

# Operation and Installation Manual



## INDIRECT WATER HEATERS

**OKC 1500 NTR/1 MPa**  
**OKC 2000 NTR/1 MPa**

**OKC 1500 NTRR/1 MPa**  
**OKC 2000 NTRR/1 MPa**

**Družstevní závody Dražice – strojírna s.r.o.**  
**(Works Cooperative - Dražice – Machine Plant, Ltd.)**

**Dražice 69**

**29471 Benátky nad Jizerou**

**Tel.: 326 370911, fax: 326 370980**

**[www.dzd.cz](http://www.dzd.cz)**

**[dzd@dzd.cz](mailto:dzd@dzd.cz)**

## Read carefully the below instructions prior to the installation of the heater!

### Dear Customer,

The Works Cooperative of Dražice – Machine Plant, Ltd., would like to thank you for your decision to use a product of our brand.

**The manufacturer reserves the right for engineering modification of the product.**

**The product is designed for permanent contact with drinkable water.**



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### Environment Type:

It is recommended to use the product in indoor environment with air temperatures from +2°C to 45°C and relative humidity up to 80%.

## 1. USE

Indirect stationary heaters lines NTR and NTRR are used for water heating in conjunction with another source of heating water, most often a gas boiler. The NTRR types combine two sources of heating water (gas boiler + a solar system, or a heat pump). Their nominal performance provides sufficient amount of hot water for large flat units, premises, restaurants, and similar establishments. **In case of increased hot water consumption, these tanks heat water continuously, operating similarly to flow heaters.**

## 2. PRODUCT DESCRIPTION

The heater tank is welded from a steel sheet; it is entirely coated with hot water resistant enamel. One or two spiral steel pipe exchangers, enamelled on the outside, are welded on inside the tank, as well as hot and cold water and circulation pipes and a thermowell. **The pipe heat exchanger is only intended for the heating circuit.**

On the heater side, there is a cleaning and revision opening ending with a 178 mm flange; the clearance including 12 M12 bolts is 210 mm. Using a 150/210 reduction flange, heating units of various performances, with a thermostat and a safety fuse may be mounted into the opening. The NTR and NTRR series heaters are equipped with a G 1/2" opening for mounting an additional heating element. Such version is used when the heater is connected to either a solar system or a system with a heat pump, to heat water in the upper part of the heater to the temperature required. The insulation of

the heater consists of a 100 mm polyurethane foam without CFCs content. The tank shell is made of painted steel sheet; connecting parts are metal-coated.

### 3. IMPORTANT NOTICES

- **Without a confirmation of both electric installation and assembly being performed by an authorised company, the warranty certificate is invalid.**
- Check and exchange the Mg anode regularly.
- **No stop valves can be put between the heater and the safety valve.**
- All hot water outputs must have a combination faucet.
- Before filling the heater with water for the first time, it is recommended to fasten the flange connection nuts of the tank.
- It is not allowed to handle the thermostat, aside from temperature resetting with a control button.
- All electric installation handling, setting, and regulation feature exchange, may only be implemented by a service company.
- **The thermal fuse must not be turned off!** In case of thermostat defect, the thermal fuse interrupts electric power input to the heating element if the water temperature in the heater exceeds 90 °C.
- As an exception, the thermal fuse may also switch off due to water overheating caused by overheating the hot water heating system boiler (in case of a combined heater).
- **We recommend you operate the heater with one type of energy.** In case a solar system is connected to the bottom exchanger, it is necessary to connect a TJ 6/4" line element in the coupling above the heater for potential additional heating.
- Prior to commissioning, you must run the heating circuit and any impurities that are trapped in the filter clean, then the system is fully operational.

### 4. PUTTING THE HEATER INTO OPERATION

After connecting a heater to the water main, the hot water heating system, the electric network, and after testing its safety valve (based on the valve manual attached), the heater may be put into operation.

#### Procedure:

- a) Check both water and electric installation; for combined heaters, check the installation to a hot water heating system. Check proper placement of operating and safety thermostat sensors. The sensors must be inserted all the way in; first the thermostat and then the safety fuse.
- b) open the hot water valve on the combination faucet;
- c) open the cold water inlet valve to the heater;
- d) when the water starts flowing through the hot water valve, the filling of the heater is finished and the valve needs to be closed;
- e) if there is a leakage in the flange lid, we recommend fastening the flange lid bolts;
- f) fasten the electric installation cover;
- g) when heating service water heating by electric energy, turn on the electricity (for combined heaters, the heating water inlet to the heating insert must be closed);
- h) when heating service water with electric energy from the hot water heating system, turn the electricity off and open the valves of heating water input and output, possibly de-aerate the exchanger. When commencing operation, flush the heater until the cloudiness in the water is gone.

## 5. TECHNICAL DATA

1

| Type   | OKC 1500 NTR/1Mpa  | OKC 2000 NTR/1MPa  |
|--|--------------------|--------------------|
|  | OKC 1500 NTRR/1Mpa | OKC 2000 NTRR/1MPa |
| Tank capacity (l)  | 1500               | 2000               |
| Weight (kg)  | 360                | 420                |
| Heater diameter (mm)   | 1100               | 1200               |
| Operating hot water pressure (MPa)   | 1                  | 1                  |
| Operating heating water pressure (MPa)                                     | 1                  | 1                  |
| Max. heating water temperature (°C)  | 110                | 110                |
| Max. hot water temperature (°C)  | 95                 | 95                 |
| Heating surface of the bottom/top exchanger (m <sup>2</sup> )              | 3,5 / 1,75         | 4 / 2,0            |
| Bottom/top exchanger performance for temperature drop 80/60 °C (kW)        | 38,9 / 26,4        | 71,5 / 41,9        |
| Hot water <sup>1</sup> permanent performance – bottom/top exchanger (l/hr) | 670 / 454          | 761 / 503          |
| Heating time by bottom/top exchanger for temperature drop 80/60 °C (min)   | 128 / 94           | 155 / 108          |
| Bottom/top exchanger performance number based on DIN 4708 (NL)             | 43                 | 54                 |
| Heat losses  |                    |                    |

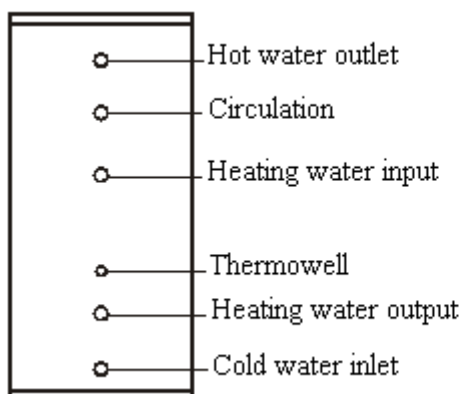
\*HSW (TUV) - Hot service water 45°C

## 6. CONNECTING A HEATER TO A HOT WATER DISTRIBUTION

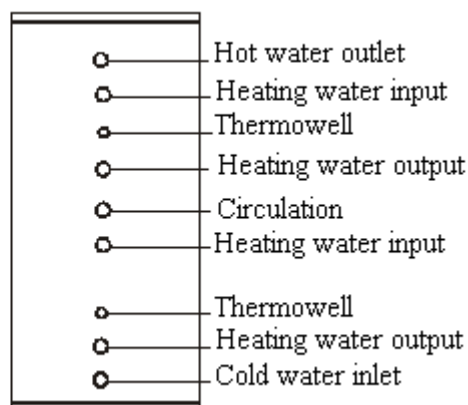
Implement the connection in accordance with scheme on page 6.

### Scheme of Heater's Water Inputs and Outputs

OKC 1500 NTR/1 MPa  
OKC 2000 NTR/1 MPa



OKC 1500 NTRR/1 MPa  
OKC 2000 NTRR/1 MPa



The heater's cold water inlet must be fitted with a T-fitting with a discharge valve for any discharge of water from the heater (see Section No.11).

On the hot water inlet, each individually closable heater must have a test cock, backflow valve, safety valve, and a manometer.

## 7. SECURITY EQUIPMENT

Each hot service water pressure heater must have a safety valve with a backflow flap. Nominal clearance of safety valves is defined in the ČSN 06 0830 standard. The 300 l heaters are not equipped with a safety valve. The safety valve must be easily accessible, as close to the heater as possible. The inlet pipes must have at least the same clearance as the safety valve. The safety valve is placed high enough to secure dripping water drain by gravity. We recommend mounting the safety valve onto the branch led above the heater. This allows easier exchange without having to drain the water from the heater. Safety valves with fixed pressure settings from the manufacturer are used for the assembly. Starting pressure of a safety valve must be identical to the maximum allowed heater pressure, and at least 20 % higher than the maximum pressure in the water main. If the water main pressure exceeds such value, a reduction valve must be added to the system. No stop valves can be put between the heater and the safety valve. During the assembly, follow the guide provided by the safety equipment manufacturer. Before putting the safety valve into operation it always needs to be checked by manual removal of the membrane from the valve seat and turning the make-and-break device button always in the direction of the arrow. After being turned, the button must click back into a notch. Proper function of the make-and-break device results in water draining through the safety valve outlet pipe. In common operation, such a check needs to be implemented at least once a month, and after each heater shutdown for more than 5 days. Water can drip from the safety valve through the drain pipe; the pipe must be freely open to the atmosphere, placed vertically and shall be in an environment free of temperatures below freezing.

When draining the heater, use a recommended drain valve. First, close water input into the heater.

Find necessary pressure values in the following table.

For proper safety valve operation, a backflow valve must be mounted on the inlet pipes, preventing spontaneous heater draining and hot water penetrating back into the water main.

| Safety valve starting pressure (MPa) | Admissible operating water heater pressure (MPa) | Max. pressure in the cold water pipe (MPa) |
|--------------------------------------|--|--|
| 0.6                                  | 0.6  | up to 0.48                                 |
| 0.7                                  | 0.7  | up to 0.56                                 |
| 1                                    | 1  | up to 0.8                                  |

**When assembling the security equipment, follow ČSN 06 0830.**

## 8. SPARE PARTS

- **Thermometer;**

**When ordering spare parts, give part name, type, and type number from the heater label.**

## 9. HEATER CLEANING AND ANODE ROD EXCHANGE

Repetitive water heating causes limestone sediment on both the enamelled tank walls and chiefly the flange lid. The sedimentation depends on the hardness of water heated, its temperature, and amount of hot water consumed.

**After two years of operation, it is recommended to check, and possibly clean, the tank of limestone, as well as to check, and possibly exchange, the anode rod.** The anode life is theoretically calculated for two years of operation; however, it changes with water hardness and chemical composition in the place of use. Based on such an inspection, the next term of anode rod exchange may be determined. Have the company in charge of service affairs clean and exchange the anode. When draining water from the heater, the combination faucet valve for hot water must be open, preventing occurrence of under-pressure in the heater tank which would stop the water from draining.

## 10. INSTALLATION REGULATIONS

Regulations and instructions that must be obeyed during heater assembly:

### a) to the heating system

ČSN 06 0310 – Thermal systems in buildings – Designing and Installation

ČSN 06 0830 – Thermal systems in buildings – Protecting devices

### b) to the electrical network

ČSN 33 2180 - Connecting of electric devices and appliances

ČSN 33 2000-4-41 - Low voltage electric installations Protective measures to ensure safety – Protection against electric shock

ČSN 33 2000-7-701 - Low voltage electric installations Single-purpose devices and devices in special premises - Premises with tub or shower to hot service water heating system

### c) to the hot water heating system

ČSN 06 0320 - Thermal systems in buildings - Hot water preparation – Design and Project Engineering

ČSN 06 0830 – Thermal systems in buildings – Protecting devices

ČSN 73 6660 – Internal water mains

ČSN 07 7401 - Water and steam for thermal energy equipments with working steam pressure up to 8 MPa

ČSN 06 1010 - Tank water heaters with water and steam heating; and combined with electric heating  
Technical requirements. Testing.

ČSN 75 5455 – Calculation of water installations inside buildings

ČSN EN 12897 – Water supply – Indirectly heated closed tank-type water heaters

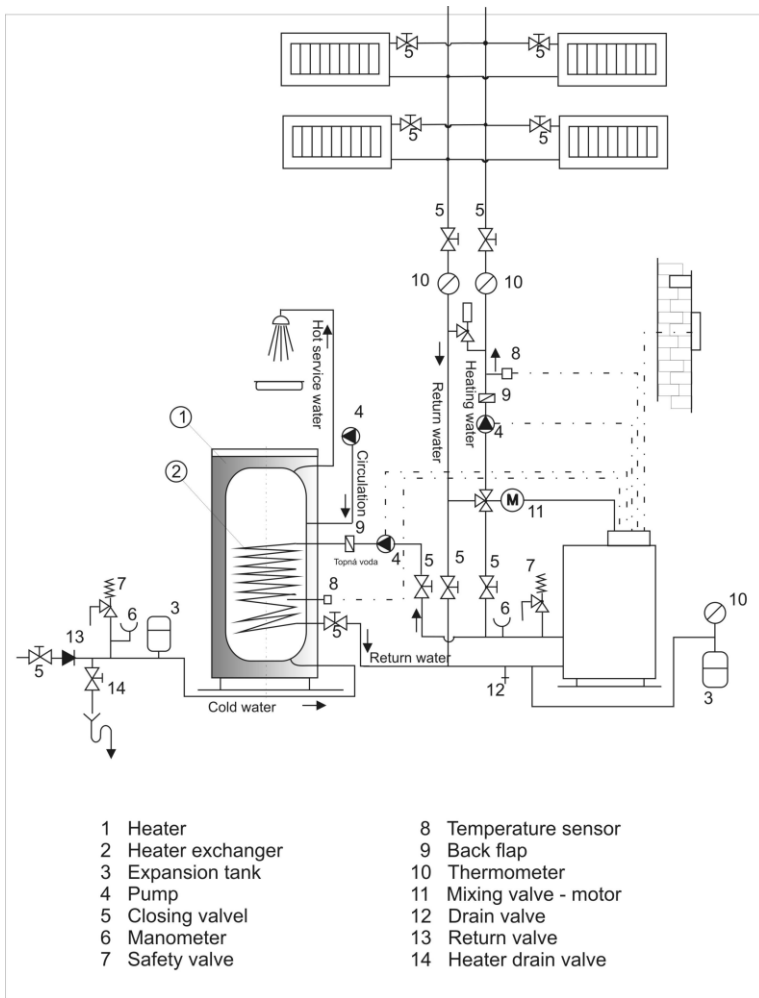
Both electric and water installation must follow and meet requirements and regulations relevant in the country of use.

**Notice:** To prevent the occurrence of bacteria (e.g. Legionella pneumophila) within stack heating it is recommended, if absolutely necessary, to increase the temperature of hot service water (HSW) periodically for a transitional period of time to at least 70°C. It is also possible to make use of another way of disinfecting HSW.

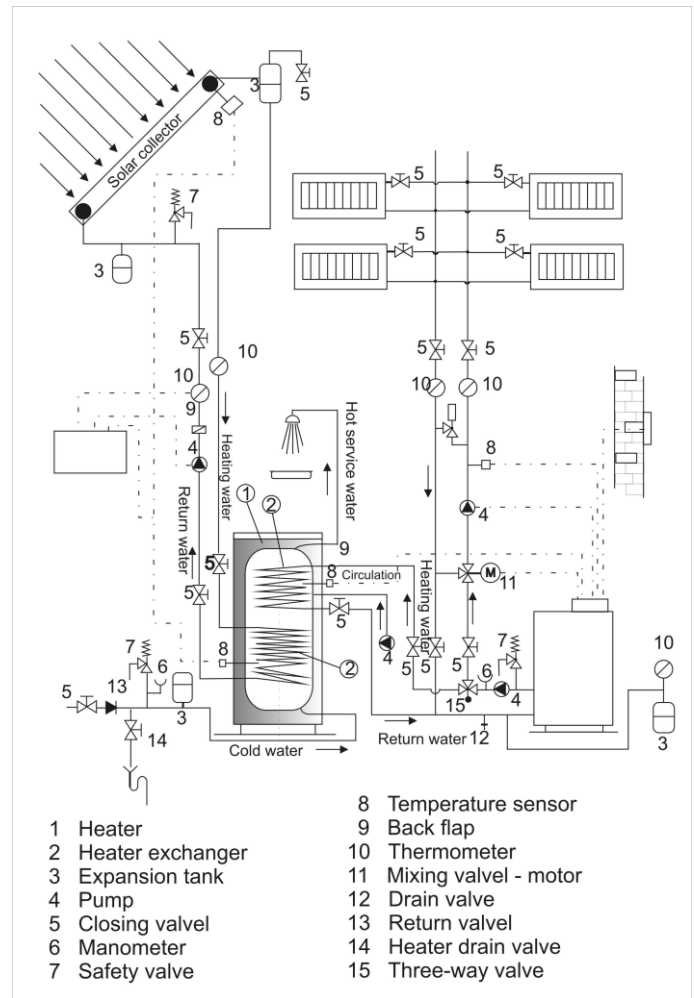
## 11. CONNECTING A HEATER TO A HEATING SYSTEM

The heater is placed on the ground, next to the heating source, or in its vicinity. The heating circuit is connected to marked inputs and outputs of the heater exchanger; the deaerating valve is mounted in the highest place. It is necessary to install a filter into the circuit in order to protect the pumps, the three-way valve, and backflow flaps, and the exchanger from sedimentation. It is recommended to flush the heating circuit before the assembly. All wiring connections must be properly insulated from heat. If the system will work with priority heating of hot water using a three-way valve, always follow the installation instructions of the three-way valve's manufacturer.

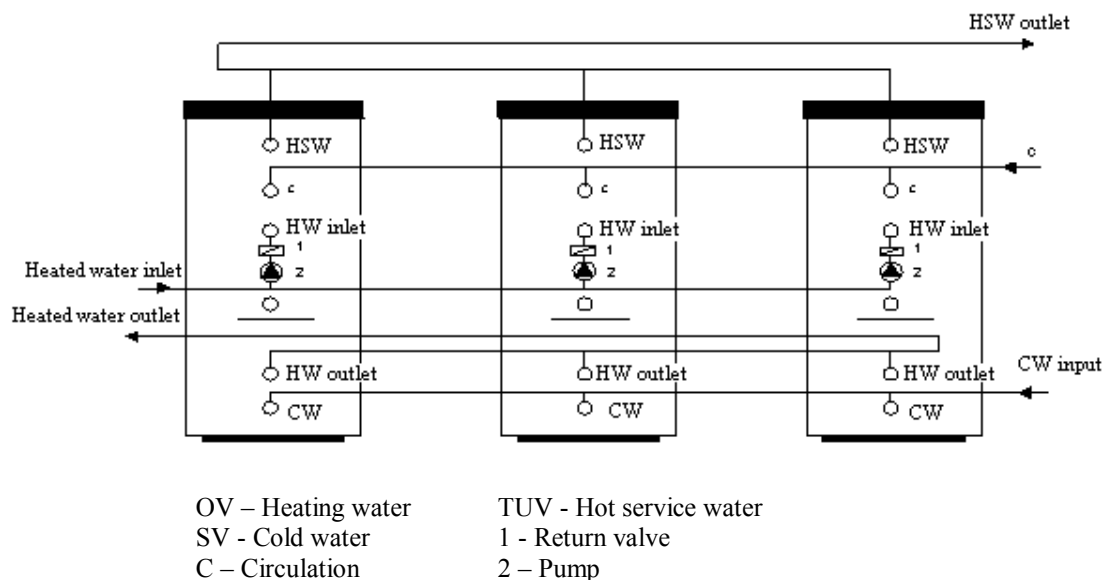
OKC 1500-2000 NTR  
heated by a gas boiler with two pumps



OKC 1500-2000 NTRR  
heated by a gas boiler and solar collectors  
controlled by a three-way valve



An example of a group heater connection for steady hot water consumption from all tanks using Tichelmann's method



## 12. PERFORMANCE DATA

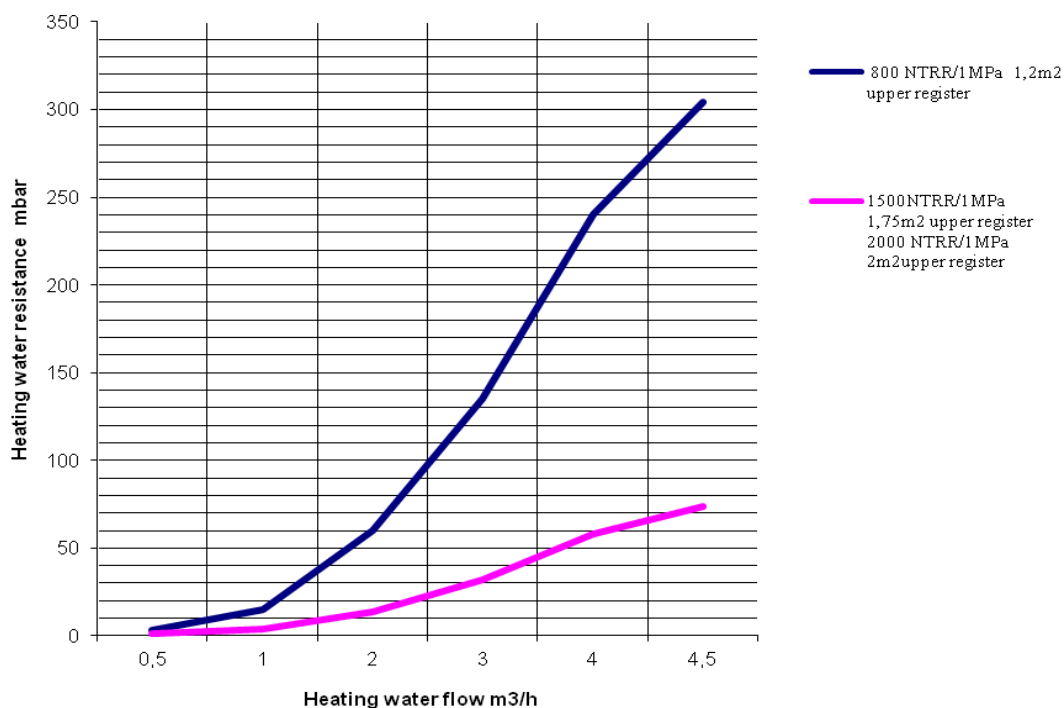
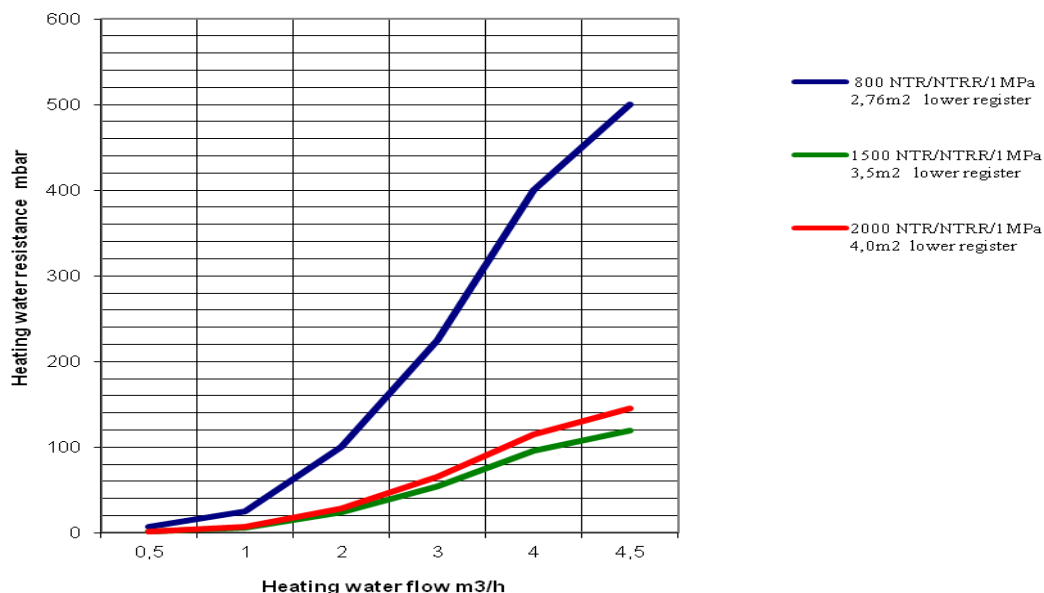
| Exchanger performance the for flow of                              | 500 l/hr | 1,000 l/hr | 3,000 l/hr | 4,500 l/hr |
|--|----------|------------|------------|------------|
| <b>800 NTR/NTRR – bottom exchanger surface 2.76 m<sup>2</sup></b>  |          |            |            |            |
| Heating time by exchanger for temperature drop 80/60°C (min)       | 136      | 94         | 66         | 61         |
| Performance for temperature drop 80/60°C (kW)                      | 20,2     | 29,9       | 41,8       | 45         |
| Permanent performance (l/hr)                                       | 348      | 515        | 720        | 775        |
| <b>800 NTRR – top exchanger surface 1.2 m<sup>2</sup></b>          |          |            |            |            |
| Heating time by exchanger for temperature drop 80/60°C (min)       | 81       | 60         | 46         | 42         |
| Performance for temperature drop 80/60°C (kW)                      | 14,4     | 19,2       | 24,6       | 26         |
| Permanent performance (l/hr)                                       | 248      | 330        | 423        | 447        |
| <b>1500 NTR/NTRR – bottom exchanger surface 3.5 m<sup>2</sup></b>  |          |            |            |            |
| Heating time by exchanger for temperature drop 80/60°C (min)       | 213      | 128        | 71         | 60         |
| Performance for temperature drop 80/60°C (kW)                      | 25,2     | 38,9       | 64,4       | 74,2       |
| Permanent performance (l/hr)                                       | 435      | 670        | 1109       | 1276       |
| <b>1500 NTRR – top exchanger surface 1.75 m<sup>2</sup></b>        |          |            |            |            |
| Heating time by exchanger for temperature drop 80/60°C (min)       | 137      | 94         | 63         | 56         |
| Performance for temperature drop 80/60°C (kW)                      | 19,4     | 26,4       | 37,2       | 40,9       |
| Permanent performance (l/hr)                                       | 334      | 454        | 640        | 704        |
| <b>2000 NTR/NTRR – bottom exchanger surface 4.00 m<sup>2</sup></b> |          |            |            |            |
| Heating time by exchanger for temperature drop 80/60°C (min)       | 262      | 155        | 86         | 73         |
| Performance for temperature drop 80/60°C (kW)                      | 28,9     | 44,2       | 71,5       | 81,4       |
| Permanent performance (l/hr)                                       | 498      | 761        | 1230       | 1400       |
| <b>2000 NTRR – top exchanger surface 2.00 m<sup>2</sup></b>        |          |            |            |            |
| Heating time by exchanger for temperature drop 80/60°C (min)       | 160      | 108        | 70         | 63         |
| Performance for temperature drop 80/60°C (kW)                      | 21,2     | 29,2       | 41,9       | 46,3       |
| Permanent performance (l/hr)                                       | 364      | 503        | 721        | 797        |

### NL Power Factor

Based on DIN, the expression of a normal flat is introduced for apartment houses in the FRG. Such a flat has four rooms; it is occupied by 3.5 people; it has a bathtub, a hand basin, and a sink. Flats of other sizes, number of occupants and different equipment are converted to normal flats using the relations given in the standard (NL). The situation in our apartment houses, massively built until the recent past, is similar. Flats intended for 3 to 4 people are equipped identically with normal German flats. Smaller flats tend to have smaller bathtub or a shower; larger, so-called two-generation flats tend to have an extra hand basin. Apartment buildings with luxury flats and high standard equipment, with higher number of fittings, of fittings equipped with high standard drain armatures, both hot water and heat energy needs must be adjusted.



## 13. PRESSURE LOSSES



### Disposal of packaging material and functionless product

A service fee for providing return and recovery of packaging material has been paid for the packaging in which the water heater was delivered.

The service fee was paid pursuant to Act No. 477/2001 Coll., as amended, at EKO-KOM a.s. The client number of the company is F06020274. Take the water boiler packages to a waste disposal place determined by the town. When the operation terminates, disassemble and transport the discarded and unserviceable heater to a waste recycling centre (collecting yard), or contact the manufacturer.



# 14. ASSEMBLY GUIDE FOR ZIP-FASTENER INSULATION (Only concerns heaters with the capacity of 800 and 2000 litres)

Two people are enough to implement the assembly; three people are required for larger boilers; the assembly must be implemented in areas with the temperature of at least 18°C.

If the insulation includes tank bottom insulation, the latter must be mounted first. Consequently, the insulation is inserted around the boiler; pre-pressed insulation openings must be respected. Pull gently in the direction of the arrows to put the two insulation sides together so that (see Fig. 1) the openings in the insulation fit the boiler inlets and outlets. It must be secured that both halves of the closure are not further than 20 mm apart before closing (see fig. 2). No foam shall get into the zip-fastener on closing.

After the insulation coat is properly mounted and the closure closed, insert the top lid made of foam material and cover it with either a foil cover or a plastic lid. It is also possible to glue the outlet caps to connection places (see fig. 3).

The insulation may only be stored in dry storage places.

We take no responsibility for damages caused by not respecting this guide.

Fig. 1

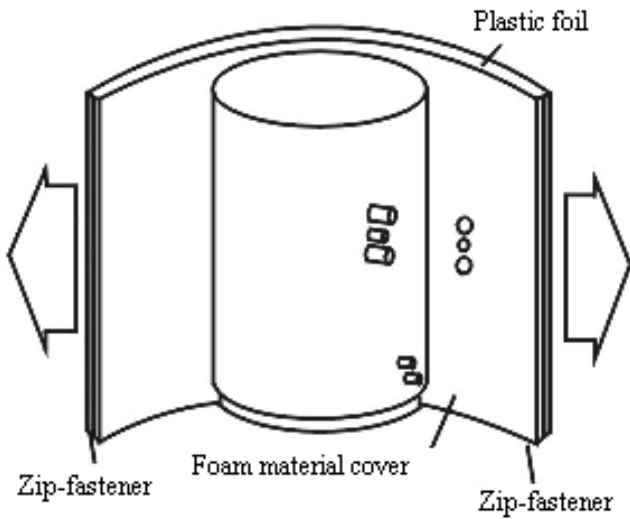


Fig. 2

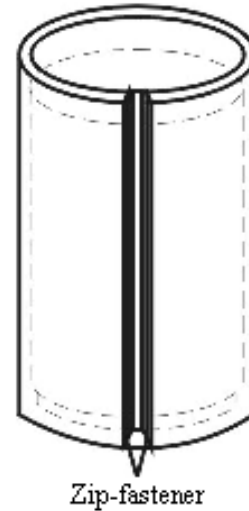
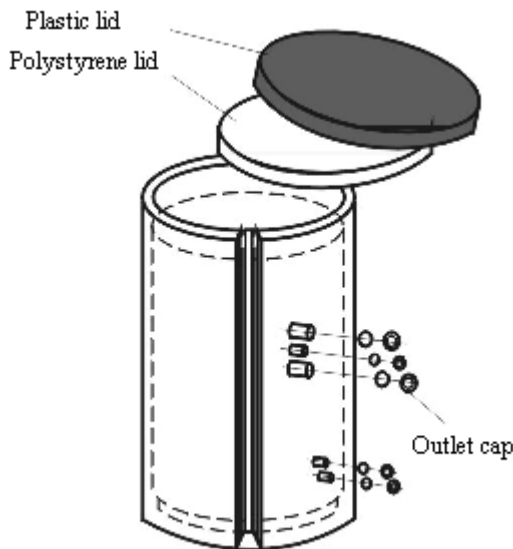


Fig. 3

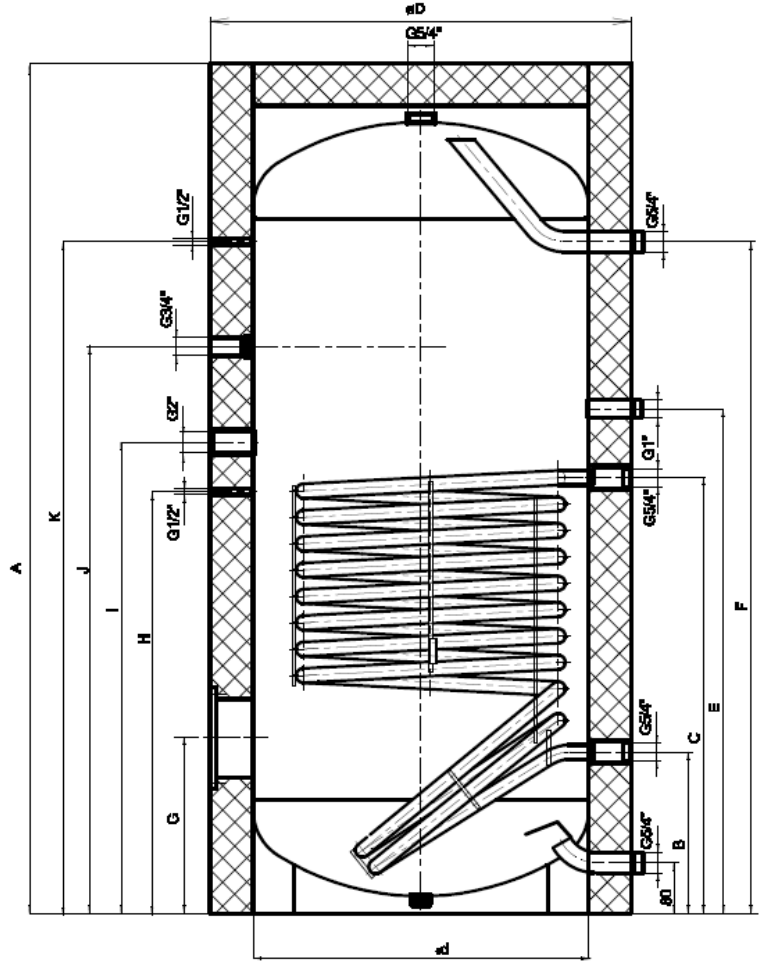


## 15. CONSTRUCTION HEATER PARAMETERS

OKC 1500 NTR/1 MPa

OKC 2000 NTR/1 MPa

|   | OKC 1500<br>NTR/1MPa | OKC 2000<br>NTR/1MPa |
|---|----------------------|----------------------|
| A | 2240                 | 2500                 |
| B | 442                  | 452                  |
| C | 1117                 | 1152                 |
| D | 1100                 | 1200                 |
| d | 1000                 | 1100                 |
| E | 1217                 | 1252                 |
| F | 1825                 | 1997                 |
| G | 437                  | 447                  |
| H | 1167                 | 1202                 |
| I | 1354                 | 1472                 |
| J | 1494                 | 1612                 |
| K | 1825                 | 1997                 |



OKC 1500 NTRR/1 MPa

OKC 2000 NTRR/1 MPa

|   | OKC 1500<br>NTRR/1 MPa | OKC 2000<br>NTRR/1 MPa |
|---|------------------------|------------------------|
| A | 2240                   | 2430                   |
| B | 442                    | 452                    |
| C | 1067                   | 1090                   |
| D | 1200                   | 1300                   |
| d | 1000                   | 1100                   |
| E | 1217                   | 1252                   |
| F | 1342                   | 1393                   |
| G | 1722                   | 1713                   |
| H | 1825                   | 1997                   |
| I | 437                    | 447                    |
| J | 1167                   | 1202                   |
| K | 1354                   | 1472                   |
| L | 1494                   | 1612                   |
| M | 1825                   | 1997                   |

