

# Operating and service instructions

for contractors

# VIESSMANN

**Vitomax 200-HW**

**Type M74A**

Oil/gas high pressure hot water boiler

Rated heating output 8.0 to 16.5 MW



## VITOMAX 200-HW



## Safety instructions



Please follow these safety instructions closely to prevent accidents and material losses.

### Safety instructions explained



#### **Danger**

This symbol warns against the risk of injury.



#### **Please note**

This symbol warns against the risk of material losses and environmental pollution.

### Note

Details identified by the word "Note" contain additional information.

### Target group

These instructions are exclusively designed for qualified contractors.

- Work on gas installations must only be carried out by a registered gas fitter.
- Work on electrical equipment must only be carried out by a qualified electrician.
- The system must be commissioned by Viessmann Industrieservice, the system installer or a qualified person authorised by the installer.

### Regulations

Observe the following when working on this system

- All legal instructions regarding the prevention of accidents
- All legal instructions regarding environmental protection
- Health and Safety at Work Act (BetrSichV) [Germany]

- The Code of Practice of relevant trade associations
- Directive 97/23/EC, as well as the relevant safety regulations of the following countries
  - Ⓓ DVGW, TRGI, TRF and VDE, TRD
  - Ⓐ KG, ABV, LRG-K, LRV-K, DKBG
  - ⒸⒽ SEV, SUVA, SVGW, SVTI, SWKI, VKF and EKAS Directive 1942: LPG, part 2

### If you notice oil leaks and the smell of gas



#### **Danger**

Escaping fuel can lead to explosions which may result in very serious injuries.

- Do not smoke. Prevent naked flames and sparks. Do not press any switches for lights or electrical appliances.
- Close the quick-acting fuel valve and shut-off valve.
- Open windows and doors.
- Remove all people from the danger zone.
- Notify your gas or electricity supply utility from outside the building.
- Shut off the electricity supply to the building from a safe place (outside the building).

## Safety instructions (cont.)

### If you smell flue gas



#### Danger

- Flue gas can lead to life-threatening poisoning.
- Shut down system.
  - Ventilate boiler room.

### Working on the system

- Close the fuel shut-off valve and secure against unintentional opening.
- Isolate the system from the power supply and check that it is no longer 'live', e.g. by removing the separate fuse or by means of a main isolator.
- Safeguard the system against unauthorised reconnection.



#### Please note

- Electronic assemblies can be damaged by electrostatic discharges.
- Before beginning work, touch earthed objects, such as water pipes, to discharge static loads.



#### Danger

- Risk of burning from hot surfaces so that
- steam line,
  - hot water line,
  - cleaning cover and closures/plugs at the boiler system,
  - boiler doors, as well as components behind the doors,
- can all become very hot. Observe safety in the workplace!

### Repair work



#### Please note

- Repairing components that fulfil a safety function can compromise the safe operation of your system.
- Replace faulty components only with original Viessmann spare parts.

### Auxiliary components, spare and wearing parts



#### Please note

- Spare and wearing parts that have not been tested together with the heating system can compromise its function. Installing non-authorised components and making non-approved modifications or conversions can compromise safety and may invalidate our warranty.
- For replacements, use only original spare parts supplied or approved by Viessmann.

### Draining hot water



#### Please note

- The blow-down and T.D.S. water from boiler systems can reach temperatures of up to and over 100 °C.
- Set up the system in such a way that this water is cooled to a temperature of < 35 °C before being channelled into the drainage system. If necessary, consult the local water board.

## Safety instructions (cont.)

### Draining condensate from the flue gas side



#### Please note

When starting up the boiler system, or under certain operating conditions, condensate may build up in the flue passes, the flue gas collector and the downstream flues, including the chimney. The system user must provide suitable installations to safely drain such condensate.

Subject to the regulations in the country concerned, this condensate may need to be neutralised. In such cases, consult the local water board or the relevant authorities in the country of installation.

## Technical safety information

### Any damage to the boiler that could lead to risks requires an immediate boiler shutdown.

If the boiler or any vessels suffer large-scale damage, notify the installation/service company immediately before carrying out any repairs.

Observe all technical safety instructions.

In the case of damage, nothing should be altered before an inspection takes place unless it is to prevent further damage or to rescue somebody.

The boiler house must only be entered by authorised personnel. Always keep the boiler house clean, well lit and free from all objects that do not belong there and that might impair the operation. The use of any part of the system as a drying area is prohibited.

During operation, all required exits must be left unlocked and free from obstructions. The operating personnel must log all events, such as faults, adjustments, consumption of spare parts and repairs. A log must be maintained of all regular readings of the control instruments. Obvious signs at weld seams, leaking damaged areas, severe corrosion, unusual characteristics of operating instruments and system components as well as unusual noise inside the boiler must be notified immediately. Faults and defects on the system that cannot be remedied by experts locally must be notified to the manufacturer. Protect all boiler parts and control equipment from rain, water leaks and expelled steam. Any damage or leaks that occur should be repaired without delay. Apart from the relevant legal requirements, all practical instructions issued by our technical personnel to the operating personnel are applicable.

**Technical safety information** (cont.)

It is impossible to clarify and describe all potential cases of indicators and possible faults. After the system has been operated for a certain time, the regulations specified should therefore be supplemented in the light of experience gained.

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## Information on operating with temperatures up to 100 °C

Only fill and operate boilers and heating systems with water compliant with the water quality requirements (see chapter "Water quality requirements").

The system must be commissioned by the Viessmann Industrieservice, Berlin, the system installer or a qualified person authorised by the installer as well as the relevant expert.

Record all actual values in a test report. These must be confirmed by the installer, the relevant expert and the system user.

Within 4 weeks of the combustion equipment being commissioned, the operator must notify the local flue gas inspector accordingly [check local regulations].

We would recommend that you operate the boiler constantly at the required operating pressure and at a boiler water temperature of 70 °C. Even if no heat is drawn off for a longer period of time, it is still better to operate the boiler continuously.

In systems comprising several boilers, of which one is constantly used as a standby boiler, only change operation over from one to another after longer intervals, e.g. during the annual inspection of the entire system.



Operating instructions on preserving the water and hot gas sides

## Information on operating with temperatures in excess of 100 °C

According to the Pressure Equipment Directive 97/23/EC, a boiler system to category IV may only be taken into use once the relevant authority has granted permission for the installation of the system, and the relevant expert has tested the system.

The system must be commissioned by the Viessmann Industrieservice, Berlin, the system installer or a qualified person authorised by the installer as well as the relevant expert.

Record all actual values in a test report. These must be confirmed by the installer, the relevant expert and the system user.

According to the Pressure Equipment Directive 97/23/EC, hot water boilers to category IV may only be operated, supervised and maintained by a trained boilerman.

The relevant authority may grant, upon application, permission to operate the boiler without constant supervision, subject to it being equipped in accordance with EN 12953 part 6.

In systems comprising several boilers, of which one is constantly used as a standby boiler, only change operation over from one to another after longer intervals, e.g. during the annual inspection of the entire system.

We would recommend that you operate the boiler constantly at the required operating pressure and temperature.

Even if no heat is drawn off for a longer period of time, it is still better to operate the boiler continuously.

## Information on operating with temperatures in... (cont.)

### Operating checks



#### Danger

Boiler components that are not thermally insulated can be subject to high temperatures that can cause burns.

Take care with hot surfaces.

Subject to the safety equipment fitted and the details in the approval certificate, either monitor the correct boiler operation constantly, every 24 hours or every 72 hours.

Determine the extent of checks required in accordance with TRD 601, sh. 1, section 7 [or local regulations]. Test the chemical composition of the boiler water and feedwater constantly in accordance with EN 12953 part 10 and VdTÜV data-sheet 1466 [or local regulations].

Carry out the following checks **daily** or every 72 hours, subject to boiler version and the manufacturer's specification (see also TRD 601, sh. 1):

- Blow-down the boiler (only for boilers without automatic facility; briefly open the valve two or three times at operating pressure).
- Check the water level limiter.
- Check the feedwater and boiler water.

Carry out the following checks

#### monthly:

- Check the function of the safety valve.
- Check the function of all control and safety equipment.
- Check all connections and fittings for tightness.
- Check the installation room ventilation.

Have someone carry out the following checks **every six months** (in accordance with TRD 602 and 604):

- Check the safety equipment.
- Check the burner.
- Check the thermal insulation on the hot gas side, i.e. on covers and doors.

Record the results of the daily, monthly and bi-annual checks in a log.

### Shutdown

To prevent corrosion setting in, during idle periods when the boiler is not pressurised, preserve the boiler surfaces on the flue gas and water sides, subject to the length of the period during which the boiler is taken out of use. There is a differentiation between wet preservation (during which exposure to oxygen is to be avoided) and dry preservation (during which moisture levels are to be minimised).



## Shutdown (cont.)

### Brief operational interruption (1 to 2 days)

#### Water side

Recommendation: Maintain the boiler pressure and temperature. If this is not possible and the boiler needs to be depressurised for several days, we recommend the following:

To prevent oxygen corrosion, approx. one hour before shutting the boiler down, add 2 to 3 times more oxygen binder than usual to the feedwater until the boiler is shut down.

#### Flue gas side

Keep the heating surfaces dry. Remove severe contamination as it binds moisture.

### Longer interruptions of operation

#### Water side

#### Wet preservation if no risk of frost\*<sup>1</sup> exists

1. Fill the boiler up to the highest possible level with treated feedwater. To prevent oxygen corrosion, add an oxygen binder to the boiler water (e.g. sodium sulphite) in accordance with the manufacturer's instructions. Test the oxygen binder concentration at least monthly and top up if required. For this, ensure a good admixing with the boiler water (thermal or mechanical agitation).
2. In multi boiler systems if only some boilers must be preserved, these can be filled with desalinated boiler water from the boilers that remain in use. This will also maintain the temperature.
3. Maintaining pressure in a fully filled boiler using nitrogen (preferably nitrogen 5.0) of 0.1 to 0.2 bar can prevent corrosion.

#### Dry preservation if there is a risk of frost\*<sup>1</sup> or prolonged idle period

Drain the boiler at 90 °C and then open the water connections.

Dry the boiler thoroughly and fill with dessicant (e.g. silica gel) in accordance with the manufacturer's details.

Ensure that the dessicant does not come into contact with the boiler material. Then close the boiler again. Check in regular intervals whether the dessicant is still able to absorb moisture.

\*<sup>1</sup> See chapter "Using antifreeze in boilers"

## Shutdown (cont.)

### Flue gas side

Thoroughly clean and dry the surfaces on the flue gas side.

Maintain the alkaline balance of the wash water (pH 8-9, in the case of ammonia pH 10).

After thoroughly drying the surfaces, preserve them with a thin film of graphite or varnish.

Keep the surfaces dry during the idle periods (by adding a desiccant such as silica gel or by air circulation via a connected dryer).

### Further details

For further details, see the operating instructions for preservation on the water and hot gas side or the VdTÜV data-sheets (no. 1465, Oct. 1978) and the VGB (no. R116H, 1981) [or local regulations].

## Maintenance instructions

We recommend having the boiler system serviced regularly to ensure fault-free, efficient and environmentally responsible operation.

The boiler should be cleaned regularly to prevent the flue gas temperature rising with increasing contamination, which leads to higher energy consumption.

We recommend the installation of a flue gas thermometer. Monitoring the flue gas temperature highlights incorrect burner adjustment and the level of boiler contamination.

Excessive flue gas temperatures through contamination or altered burner adjustment reduce efficiency. Where necessary, clean the boiler or adjust the burner settings.



**Steps - commissioning, inspection and...** (cont.)

	Page
Commissioning steps	
Inspection steps	
Maintenance steps	
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## Further details regarding the individual steps

### Commissioning the system



Details provided by the burner manufacturer and regarding accessories

1. Open the boiler doors and check that the turbulators (if installed) are fully inserted into the hot gas flues.
2. Check that the installation room ventilation is unobstructed.
3. Fill the heating system with water and vent the system.
9. Check that the dewatering line (if installed) is correctly connected to the condensate drain. The condensate drain must be closed when not in use.
10. Open the shut-off valves in the oil lines (at the oil tank and filter) or the gas shut-off valve.
11. Switch ON the mains isolator, the switch for the equipment required for the boiler system and burner ON/OFF switch in this order.



#### Please note

Unsuitable water quality can damage the boiler body. Fill and operate the heating system with water compliant with the "Water quality requirements" from page 24.



Burner manufacturer's operating instructions

#### Note

*Record the fill volume and total hardness on page 22.*

4. Check the system pressure.
5. Check all fitted components, such as pipework, valves, controllers, pumps etc. for function and leaks.
6. Check the fuel supply for leaks and pressure.
7. Open the flue gas damper (if installed).
8. Check that the cleaning aperture on the flue outlet is closed.
12. Start the boiler at a low heating output (max. 30 %) and heat up to a temperature of approx. 30 K below the operating temperature. The condensate drains must be open and any condensate must be correctly collected or drained.
13. After the required flow temperature has been achieved, open the boiler return valve, the feedwater valve if required and then, very slowly, the boiler flow valve.
14. Only then should the full burner load be enabled.
15. While the system heats up, check the correct function of all control and safety equipment.
16. Observe the pressure and temperature test equipment.

## Further details regarding the individual steps (cont.)

17. Check the fittings for leaks and retighten if required.

Closure	Dimensions	Torque
Hand-hole	100 x 150 mm, M 16	100 Nm
Head-hole	220 x 320 mm, M 20	200 Nm

18. After approx. 50 hours run, check the boiler doors and cleaning cover for leaks and retighten all screws (torque approx. 20 Nm).

## Shutting down the system



### Danger

Heating water escaping under pressure will cause injury. Only open connections and inspection ports on the heating water and flue gas sides if the boiler has been depressurised and cooled.



### Please note

Draining the boiler with a suction pump will create negative pressure inside the boiler. Only drain the boiler with a suction pump if the air vent valve is open.



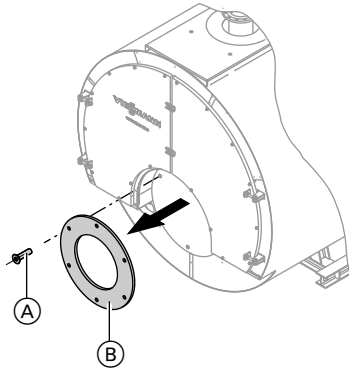
### Please note

Hot water can cause damage. Never drain hot water into the drainage system. Ensure adequate cooling.

1. Shut down the burner.
2. Close the shut-off valves in the oil lines (at the oil tank and filter) or the gas shut-off valve.
3. Isolate the system from the power supply.
4. Close all valves.

## Further details regarding the individual steps (cont.)

### Removing the burner (if required)



1. Remove the fuel supply line.  
For pressure-jet gas burner:  
Remove the gas supply pipe.



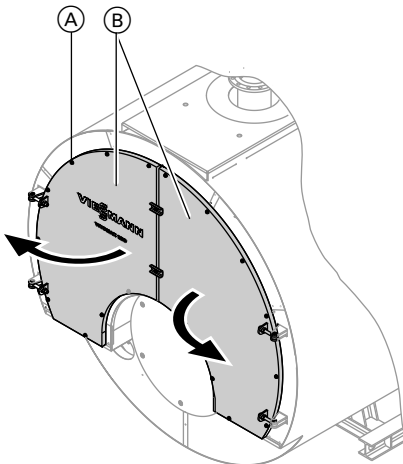
#### **Danger**

Escaping gas leads to a risk of explosion.

Check all gas connections for tightness.

2. Undo screws (A) and remove burner with burner plate (B).

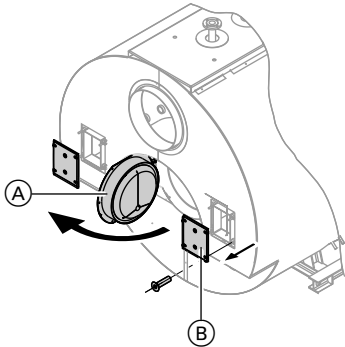
### Opening the boiler door



Undo screws (A) on boiler doors (B) and swing open boiler doors.

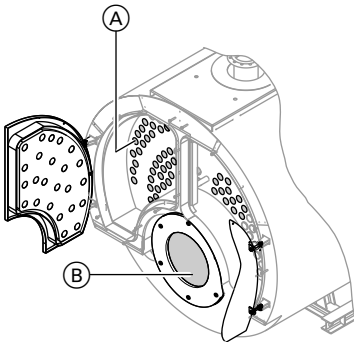
## Further details regarding the individual steps (cont.)

### Opening the cleaning door and cleaning cover



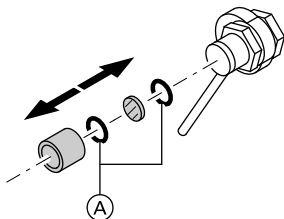
Undo nuts and remove cleaning cover (B). Open cleaning door (A).

### Cleaning heating surfaces and flue gas collector



1. Clean flues (A), combustion chamber (B) and rear reversing chamber with suitable cleaning equipment and remove combustion residues.
2. Remove combustion residues from the flue gas collector (back).

### Cleaning the sight glass

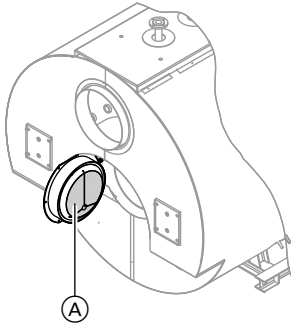


Check sight glass with gaskets (A) for tightness and clean.

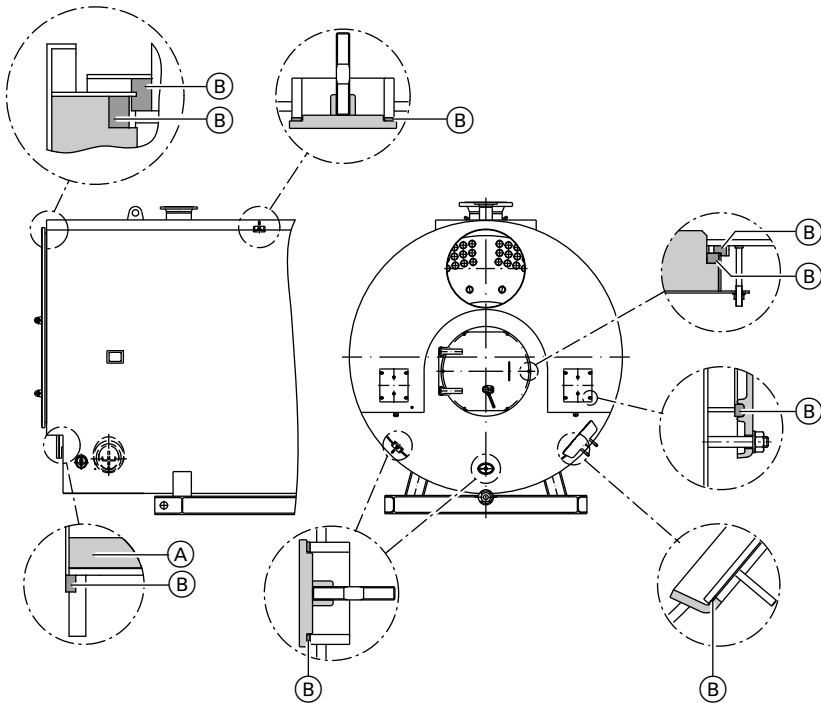


**Further details regarding the individual steps (cont.)**

**Checking thermal insulation components and gaskets**

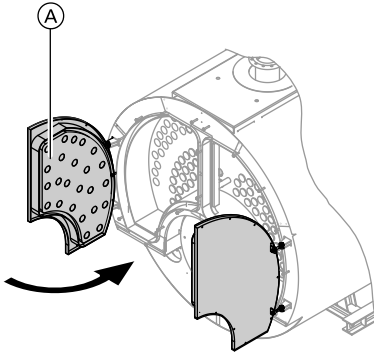


Check thermal insulation components  
Ⓐ and gaskets Ⓑ.  
Replace faulty components.



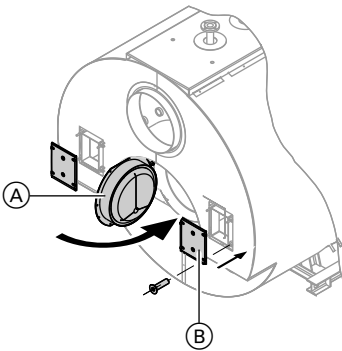
## Further details regarding the individual steps (cont.)

### Closing boiler doors



1. Close boiler doors (A).
2. Tighten boiler door screws evenly (torque approx. 20 Nm).

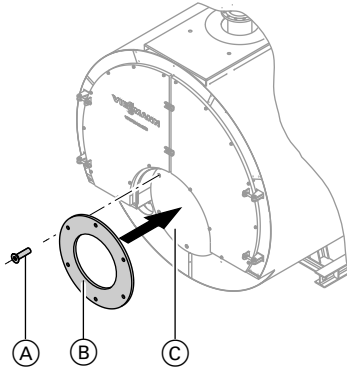
### Securing the cleaning door and cleaning cover



1. Secure both cleaning covers (B) so they seal tightly.
2. Close cleaning door (A) and secure it so it seals tightly.

## Further details regarding the individual steps (cont.)

### Fitting the burner



1. Fit burner plate (B) with screws (A) to burner flange (C).
2. Seal annular gap (if present) between flame head and insulation rings with heat-resistant insulation material (see parts list).
3. For pressure-jet gas burner:  
Fit the gas supply pipe.



#### **Danger**

Escaping gas leads to a risk of explosion.

Check all gas connections for tightness.

### Checking the inspection port for tightness



#### **Danger**

Boiler components that are not thermally insulated can be subject to high temperatures that can cause burns.

Take care with hot surfaces.



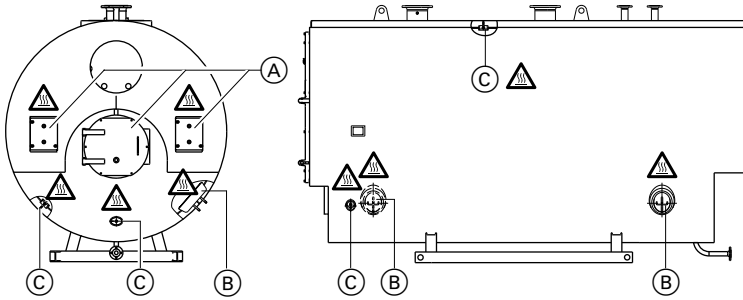
Gasket manufacturer's installation instructions


#### **Note**

*Replace the gaskets every time the connections and inspection ports are opened.*

*Only use gaskets approved in accordance with TRD 401, appendix 1 or VdTÜV [or local regulations].*

**Further details regarding the individual steps (cont.)**



 Caution - hot surface!

- (A) Cleaning apertures
- (B) Headhole

- (C) Handhole

## Further details regarding the individual steps (cont.)

### Checking the water chamber for deposits

1. Fully drain the boiler.



#### **Danger**

Heating water escaping under pressure will cause injury. Only open connections and inspection ports on the heating water and flue gas sides if the boiler has been depressurised and cooled.



#### **Please note**

Draining the boiler with a suction pump will create negative pressure inside the boiler. Only drain the boiler with a suction pump if the air vent valve is open.



#### **Please note**

Hot water can cause damage. Never drain hot water into the drainage system. Ensure adequate cooling.

2. Clean the water chamber (hose it out) and remove deposits via the drain. In case of harder deposits that cannot be removed by hosing down, carry out chemical cleaning using an approved solvent.
3. Clean the sealing faces of the handhole and headhole covers and replace gaskets. Retighten new gaskets after commissioning and check again after 24 hours run.

### Checking the safety valve



Manufacturer's details

### Checking all water connections for leaks after the boiler has been filled

Replace the gaskets every time a connection has been opened.

1. Clean the sealing face.

2. Replace the gasket.

3. Retighten all connections after commissioning.



## Further details regarding the individual steps (cont.)

### Adjusting the burner



Burner manufacturer's details

Adjust the highest fuel oil (HEL) or gas throughput of the burner to the rated heating output of the boiler.

Boiler size* <sup>2</sup>	Rated heating output		Pressure drop on flue gas side			
	HEL MW	Gas MW	HEL* <sup>3</sup>		Gas	
			Pa	mbar	Pa	mbar
1	7.73	8.00	980	9.8	1190	11.9
2	8.55	10.00	820	8.2	1310	13.1
3	10.12	12.00	1020	10.2	1630	16.3
4	11.84	14.00	880	8.8	1450	14.5
5	12.98	16.50	830	8.3	1630	16.3

To protect the system against dew point corrosion, the full load must be set to the rated boiler heating output and must not be switched off during the summer months (full load at constant standby).

The minimum boiler water temperature is 70 °C. Adjust the return temperature raising facility to at least to 50 °C (oil operation) or 55 °C (gas operation).

\*<sup>2</sup> The last digit of the part number indicates the boiler size.

\*<sup>3</sup> With a maximum permissible combustion output.

## Water quality requirements

### Heating systems with rated operating temperatures up to 100 °C (VDI 2035)

Water used in heating systems must meet the chemical values in the Drinking Water Ordinance [Germany]. If well water or similar is used, check its suitability before filling the system. Prevent excessive scale build-up (calcium carbonate) on the heating surfaces. For heating systems with operating temperatures up to 100 °C, the Directive VDI 2035 sheet 1 "Prevention of damage in water heating installations – Scale formation in domestic hot water supply installations and water heating installations" applies [in Germany; check local regulations] with the following standard values. For further information, see the annotations to Directive VDI 2035.

Total heating output in kW	> 600
Total of alkaline earths mol/m <sup>3</sup>	< 0.02
Total hardness in °dH	< 0.11

The standard values assume the following:

- The total volume of fill and top-up water of the heating system during its service life will not exceed three times the water content of the heating system
- The specific system volume is less than 20 l/kW heating output. In multi boiler systems, apply the output of the smallest boiler.
- All measures to prevent corrosion on the water side in accordance with VDI 2035 sheet 2 have been implemented.

Soften the fill and top-up water in heating systems operating under the following conditions:

- The total of alkaline earths in the fill and top-up water exceeds the standard value.
- Higher fill and top-up water volumes are expected.

When designing the system, observe the following:

- Install shut-off valves in different sections. This prevents the need to drain the entire heating water in case of repairs or system expansion.
- Install a water meter to record the amount of the fill and top-up water. Enter the volume of fill water and the water hardness into the boiler service instructions.

Operating information:

- Commission the system step by step, starting with the lowest boiler output and a high heating water flow rate. This prevents a localised concentration of limescale deposits on the boiler heating surfaces.
- During expansion or repair work, only drain the absolutely necessary pipe-work sections.



## Water quality requirements (cont.)

- Where water treatment is required, treat even the first fill of the heating system prior to commissioning. This also applies to any subsequent filling, e.g. when adding top-up water, or after a repair or system expansion.
- Filters, dirt traps and other blow-down or separating facilities in the heating water circuit must be checked, cleaned and activated more frequently after commissioning or recommissioning, and later on as required, subject to the water treatment applied (e.g. water softening).

The build-up of limescale deposits on the heating surfaces will be minimised if these instructions are observed.

Any limescale deposits that have formed because the requirements to Directive VDI 2035 have not been observed will in most cases already have caused a reduction in the service life of the installed heating equipment. Removing the limescale deposits is one option for restoring operational viability. This measure must be carried out by the Viessmann Industrieservice or a specialist company. Inspect the heating system for possible damage prior to returning it into use. It is essential that the faulty operating parameters are corrected to prevent renewed formation of excessive scale deposits.

## Heating systems with rated operating temperatures in excess of 100 °C (EN 12953)

According to EN 12953 part 10 and the VdTÜV datasheet 1466 regarding the water quality for hot water boilers in heating systems, the following details apply to heating systems operated with flow temperatures in excess of 100 °C:

### Operation with circulating water with low salt content

Only use water with low salt content as fill or top-up water, such as desalinated water, permeate or condensate.

Systems using mixed condensate generally create water with low salt content if no boiler water is fed into the system for alkanization.

### Operation with saline water

Where possible, use water with a low salt content that is at least free from alkaline earths (softened) as fill or top-up water.

**Water quality requirements (cont.)**

		Low salt content		Saline
El. conductivity at 25 °C	µS/cm	10 to 30	>30 to 100	>100 to 1500
General requirements		clear, without sediments	clear, without sediments	clear, without sediments
pH value at 25 °C		9 - 10	9 - 10.5	9 - 10.5
pH value according to the Drinking Water Ordinance/ Drinking Water Treatment Ordinance [or local regulations]		≤9.5	≤9.5	≤9.5
Oxygen (O <sub>2</sub> ) (Values for constant operation are generally significantly lower)	mg/ litre	< 0.1	< 0.05	< 0.02* <sup>4</sup>
Alkaline earths (Ca + Mg)	mmol/ litre	< 0.02	< 0.02	< 0.02
Phosphate (PO <sub>4</sub> )	mg/ litre	< 5	< 10	< 15
Phosphate (PO <sub>4</sub> ) according to the Drinking Water Ordinance/Drinking Water Treatment Ordinance	mg/ litre	≤7	≤7	≤7
Phosphate (PO <sub>4</sub> ) for Viessmann hot water boilers	mg/ litre	< 2.5	< 5	< 15
When using oxygen binders: Sodium sulphite (Na <sub>2</sub> SO <sub>3</sub> ) (When using other suitable products, observe the relevant guidelines issued by the respective supplier)	mg/ litre	–	–	< 10

The VdTÜV datasheet 1466 advises that further oxygen binders are offered as chemicals, which may have the following active ingredients:

- Ascorbic acid
- Carbohydrazide
- Diethylhydroxylamine (DEHA)

- Hydroquinone
- Methyl ethyl ketoxime (Meko)
- Tannin

\*<sup>4</sup> The oxygen concentration in the circulating water may be up to 0.1 mg/litre, if suitable inorganic corrosion inhibitors are used.

## Water quality requirements (cont.)

These must be used with care, however, as they can give rise to oxidation, cleavage and transformation products under boiler operating conditions. For further details, please refer to the directive mentioned above.

### Prevention of damage due to corrosion on the water side

The corrosion resistance of ferrous materials on the heating water side of heating systems and boilers depends on the absence of oxygen in the heating water.

The oxygen introduced into the heating system with the first filling and subsequent top-ups reacts with the system materials without causing damage.

The characteristic blackening of the water after some time in use indicates that free oxygen is no longer present. The Technical Rules and in particular Directive VDI 2035 sheet 2 therefore recommend that heating systems are designed and operated so that a constant ingress of oxygen into the heating water is prevented.

Opportunities for oxygen ingress during operation:

- Through open expansion vessels receiving a flow.
- Through negative pressure in the system.
- Through gas-permeable components.

Sealed unvented systems – e.g. with diaphragm expansion vessel – offer good protection against the ingress of airborne oxygen into the system, if correctly sized and operated at the correct pressure.

At every part of the heating system, even at the suction side of the pump, and under all operating conditions, the system pressure should be above ambient atmospheric pressure.

The pre-charge pressure of the diaphragm expansion vessel should be checked at least during the annual service.

The use of permeable components, e.g. plastic pipes that are permeable to gas in underfloor heating systems, should be avoided. Provide system separation if such components are nevertheless used. This must separate the water flowing through the plastic pipes from other heating circuits – e.g. from the heat source – by the provision of a heat exchanger made of corrosion-resistant material.

No further anti-corrosion measures are required for sealed unvented hot water heating systems subject to the above points being observed.

However, take additional precautions where there is a risk of oxygen ingress, for example by adding oxygen binder sodium sulphite (5-10 mg/litre into the excess). The pH value of the heating water should be between 9.0-10.5. Different conditions apply to systems that contain aluminium components.

### Water quality requirements (cont.)

Where chemicals are used as part of the corrosion protection, we recommend that the manufacturer of the chemicals issues a certificate of suitability of the additives with regard to the boiler materials and the materials of the other heating system components.

We recommend you refer questions of water treatment to Viessmann Industrieservice or an appropriate specialist. Further details can be found in Directive VDI 2035 sheet 2 and EN 14868.

### Using antifreeze in boilers

Viessmann boilers are designed and built for water as a heat transfer medium. To protect boiler systems from frost, it may be necessary to treat the boiler water or circulating water with antifreeze.

When doing so, observe the following:

- In general, follow the specifications given by the antifreeze manufacturer.
- The properties of antifreeze and water are very different.
- The temperature stability of the antifreeze must be sufficient for the particular application.
- Check the compatibility with sealing materials. If other sealing materials are used, take this into account when designing the system.
- Antifreeze developed especially for heating systems contains inhibitors and buffer substances for corrosion protection as well as glycol. When using antifreeze, always observe the manufacturer's instructions regarding minimum and maximum concentrations.
- The concentration must never fall below the prescribed minimum level, subject to the required frost protection temperature. Check and adjust the pH value and frost protection (measure the density) regularly, at least once a year, according to the manufacturer's instructions.
- Check with the relevant supplier whether antifreeze may affect system components that are not part of the boiler, such as pumps, electrically and pneumatically driven valves, other types of valves, gaskets, etc.
- If the system is filled with antifreeze, it must be marked accordingly.
- If a boiler system is changed to operate without antifreeze, flush the system in order to remove all traces of the antifreeze.
- The quality of the boiler water and feedwater must meet the requirements of Directive VDI 2035.
- The systems must be designed as sealed unvented systems, as the antifreeze inhibitors decrease rapidly if airborne oxygen is allowed to enter.
- Diaphragm expansion vessels must comply with DIN 4807 [or local regulations].

## Using antifreeze in boilers (cont.)

- Solder connections should preferably be made with Ag or Cu hard solder. If liquids containing chlorides are used for soft soldering, any deposits must be removed from the circuit afterwards through thorough flushing. A higher chloride content in the heat transfer medium can cause corrosion damage.
- Only use oxygen diffusion-resistant hoses or metal hoses for flexible connections.
- Never equip the system on the primary side with zinc-plated heat exchangers, containers or pipes as zinc can be corroded by glycol/water mixtures.
- To avoid the risk of corrosion, ensure that there is no difference in electrical potential between system components that are in contact with anti-freeze.
- Route all pipes in such a way that circulation cannot be interrupted by gas cushions or deposits.
- The water circuit must always be filled up to the highest point with the heat transfer medium.
- After filling, ensure there are no more air cushions in the system. When the temperature falls, gas cushions form negative pressure and this can draw air into the system.
- After initial filling and commissioning, but after 14 days at the latest, clean the integral dirt trap so the heat transfer medium can flow freely.
- Following any losses through leaks or drawing off, top up the antifreeze solution according to the concentration already in place. Establish the volume of antifreeze as a check.

## Parts lists

**When ordering spare parts:**  
Quote the serial number and type, as well as the quantity required.

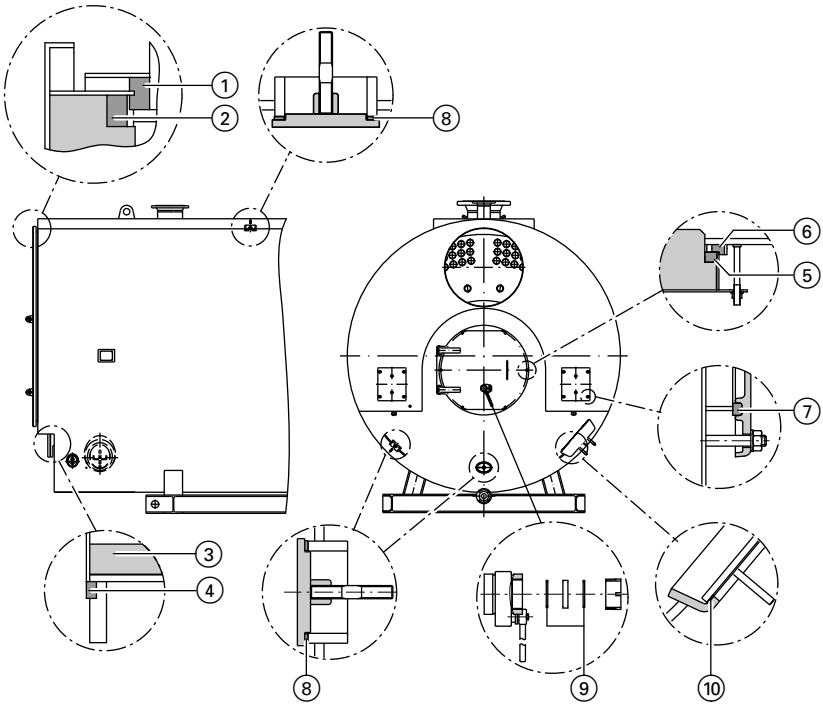
Standard parts are available from your local supplier. A corresponding amount of installation adhesive is provided.

Pos.	Component	Boiler size <sup>*2</sup>				
		1	2	3	4	5
		Number	Number	Number	Number	Number
1	Packing per boiler door					
2	Packing per boiler door					
3	Insulation ring					
4	Burner connection packing					
5	Cleaning cover packing					
6	Rear boiler floor packing					
7	Packing per cleaning aperture					
8	Handhole gasket 100 x 150 mm					
9	Seal ring set					
10	Headhole gasket 225 x 325 mm					

**Please order individual parts from:**  
**Viessmann Industrieservice**  
 Tel.: +49 (0)30/6602 389  
 Fax.: +49 (0)30/6602 136  
 Email: [industrieservice@viessmann.com](mailto:industrieservice@viessmann.com)  
 Internet: [www.viessmann-industriekessel.de](http://www.viessmann-industriekessel.de)

<sup>\*2</sup> The last digit of the part number indicates the boiler size.

**Parts lists** (cont.)



**Commissioning/service reports**

	<b>Commissioning</b>	<b>Service</b>	<b>Service</b>
date:			
by:			

	<b>Service</b>	<b>Service</b>	<b>Service</b>
date:			
by:			

	<b>Service</b>	<b>Service</b>	<b>Service</b>
date:			
by:			

	<b>Service</b>	<b>Service</b>	<b>Service</b>
date:			
by:			

	<b>Service</b>	<b>Service</b>	<b>Service</b>
date:			
by:			



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