kraftBoxx
POWER TO HEAT SYSTEMS

AXIOTHERM® INSIDE

heatStixx

heatSel

heatSel XL

Assembly
Operation
Maintenance

GB

Version: 03/2023 V0.5

Content

WHY PCM?
PCM (Phase Change Material) is used to store and withdraw thermal energy. The phase change plays the crucial role. Depending on the PCM material (paraffin, salt hydrates, etc.), the binding forces are "broken up" energetically when a certain temperature is reached (this is the phase change temperature and depends on the PCM), which is called the melting process.
This takes place at a constant temperature. If the PCM is cooled down again, i.e. the stored energy is extracted at a constant temperature, it becomes solid again. Looking at water ice as an example shows just how much this energy can make: to turn 1 kg of water from 0°C solid to 0°C liquid, you need as much energy as for heating 1 kg of water from 0°C (liquid) to 80°C. This is the latent effect!

1 Introduction

1.1 General instructions

These operating instructions apply to: **heatStixx, heatSel** and **heatSel XL** are included in the scope of delivery. The instructions apply for the installation, operation and maintenance.

These instructions are intended for qualified technicians who are authorised for the corresponding fields of activity. They must have the necessary specialist knowledge and be informed of the relevant accident prevention regulations.

Before starting assembly work, carefully read these instructions along with the safety information and instructions for the assembly and commissioning. This will help you avoid any damage to your equipment that could arise from incorrect handling.

Failure to observe the safety information may result in personal injury, material damage or environmental damage.

The information and recommendations provided do not claim to be exhaustive. All relevant directives, standards and regulations must be observed when carrying out assembly work and operating a heating system.

Please refer to the respective applicable version of the General Terms and Conditions.

1.2 Intended use

The latent storage capsules of the **heatStixx**, **heatSel** and **heatSel XL** series can be used in existing or new heating and cooling systems. They are intended exclusively for increasing the storage capacity in heat accumulators and cold accumulators.

No contact with drinking water allowed.

Any use contrary to the intended purpose as well as inadmissible changes to the assembly type, process or design will result in the exclusion of any liability and warranty claims.

1.3 Safety

The general safety and warning information is an integral part of these instructions and is of fundamental importance for the handling of the product.

Attention!

This symbol warns of material damage and personal injury.

Attention!

Risk of burns and scalding!

Temperatures > 60°C can occur in the storage tank; there is therefore a risk of scalding and possibly burns at the connections or components.

→Do not touch hot components.

Attention!

Risk of injury

Health hazards may result from inhalation, ingestion or eye contact, for example.

→Observe the GHS symbols of the respective product information (PCM).

→Observe the safety data sheets of the respective PCMs.

The latent storage capsules of the **heatStixx**, **heatSel** and **heatSel XL** series are constructed according to the state-of-the-art technology and the approved safety regulations. However, when used, there is a risk of injury including fatal injury for the operator and/or third parties, and damage to the product and other property.

The latent storage capsules may only be operated when in technically perfect condition.

In the event of safety-related faults, immediately shut down the product and have the fault rectified by a qualified technician.

1.4 Other applicable documents

Observe the operating instructions of all system components used, such as the storage tank, buffer tank or electric heating cartridge.

Observe the safety data sheet of latent material and product information.

1.5 Guarantee and warranty conditions

The warranty for all storage parts corresponds to the statutory warranty provisions of the country to which the manufacturer has delivered. This applies subject to installation and assembly by a specialist at a suitable location.

The requirements and deadlines of the latest version of the General Terms and Conditions apply to the warranty provisions of our products.

The guarantee explicitly does not extend to the following damages and their consequences:

- Transport damage
- Unsuitable or improper use
- Faulty assembly or commissioning by the operator or third parties
- Natural wear and tear
- Faulty or negligent handling or maintenance
- Use of unsuitable equipment
- Inadequate water quality
- Failure to observe the assembly, operating and maintenance instructions
- Improper modifications or repair work by the purchaser or third parties
- Installation in unsuitable rooms (frost, no possibility for maintenance etc.)
- Continued use despite the occurrence of a fault, damage or defect

1.6 Installation instructions

In addition to the national and local regulations and guidelines, also observe the following standards:

- **DIN1988** Technical rules for drinking water installations
- **DIN 4708** Central water heating systems
- **DIN 4753** Water heaters and water heating installations for drinking water and service water; requirements, marking, equipment and testing
- **DIN 18380** Heating systems and central water heating systems
- **DIN 18381** Installation of gas, water and drainage pipework inside buildings
- **DIN EN 12828** Heating systems in buildings - Design for water-based heating systems
- **EN12897** Water supply - Specification for indirectly heated unvented (closed) storage water heaters
- **EN 12975** Thermal solar systems and components
- **VDE 0100** Installation of electrical equipment, earthing, protective conductor, equipotential bonding conductor.
- **VDI 2035** Avoidance of damage in hot water heating systems
- **DVGW standards** Requirements and testing for drinking water heaters, in particular drinking water
  DVGW W551 heating and drinking water piping systems

2 Transport and storage

2.1 General information

When transporting and opening the packaging, observe the instructions on the packaging.

Inspect the goods immediately upon delivery for correctness, completeness and intactness.

In the event of any transport damage, inform the carrier immediately and in any case leave the packaging and the goods in their original condition until the damage has been inspected by an agent of the carrier. Note any damage directly on the delivery note.

Do not store latent storage capsules outdoors. Store only in dry, frost-free and ventilated rooms.

Avoid any scratches or knocks and blows to the latent storage capsules.

2.2 Scope of delivery

Deviations depending on model and design

- **heatStixx, heatSel** or **heatSel XL**
- Product information
- Safety data sheet of latent material (PCM)
- Identification sticker
- Operating instructions

3 Ranges of application / technical data

Type	**heatStixx HP**	**heatSel**	**heatSel XL**
Dimensions	Ø 30 x 230 mm	185 x 185 x 32 mm	275 x 275 x 32 mm
Volume	0,21 l	0,38 l	1,1 l
Weight	Depends on PCM		
For storage tank size	50 - 1.000 l	500 - 2.000 l	1.500 - 20.000 l
Storage tank diameter	400 - 1.000 mm	600 - 1.200 mm	ab 1.200 mm
Quantity per 100 l storage volume	approx. 240 pcs	approx. 100 pcs	approx. 40 pcs
Installation	1½“ Sleeve	Flange DN 200	Flange DN 300
Max operating pressure	3 Bar		
Operating temperature	PCM data sheet		
Ambient medium	Heating water according to VDI 2035 Water – glycol mixtures		
Recommended flow rate	1x Speicherinhalt/h		
Pressure loss in the storage tank per m layer thickness	approx. 20-50 mbar	approx. 20-50 mbar	approx. 20-50 mbar
Expansion volume due to phase change	approx. 10 %	approx. 10 %	approx. 10 %
Factor for capacity increase to water (<=0°C compared to frost protection) at storage tank useful temperature of (varies depending on PCM)	10K ca. 2,8 – 5,3	10K ca. 2,5 - 4,9	10K ca. 2,8 – 5,2
	15K ca. 2,3 – 3,9	15K ca. 2,0 - 3,6	15K ca. 2,3 – 3,8
	30K ca. 1,5 - 2,4	30K ca. 1,5 - 2,4	30K ca. 1,5 - 2,4

3.1 Technical requirements for the buffer storage tank

Not all buffer tanks are suitable for the use of heatStixx, heatSel or heatSel XL. To make this possible, the following requirements must be met:

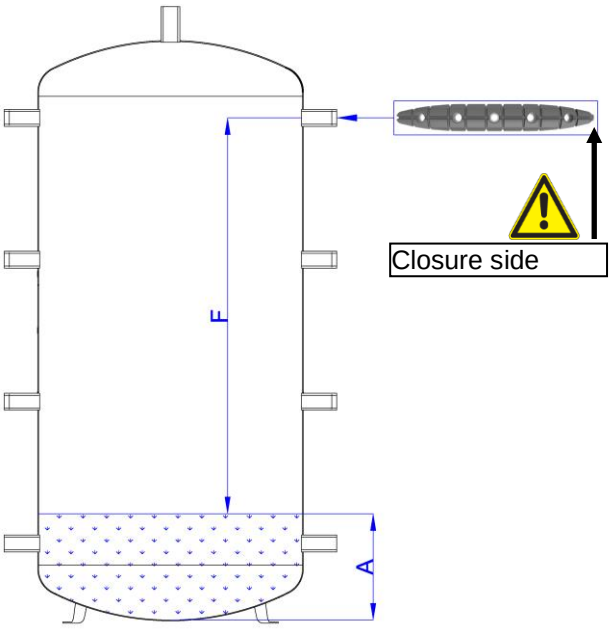
- Insertion:
  - heatStixx: socket 1 ½" without baffle plate must be present in the upper area of the storage tank.
  - heatSel: flange DN 200 must be present in the upper area
  - heatSel XL: flange DN 300 must be present in the upper area.

- Withdrawal:
  - heatStixx: flange DN 200 must be present in the lower area
  - heatSel: flange DN 200 must be present in the lower area
  - heatSel XL: flange DN 300 must be present in the lower area

- During filling, as well as during emptying of the accumulator, a high load on the capsules occurs as long as there is no water in the accumulator. In this case, special care must be taken to prevent damage.
- There must be no sharp edges inside the accumulator. In particular, flange collars and socket collars must be cut flush with the inside of the storage tank wall.
- There must not be any internal heat exchangers
- Latent capsules must not be used in direct contact with drinking water as a matter of principle. For drinking water heating with heatStixx, a system separation must be available (e.g. fresh water station)

4 Assembly – fitting

4.1 heatStixx fitting

<table>
<tr>
<td> 
</td>
<td>1. Fill the storage tank with medium up to the minimum filling level.
2. Insert heatStixx through the connections.
→Important: Always hold on to the closure side and insert the round side ahead.
3. Fill the required number of heatStixx into the storage tank.</td>
</tr>
<tr><td>A = Minimum fill height 50 cm</td><td></td></tr>
<tr><td>F = Max. fall height 1.5 m</td><td></td></tr>
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Attention!

Risk of damage

The latent storage capsules heatStixx, heatSel and heatSel XL must not come into direct contact with hot surfaces such as electric heating cartridges or solar heat exchangers.

→Protect from direct contact

→Maintain a minimum distance of 200 mm to hot surfaces.

Attention!

Danger of flow reduction

If the position in the storage tank is unfavourable, heatStixx can be flushed from the inside into the storage tank connection and thus block the required flow.

→Protect connections from heatStixx.

Note: When designing the expansion tank, take into account the increased expansion volume due to phase change.

5 Commissioning

5.1 Flushing and filling the system

1. Check all connections, including the cleaning flanges, for leaks.
2. Fill the storage tank according to VDI 2035, vent and rise to operating pressure.
3. Check the connections under pressure for leaks.
4. Check the entire system, including the components assembled in the manufacturing plant, for leaks.
5. Check correct seating of all screws, repair if necessary and tighten.
6. Check the function of the entire system

5.2 Control unit

Set the correct operating temperature on the controller. Observe the technical data.

- Set the desired storage tank temperature at the boiler control or at the heat source.
- Set the maximum storage tank temperature at the boiler control or at the heat source.
- On the control side, ensure that the latent storage capsules are protected against overheating.

Attention!

Danger from damage

The latent storage capsules heatStixx, heatSel and heatSel XL must not be overheated.

→ Operating temperatures must be taken into account during setting (see technical data).

5.3 Identification

Mark the type and quantity of latent storage capsules introduced with a clearly visible marking on the storage tank.

Mount the temperature monitoring display at the warmest point of the storage tank.

Each capsule is marked with a color code that provides information about the filled PCM:

1 x Red	ATS 58
1 x Orange	ATS 50
1 x Yellow	ATS 31
1 x Blue	ATP 16
1 x Brown	ATP 60
1 x turquoise	ATS -6
1 x Green	ATP 37
1 x Pink	ATS 70
1 x Purple	ATS -3
1 x White	ATS -10
2 x red	ATS 84
2 x Yellow	ATS -16
2 x Green	ATP 15
2 x Orange	ATS 11
2 x Pink	ATP 44
2 x blue	ATS 44

2 x turquoise	ATS 21
2 x Brown	ATS 115
2 x Purple	ATP 28
Black	ATS -10

5.4 Operator briefing

The operator must be informed in detail about the operation and functionality of the device.
Pay particular attention to safety-related details in the declaration, in particular that:

- An expert must be consulted if the safety temperature limiter responds repeatedly.
- The relief lines of the safety valves must always be open.
- The safety valves are to be checked from time to time by ventilating them.
- An annual maintenance of the system must be carried out
- The operating instructions must be kept in a visible place on the system.

6 Operation

✓ The operator has been instructed by a qualified technician.

6.1 Setting and monitoring the storage tank temperature

- Set the target storage tank temperature at the boiler control or at the heat source.

Attention!

Risk of damage

The latent storage capsules heatStixx, heatSel and heatSel XL must not be overheated.

→ Consider the operating temperatures for adjustment (see technical data).

Notes on the latent storage capsules:

It should be noted that you need a subcooling for the latent storage capsules. The subcooling describes the temperature difference between the melting temperature of the phase change material (PCM) and the temperature until the phase change is activated. If this is not kept, there will be no phase change.
The information on the material can be found on the data sheets.

6.2 Checking the system

- Vent the lines, check for leaks.
- Check temperatures for plausibility.
- Check operating pressures and pressure fluctuations.
- The maximum storage tank temperature (see technical data) must not be exceeded.

The operator of the system is responsible for proving compliance with the maximum storage tank temperature.
This can be fulfilled by attaching a temperature monitoring display such as a temperature recording label during commissioning.

7 Maintenance

In addition to the usual maintenance work on the system, the following points must be observed when using heatStixx, heatSEL and heatSEL XL:

Measure	Interval
Medium quality check: Take a water sample from the storage tank and send it to be examined: **pro KÜHLSOLE GmbH** Am Langen Graben 37 52353 Düren, Germany	1. Initially during commissioning 2. Follow-up test 3 months after commissioning 3. Follow-up test 12 months after commissioning Then 1x year
Check the settings for the storage tank temperature	1x year
Checking the actual storage tank temperatures at the warmest point of the storage tank.	1x year

8 Environmental protection and disposal

Environmental protection is a corporate principle. Product quality, economic efficiency and environmental protection are equally important goals for us. Laws and regulations on environmental protection are strictly observed. We use the best possible technology and materials, taking economic aspects into account, in order to protect the environment.

8.1 Packaging

All packaging materials used are environmentally friendly and recyclable.

8.2 Old products

Old heatStixx, heatSels or heatSels XL may contain recyclable materials that can be recycled. Therefore these products may be sent to the following address for disposal:

Axiotherm GmbH
Bahnhofstraße 31
07607 Eisenberg/Thuringia, Germany

kraftBoxx POWER TO HEAT SYSTEMS	**kraftBoxx GmbH** Riedweg 5 D-88326 Aulendorf www.kraftboxx.de
AXIOTHERM® INSIDE	**Axiotherm GmbH** Bahnhofstraße 31 D-07607 Eisenberg/Thüringen www.axiotherm.de