 68.0° F



8 - Maintenance

If the tank is fitted with a heating element, disconnect it from the mains first. Clean the exterior of the tank with a soft cloth and a mild detergent. Never use abrasive cleaners or solvents. Check all connections for leaks.

9 - Disposal

Packaging shall be disposed of in compliance with the valid rules. When the product reaches the end of its life, it shall not be disposed of as household waste. It shall be dropped off at a Local Waste Recycling Center. Insulation shall be recycled as plastic and the steel vessel as scrap iron.

10 - Warranty

This product is covered by warranty under conditions specified in this Manual and the respective Warranty Certificate. The Warranty Certificate is an integral part of supply of this Thermal Store.

