Technical guide

**VITOFLEX 300-UF**

Fully automatic solid fuel boiler with grate combustion for the combustion of woodchips, wood pellets, shavings and mixed wood
1. Principles of wood combustion
   1. 1 Principles of wood combustion for generating heat ........................................ 6
   2. 2 Principles of wood pellet combustion for generating heat ................................ 8
      ■ What are wood pellets? .................................................................................. 8
      ■ Pellet requirements ...................................................................................... 8
      ■ Pellet quality characteristics ........................................................................ 9
      ■ Types of pellet delivery ................................................................................ 9
   3. 3 Principles of woodchip combustion for generating heat .................................. 9
      ■ What are woodchips? ................................................................................... 9
      ■ Definition of woodchip size classes according to EN ISO 17225-4 ................ 9
      ■ Woodchip requirements ............................................................................... 9
      ■ Substances .................................................................................................. 10
      ■ Non-wood biomass fuels ............................................................................ 10
   4. 4 German Immissions Ordinance (1st BlmSchV) ............................................... 10
      ■ Contents of the 1st BlmSchV ........................................................................ 10
      ■ Update of the 1st BlmSchV – Tightening of the emission limits ..................... 10
      ■ Emission limits for dust and carbon monoxide (CO) according to 1st BlmSchV, stage 2 (Article 5) ................................................................. 11

2. Vitoflex 300-UF
   2. 1 Product description ....................................................................................... 12
      ■ Benefits at a glance ...................................................................................... 12
      ■ Delivered condition ...................................................................................... 12
   2. 2 Specification ................................................................................................. 14
      ■ Specification ................................................................................................ 14
      ■ Dimensions .................................................................................................. 16

3. Control unit
   3. 1 Ecocontrol specification ............................................................................... 19
      ■ Description .................................................................................................. 19
      ■ Ecocontrol function .................................................................................... 19
      ■ Operation ..................................................................................................... 19
      ■ Standard delivery package for Ecocontrol .................................................. 19
   3. 2 Accessories for Ecocontrol .......................................................................... 20
      ■ External drive switching without light barrier .......................................... 20
      ■ External drive switching with light barrier ............................................... 20
   3. 3 Accessories for Ecocontrol output management ....................................... 21
      ■ Additional heat generator demand (peak load heat generator) .................... 21
      ■ Cylinder management with 5 sensors (QM) ............................................... 21
      ■ External demand ON/OFF ......................................................................... 21
      ■ Output signal 0-10 V .................................................................................. 21
   3. 4 Accessories for Ecocontrol remote transfer/remote monitoring .................... 22
      ■ Analogue fault message device with battery .............................................. 22
      ■ Exporting operating data via Modbus TCP/IP ............................................ 22
      ■ External visualisation (hardwired) ............................................................... 22
   3. 5 Accessories for Ecocontrol function extension ............................................. 23
      ■ Controller module ...................................................................................... 23
      ■ Data cable 10 m long .................................................................................. 23
   3. 6 Accessories for function extension sensors .................................................. 24
      ■ Temperature sensor for heating circuit ...................................................... 24
   3. 7 Controller for boiler sequence control/charging control panel ....................... 25
      ■ Charging control panel without boiler sequence control ......................... 25
      ■ Charging control panel with boiler sequence control ............................... 25
      ■ Buffer controller with boiler sequence control ......................................... 25

4. Installation accessories
   4. 1 Boiler accessories .......................................................................................... 26
      ■ Flue gas recirculation ................................................................................ 26
      ■ Displacer rods ............................................................................................ 26
      ■ Automatic ignition system ......................................................................... 26
      ■ Pneumatic cleaning ..................................................................................... 26
      ■ Feed screw conveyor, 2-stage .................................................................... 27
   4. 2 Boiler accessories for safety equipment ....................................................... 28
      ■ Thermally activated safety valve 100 °C .................................................... 28
      ■ Safety valves ............................................................................................. 28
      ■ Water level limiter ..................................................................................... 28
      ■ Maximum pressure limiter 0 to 6 bar ......................................................... 28
      ■ Minimum pressure limiter 0 to 6 bar ......................................................... 28
      ■ Fitting assembly with pressure gauge ....................................................... 28
      ■ Flash trap replacement set ........................................................................ 28
Index (cont.)

4. 3 Heat distribution accessories ................................................................. 29
  ■ Motorised three-way valve (return temperature raising facility) .......... 29
  ■ Circulation pumps .............................................................................. 29

4. 4 Accessories for flue gas dust extraction ............................................ 30
  ■ Flue gas dust extractor with ash container ........................................ 30

4. 5 Accessories for flue gas routing .......................................................... 33

4. 6 Accessories for sound insulation measures ........................................ 34
  ■ Anti-vibration fittings ......................................................................... 34

4. 7 Accessories for ash removal ............................................................... 35
  ■ Ash removal into an ash container ....................................................... 35
  ■ Combustion chamber screw conveyor extension .................................. 36
  ■ Extension for steeply inclined screw conveyor .................................... 37

4. 8 Mobile cleaning equipment accessories ............................................. 38
  ■ Cleaning set with ash vacuum cleaner, 90 l ...................................... 38
  ■ Cleaning set with ash vacuum cleaner, 240 l ..................................... 38
  ■ Ash vacuum cleaner ........................................................................... 38
  ■ Ash vacuum cleaner accessories ....................................................... 39
  ■ Accessories for mobile cleaning equipment, ash containers .............. 39

4. 9 Burn-back protection devices (RSE) .................................................. 40
  ■ Rotary lock valve ................................................................................ 40
  ■ Shut-off gate valve MA 220 ............................................................... 40
  ■ Drop chute L = 1.0 m ......................................................................... 41
  ■ Special adaptor .................................................................................. 41

5. Fuel discharge

5. 1 Application options for extraction system by fuel .............................. 42
  ■ Overview ............................................................................................ 42

5. 2 Fuel extraction with screw conveyor .................................................. 43
  ■ Pellet extraction screw conveyor, D = 120 mm .................................. 43
  ■ Specification ....................................................................................... 43
  ■ Pellet discharge screw conveyor drive .............................................. 44

5. 3 Fuel discharge with agitators ............................................................. 45
  ■ Horizontal discharge AH ................................................................. 45
  ■ Specification ....................................................................................... 45
  ■ Discharge screw conveyor AH to horizontal discharge AH .................. 48
  ■ Additional discharge screw conveyor AH, per m ................................ 48
  ■ Substructure AH ............................................................................... 50
  ■ Protective panel AH for the fuel store wall ......................................... 51
  ■ Cover panel AH for wood pellets ..................................................... 51

5. 4 Fuel extraction with funnel discharge ................................................ 52
  ■ Funnel discharge AP ......................................................................... 52
  ■ Specification ....................................................................................... 52
  ■ Additional outlet flange AP ............................................................... 53
  ■ Funnel, large ....................................................................................... 53

5. 5 Fuel extraction with hydraulic push floor discharge system ............... 54
  ■ Specification for push floor discharge .............................................. 54
  ■ Pushrod discharge ............................................................................ 54
  ■ Maximum dumping heights .............................................................. 54
  ■ Pushrod drive specification ............................................................... 54
  ■ Forces on the building ..................................................................... 55
  ■ Applications of push floor discharge ............................................... 55
  ■ Slot discharge for pulling ................................................................. 55
  ■ Centre discharge ................................................................................ 57
  ■ Slot discharge with fill function ........................................................ 59
  ■ Hydraulic assemblies for moving floor discharge ............................... 61
  ■ Pushrod ............................................................................................. 61
  ■ Pushrod drive, individual .................................................................. 61
  ■ Weld base, pushrod drive, individual ................................................. 61
  ■ Pushrod drive, twin ......................................................................... 61
  ■ Weld base, pushrod drive, twin .......................................................... 62
  ■ Bunker weld base (fuel store) ............................................................ 62
  ■ Hydraulic unit, AS single .................................................................. 62
  ■ Hydraulic drive, AS twin ................................................................... 63
  ■ Push floor screw conveyor, D = 190 mm .......................................... 63
  ■ Push floor screw conveyor, D = 250 mm .......................................... 64
  ■ Push floor screw conveyor drive, standard ........................................ 64
  ■ Drive, push floor screw conveyor, high power ................................... 64
  ■ Push floor screw conveyor cover .................................................... 64

6. Fuel transport

6. 1 Application options for transport systems by fuel .............................. 65
  ■ Overview ........................................................................................... 65

6. 2 Fuel transport with screw conveyor .................................................. 66
### Index (cont.)

- Trough screw conveyor .............................................................. 66
- Standard trough screw conveyor drive ........................................ 66
- Pipe screw conveyor ................................................................. 67
- Pipe screw conveyor drive, pellets ............................................. 68
- Pipe screw conveyor drive, standard .......................................... 69
- Pipe screw conveyor drive, high power ....................................... 69

### 7. Fuel storage

#### 7.1 Fuel storage in on-site pellet store
- Sizing the pellet storage room .................................................. 70
- Pellet storage room design and required system components .......... 71
- Additional safety instructions for pellet stores .............................. 72
- Protective boards with Z brackets .............................................. 72
- Fill connector and return air connector ...................................... 72
- Accessories for the on-site pellet store ...................................... 75

#### 7.2 Filling the on-site fuel store .................................................. 77
- Manual silo cover FDM 2.9/1.3 m ................................................. 77
- FDH hydraulic bunker cover ..................................................... 78
- Fall protection grille 120 for FDH .............................................. 80
- Fall protection grille 200 for FDH .............................................. 80
- FDB drive-over bunker cover ................................................... 80
- Fall protection grille 120 for FDB .............................................. 82
- Fall protection grille 200 for FDB .............................................. 82
- Shaker motor for fall protection grille ...................................... 82
- Hydraulic unit for bunker charging cover .................................. 82
- Cover drive for hydraulic unit .................................................. 83

### 8. Heating water buffer cylinder

#### 8.1 Heating water buffer cylinder on request ................................ 84
- Heating water buffer cylinder (customised) ............................... 84

### 9. Design information

#### 9.1 System design ................................................................. 84
- Selecting the rated heating output ............................................. 84
- Safety temperatures ............................................................... 84

#### 9.2 Delivery ........................................................................... 84
- Lifting the solid fuel boiler ....................................................... 84

#### 9.3 Positioning ....................................................................... 84
- Handling .................................................................................. 84
- Boiler room requirements ......................................................... 85
- Boiler room floor requirements ................................................... 85
- Requirements of the Muster-Feuerungsverordnung [M-FeuVo Sample Combustion Ordinance - Germany] .................................................. 86
- Combustion air supply ............................................................. 86
- Safety precautions .................................................................... 87
- Minimum clearances .............................................................. 87

#### 9.4 Water connection ............................................................ 88
- Heating connections ............................................................... 88
- Boiler circuit and shunt pump .................................................. 88
- System example ...................................................................... 88
- Sizing the expansion vessel ...................................................... 90

#### 9.5 Electrical installation .......................................................... 91
- Requirements .......................................................................... 91
- Positioning the control panel .................................................... 91

#### 9.6 Safety equipment to EN 12828 ............................................. 91

#### 9.7 Safety equipment to protect against overfilling with fuel and burn-back
- Automatic extinguishing device (SLE) ....................................... 92
- Preventing overfilling with fuel ................................................. 92
- Burn-back protection device (RHE) .......................................... 93
- Reignition protection (RZ3) ....................................................... 93
- Temperature and flame monitor (TÜF, FÜF) ............................. 93
- Burn-back protection device (RSE) .......................................... 94

#### 9.8 Fire safety ........................................................................ 94
- Fuel store fire safety .............................................................. 94

#### 9.9 Commissioning ............................................................... 94
- Fuel for commissioning .......................................................... 95
- Amount of fuel to be stored for commissioning ......................... 95

#### 9.11 Fuels ............................................................................. 95

#### 9.12 Standard values for water quality .................................... 95
- Heating systems with rated operating temperatures up to 100 °C (VDI 2035) .................................................. 95
- Filling the heating system ....................................................... 96

#### 9.13 Frost protection .............................................................. 96

#### 9.14 Connection on the flue gas side ....................................... 96
- Chimney ................................................................................ 96
Index (cont.)

- Flue pipe ................................................................................................................. 96
  9.15 Sound insulation ............................................................................................... 97

10. Appendix

10. 1 General information on low pressure hot water boilers with safety temperatures of up to 110 °C ......................................................................................... 97
10. 2 Pipe connections ................................................................................................. 98
10. 3 Electrical installation ........................................................................................ 98
10. 4 Operating instructions ....................................................................................... 98
10. 5 Checks as part of the Building Regulations approval procedure .................... 98

11. Keyword index......................................................................................................... 99
## Principles of wood combustion

### 1.1 Principles of wood combustion for generating heat

**General principles**

**Net calorific value of wood biomass as a function of moisture content**

The energy content of wood is given as the net calorific value $H_u$. The net calorific value is the energy that can be obtained from burning one kilogram of damp wood. The water contained in the flue gas is present in the form of water vapour. The gross calorific value $H_o$ additionally takes account of the latent heat of condensation in the water vapour, which is released as it cools back down to the initial temperature.

The moisture content of a fuel charge is the main factor that influences combustion. It determines the energy content and therefore the energy conversion that can be achieved during combustion. In practice, the net calorific value of fuels is between 5.0 kWh/kg (18 MJ/kg) at a moisture content of 5 % and 1.5 kWh/kg (5.4 MJ/kg) at a moisture content of 60 %. This net calorific value depends on the type of wood and, more importantly, on the moisture content or moisture level in the wood. The moisture content is crucial for controllability at partial load and the emissions performance of the system.

**Determining the moisture content**

The moisture content is determined with the drying cabinet method on which the CEN (European Committee for Standardisation) standard is based. As part of this, a fuel sample is weighed when wet, dried in a drying cabinet at approx. 105 °C for several hours, and then weighed again. The proportion of water in the fuel is given as the moisture content (M).

### Net calorific value of wood in relation to moisture content (M)

**Graph**

![Graph showing the relationship between moisture level and net calorific value in MJ/kg and kWh/kg.](image)

- **A** Softwood
- **B** Hardwood
Principles of wood combustion (cont.)

Net calorific value for various types of wood, source: Technologie- und Förderzentrum (Technology and Support Centre) (TFZ) Straubing, Bavaria, Germany

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<thead>
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<th>Water content in %</th>
<th>Unit of measurement</th>
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<table>
<thead>
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<th>Type of tree</th>
<th>kWh/kg</th>
<th>kWh/smt</th>
<th>kWh/stcm</th>
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<th>kWh/smt</th>
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<td>1005</td>
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<td>709</td>
<td>2.33</td>
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<td>2.22</td>
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<td>Scots pine</td>
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Relation of moisture content (w) to moisture level in fuel (u)
The proportion of water in woodchips and wood pellets is given as either the moisture content or the fuel moisture level. The moisture content (in %) is relative to the moist fuel mass or the fresh substance (FS); the fuel moisture level is relative to the absolutely dry fuel mass (TS).

Example:
If 100 kg of fuel contains 50 kg of water, the fuel has a moisture content of 50 % (w50) and a fuel moisture level of 100 % (u = 100).

\[ u \% = \frac{w \%}{100 - w \%} \times 100 \]

Determining the amount of fuel required
The amount of fuel required can be calculated on the basis of the net calorific value and the required rated heating output. Significant influencing factors for this are the moisture content of the fuel and the efficiency of the system.

\[ B = \frac{Q_n}{H_L \times \eta} \]
1.2 Principles of wood pellet combustion for generating heat

What are wood pellets?

Wood pellets are made from 100 percent natural wood remnants. This raw material is waste matter created by the wood industry in large volumes through planing or sawing. Wood remnants are compressed under high pressure and formed into pellets, i.e. pressed into a cylindrical shape.

The raw material is stored and transported under completely dry conditions. System users should also ensure completely dry storage conditions. This is the only way to guarantee optimum and effective combustion.

Pellet requirements

For heat generation, use wood pellets that have the following properties:
- Diameter of 6 mm
- Length of 3.15 to 40 mm (1 % up to 45 mm)
- Max. moisture content of 10 %

The wood pellets used for combustion in the solid fuel boiler must correspond to the requirements of EN ISO 17225-2.

### Requirement | ENplus-A1 | EN ISO 17225-2 quality A1
--- | --- | ---
Diameter (mm) | 6 ± 1 | D06
Length (mm) | 3.15 to 40 | 600 to 750
Bulk density in the delivered condition (kg/m³) | 600 to 750 | BD600
Net calorific value in the delivered condition (MJ/kg/kWh/kg) | ≥ 16.5 | Q16.5
Water content in the delivered condition (m-%) | ≤ 10 | M10
Fines content in the delivered condition (m-%) | ≤ 1 | F1.0
Mechanical strength in the delivered condition (m-%) | ≥ 97.5 | DU 97.5
Ash content, free from water (%) | ≤ 0.7 | A0.7
Principles of wood combustion (cont.)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>ENplus-A1</th>
<th>EN ISO 17225-2 quality A1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ash softening temperature</td>
<td>°C</td>
<td>≥ 1200</td>
</tr>
<tr>
<td>This value is only binding for pellets certified to ENplus. It indicates the temperature at which the wood ash is deformed and can therefore cause fusions in the combustion chamber.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorine content, free from water m-%</td>
<td>≤ 0.02</td>
<td>Cl0.2</td>
</tr>
<tr>
<td>Sulphur content, free from water m-%</td>
<td>≤ 0.04</td>
<td>S0.04</td>
</tr>
<tr>
<td>Nitrogen content, free from water m-%</td>
<td>≤ 0.3</td>
<td>N0.03</td>
</tr>
</tbody>
</table>

m-% = percentage by mass

**Note**

EN 14961-2 was superseded by the new standard EN ISO 17225-2 in September 2014. It describes the essential properties of wood pellets.

**Pellet quality characteristics**

**Good wood pellets:**
- Smooth, shiny surface
- Uniform length
- Low proportion of dust
- Sink in water

**Low quality wood pellets:**
- Cracked rough surface
- Widely varying length
- High proportion of dust
- Float in water

**Types of pellet delivery**

- In their loose form, wood pellets are transported by silo tanker and pumped into the storage room via a hose system.
- Careful handling of wood pellets ensures a low proportion of dust, trouble-free boiler charging and a constant heating output by the solid fuel boiler.

**1.3 Principles of woodchip combustion for generating heat**

**What are woodchips?**

Woodchips are made from 100 percent natural wood from forests and plantations. This raw material comes from tree trunks or branches. The wood is then processed with high speed cutting tools in accordance with EN ISO 17225.

**Definition of woodchip size classes according to EN ISO 17225-4**

<table>
<thead>
<tr>
<th>Size class</th>
<th>Main percentage (at least 60 % of the mass), a)</th>
<th>Fine fraction (≤ 3.15 mm) In % of the mass</th>
<th>Coarse fraction (in brackets particle length) In % of the mass</th>
<th>Maximum particle length, b) in mm</th>
<th>Maximum cross-sectional area of the coarse fraction, b) c) In cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>P16S</td>
<td>3.15 to 16</td>
<td>≤ 15 %</td>
<td>≤ 6 (≥ 31.5 mm)</td>
<td>≤ 45</td>
<td>≤ 2</td>
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<tr>
<td>P31S</td>
<td>3.15 to 31.5</td>
<td>≤ 10 %</td>
<td>≤ 6 (≥ 45 mm)</td>
<td>≤ 150</td>
<td>≤ 4</td>
</tr>
<tr>
<td>P45S</td>
<td>3.15 to 45</td>
<td>≤ 10 %</td>
<td>≤ 10 (≥ 63 mm)</td>
<td>≤ 200</td>
<td>≤ 6</td>
</tr>
</tbody>
</table>

a) The number in the size class refers to the maximum particle size in the main percentage. The particles have to pass through a strainer with a circular mesh (ISO 17827-1 standard), in which the sieve apertures are of the specified size for the size class. The lowest possible property class should be specified.

b) Only determine the length and cross-sectional area of particles in the coarse fraction. In a sample of about 10 12 pieces at the most can exceed the maximum length if the cross-sectional area is < 0.5 cm².

c) To measure the cross-sectional area, you are advised to use a transparent set square, arrange the particles at right angles behind the set square and use a cm² grid to estimate the maximum cross-sectional area of these particles.

**Woodchip requirements**

For combustion in the solid fuel boiler, use woodchips of size class P31S that have the following properties:
- Max. length of 15 cm (1 % up to 45 mm)
- Max. coarse fraction of 6 % (> 45 mm)
- Max. cross-section of 4 cm²

- Max. length of 15 cm (1 % up to 45 mm)
- Moisture content (see product description)
Principles of wood combustion (cont.)

Bulk density of woodchips

Bulk densities of woodchips as defined by water content, according to EN ISO 17225-4

<table>
<thead>
<tr>
<th>Water content based on moisture mass</th>
<th>% of the mass</th>
<th>8 to 18</th>
<th>18 to 25</th>
<th>25 to 35</th>
<th>35 to 45</th>
</tr>
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<tr>
<td>Bulk density for coniferous species</td>
<td>kg/m³</td>
<td>BD150</td>
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<td>BD200</td>
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<tr>
<td>Property class</td>
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<td>160 to 180</td>
<td>180 to 200</td>
<td>200 to 225</td>
<td>225 to 270</td>
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<tr>
<td>Bulk density for deciduous species</td>
<td>kg/m³</td>
<td>BD200</td>
<td>BD250</td>
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<td>BD300</td>
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<td>Property class</td>
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<td>225 to 250</td>
<td>250 to 280</td>
<td>280 to 320</td>
<td>320 to 380</td>
</tr>
</tbody>
</table>

Woodchip quality characteristics

Good woodchips:
- Low, homogeneous water content, no moisture pockets or mould
- Low proportion of needles, leaves, fine branches and bark
- Low proportion of fine wood material (hardly any particles < 3 mm)
- No contamination from mineral soil and foreign matter or impurities
- Uniform particle size (no excess length)
- Smooth edges, no fraying

Low quality woodchips:
- High proportion of fraying surfaces or edges
- High proportion of needles, leaves, fine branches and bark
- Contamination from mineral soil and foreign matter or impurities
- Heterogeneous particle size
- High fine fraction and water content

Substances

When buying wood for combustion, it is important to ensure that the following foreign matter is avoided:
- Stones
- Metal particles
- Masonry remnants
- Plastics

Foreign matter changes the composition of the fuel and therefore the critical parameters of the combustion process.

Exceeding the above limits will shorten the service life of the combustion chamber and the solid fuel boiler. This also means a greater amount of maintenance work and shorter service intervals.

Non-wood biomass fuels

Non-wood biomass fuels such as needles, leaves, cereals, straw, husks, fruit stones, etc. are unsuitable as fuels for trouble-free operation, and are therefore not permitted.

1.4 German Immissions Ordinance (1st BImSchV)

Contents of the 1st BImSchV

The German Immissions Order (1st BImSchV) regulates the following for small and medium-scale biomass combustion systems which do not require approval:
- The conditions under which small and medium-scale biomass combustion systems may be installed and operated.
- Establishing the emission limits of small and medium-scale systems
- How often and to what extent a system must be monitored in order to protect the environment from emissions.

Update of the 1st BImSchV – Tightening of the emission limits

The update of the 1st BImSchV, which contains the following essential new points, came into force from 22 March 2010 onwards:
Control of the emission limits for solid fuel boilers with a rated heating output of 4 to 1000 kW
- Verification of the required emission limits in the form of periodic on-site measurements to be carried out by the flue gas inspector when commissioning new systems (with subsequent periodic checks every 2 years)
- Emission limits tightened to 20 mg/m³ for dust and to 400 mg/m³ for CO in the 1st BImSchV, stage 2

Verification of the required emission limits in the form of periodic on-site measurements to be carried out by the flue gas inspector when commissioning new systems (with subsequent periodic checks every 2 years)

Emission limits tightened to 20 mg/m³ for dust and to 400 mg/m³ for CO in the 1st BImSchV, stage 2

Design of the heating water buffer cylinder in hand charged systems: Min. 12 litres per litre fuel hopper or 55 litres/kW rated boiler heating output

Design of the heating water buffer cylinder in automatically charged systems: Min. 20 litres/kW rated boiler heating output

Emission limits for dust and carbon monoxide (CO) according to 1st BImSchV, stage 2 (Article 5)

Note
Emission limits in periodic on-site measurements (relative to 13 % oxygen)

<table>
<thead>
<tr>
<th>Fuel according to Article 3, paragraph 1</th>
<th>For new systems installed</th>
<th>Rated heating output in kW</th>
<th>Dust in mg/m³</th>
<th>CO in mg/m³</th>
<th>Solid fuel boilers affected</th>
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</thead>
<tbody>
<tr>
<td>Pellets</td>
<td>From 1 January 2015</td>
<td>≥ 4 to ≤ 1000</td>
<td>≤ 20</td>
<td>≤ 400</td>
<td>Vitoligno 300-C</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Vitoligno 300-H</td>
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<tr>
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<td></td>
<td>Vitoflex 300-RF</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Vitoflex 300-UF</td>
</tr>
<tr>
<td>Woodchips</td>
<td>From 1 January 2015</td>
<td>≥ 4 to ≤ 1000</td>
<td>≤ 20</td>
<td>≤ 400</td>
<td>Vitoligno 300-H</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>Vitoflex 300-RF</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Vitoflex 300-UF</td>
</tr>
<tr>
<td>Natural non-bulky pieces of wood (sawdust, shavings, sanding dust), wood briquettes</td>
<td>From 1 January 2015</td>
<td>≥ 4 to ≤ 1000</td>
<td>≤ 20</td>
<td>≤ 400</td>
<td>Vitoligno 250-S</td>
</tr>
<tr>
<td></td>
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<td>Vitoligno 300-S</td>
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<td>Vitoflex 300-RF</td>
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<td></td>
<td></td>
<td></td>
<td>Vitoflex 300-UF</td>
</tr>
<tr>
<td>Logs</td>
<td>From 1 January 2017</td>
<td>≥ 4 to ≤ 1000</td>
<td>≤ 20</td>
<td>≤ 400</td>
<td>Vitoligno 150-S</td>
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<tr>
<td></td>
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<td>Vitoligno 200-S</td>
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<td>Vitoligno 250-S</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vitoligno 300-S</td>
</tr>
</tbody>
</table>

Note on dust emission limits
Depending on both the type of fuel used, e.g. wood pellets or woodchips, and fuel quality (according to EN ISO 17225) additional emission reduction measures may be required in order to adhere to the dust emission limits demanded by the 1st BImSchV.

These are secondary measures, such as a fine-dust filter (e.g. an electrostatic filter) or tertiary measures in the form of the support of a Viessmann engineer when measuring. Viessmann should be consulted on this.

VDI 4207, Sheet 2 (Emission measurements at small firing installations)

VDI 4207, Sheet 2 (Emission measurements at small firing installations) specifies the requirements for the initial and periodic testing and measurement of dust emissions in accordance with the 1st BImSchV or the Kehr- und Überprüfungsordnung (KÜO - sweeping and inspection regulation) when using solid fuels. Also described are the system and operation-related measures that need to be implemented in advance in order to ensure that the emissions measurements are carried out correctly.
2.1 Product description

The Vitoflex 300-UF grate combustion system has been specially developed for the automatic combustion of dry and moist fuels (wood remnants, wood pellets or woodchips from forest thinnings up to max. M50). It combines the benefits of underfeed combustion with the advantages of grate combustion to optimum effect. The Vitoflex 300-UF grate combustion system is characterised by highest efficiency levels and perfect combustion in all load stages. The horizontal heat exchanger with pneumatic cleaning is ideal for the use of fuel with a high percentage of fines.

The ash is removed automatically from the combustion base and transported into a standard container. Efficiency of over 90 % enables maximum seasonal efficiency in modulating operating mode. Use of the Vitoflex 300-UF as a base load boiler is practical for building heat loads of 300 kW and above. Combination with a solar thermal system is also easily possible. The Vitoflex 300-UF is tested and approved in accordance with EN 303-5. It is also manufactured in accordance with the Machinery Directive and has a CE designation. It is also subject to on-going inspections by TÜV.

Benefits at a glance

■ High efficiency thanks to proven combustion technology, three-pass heat exchanger, modulating output control and regulated primary and secondary air supply.
■ Easy servicing thanks to fully automatic ash removal and optional pneumatic cleaning system.
■ Highly developed safety equipment ensures safe and reliable operation.
■ Optimum system output results from the design and delivery of all system components from a single source.

■ Automatic ignition precludes the need for firebed maintenance and saves fuel.
Option: For fuels with less than 40 % moisture content (< M40) only.
■ Individual design of your system by our team of experts.
■ Output control from 30 to 100 %

Delivered condition

■ Fully assembled steel boiler for wood pellets and woodchips:
  – Combustion block with combustion retort:
  – Slanting external grate
  – Combustion chamber door
  – Ash doors
  – Ash pans
  – Boiler with horizontal heat exchanger
  – Cleaning equipment
■ Flue gas fan
■ Ventilation air fan (primary and secondary air fan)
■ Feed screw conveyor with barrier layer:
  – Extinguishing valve with dirt trap
  – Extinguishing water container with retainer

Standard delivery for sensors:
■ Sensors on the combustion block and in the flue outlet:
  – Limit switch, combustion chamber door
  – Positive pressure limiter
  – Negative pressure sensor
  – NiCrNi combustion chamber temperature sensor
  – Infrared light barriers, fuel level monitoring in combustion chamber
  – Zirconium dioxide probe with measured value transducer (Lambda probe)
  – Pt1000 flue gas temperature sensor with 1/2” x 280 mm sensor well
■ Sensors and switches installed at top of boiler:
  – Pt1000 boiler water temperature sensor in flow connector
  – Pt1000 return temperature sensor in return connector
  – High limit safety cut-out
Sensors and switches installed on the feed screw conveyor:
- Infrared light barrier for level monitoring of the barrier layer for the feed screw conveyor
- Safety limit switch on inspection cover of feed screw conveyor
- Pt1000 contact temperature sensor on the feed screw conveyor

Sensor in the low loss header (installation on site):
- Pt1000 system sensor with sensor well 1/2" x 280 mm (B28.1)
## 2.2 Specification

### Specification

<table>
<thead>
<tr>
<th>Rated heating output</th>
<th>kW</th>
<th>390</th>
<th>530</th>
<th>720</th>
<th>950</th>
<th>1250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. heat transfer</td>
<td>kW</td>
<td>117</td>
<td>159</td>
<td>216</td>
<td>285</td>
<td>375</td>
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<tr>
<td>Fuel efficiency</td>
<td>kW</td>
<td>424</td>
<td>576</td>
<td>783</td>
<td>1033</td>
<td>1359</td>
</tr>
</tbody>
</table>

### Performance data

| Rated heating output with standard fuel M45 | kW  | 390 | 530 | 720 | 950 | 1250 |
| Rated constant heating output with standard fuel M45 | kW  | 370 | 503 | 648 | 855 | 1125 |
| Minimum heating output Q<sub>min</sub> | kW  | 117 | 159 | 216 | 285 | 375  |

### Heating data

#### Flow temperature

| Permissible (safety temperature) | °C  | 100 | 100 | 100 | 100 | 100 |
| Maximum | °C  | 95  | 95  | 95  | 95  | 95  |
| Minimum | °C  | 75  | 75  | 75  | 75  | 75  |

#### Minimum return temperature | °C  | 65  | 65  | 65  | 65  | 65  |

### Permiss. operating pressure

| Boiler | bar | 6   | 6   | 6   | 6   | 6   |
|        | MPa | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| Test pressure | bar | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 |
| Safety heat exchanger | bar | 3 - 6 | 3 - 6 | 3 - 6 | 3 - 6 | 3 - 6 |
|                | MPa | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 |

### Thermally activated safety valve

| l/h | - | - | - | - | - |

### Water flow rate

| Flow rate (10 K diff.) | m³/h | 33.54 | 45.58 | 61.92 | 81.70 | 107.50 |
| Flow rate (15 K diff.) | m³/h | 22.36 | 30.39 | 41.28 | 54.47 | 71.67  |
| Flow rate (20 K diff.) | m³/h | 16.77 | 22.79 | 30.96 | 40.85 | 53.75  |

### Pressure drop on the water side

| Pressure drop on the water side (10 K diff.) | Pa  | 2314 | 4274 | 7888 | 5844 | 10118 |
| Pressure drop on the water side (15 K diff.) | Pa  | 1029 | 1900 | 3506 | 2597 | 4497  |
| Pressure drop on the water side (20 K diff.) | Pa  | 579  | 1069 | 1972 | 1461 | 2529  |

### Heating surface

| m²  | 25.44 | 33.88 | 49.47 | 66.75 | 79.04 |

### Total dimensions

| Total length | mm  | 4370 | 4870 | 5257 | 5447 | 5992  |
| Total width (boiler) | mm  | 1274 | 1247 | 1380 | 1612 | 1612  |
| Total width (boiler with feed screw conveyor) | mm  | 2382 | 2382 | 2488 | 2852 | 2852  |
| Total height (boiler) | mm  | 3186 | 3186 | 3378 | 3452 | 3717  |
| Total height (boiler with flue gas fan) | mm  | 4863 | 7160 | 8869 | 11463 | 12919 |

### Weight

| Boiler | kg  | 1680 | 2707 | 3291 | 4874 | 5563  |
| Combustion block | kg  | 2970 | 4238 | 4953 | 5779 | 6520  |
| Displacer rods | kg  | -   | -   | 394  | 538  | 538   |
| Flue gas fan | kg  | 60  | 62  | 78   | 82   | 107   |
| Feed screw conveyor | kg  | 153 | 153 | 153  | 190  | 190   |
| Total dry weight | kg  | 4863 | 7160 | 8869 | 11463 | 12919 |
| Total wet weight | kg  | 6076 | 8604 | 10730 | 13406 | 15400 |

### Capacity

| Boiler water | l   | 1213 | 1444 | 1861 | 1943 | 2482  |
| Content on hot gas side | l   | 1540 | 2280 | 2830 | 4050 | 5210  |
| Ash box, grate ash | l   | 240  | 240 | 240  | 240  | 240   |
| Ash box, flue gas dust extractor | l   | 240  | 240 | 240  | 240  | 240   |

---

*1. When the boiler and combustion chamber have been cleaned and the boiler is equipped with pneumatic boiler cleaning.

*2. Levelled output when boiler is used as base load boiler in continuous operation, equipped with pneumatic boiler cleaning and a runtime (time between 2 boiler cleaning operations) of 600 hours.

*3. Q ≥ Q<sub>min</sub>: Output operation modulating control (variable output control)

*4. Q ≤ Q<sub>min</sub>: Low load with ON Q<sub>min</sub>/ OFF (stop and go operation)

*5. Temperature adjustable at the control unit
<table>
<thead>
<tr>
<th></th>
<th>kW</th>
<th>390</th>
<th>530</th>
<th>720</th>
<th>950</th>
<th>1250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated heating output</td>
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<td>8420</td>
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<td>During heating operation</td>
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<td>2880</td>
<td>3570</td>
<td>4560</td>
<td>5170</td>
<td>6790</td>
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<td>2200</td>
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<td>Max. power consumption</td>
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<tr>
<td>Max. power consumption at Qₙ</td>
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<td>3570</td>
<td>4560</td>
<td>5170</td>
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<td>Boiler connections</td>
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<tr>
<td>Average flue gas temperature at Qₙ²⁸</td>
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<tr>
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<tr>
<td>Qₙ, M₅, O₂ 6 %</td>
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<td>393.2</td>
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<tr>
<td>Qₙ, M₄₅, O₂ 8 %</td>
<td>g/s</td>
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<tr>
<td>Qₙ, M₅, O₂ 6 %, 150 °C</td>
<td>m³/s</td>
<td>0.32</td>
<td>0.43</td>
<td>0.59</td>
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<td>Qₙ, M₄₅, O₂ 8 %, 150 °C</td>
<td>m³/s</td>
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<td>Required draught</td>
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<td>– Required at full load</td>
<td>Pa</td>
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<td>5</td>
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<td>Max. permissible draught⁹</td>
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<tr>
<td>– Full load¹⁰</td>
<td>%</td>
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<td>93.8</td>
<td>92.8</td>
<td>91</td>
<td>91</td>
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<tr>
<td>– Partial load</td>
<td>%</td>
<td>92.9</td>
<td>93.1</td>
<td>93.3</td>
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<td>Boiler category to EN 303-5</td>
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<td>3</td>
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</table>

¹⁶ Values for calculating the size of the flue system to EN 13384, based on 12 % O₂.
¹⁷ Actual flue gas temperature as average gross value in line with EN 304 at 20 °C combustion air temperature, based on 12 % O₂.
¹⁸ Flue gas temperature: Reduction possible by employing the displacer rods (Qₙ₋20 °C; Qᵦₙ₋10 °C)
¹⁹ In chimneys with a draught (chimney draught) above 0.15 mbar, a secondary air device (draught limiter) must be installed.
²⁰ Lower for dry fuel (M₅-M₂₀) without recirculation.
²¹ Lower for Vitoflex 300-UF, 720 to 1250 kW without displacer rods.
**Vitoflex 300-UF (cont.)**

**Dimensions**

![Diagram of Vitoflex 300-UF]

<table>
<thead>
<tr>
<th>KR</th>
<th>Boiler return</th>
</tr>
</thead>
<tbody>
<tr>
<td>KV</td>
<td>Boiler flow</td>
</tr>
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</table>

**Dimensions**

<table>
<thead>
<tr>
<th>Rated heating output</th>
<th>kW</th>
<th>390</th>
<th>530</th>
<th>720</th>
<th>950</th>
<th>1250</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>mm</td>
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<td>2536</td>
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<td>mm</td>
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<td>mm</td>
<td>4370</td>
<td>4870</td>
<td>5257</td>
<td>5447</td>
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<td>d</td>
<td>mm</td>
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<td>2560</td>
<td>2562</td>
<td>2562</td>
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<td>e</td>
<td>mm</td>
<td>577</td>
<td>577</td>
<td>577</td>
<td>657</td>
<td>657</td>
</tr>
<tr>
<td>f</td>
<td>mm</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td>1275</td>
<td>1275</td>
</tr>
<tr>
<td>g</td>
<td>mm</td>
<td>2405</td>
<td>2905</td>
<td>2993</td>
<td>2861</td>
<td>3406</td>
</tr>
<tr>
<td>h</td>
<td>mm</td>
<td>1086</td>
<td>1086</td>
<td>1380</td>
<td>1612</td>
<td>1612</td>
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<tr>
<td>k</td>
<td>mm</td>
<td>803</td>
<td>803</td>
<td>803</td>
<td>929</td>
<td>929</td>
</tr>
<tr>
<td>l</td>
<td>mm</td>
<td>453</td>
<td>453</td>
<td>453</td>
<td>479</td>
<td>479</td>
</tr>
<tr>
<td>m</td>
<td>mm</td>
<td>2077</td>
<td>2331</td>
<td>2491</td>
<td>2444</td>
<td>2639</td>
</tr>
<tr>
<td>n</td>
<td>mm</td>
<td>308</td>
<td>308</td>
<td>308</td>
<td>440</td>
<td>440</td>
</tr>
<tr>
<td>o</td>
<td>mm</td>
<td>1274</td>
<td>1274</td>
<td>1380</td>
<td>1612</td>
<td>1612</td>
</tr>
<tr>
<td>p</td>
<td>mm</td>
<td>1263</td>
<td>1417</td>
<td>1413</td>
<td>1317</td>
<td>1566</td>
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<tr>
<td>q</td>
<td>mm</td>
<td>2077</td>
<td>2220</td>
<td>2491</td>
<td>2444</td>
<td>2639</td>
</tr>
</tbody>
</table>
**Vitoflex 300-UF** (cont.)

Dimensions and overview of actuators and sensors

![Diagram of actuator and sensor layout]

A  Sensor well for thermally activated safety valve (TAS)  
B  Boiler return  
C  Return temperature sensor  
D  Drive, ash removal  
E  High limit safety cut-out  
F  Safety heat exchanger  
G  Primary air fan 1  
H  Boiler water temperature sensor  
I  Boiler flow  
J  Secondary air fan  
K  Feed screw conveyor

### Dimensions for boiler length

<table>
<thead>
<tr>
<th>Rated heating output</th>
<th>kW</th>
<th>390</th>
<th>530</th>
<th>720</th>
<th>950</th>
<th>1250</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>mm</td>
<td>3282</td>
<td>3782</td>
<td>3877</td>
<td>3835</td>
<td>4380</td>
</tr>
<tr>
<td>b</td>
<td>mm</td>
<td>3800</td>
<td>4300</td>
<td>4434</td>
<td>4392</td>
<td>4937</td>
</tr>
</tbody>
</table>
Overview

KV  Boiler flow
KR  Boiler return
A   Ash removal
B   Cleaning cover, flue gas collector
C   Combustion chamber temperature sensor
D   Pressure sensor
E   Light barrier, firebed
F   Ignition unit
G   Cleaning cover, combustion retort
H   Cleaning cover, external grate
K   Light barrier, ash removal

1  Boiler door
M   Cleaning, pneumatic
N   Combustion chamber door
O   Limit switch, combustion chamber door
P   Primary air fan 2
Q   Drive, infeed grate
R   Contact temperature sensor, feed screw conveyor
S   Limit switch, maintenance cover
T   Light barrier, feed screw conveyor
U   Extinguishing water connection
V   Boiler drain valve
3.1 Ecocontrol specification

Description

For part no., see pricelist
Wood combustion system control including activation of equipment for fuel charging according to the articles listed separately.

- The heating output is modulated to match the heat consumption.
- The control circuit for combustion optimisation with a Lambda probe overlaps the output control circuit.
- With regard to fire safety and personal safety, the highest possible quality criteria are fulfilled.
- Weather-compensated heating circuit control unit for up to 8 heating circuits.

Ecocontrol function

- Automatic ignition system (option)
- Output control circuit with modulating output operation (30 - 100 %)
  - Air-controlled: Variable speed ventilation air fan subject to boiler output.
  - Exact fuel supply via the feed screw conveyor (dosing hopper with barrier layer).
  - Topping up of the dosing hopper by means of level monitoring.
- Limitation of the burning mass in the combustion chamber by means of level monitoring.
- Emissions-optimised control circuit: Optimisation of the air supply through variable speed ventilation air and secondary fans with Lambda probe measurement to ensure optimum combustion.
- Limitation of the combustion chamber temperature with corresponding variation of air ratio for protection of the fireproof lining.
- The pressure regulator ensures constant negative pressure in the combustion chamber.
- Keeping up the return temperature with the boiler mixer ensures a long boiler service life.

Operation

Operation is via a touchscreen. All operating data can be read from the display. The set values of all important parameters can be entered easily. Fault messages are displayed in plain text and issued in the sequence of occurrence.

Touchscreen:
For operating the heating system.
The touchscreen integrated into the control panel door enables visualisation and graphic evaluation of the system.

Standard delivery package for Ecocontrol

- Compact control panel
  - Powder coated surface
  - Version as per ÖVE/VDE guidelines, fully wired to terminal strips
  - Feed 3 × 400 V, 50 Hz, control voltage 230 V or 24 V
  - Control panel temperature monitoring
  - Freely programmable control unit
  - Hybrid motor starter for all drives priced separately
  - Inverter for fan motors
- In the control panel door
  - 4-pole mains isolator
  - Graphics-capable touchscreen
  - Control panel fan (incl. Pt1000 control panel sensor)
  - Documentation incl. fixed wiring diagram, terminal connection diagram, operating instructions, installation instructions in the guide folder

- Integral LAN interface (touchscreen)

Note
The control panel must be installed on site.
For the standard delivery package for the sensors, see “Boiler delivered condition”.
If extending the heating circuits, the information in the chapter “Accessories for Ecocontrol function extension” must be observed.
3.2 Accessories for Ecocontrol

External drive switching without light barrier

For part no., see pricelist
Activation of an external conveyor drive or a rotary lock valve without reversing (changing the rotational direction).
The motors are protected against overload.

Standard delivery:
- Hybrid motor starter for the drive motor integrated into the control panel
- Input in control panel (safety limit switch on maintenance cover)
- Output in control panel (external conveyor drive)

Note
- The electrical output data of the existing conveyor device (kW, amps, volts) must be stated.
- The customer is responsible for delivery and installation of the safety switches of the external conveyor drive.
- Only with a defined limited material supply (upstream screw conveyor).

External drive switching with light barrier

For part no., see pricelist
Activation of an external conveyor drive without reversing (changing the rotational direction).
If there is a risk of overfilling in the charging system, the integral light barrier interrupts the upstream charging.
The motors are protected against overload.

Standard delivery:
- Hybrid motor starter for the drive motor integrated into the control panel
- Input in control panel (safety limit switch on maintenance cover)

Note
- Output in control panel (external conveyor drive)
- Infrared light barrier (screw conveyor inlet)

- The electrical output data of the existing conveyor device (kW, amps, volts) must be stated.
- The customer is responsible for delivery and installation of the safety switches.
- For the activation of a screw conveyor with external motor downstream of the external discharge.
3.3 Accessories for Ecocontrol output management

Additional heat generator demand (peak load heat generator)

For part no., see pricelist

Function:
With the "enable signal" (floating contact), an on-site peak load heat generator (oil or gas boiler) is activated when the cylinder temperature falls below a certain value. The temperature of start and stop points can be selected freely on the controller.

Standard delivery:
- Floating contact
- Submenu on touchscreen

Note
The controller and control unit for the oil or gas boiler is not included in the standard delivery.

Only possible in combination with 5-sensor cylinder management (QM).

Cylinder management with 5 sensors (QM)

For part no., see pricelist

The solid fuel boiler’s modulating output operation is optimised with the use of a heating water buffer cylinder. Short term heat demand peaks are also covered. The temperature sensors record the heating of the heating water buffer cylinder. The specification of the charging level of the heating water buffer cylinder is weather-compensated and carried out via the outside temperature sensor. The combustion heating output is matched to the average heating water buffer cylinder temperature.

Standard delivery:
- 5 Pt1000 sensors with connecting cable
- 5 sensor wells, R1/2 x 280 mm
- 1 Pt1000 outside temperature sensor

Note
No 0―10 V output signals possible.

External demand ON/OFF

For part no., see pricelist

A potential-free input is provided in the control panel for external ON/OFF control.

Note
ON/OFF control via an external N/O contact.

Only possible in combination with automatic ignition system.

Output signal 0-10 V

For part no., see pricelist

Issuing of boiler output as voltage signal and a connection to receive a maximum boiler output limit included in standard delivery.

Functions:
- Issue of the output signals
- Receipt and processing of an external output restriction

Processing of the 0-10 V output signals

<table>
<thead>
<tr>
<th>Function</th>
<th>from</th>
<th>to</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firebed maintenance</td>
<td>0.0</td>
<td>3.0</td>
<td>V</td>
</tr>
<tr>
<td>Output operation</td>
<td>3.1</td>
<td>10</td>
<td>V</td>
</tr>
</tbody>
</table>

Note
The boiler can only be shut down externally via "External demand ON/OFF"; this must be ordered separately.
3.4 Accessories for Ecocontrol remote transfer/remote monitoring

Analogue fault message device with battery

For part no., see pricelist
Transmits the boiler system text messages as a phone message. 4 different text messages are possible, as the fault message modem has 4 independent digital inputs.

To be carried out by the customer:
■ Installation of fault message device
■ Electrical connection of the fault message device
■ Connection of phone line
■ Configuration in accordance with the documentation

Standard delivery:
■ Analogue modem for wall mounting
■ Rechargeable battery pack (also works in the event of a power failure)
■ Plug-in power supply unit

Note
The fault message device can only send voice messages.

Exporting operating data via Modbus TCP/IP

For part no., see pricelist
Output of relevant boiler system operating data and fault messages via Ethernet to an on-site, higher ranking control system. On request, the flow temperature can be specified by the on-site, higher ranking control system. The number of data points depends on the supplied system.

Standard delivery:
■ Ethernet interface on touchscreen
■ Software module
■ Modbus TCP/IP
■ Data point list (on request)

External visualisation (hardwired)

For part no., see pricelist
Pack for the transmission of relevant data to an EDP workstation (internal and/or external) for visualisation, remote maintenance and operating data archiving of the boiler system. Hardware and software are integrated into the Ecocontrol control unit. All adjustable parameters can be changed from the IT workstation.

Standard delivery:
■ Industrial PC with interfaces for screen, keyboard and PC mouse for IT workstation close to boiler room
■ Windows operating system, remote maintenance software (Team Viewer) and visualisation/archiving software installed on the industrial PC

Images on the screen:
■ Cross-sectional image of boiler, 3D with display fields
■ Table of parameters (with change option)

To be carried out by the customer:
■ IT workstation for remote maintenance, installation of remote maintenance software
■ Network connection for remote maintenance purposes

Note
Option of additional fault message device, analogue with rechargeable battery pack – for part no., see pricelist.
3.5 Accessories for Ecocontrol function extension

Controller module

For part no., see pricelist

For extending the functionality of the Ecocontrol with up to 4 functions.

Note
A data cable (7522616) is also required for the controller module.

Standard delivery:
- Controller module in a plastic enclosure for wall mounting
  Width 325 mm, height 195 mm, depth 75 mm

Overview of controller module connection options

<table>
<thead>
<tr>
<th>Function</th>
<th>Abbreviation of function</th>
<th>Number of required functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating circuit</td>
<td>HC</td>
<td>1</td>
</tr>
<tr>
<td>DHW heating</td>
<td>TWE</td>
<td>1</td>
</tr>
<tr>
<td>DHW circulation pump</td>
<td>ZP</td>
<td>1</td>
</tr>
<tr>
<td>Solar circuit</td>
<td>SOL</td>
<td>On request</td>
</tr>
<tr>
<td>Heat pipeline</td>
<td>WFL</td>
<td>On request</td>
</tr>
<tr>
<td>Heating water buffer cylinder as substation (satellite buffer)</td>
<td>SAT</td>
<td>On request</td>
</tr>
</tbody>
</table>

Note
Accessories required for function extension (not in standard delivery)
- Contact temperature sensors (7528121) required for heating circuits
- Immersion temperature sensors (7528122) and R 1/2 200 mm sensor wells (7819693) required for DHW heating
- Room temperature sensor (option)

Data cable 10 m long

For part no., see pricelist

To connect the boiler control unit and controller module.

Note
The total length of all cables must not exceed 300 m.

Standard delivery:
- Prefabricated data cable CAN bus LiYCY 2 x 2 x 0.34 mm²
3.6 Accessories for function extension sensors

Temperature sensor for heating circuit

For part no., see pricelist
For recording the flow temperature of a heating circuit.

Standard delivery:
- Pt1000 contact temperature sensor
3.7 Controller for boiler sequence control/charging control panel

Charging control panel without boiler sequence control

For part no., see pricelist
This charging control panel is used to activate the shared discharging and conveying equipment of a twin boiler system without boiler sequence control. Boiler sequence control incl. buffer management is carried out by an on-site higher ranking control system (e.g. building management system).

Note
Required for each boiler system:
- Output signals 0-10 V
- External demand ON/OFF

Required for each drive (e.g. discharge, screw conveyors):
- External drive switching (with or without light barrier)

Charging control panel with boiler sequence control

For part no., see pricelist
This charging control panel is used to activate the shared discharging and conveying equipment of a twin boiler system with boiler sequence control, incl. buffer controller.

Note
Required for each drive (e.g. discharge, screw conveyors):
- External drive switching (with or without light barrier)

Buffer controller with boiler sequence control

For part no., see pricelist
This buffer controller is used to control buffer management in twin boiler systems. The Ecocontrol regulates buffer management incl. boiler sequence control.

Note
The boiler systems each have their own fuel charging system (discharge and conveying equipment).
4.1 Boiler accessories

Flue gas recirculation

For part no., see pricelist

Standard delivery:
- Inlet line made from heat-resistant steel, from flue outlet to inlet adaptor
- Inlet adaptor, ventilation air, with motorised cover
- Recirculation fan in heat-resistant design
- Supply line for gas mixture incl. dampers to the combustion block (internal and external grates)
- Software module in the controller

Note
Thermally insulating the flue gas recirculation line is the responsibility of the customer as part of the general thermal insulation work on flue gas and heating pipes.

Displacer rods

For part no., see pricelist

Installation of the displacer rods in the heat exchangers results in better heat transfer and therefore a considerable reduction in flue gas temperature. We only recommend their use when particularly low flue gas temperatures are required and when used as a base load boiler.

Note
In 390 and 530 kW boilers, DN 40 boiler pipes are used. As a result, the flow velocity of the flue gas is higher and there is no need for displacer rods in these boilers.

Automatic ignition system

For part no., see pricelist

The heating element is electronically protected against overload, eliminating the need for visual heating element monitoring. The heating element reliably achieves the specified maximum temperatures.

Function:
If the combustion chamber is filled accordingly with fuel, the ignition process is triggered.
The fuel is ignited with hot air. If ignition is successful, the ignition system switches off.
The fan of the ignition system runs on for approx. 1 minute. This cools the heating element and supplies the combustion chamber with outdoor air.

Specification

<table>
<thead>
<tr>
<th>Ignition system</th>
<th>Operating voltage V/Hz</th>
<th>230/50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure</td>
<td>Pa</td>
<td>2800</td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>1.1</td>
</tr>
<tr>
<td>Length</td>
<td>mm</td>
<td>335</td>
</tr>
<tr>
<td>Width</td>
<td>mm</td>
<td>85</td>
</tr>
<tr>
<td>Height</td>
<td>mm</td>
<td>85</td>
</tr>
<tr>
<td>Flame tube diameter</td>
<td>mm</td>
<td>31.5</td>
</tr>
<tr>
<td>Max. temperature</td>
<td>°C</td>
<td>650</td>
</tr>
<tr>
<td>Length of power cable</td>
<td>mm</td>
<td>2000</td>
</tr>
<tr>
<td>Connected load</td>
<td>kW</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Note
Automatic ignition only functions up to a max. fuel moisture content of M40.

Pneumatic cleaning

For part no., see pricelist

The whole tubular heat exchanger is cleaned with periodic blasts of compressed air during operation. The process of cleaning itself is carried out in consecutive blasting of the individual sections with compressed air. Ash is removed from the heat exchanger pipes by means of a very short but extremely intensive pressure pulse. The loosened particles are carried in the gas flow to the dust extractor, where they are separated out.
The device is integrated in the boiler door.
The number of cleaning processes within a unit of time (e.g. per hour) is matched to the boiler load. An individual, complete cleaning process comprises a sequence of pressure pulses across all sections of the heat exchanger.

Standard delivery:
- Nozzle part integrated in the boiler door, incl. connectors with heat dissipation discs
- Compressed air distributor with container and valves, connected to the nozzle part with heat-resistant hoses
- Compressor (rotation compressor) for municipal applications, incl. pressure regulator and pressure switch
- Compressed air hose up to max. 4.0 m in length
- Valves fully wired on terminal strip
- Software module in the controller
- Output terminals in control panel for power supply to the compressor (rotation compressor)

To be carried out by the customer:
- Provision of a socket 400 V / 16 A
- Connector for compressor 400 V / 16 A

Compressor specification

<table>
<thead>
<tr>
<th>Supply output</th>
<th>l/min</th>
<th>160</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder</td>
<td>l</td>
<td>90</td>
</tr>
<tr>
<td>Max. pressure</td>
<td>bar</td>
<td>10</td>
</tr>
<tr>
<td>Output</td>
<td>kW</td>
<td>1.5</td>
</tr>
<tr>
<td>Speed</td>
<td>rpm</td>
<td>1450</td>
</tr>
<tr>
<td>Voltage</td>
<td>V</td>
<td>3 x 400</td>
</tr>
<tr>
<td>Sound level</td>
<td>dB(A)</td>
<td>64</td>
</tr>
</tbody>
</table>

Specification

<table>
<thead>
<tr>
<th>Rated heating output kW</th>
<th>390</th>
<th>530</th>
<th>720</th>
<th>950</th>
<th>1250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of valves pce</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Size of valves 6/4&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VIESMANN

VITOFLEX 300-UF
### Installation accessories (cont.)

<table>
<thead>
<tr>
<th>Rated heating output</th>
<th>kW</th>
<th>390</th>
<th>530</th>
<th>720</th>
<th>950</th>
<th>1250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. air consumption under full load</td>
<td>l/h</td>
<td>3500</td>
<td>3500</td>
<td>4400</td>
<td>5300</td>
<td>5300</td>
</tr>
<tr>
<td>Additional weight (on the boiler)</td>
<td>kg</td>
<td>78</td>
<td>78</td>
<td>86</td>
<td>104</td>
<td>104</td>
</tr>
</tbody>
</table>

**Note**
The compressor (rotation compressor) should be installed in a cool place in the boiler room.
Pneumatic cleaning is also available without compressor – see pricelist.

### Feed screw conveyor, 2-stage

For part no., see pricelist
The version with two-stage feed screw conveyor enables operation to be matched to the fuel being used. It is optimised for shavings/woodchips (high level) on the one side and for wood pellets (low level) on the other.

**Standard delivery:**
- Feed screw conveyor geared motor, pole-changing (drive speed of the geared motor: 750/3000 rpm)
- Motor starter for geared motor
- Software module in the controller
4.2 Boiler accessories for safety equipment

**Note**
Observe the information in the chapter "Safety equipment to EN 12828". See page 91.

Thermally activated safety valve 100 °C

For part no., see pricelist
Standard version for fixed response temperature approx. 100 °C, connection G ¾

Water supply requirements:
- Cold water inlet DN 15 R ½
- Permanently connected with a metal pipe
- Min. 2.5 bar, max. 3.5 bar
- Drain pipe R ¾

Standard delivery:
- Thermally activated safety valve incl. sensor well

**Note**
We recommend using the thermally activated safety valve even if it is not required by local safety regulations.
2 pce required for boilers with output of 720 kW and higher.

Safety valves

For part no., see pricelist
The safety valve is installed at the highest point of the solid fuel boiler. Alternatively, the safety valve can also be fitted to a line that is connected to the highest point.
It must not be possible to shut off the line between the boiler and the safety valve. Pumps, fittings or constrictions must not be present in the line. The discharge pipe must be designed in such a way that no pressure increase is possible. Any expelled heating water must be drained off safely. The outlet point of the discharge pipe must be arranged in such a way that any water expelled from the safety valve can be drained off safely and visibly.

Available safety valves:
- Safety valve 3 bar (0.3 MPa)
- Safety valve 4 bar (0.4 MPa)
- Safety valve 6 bar (0.6 MPa)

Water level limiter

For part no., see pricelist
- For use as a low water indicator
- With valid component identification
- Installation in the heating flow outside the boiler

Maximum pressure limiter 0 to 6 bar

For part no., see pricelist
- With valid component identification
- Safety equipment to EN 12828

**Note**
Required for every boiler in multi boiler systems.

Minimum pressure limiter 0 to 6 bar

For part no., see pricelist
- For use as a replacement low water indicator
- With valid component identification

Fitting assembly with pressure gauge

For part no., see pricelist
For fitting a maximum pressure limiter and a minimum pressure limiter (2 free connections).

Flash trap replacement set

For part no., see pricelist
- Sensor well G 1/2 x 150 mm

**Standard delivery:**
- High limit safety cut-out
- Safety pressure limiter (maximum pressure limiter 0 to 6 bar positive pressure)
- With valid component identification
#### 4.3 Heat distribution accessories

**Motorised three-way valve (return temperature raising facility)**

For part no., see pricelist

<table>
<thead>
<tr>
<th>Rated heating output [kW]</th>
<th>Designation</th>
<th>DN [mm]</th>
<th>KVs [m³/h]</th>
<th>Servomotor 230 V</th>
<th>Incl. complete fittings</th>
</tr>
</thead>
<tbody>
<tr>
<td>390 - 1250</td>
<td>Motorised three-way valve, DN 50</td>
<td>50</td>
<td>40</td>
<td>SQK 33</td>
<td>Mating flanges, gaskets</td>
</tr>
<tr>
<td>390 - 1250</td>
<td>Motorised three-way valve, DN 65</td>
<td>65</td>
<td>63</td>
<td>SAL 31</td>
<td>Mating flanges, gaskets</td>
</tr>
<tr>
<td>390 and 530</td>
<td>Motorised three-way valve, DN 80</td>
<td>80</td>
<td>100</td>
<td>SAL 31</td>
<td>Mating flanges, gaskets</td>
</tr>
<tr>
<td>720</td>
<td>Motorised three-way valve, DN 100</td>
<td>100</td>
<td>160</td>
<td>SAL 31</td>
<td>Mating flanges, gaskets</td>
</tr>
<tr>
<td>950 and 1250</td>
<td>Motorised three-way valve, DN 125</td>
<td>125</td>
<td>550</td>
<td>SAL 31</td>
<td>Mating flanges, gaskets</td>
</tr>
</tbody>
</table>

**Note**

Not available separately: Only as part of an overall system

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**Circulation pumps**

**Wilo Stratos high efficiency circulation pumps**

For part no., see pricelist

- System extension by retrofitting communication modules LON, CAN, PLR, etc.
- Remote control via infrared interface (IR module/IR monitor)
- Energy efficiency class A
- ErP ready
- System temperature from -10 to +110 °C (no icing up)
- 1 × 230 V~, 50/60 Hz
- IP rating IP 44

<table>
<thead>
<tr>
<th>Rated heating output [kW]</th>
<th>Designation</th>
<th>DN [mm]</th>
<th>Installed length [mm]</th>
<th>Nominal pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>390</td>
<td>Wilo Stratos 65/1-12</td>
<td>65</td>
<td>360</td>
<td>PN 6/10</td>
</tr>
<tr>
<td>530 and 720</td>
<td>Wilo Stratos 80/1-12</td>
<td>80</td>
<td>360</td>
<td>PN 6/10</td>
</tr>
</tbody>
</table>

**Wilo Stratos IL inline circulation pump**

For part no., see pricelist

- Bidirectional force-flushed mechanical seal
- System temperature from -20 to +140 °C
- 3 × 400 V~, 50/60 Hz
- IP rating IP 55

**Wilo IL low pressure inline circulation pumps**

- Single stage low pressure centrifugal pump in inline design
- IEC standard motor
- Pump body with cataphoresis coating to prevent corrosion due to the formation of condensate

**Standard delivery:**

- Wilo Stratos IL inline circulation pump
- Pump with gaskets, mating flanges

<table>
<thead>
<tr>
<th>Rated heating output [kW]</th>
<th>Designation</th>
<th>DN [mm]</th>
<th>Installed length [mm]</th>
<th>Nominal pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1250</td>
<td>Wilo IL 100/145-1, 1/4</td>
<td>100</td>
<td>500</td>
<td>PN 16</td>
</tr>
</tbody>
</table>

**Note**

- Cannot be ordered separately: Delivery only as part of a complete system
- We reserve the right to select the pump manufacturers and types

**Pump selected according to:**

- Pump selected according to minimum requirements (see Specification page 14)
- Requirements of the relevant application
4.4 Accessories for flue gas dust extraction

Flue gas dust extractor with ash container

For part no., see pricelist

Flue gas dust extractor
The flue gas dust extractor minimises dust emissions and is designed as a multi cyclone with axial function. The dust extractor is fully insulated and has 3 covers for cleaning. The raw gas space is cleaned via the side cleaning cover. The clean gas space is cleaned via the upper or back cleaning cover (unused fan connection).

Ash container
The ash container is equipped with rollers and connected to the dust extractor with quick-action fasteners. It can be pulled out for emptying. The fan can be installed either on the side or the top.

Standard delivery:
- 1 flue gas dust extractor 240 or 800 l
- 1 ash container with a volume of 240 or 800 l

Note
The flue gas dust extractor is required for fuels with an increased percentage of fines. (Percentage of fines > 4 %)
Diagram of flue gas dust extractor

Positioning in 4 x 90° possible (ash container removal)

- A Flue gas fan (with variable rotation)
  - Either at the top or side
  - Unused connection as cleaning cover, clean gas space
- B Cleaning cover (raw gas space)
- C Dust extractor (axial cyclone)
- D Ash station
- E Lambda probe with transducer
- F Flue gas temperature sensor
- G Flue gas fan

Installation accessories (cont.)

VITOFLEX 300-UF
### Dimensions of flue gas dust extractor with 240 l ash container

<table>
<thead>
<tr>
<th>Rated heating output kW</th>
<th>390</th>
<th>530</th>
<th>720</th>
<th>950</th>
<th>1250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume l</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight with flue gas fan kg</td>
<td>500</td>
<td>500</td>
<td>517</td>
<td>535</td>
<td>559</td>
</tr>
</tbody>
</table>

### Dimensions

<table>
<thead>
<tr>
<th></th>
<th>a mm</th>
<th>b mm</th>
<th>c mm</th>
<th>d mm</th>
<th>e mm</th>
<th>f mm</th>
<th>g mm</th>
<th>h mm</th>
<th>k mm</th>
<th>l mm</th>
<th>m mm</th>
<th>n mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>350</td>
<td>447</td>
<td>2359</td>
<td>3186</td>
<td>1330</td>
<td>1256</td>
<td>600</td>
<td>2080</td>
<td>1670</td>
<td>620</td>
<td>1260</td>
<td>1330</td>
</tr>
<tr>
<td></td>
<td>350</td>
<td>447</td>
<td>2359</td>
<td>3186</td>
<td>1330</td>
<td>1256</td>
<td>600</td>
<td>2080</td>
<td>1670</td>
<td>620</td>
<td>1260</td>
<td>1330</td>
</tr>
<tr>
<td></td>
<td>350</td>
<td>447</td>
<td>2359</td>
<td>3186</td>
<td>1330</td>
<td>1256</td>
<td>600</td>
<td>2080</td>
<td>1670</td>
<td>620</td>
<td>1260</td>
<td>1330</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>579</td>
<td>2491</td>
<td>3378</td>
<td>1462</td>
<td>1300</td>
<td>660</td>
<td>2491</td>
<td>1730</td>
<td>620</td>
<td>1260</td>
<td>1300</td>
</tr>
<tr>
<td></td>
<td>450</td>
<td>579</td>
<td>2444</td>
<td>3452</td>
<td>1462</td>
<td>1300</td>
<td>690</td>
<td>2446</td>
<td>2083</td>
<td>620</td>
<td>1260</td>
<td>1300</td>
</tr>
</tbody>
</table>

### Dimensions of flue gas dust extractor with 800 l ash container

<table>
<thead>
<tr>
<th>Rated heating output kW</th>
<th>390</th>
<th>530</th>
<th>720</th>
<th>950</th>
<th>1250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume l</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight with flue gas fan kg</td>
<td>641</td>
<td>641</td>
<td>691</td>
<td>709</td>
<td>749</td>
</tr>
</tbody>
</table>

### Dimensions

<table>
<thead>
<tr>
<th></th>
<th>a mm</th>
<th>b mm</th>
<th>c mm</th>
<th>d mm</th>
<th>e mm</th>
<th>f mm</th>
<th>g mm</th>
<th>h mm</th>
<th>k mm</th>
<th>l mm</th>
<th>m mm</th>
<th>n mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>350</td>
<td>447</td>
<td>2359</td>
<td>3186</td>
<td>1330</td>
<td>1256</td>
<td>600</td>
<td>2080</td>
<td>1670</td>
<td>620</td>
<td>1260</td>
<td>1330</td>
</tr>
<tr>
<td></td>
<td>350</td>
<td>447</td>
<td>2359</td>
<td>3186</td>
<td>1330</td>
<td>1256</td>
<td>600</td>
<td>2080</td>
<td>1670</td>
<td>620</td>
<td>1260</td>
<td>1330</td>
</tr>
<tr>
<td></td>
<td>350</td>
<td>447</td>
<td>2359</td>
<td>3186</td>
<td>1330</td>
<td>1256</td>
<td>600</td>
<td>2080</td>
<td>1670</td>
<td>620</td>
<td>1260</td>
<td>1330</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>579</td>
<td>2491</td>
<td>3378</td>
<td>1462</td>
<td>1300</td>
<td>660</td>
<td>2491</td>
<td>1730</td>
<td>620</td>
<td>1260</td>
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<tr>
<td></td>
<td>450</td>
<td>579</td>
<td>2444</td>
<td>3452</td>
<td>1462</td>
<td>1300</td>
<td>690</td>
<td>2446</td>
<td>2083</td>
<td>620</td>
<td>1260</td>
<td>1300</td>
</tr>
<tr>
<td></td>
<td>500</td>
<td>579</td>
<td>2444</td>
<td>3452</td>
<td>1462</td>
<td>1300</td>
<td>690</td>
<td>2446</td>
<td>2083</td>
<td>620</td>
<td>1260</td>
<td>1300</td>
</tr>
</tbody>
</table>

### Available ash containers, reserve

- Ash container 90 l, reserve
- Ash container 240 l, reserve
- Ash container 800 l, reserve

For part no., see pricelist
4.5 Accessories for flue gas routing

*Note*
When designing the flue gas routing, observe the information in the chapter "Connection on the flue gas side". See page 96.

Flue bend 0 - 90°
For part no., see pricelist
Version: Black, without thermal insulation

Available flue bends:
- 250 mm diameter
- 300 mm diameter
- 350 mm diameter
- 400 mm diameter
- 450 mm diameter

Flue pipe, L = 1000 mm
For part no., see pricelist
Version: Black, without thermal insulation

Available flue pipes:
- 250 mm diameter
- 300 mm diameter
- 350 mm diameter
- 400 mm diameter
- 450 mm diameter
4.6 Accessories for sound insulation measures

Note
Observe the design information on "sound insulation". See page 97.

Anti-vibration fittings

Supports
For part no., see pricelist
To avoid the transmission of structure-borne noise during the operation of the fuel transportation equipment, the braces and the anchors of the relevant conveyor device are placed on high quality Sylomer bases (plastic anti-vibration mounts for noise attenuation) or anchored with a Sylomer support and a chipboard plate in the building structure. The anchor points with heavy load anchors are separated from the supports with Sylomer washers.

Standard delivery:
- Sylomer washer
- Sylomer pad
- Sylomer base
- Chipboard plate for the supports of the respective equipment

Available supports for:
- Discharge screw conveyor
- Screw conveyor
- Feed
- Flexible agitator discharge
- Horizontal discharge
- Ash removal
- Flue gas dust extractor

Note
- One anti-vibration fitting should be used for each means of fuel transport, e.g. 1 pce AH + 1 pce anti-vibration fitting AH-AS
- Installation room characteristics relating to the physical building structure largely determine the transmission of structure-borne noise in the building. It is important to note that the specified measures cannot provide complete noise and vibration isolation.
- Building related measures (wall openings, fire barriers, floating screeds, etc.) must be coordinated with structural engineers and architects and are not included in the standard delivery and therefore not within our area of responsibility.
4.7 Accessories for ash removal

Ash removal into an ash container

Complete screw conveyor ash removal from the ash chamber into an external, mobile, zinc-plated ash container. The level in the ash trough is monitored with a light barrier. If a certain level is exceeded, a specific amount of ash is conveyed into the container. In this way, the ash can cool down in the ash chamber under the combustion system. In standard mode, only cooled ash is fed into the container. For cleaning purposes, ash removal can be switched to continuous operation in the event of a boiler standstill.

Standard delivery:
- Boiler ash pan made from heat-resistant steel
- Combustion chamber screw conveyor made from heat-resistant steel
- Steeply inclined screw conveyor as a pipe conveyor with direct transfer from the ash removal screw conveyor
- Drive via geared screw conveyor motor
- Docking point with mobile ash container
- Activation of the screw conveyor drives
- Infrared light barrier for monitoring the level of ash in the combustion chamber

Available ash removal systems with ash container
- Ash removal into 240 l ash container (standard)
- Ash removal into 800 l ash container

Note
Additional reserve ash containers must be ordered separately.

System variants for ash removal into ash container

Docking point with mobile ash container can be installed at a 90° angle in each case. It is possible to select the direction in which the ash container is pulled out.
Installation accessories (cont.)

Ash removal to 240 l ash container
For part no., see pricelist

Ash removal into an ash container with a volume of 240 l

Ash removal to 800 l ash container
For part no., see pricelist

Ash removal into an ash container with a volume of 800 l

Combustion chamber screw conveyor extension
For part no., see pricelist

Note
Per metre
Up to 2 extensions are permissible
Installation accessories (cont.)

Extension for steeply inclined screw conveyor

For part no., see pricelist

Note
Per metre
Up to 2 extensions are permissible
### Installation accessories (cont.)

#### 4.8 Mobile cleaning equipment accessories

**Cleaning set with ash vacuum cleaner, 90 l**

Boiler cleaning set

For part no., see pricelist

![Image of mobile cleaning equipment](image)

<table>
<thead>
<tr>
<th>Standard delivery</th>
<th>Cleaning set with ash vacuum cleaner, 240 l</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSZ 2210 ash vacuum cleaner</td>
<td></td>
</tr>
<tr>
<td>Ash container, 90 l capacity</td>
<td></td>
</tr>
<tr>
<td>Cyclone cover for 90 l ash container</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trolley with toggle fastener</th>
<th>Metal hose 2 m</th>
<th>Metal hose 3 m</th>
<th>Vacuum gun, DN 50</th>
</tr>
</thead>
</table>

**Cleaning set with ash vacuum cleaner, 240 l**

Boiler cleaning set

For part no., see pricelist

<table>
<thead>
<tr>
<th>Standard delivery</th>
<th>Cleaning set with ash vacuum cleaner, 240 l</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSZ 2210 ash vacuum cleaner</td>
<td></td>
</tr>
<tr>
<td>Ash container 240 l capacity</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cyclone cover for 240 l ash container</th>
<th>Metal hose 2 m</th>
<th>Metal hose 3 m</th>
<th>Vacuum gun, DN 50</th>
</tr>
</thead>
</table>

**Available ash vacuum cleaner accessories:**

Boiler room cleaning accessory set:

- The room cleaning accessory set is offered as a complement to the ash vacuum cleaners.

See page 39.

<table>
<thead>
<tr>
<th>Ash container:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ash bin 90 l, reserve</td>
<td></td>
</tr>
<tr>
<td>Ash container 240 l, reserve</td>
<td></td>
</tr>
<tr>
<td>800 l ash container, with cover</td>
<td></td>
</tr>
</tbody>
</table>

See page 39.

### Ash vacuum cleaner

**WS ash vacuum cleaner**

For part no., see pricelist

Ash vacuum cleaner with body made from GRP and with low filter loading on the cell filter. Motors are cooled separately.

**DS ash vacuum cleaner**

For part no., see pricelist

Ash vacuum cleaner with body made from GRP and with low filter loading on the cell filter. Motors are cooled separately.

#### Specification

<table>
<thead>
<tr>
<th>Ash vacuum cleaner</th>
<th>WSZ 2210</th>
<th>WS</th>
<th>DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>W</td>
<td>2 x 1000</td>
<td>1 x 3600</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>V</td>
<td>230</td>
<td>230</td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>46</td>
<td>49</td>
</tr>
<tr>
<td>Vacuum</td>
<td>mm WC</td>
<td>1950</td>
<td>2100</td>
</tr>
<tr>
<td>Air flow rate</td>
<td>m³/h</td>
<td>270</td>
<td>430</td>
</tr>
<tr>
<td>Filter surface area</td>
<td>m²</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Sound level</td>
<td>dB(A)</td>
<td>64</td>
<td>69</td>
</tr>
<tr>
<td>Maximum total length of permanently installed pipework for the flue gas extraction system</td>
<td>m</td>
<td>Permanently installed pipework is not permissible</td>
<td>20</td>
</tr>
</tbody>
</table>
### Installation accessories (cont.)

<table>
<thead>
<tr>
<th>Ash vacuum cleaner</th>
<th>WSZ 2210</th>
<th>WS</th>
<th>DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal diameter of permanently installed pipework for the flue gas extraction system from the ash vacuum cleaner to the pre-separator</td>
<td>NW</td>
<td>Permanently installed pipework is not permissible</td>
<td>76</td>
</tr>
<tr>
<td>Nominal diameter of permanently installed pipework for the flue gas extraction system from the pre-separator to the suction point</td>
<td>NW</td>
<td>Permanently installed pipework is not permissible</td>
<td>76</td>
</tr>
<tr>
<td>Max. height differential from the suction point to the pre-separator</td>
<td>m</td>
<td>Permanently installed pipework is not permissible</td>
<td>5</td>
</tr>
</tbody>
</table>

### Ash vacuum cleaner accessories

#### Vacuum gun, DN 50
For part no., see pricelist
The vacuum gun is connected with the metal hose. It is used to clean the heat exchanger pipes. For this purpose, the cleaning brush is attached to the vacuum gun, and the vacuum gun to the heat exchanger pipe. Movement of the cleaning brush cleans the surfaces, whilst the dirt is removed by the ash vacuum cleaner.

For part no., see pricelist

#### Vacuum hose, plastic, DN 50
The vacuum hose can be used for general cleaning. It is unsuitable for hot ash.

For part no., see pricelist

#### Vacuum hose, metal, DN 50
The vacuum hose can be used for general cleaning and to clean the boiler.

For part no., see pricelist

#### Boiler room cleaning accessory set
For part no., see pricelist

#### Standard delivery
- Vacuum hose, plastic, DN 50, 3 m, including connection
- Bent mouth piece, DN 50

#### Accessories for mobile cleaning equipment, ash containers

**Ash container 90 l, reserve**
For part no., see pricelist

**Ash container 240 l, reserve**
For part no., see pricelist

**Cyclone cover for 240 l ash container**
For part no., see pricelist
The cyclone cover is intended for the connection of the ash vacuum cleaner hoses to the ash container. It is equipped with a spark arrestor [sieve]. Ventilation air and extract air connections, DN 76

**800 l ash container with cover**
For part no., see pricelist

#### Standard delivery
- 800 l zinc-plated ash container with hinged cover
- Cover gasket
- Ventilation air and extract air connection to the cover (DN 76)
- Spark arrestor [sieve]
4.9 Burn-back protection devices (RSE)

Note
In wood processing operations, 2 burn-back protection devices connected in series are required.
For example 2 rotary lock valves or 1 rotary lock valve in combination with a shut-off gate valve.

Rotary lock valve

For part no., see pricelist
Rotary lock valve for fire-safe separation of the combustion system from the fuel store with positive pressure, and with simultaneous material transportation for installation in a drop section. The rotary valve is made entirely from steel and is permissible as fire protection between the combustion system and woodchip silos in wood processing operations with positive pressure. The drive device is a spur geared motor with sprung torque support. If the woodchips are extremely coarse, reversing the direction of rotation of the rotary lock valve avoids jamming.
Fire safety: RSE to TRVB H-118

Application:

MZ 260:
- Use only with fuels up to max. P16S to EN ISO 17225-4 and a conveyor device with a diameter of 150 mm or 190 mm

MZ 340:
- Use only with fuels up to max. P31S to EN ISO 17225-4 and a conveyor device with a diameter of 190 mm or 250 mm

Max. permissible positive pressure in the fuel store: + 500 Pa
Max. permissible negative pressure in the fuel store: ± 0 Pa

Standard delivery:
- Rotary lock valve as per order data
- Activation of spur geared motor for both rotational directions according to boiler control unit

Positioning:
- Directly above the feed screw conveyor
- Exception for funnel discharge: Directly at the discharge

Dimensions of rotary lock valve

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Rotary lock valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>MZ 260</td>
</tr>
<tr>
<td>a (mm)</td>
<td>330</td>
</tr>
<tr>
<td>b (mm)</td>
<td>264</td>
</tr>
<tr>
<td>c (mm)</td>
<td>709</td>
</tr>
<tr>
<td>d (Di) (mm)</td>
<td>202</td>
</tr>
<tr>
<td>d (Da) (mm)</td>
<td>250</td>
</tr>
<tr>
<td>e (Di) (mm)</td>
<td>202</td>
</tr>
<tr>
<td>e (Da) (mm)</td>
<td>250</td>
</tr>
<tr>
<td>f (mm)</td>
<td>348</td>
</tr>
<tr>
<td>Drive rating (kW)</td>
<td>0.75</td>
</tr>
<tr>
<td>Drive speed (rpm)</td>
<td>25</td>
</tr>
</tbody>
</table>

Shut-off gate valve MA 220

For part no., see pricelist
Fire safety-tested device for installation in a drop section, for mechanical separation of combustion system from unpressurised fuel store. The shut-off gate valve is opened by a motor and closed by spring balancer with zero current in the event of burnout, risk of burn-back or power failure.

Material: Steel
Drive: Spring return motor
Fire safety: RSE to TRVB H-118

Standard delivery:
- Shut-off gate valve as per order data
- Activation of shut-off gate valve according to boiler control unit
- Spring return motor (torque 30 Nm)

Note
In wood processing operations, 2 burn-back protection devices connected in series are required (e.g. 2 rotary lock valves or one rotary lock valve in combination with a shut-off gate valve).
Installation accessories (cont.)

**Drop chute L = 1.0 m**

For part no., see pricelist
Connection of a drop section between the discharge system or conveyor device and an onward conveyor device by means of a drop chute.

**Note**
The drop chute is 1 m long. The design (diameter, profile) of the drop chute is matched to the relevant project at the factory.

**Special adaptor**

For part no., see pricelist
Connection of a drop section between the external discharge system and an onward conveyor device by means of a special adaptor.

**Note**
The existing on-site flange must be described (dimensions, hole pattern) when ordering.

Note
The design (diameter, profile) of the special adaptor is matched to the relevant project at the factory.
Fuel discharge

5.1 Application options for extraction system by fuel

Overview

<table>
<thead>
<tr>
<th>Extraction system</th>
<th>Page</th>
<th>Pellets according to EN ISO 17225-2</th>
<th>Woodchips according to ÖNORM M 7133</th>
<th>Woodchips according to EN ISO 17225-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pellet extraction screw conveyor</td>
<td>From p. 43</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizontal discharge AH</td>
<td>From p. 45</td>
<td>X X X</td>
<td>X X X X X</td>
<td></td>
</tr>
<tr>
<td>Funnel discharge</td>
<td>From p. 52</td>
<td>X X X</td>
<td>X X X X</td>
<td></td>
</tr>
<tr>
<td>Pushrod discharge</td>
<td>From p. 54</td>
<td>X X X</td>
<td>X X X X</td>
<td></td>
</tr>
</tbody>
</table>

*11 With coarse fraction limitation (< 1 %) to 125 mm
5.2 Fuel extraction with screw conveyor

Pellet extraction screw conveyor, D = 120 mm

For part no., see pricelist
The discharge screw conveyor is used to transport wood pellets from a rectangular fuel store. The wood pellets trickle via a tilted intermediate floor into the screw conveyor channel. The screw conveyor located in this channel transports the wood pellets to the outlet.

Standard delivery:
- Pellet discharge screw conveyor as per project drawing

To be carried out by the customer:
Delivery and installation of the intermediate floor (preferably made of wood) incl. static calculation and design. The forces resulting from the weight of the combustion material (approx. 650 kg/m³) should be transferred through the floor of the fuel store and not through the discharge screw conveyor. Observe this when designing the intermediate floor.

Note
- Article price per m
- Total length in m = length of conveyor channel (a + b)
- Max. conveyor channel length = 10 m

Note
- For inclines of 0° to 8°
- Exclusively for wood pellets
- Boiler output up to 1250 kW

Specification

<table>
<thead>
<tr>
<th>Pellet discharge screw conveyor</th>
<th>D = 120 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>mm</td>
</tr>
<tr>
<td>b</td>
<td>mm</td>
</tr>
<tr>
<td>c</td>
<td>mm</td>
</tr>
<tr>
<td>d</td>
<td>mm</td>
</tr>
<tr>
<td>e</td>
<td>mm</td>
</tr>
<tr>
<td>Total length in m = length of conveyor channel (a + b)</td>
<td></td>
</tr>
<tr>
<td>Max. conveyor channel length = 10 m</td>
<td></td>
</tr>
</tbody>
</table>

Diagram:

- Possible outlet in the fuel store
- Drive, either on the left or right
### Fuel discharge (cont.)

#### Standard version

![Diagram of standard version](image)

- Intermediate floor (on site)

#### Version with sound insulation

![Diagram of version with sound insulation](image)

- Intermediate floor with sound insulation (on site)

### Pellet discharge screw conveyor drive

**For part no., see pricelists**

The system is driven by a spur geared motor and a chain with a dust-proof chain guard. The geared motors are sized at the factory.

**Standard delivery:**
- Drive unit
- Spur geared motor matched to boiler size and pump rate

- Switching the spur geared motor 3 x 400 V
- Discharge with inspection cover, safety limit switch and drop chute/adaptor for the following conveyor device
5.3 Fuel discharge with agitators

**Horizontal discharge AH**

- **For part no., see pricelist**
  - Horizontal discharge up to 5.0 m diameter
  - Horizontal discharge up to 6.0 m diameter

Horizontal discharge with bottom agitator as a heavy-duty version, especially for larger volumes and/or high boiler outputs. The two agitator arms each comprise one or two (depending on size) articulated arms and an externally fitted leaf spring package. The agitator is driven subject to the fill level of the discharge screw conveyor (control via light barrier).

The discharge screw conveyor itself functions independently of the agitator by a separate drive unit in accordance with boiler demand. The result is trouble-free operation and a long service life. In wood pellet applications, a cover panel is required over the screw conveyor channel. Maximum fill level and maximum slope must be observed.

**Standard delivery:**
- Horizontal discharge as per project drawing
  - Bottom agitator with two arms and external drive with shaft routed to inside
  - Bottom agitator drive 3 x 400 V, with geared screw conveyor motor and torque support
  - Switching by the boiler control unit with enabling of the discharge screw conveyor

**Specification**

<table>
<thead>
<tr>
<th>Max. fill level</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BD650 wood pellets</td>
<td>m</td>
</tr>
<tr>
<td>BD350 briquettes</td>
<td>m</td>
</tr>
<tr>
<td>BD350 woodchips</td>
<td>m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max boiler output</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BD650 wood pellets</td>
<td>kW</td>
</tr>
<tr>
<td>BD350 briquettes</td>
<td>kW</td>
</tr>
<tr>
<td>BD250 woodchips</td>
<td>kW</td>
</tr>
<tr>
<td>BD350 woodchips*12</td>
<td>kW</td>
</tr>
<tr>
<td>BD450 woodchips*12</td>
<td>kW</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Horizontal discharge AH</th>
<th>AH up to 5 m</th>
<th>AH up to 6 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge circle f m</td>
<td>3.8</td>
<td>4.5</td>
</tr>
<tr>
<td>Weight excluding conveyor channel kg</td>
<td>480</td>
<td>480</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Torque of the drives</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>At agitator centre ① Nm</td>
<td>approx. 2900</td>
</tr>
<tr>
<td>At discharge centre ⑧ Nm</td>
<td>approx. 800</td>
</tr>
</tbody>
</table>

*12 If the fuel is approved for the boiler

Note:
The discharge screw conveyor must be ordered separately.

*Speed/output of the drives: sizing by Viessmann*
Fuel discharge (cont.)

Sizing of the horizontal discharge AH with agitator and discharge screw conveyor

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Min. length of protective panel for fuel store walls</td>
</tr>
<tr>
<td>b</td>
<td>Sealed channel</td>
</tr>
<tr>
<td>c</td>
<td>Open conveyor channel downstream of agitator centre</td>
</tr>
<tr>
<td>d</td>
<td>Open conveyor channel upstream of agitator centre, max 2.8 m</td>
</tr>
<tr>
<td>e</td>
<td>Wall clearance to centre</td>
</tr>
<tr>
<td>f</td>
<td>Discharge circle from 3.9 to 6.1 m subject to situation of fuel store</td>
</tr>
<tr>
<td>g</td>
<td>Effective scope 0.8 to 0.95 x f</td>
</tr>
<tr>
<td>h</td>
<td>Max. discharge screw conveyor length 10 m</td>
</tr>
</tbody>
</table>

**Note**

Sizing is influenced by several factors:
- Fuel
- Installation position
- Compression, etc.

Sizing is determined individually for each system by Viessmann.
Fuel discharge (cont.)

Installation position, horizontal

Section A - A

Section B - B

Installation position, angled

Max. angle of inclination a subject to fuel

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>BD650 wood pellets</td>
<td>6°</td>
</tr>
<tr>
<td>BD350 briquettes</td>
<td>8°</td>
</tr>
<tr>
<td>BD350 woodchips</td>
<td>15°</td>
</tr>
</tbody>
</table>
**Fuel discharge** (cont.)

Detailed view of concrete-lined finished floor

![Diagram of concrete-lined finished floor]

Installation information for intermediate floors
- Design the support structure of the intermediate floor to ensure that the weight of the fuel does not bear on the screw trough.
- Build the intermediate floor after installing the discharge.
- Ensure that the intermediate floor incl. substructure is at the same level as the screw trough.
- The leaf spring bundles must be able to rotate without touching the intermediate floor. Observe the minimum clearance.
- Take into account any hatches required for maintenance and inspection.

Section C - C

![Diagram of Section C - C]

Discharge screw conveyor AH to horizontal discharge AH

For part no., see pricelist
The arms of the horizontal discharge move the fuel into the conveyor channel inside the fuel store. The conveyor channel is open inside the fuel store and sealed outside the fuel store.

Standard delivery:
- Conveyor channel running through the entire system with specially adapted discharge screw conveyor

**Note**
- Article price per m
- Max. discharge screw conveyor AH length = 10 m
- Total price = total length h in m x unit price

Additional discharge screw conveyor AH, per m

For part no., see pricelist
For two-boiler discharge systems with a total system output of up to 1440 kW. Extension possible up to 10 m. Conveyor channel running through the entire system with specially adapted discharge screw conveyor.
**Fuel discharge (cont.)**

![Diagram](image)

**Design/engineering information for additional discharge screw conveyor AH**

- A round discharge device and additional discharge screw conveyor must be installed at the same angle, otherwise there is a risk of the agitator colliding with the additional discharge screw conveyor.
- The additional discharge screw conveyor should be positioned in the area below the agitator.
- If the screw conveyors are installed in parallel, maintain a minimum clearance (a) of 650 mm between the two discharge screw conveyors.
- Ensure there is enough space between the screw conveyors to fit the support feet.
- Ensure there is enough space between the additional discharge screw conveyor and the angular gear of the agitator, as well as between the profiled channels, to fit the support feet.

- Max. boiler output for agitator: 1440 kW (for woodchips)
- Max. boiler output for additional discharge screw conveyor: 720 kW (for woodchips)
- In two-boiler systems where the boilers have different rated heating outputs, provide fuel to the boiler with the lower rated heating output via the additional discharge screw conveyor.

**Standard delivery:**

- Additional discharge screw conveyor for two-boiler system

**Note**

*Article price per m*

- Max. length of discharge screw conveyor AH = 10 m
- Total price = total length h in m x unit price
Substructure AH

For part no., see pricelist
Substructure for horizontal discharge, for installation in a fuel store with no concrete plinth

Dimensions

Substructure AH installation position

- Horizontal discharge AH
- Substructure AH
**Fuel discharge (cont.)**

**Protective panel AH for the fuel store wall**

*For part no., see pricelist*

Metal cover to protect the fuel store wall from damage by the agitator arms. The protective panel is attached to the straight internal fuel store wall.

**Standard delivery:**
- 2 - 4 protective panels, painted, dimensions 1000 x 250 x 4 mm
- Rawl plugs and screws

---

**Cover panel AH for wood pellets**

*For part no., see pricelist*

Metal cover of the open screw conveyor area to reduce the inlet cross-section

**Note**

*When changing the fuel, observe the following:*
- **Changeover from wood pellets to woodchips:**
  - remove the cover panels above the discharge screw conveyor before filling the fuel store with woodchips.
- **Changeover from woodchips to pellets:**
  - install the cover panels above the discharge screw conveyor before filling the fuel store with wood pellets.

**Standard delivery**
- Cover panel, painted
- Length and number matched to the project
- Screws
5.4 Fuel extraction with funnel discharge

**Funnel discharge AP**

*Standard delivery:*
- Funnel discharge with drive unit 3 x 400 V
- Automatic switching of the drive for the spur geared screw conveyor motor for both rotational directions
- Safety limit switch installed on inspection cover of discharge casing

**For part no., see pricelist**
- Funnel discharge up to 6.0 m diameter
- Funnel discharge up to 7.5 m diameter

Fuel discharge by means of an agitator installed underneath a funnel. In its centre, the discharge screw conveyor is driven via a solid universal joint. When the fuel store is full, the screw conveyor inclines towards a vertical position. The funnel limits the angle of the screw conveyor when the fuel store is empty. The agitator is driven via a spur geared screw conveyor motor. In the case of fuel compression in the discharge casing as a result of increased drive power consumption, the supply direction of the screw conveyor is changed for a period set at the factory. This releases the compression, preventing a fault.

**Specification**

<table>
<thead>
<tr>
<th>Funnel discharge</th>
<th>AP up to 6 m</th>
<th>AP up to 7.5 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. diameter of discharge circle</td>
<td>m</td>
<td>6.0</td>
</tr>
<tr>
<td>Max. possible fill level</td>
<td>m</td>
<td>10.8</td>
</tr>
<tr>
<td>Boiler outputs with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BD650 wood pellets</td>
<td>kW</td>
<td>3000</td>
</tr>
<tr>
<td>BD200 woodchips</td>
<td>kW</td>
<td>1250</td>
</tr>
<tr>
<td>BD100 shavings</td>
<td>kW</td>
<td>1250</td>
</tr>
<tr>
<td>Screw conveyor output</td>
<td>kW</td>
<td>1.1</td>
</tr>
</tbody>
</table>

**Dimensions**

<table>
<thead>
<tr>
<th>Funnel discharge</th>
<th>AP up to 6 m</th>
<th>AP up to 7.5 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Discharge circle</td>
<td>m</td>
</tr>
<tr>
<td>b</td>
<td>Funnel diameter</td>
<td>mm</td>
</tr>
<tr>
<td>c</td>
<td>Max. possible fill level</td>
<td>m</td>
</tr>
<tr>
<td>d</td>
<td></td>
<td>mm</td>
</tr>
<tr>
<td>e</td>
<td></td>
<td>mm</td>
</tr>
<tr>
<td>f</td>
<td></td>
<td>mm</td>
</tr>
</tbody>
</table>

*For fuel store diameters > 6 m, the large funnel must be ordered.*
**Fuel discharge (cont.)**

**Additional outlet flange AP**
For part no., see pricelist
Additional connection option for conveyor devices on discharge casing for two-boiler systems

**Funnel, large**
For part no., see pricelist
The standard delivery of the funnel discharge includes a funnel with a diameter of 2200 mm. For fuel store diameters > 6 m, the large funnel must be ordered for the funnel discharge.
5.5 Fuel extraction with hydraulic push floor discharge system

Specification for push floor discharge

Pushrod discharge

The fuel discharge with pushrods is suitable for rectangular fuel stores of various dimensions. The forward and return strokes of the pushrods cause the vanes to discharge the fuel from the fuel store and push it into a further conveyor device (push floor screw conveyor). The forward and return strokes are achieved with a hydraulic drive.

The number of pushrods is subject to the fuel store width and the required dumping height. Subject to fuel weight and fuel store length, pushrods of different width are used. The pushrod vanes are welded to the pushrod during installation. Retaining profiles fixed to the floor are attached between the pushrod vanes. The drive cylinder is anchored in the foundation with a special cylinder retainer.

Note

This version of fuel discharge can result in large forces acting on the building (see chapter "Forces on the building").

Maximum dumping heights

Number and length of the pushrods

 Applies to pushrod discharge with
- Pushrod drive, individual
- Pushrod drive, twin

Note

*Drive-over pushrod discharge:*
A drive-over pushrod discharge requires a material cover of at least 40 cm.

### Maximum permissible dumping heights

The max. permissible dumping heights are stated as a function of pushrod width and length and the fuel. A distinction is made between the following fuels:
- With a poured weight ≥ 200 kg/m³ (BD200)
- With a poured weight ≥ 350 kg/m³ (BD350)
- With a poured weight ≥ 450 kg/m³ (BD450)
- With a poured weight ≥ 650 kg/m³ (BD650)

#### Max. permissible dumping height for BD200 fuel

<table>
<thead>
<tr>
<th>Width</th>
<th>2.5</th>
<th>2.25</th>
<th>2.0</th>
<th>1.75</th>
<th>1.5</th>
<th>1.25</th>
<th>1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length 12 m</td>
<td>3.1</td>
<td>3.6</td>
<td>4.0</td>
<td>4.6</td>
<td>5.4</td>
<td>6.4</td>
<td>8.0</td>
</tr>
<tr>
<td>Length 10 m</td>
<td>3.9</td>
<td>4.3</td>
<td>4.9</td>
<td>5.6</td>
<td>6.5</td>
<td>7.8</td>
<td>9.8</td>
</tr>
<tr>
<td>Length 8 m</td>
<td>5.0</td>
<td>5.5</td>
<td>6.2</td>
<td>7.2</td>
<td>8.3</td>
<td>10.0</td>
<td>12.5</td>
</tr>
<tr>
<td>Length 6 m</td>
<td>6.9</td>
<td>7.7</td>
<td>8.6</td>
<td>9.9</td>
<td>11.5</td>
<td>13.8</td>
<td>17.3</td>
</tr>
</tbody>
</table>

#### Max. permissible dumping height for BD350 fuel

<table>
<thead>
<tr>
<th>Width</th>
<th>2.5</th>
<th>2.25</th>
<th>2.0</th>
<th>1.75</th>
<th>1.5</th>
<th>1.25</th>
<th>1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length 10 m</td>
<td>2.7</td>
<td>3.0</td>
<td>3.5</td>
<td>3.9</td>
<td>4.6</td>
<td>5.5</td>
<td>6.8</td>
</tr>
<tr>
<td>Length 8 m</td>
<td>3.5</td>
<td>3.9</td>
<td>4.4</td>
<td>5.0</td>
<td>5.8</td>
<td>7.0</td>
<td>8.7</td>
</tr>
<tr>
<td>Length 6 m</td>
<td>4.9</td>
<td>5.4</td>
<td>6.0</td>
<td>6.9</td>
<td>8.0</td>
<td>9.7</td>
<td>12.0</td>
</tr>
</tbody>
</table>

#### Max. permissible dumping height for BD450 fuel

<table>
<thead>
<tr>
<th>Width</th>
<th>2.5</th>
<th>2.25</th>
<th>2.0</th>
<th>1.75</th>
<th>1.5</th>
<th>1.25</th>
<th>1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length 10 m</td>
<td>2.1</td>
<td>2.4</td>
<td>2.7</td>
<td>3.0</td>
<td>3.5</td>
<td>4.25</td>
<td>5.3</td>
</tr>
<tr>
<td>Length 8 m</td>
<td>2.7</td>
<td>3.0</td>
<td>3.4</td>
<td>3.9</td>
<td>4.5</td>
<td>5.43</td>
<td>6.79</td>
</tr>
<tr>
<td>Length 6 m</td>
<td>3.8</td>
<td>4.2</td>
<td>4.7</td>
<td>5.4</td>
<td>6.3</td>
<td>7.52</td>
<td>9.40</td>
</tr>
</tbody>
</table>

#### Max. permissible dumping height for BD650 fuel

<table>
<thead>
<tr>
<th>Width</th>
<th>2.5</th>
<th>2.25</th>
<th>2.0</th>
<th>1.75</th>
<th>1.5</th>
<th>1.25</th>
<th>1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length 12 m</td>
<td>1.2</td>
<td>1.3</td>
<td>1.4</td>
<td>1.7</td>
<td>2.0</td>
<td>2.4</td>
<td>3.0</td>
</tr>
<tr>
<td>Length 10 m</td>
<td>1.5</td>
<td>1.7</td>
<td>1.8</td>
<td>2.1</td>
<td>2.5</td>
<td>3.0</td>
<td>3.7</td>
</tr>
<tr>
<td>Length 8 m</td>
<td>1.9</td>
<td>2.1</td>
<td>2.4</td>
<td>2.7</td>
<td>3.2</td>
<td>3.8</td>
<td>4.7</td>
</tr>
<tr>
<td>Length 6 m</td>
<td>2.6</td>
<td>2.9</td>
<td>3.3</td>
<td>3.8</td>
<td>4.3</td>
<td>5.2</td>
<td>6.5</td>
</tr>
</tbody>
</table>

Pushrod drive specification

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Pushrod drive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td><strong>Single</strong></td>
</tr>
<tr>
<td>Piston diameter</td>
<td>mm</td>
</tr>
<tr>
<td>Piston rod diameter</td>
<td>mm</td>
</tr>
<tr>
<td>Lift</td>
<td>mm</td>
</tr>
<tr>
<td>Test pressure at 190 bar (19 MPa) FZD</td>
<td>bar (MPa)</td>
</tr>
<tr>
<td>Pressure force at 190 bar (19 MPa) FZZ</td>
<td>kN</td>
</tr>
<tr>
<td>Pressure force at 190 bar (19 MPa) FZD</td>
<td>kN</td>
</tr>
<tr>
<td>Length from centre of cylinder – piston boss</td>
<td>mm</td>
</tr>
</tbody>
</table>
Forces on the building

If the pushrod discharge comprises multiple pushrods, they move in opposite directions. This means: cylinder 1 pulls, cylinder 2 pushes, cylinder 3 pulls, etc. The pushrod with the least resistance moves to its end position first, then the next one.

When all pushrods are in the end position, the pressure diverter valve switches to the opposite direction. The pressure diverter valve is factory set to 190 bar (19 MPa).

Note
The forces to be taken into consideration vary from project to project. Consequently, Viessmann should be consulted on this matter.

---

### Fuel discharge (cont.)

#### Forces on the building

If the pushrod discharge comprises multiple pushrods, they move in opposite directions. This means: cylinder 1 pulls, cylinder 2 pushes, cylinder 3 pulls, etc. The pushrod with the least resistance moves to its end position first, then the next one.

When all pushrods are in the end position, the pressure diverter valve switches to the opposite direction. The pressure diverter valve is factory set to 190 bar (19 MPa).

---

### Applications of push floor discharge

#### Slot discharge for pulling

The drawing below is a schematic diagram. A project-specific drawing must be produced for construction design.

---

<table>
<thead>
<tr>
<th>Number of pushrods</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS1 (FS) mm</td>
<td>1 x FS1</td>
<td>1 x FS1</td>
<td>2 x FS1</td>
</tr>
<tr>
<td>FR1 (FR) mm</td>
<td>1 x FR1</td>
<td>1 x FR1</td>
<td>2 x FR1</td>
</tr>
</tbody>
</table>

| Standard version  | 160 kN | 130 kN | 362 kN | 484 kN | 12 kN | 100 kN |

---

**Note**

Only original Viessmann weld bases are permitted for the pushrod drive.
Fuel discharge (cont.)

Specification
Slot discharge, for pulling

<table>
<thead>
<tr>
<th></th>
<th>Screw conveyor</th>
<th>Screw conveyor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D = 190 mm</td>
<td>D = 250 mm</td>
</tr>
<tr>
<td>a</td>
<td>mm</td>
<td>700</td>
</tr>
<tr>
<td>b</td>
<td>mm</td>
<td>380</td>
</tr>
<tr>
<td>c</td>
<td>mm</td>
<td>350</td>
</tr>
<tr>
<td>d</td>
<td>mm</td>
<td>&gt; 1200</td>
</tr>
<tr>
<td>e</td>
<td>mm</td>
<td>&gt; 1500</td>
</tr>
<tr>
<td>f</td>
<td>mm</td>
<td>&gt; 1750</td>
</tr>
<tr>
<td>g</td>
<td>mm</td>
<td>&gt; 1200</td>
</tr>
</tbody>
</table>

Note
For a drive-over system, a minimum material cover of 40 cm is required.

"14 See chapter "Maximum dumping heights"
Fuel discharge (cont.)

Required order data for the above example:

<table>
<thead>
<tr>
<th>Position</th>
<th>Quantity</th>
<th>Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2</td>
<td>pce</td>
<td>Pushrod drive AS single with hydraulic cylinder type L</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>pce</td>
<td>Cover for push floor screw conveyor (optional)</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>pce</td>
<td>Weld base, pushrod drive, individual</td>
</tr>
<tr>
<td>D</td>
<td>2</td>
<td>pce</td>
<td>Weld base, bunker</td>
</tr>
<tr>
<td>E</td>
<td></td>
<td></td>
<td>Hydraulic compartment</td>
</tr>
<tr>
<td>F</td>
<td>2</td>
<td>pce</td>
<td>Pushrod (incl. stop wedges)</td>
</tr>
<tr>
<td>G</td>
<td>1</td>
<td>pce</td>
<td>Push floor screw conveyor</td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
<td>Version and drive, AQ standard</td>
</tr>
<tr>
<td>K</td>
<td>1</td>
<td>pce</td>
<td>Hydraulic drive, ASH single</td>
</tr>
</tbody>
</table>

Centre discharge

The drawing below is a schematic diagram. A project-specific drawing must be produced for construction design.

Note
Only original Viessmann weld bases are permitted for the pushrod drive.

Specification

<table>
<thead>
<tr>
<th>Centre discharge</th>
<th>Screw conveyor D = 190 mm</th>
<th>Screw conveyor D = 250 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>mm</td>
<td>350 mm</td>
</tr>
<tr>
<td>b</td>
<td>mm</td>
<td>270 mm</td>
</tr>
<tr>
<td>c</td>
<td>Max. dumping height (^{15})</td>
<td>In the middle third of the fuel store</td>
</tr>
<tr>
<td>d</td>
<td>mm</td>
<td>&gt; 1200</td>
</tr>
<tr>
<td>e</td>
<td>mm</td>
<td></td>
</tr>
</tbody>
</table>

\(^{15}\) See chapter "Maximum dumping heights"
Required order data for the above example:

<table>
<thead>
<tr>
<th>Position</th>
<th>Quantity</th>
<th>Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2</td>
<td>pce</td>
<td>AS single pushrod drive with hydraulic cylinder type K</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>pce</td>
<td>Weld base, bunker</td>
</tr>
<tr>
<td>C</td>
<td>1</td>
<td>pce</td>
<td>Centre discharge cover (on site)</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>pce</td>
<td>Push floor screw conveyor</td>
</tr>
<tr>
<td>E</td>
<td>4</td>
<td>pce</td>
<td>Pushrod (incl. stop wedges)</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td>Version and drive, AQ standard</td>
</tr>
<tr>
<td>G</td>
<td>1</td>
<td>pce</td>
<td>Hydraulic compartment</td>
</tr>
<tr>
<td>H</td>
<td>1</td>
<td>pce</td>
<td>Hydraulic drive, ASH single</td>
</tr>
<tr>
<td>K</td>
<td>2</td>
<td>pce</td>
<td>Weld base, AS single</td>
</tr>
</tbody>
</table>
Slot discharge with fill function

The drawing below is a schematic diagram. A project-specific drawing must be produced for construction design.

**Note**
Only original Viessmann weld bases are permitted for the pushrod drive.

### Specification

<table>
<thead>
<tr>
<th>Slot discharge with fill function</th>
<th>Screw conveyor D = 190 mm</th>
<th>Screw conveyor D = 250 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>700</td>
<td>800</td>
</tr>
<tr>
<td>b</td>
<td>380</td>
<td>430</td>
</tr>
<tr>
<td>c</td>
<td>350</td>
<td>400</td>
</tr>
<tr>
<td>d</td>
<td>Charging chute</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>Max. dumping height(^{16})</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>&gt; 1200</td>
<td>&gt; 1200</td>
</tr>
</tbody>
</table>

\(^{16}\) See chapter “Maximum dumping heights”
Fuel discharge (cont.)

Required order data for the above example:

<table>
<thead>
<tr>
<th>Position</th>
<th>Quantity</th>
<th>Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2</td>
<td>pce</td>
<td>AS twin pushrod drive with hydraulic cylinder type K</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cover for push floor screw conveyor (optional)</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>pce</td>
<td>Weld base, bunker</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>pce</td>
<td>Pushrod (incl. stop wedges)</td>
</tr>
<tr>
<td>D</td>
<td>2</td>
<td>pce</td>
<td>Push floor screw conveyor</td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>pce</td>
<td>Version and drive, AQ standard</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td>Hydraulic drive, ASH twin</td>
</tr>
<tr>
<td>G</td>
<td>1</td>
<td>pce</td>
<td>Weld base, AS twin</td>
</tr>
</tbody>
</table>

Hydraulic assemblies for moving floor discharge

Pushrod

For part no., see pricelist
Pushrod in solid design with:
- Crosswise-mounted transport wedges
- Side connecting profiles
- Stop wedges
- Guide elements

Standard delivery:
- Pushrod dismantled into rod, transport wedges and guide elements (welded during installation)
- Retaining wedges incl. fixing materials

Available pushrods:

Pushrod:
- Width: 1.0; per m
- Width: 1.25; per m

Pushrod drive, individual

For part no., see pricelist
The hydraulic cylinder moves the pushrod back and forth. The pushrod is fitted with transport wedges and stop wedges fixed to the floor. The forward and return strokes dispense the fuel from the fuel store and transport it into the trough of the push floor screw conveyor.

Standard delivery:
- Bearing block with hinge lug connection for the cylinder
- Hydraulic cylinder each with 2 HP ball valves and 2 hydraulic hoses
- Pushrod up to fuel store wall with hinge lug connection
- Material for complete hydraulic pipework

Weld base, pushrod drive, individual

For part no., see pricelist
The weld base is for securing the pushrod drive. The solid steel structure has been structurally tested. It permanently withstands the dynamic stress. This is conditional on the structure being embedded in concrete as prescribed.

Standard delivery:
- 1 weld base per pushrod drive

To be carried out by the customer:
- Location, positioning and connecting of the weld base with the steel reinforcement on site
- Embedding the weld base in concrete
- Structural analysis and sizing of steel reinforcement on site

Note
- Only original Viessmann weld bases are permitted for the pushrod drive.

Pushrod drive, twin

For part no., see pricelist
The hydraulic cylinder moves the pushrod back and forth. The pushrod is fitted with transport wedges and stop wedges fixed to the floor. The forward and return strokes dispense the fuel from the fuel store and transport it into the trough of the push floor screw conveyor. In the case of a twin pushrod drive, each longitudinal section of the fuel store is moved with two pushrods working independently of one another.
- Charging pushrod for quick removal of the fuel filled at the end in the direction of the centre
- Discharge pushrod for controlled discharge of the fuel into the trough of the push floor screw conveyor

The two pushrod drives are located one above the other. They are supported by a common bearing block.

Standard delivery:
- Bearing block for two cylinders, each with a hinge lug connection
- 2 hydraulic cylinders, each with 2 HP ball valves and 2 hydraulic hoses
- Discharge pushrod up to fuel store wall with hinge lug connection
- Discharge pushrod up to start of fill function level with hinge lug connection
- Material for complete hydraulic pipework
### Weld base, pushrod drive, twin

**For part no., see pricelist**
The weld base is for securing the pushrod drive. The solid steel structure has been structurally tested. It permanently withstands the dynamic stress. This is conditional on the structure being embedded in concrete as prescribed.

**Standard delivery:**
- 1 weld base per pushrod drive

**To be carried out by the customer:**
- Location, positioning and connecting of the weld base with the steel reinforcement on site
- Embedding the weld base in concrete
- Structural analysis and sizing of steel reinforcement on site

**Note**
Only original Viessmann weld bases are permitted for the pushrod drive.

### Bunker weld base (fuel store)

**For part no., see pricelist**
The steel sections are used for welding the pushrod guide elements and the trough of the push floor screw conveyor. The weld base in the fuel store is also the slide rail for the pushrod.

**Standard delivery:**
- UNP 240 rolled profiles with anchoring irons per pushrod over the entire length
- 50/50/5 angle profiles with anchoring irons over the entire width of the push floor for the push floor screw conveyor

**To be carried out by the customer:**
- Production of the concrete floor
- Installation of the profiles level with the concrete floor (max. deviation of 5 mm over 10 m)

**Note**
Article price per m
Total price is calculated as follows:
For pushrod drive, single: \((\text{Pushrod drives in pce} \times \text{length of fuel store in m}) + (1 \times \text{width of fuel store in m}) \times \text{article price}\)
For pushrod drive, twin: \((\text{Pushrod drives in pce} \times \text{length of fuel store in m}) + (2 \times \text{width of fuel store in m}) \times \text{article price}\)

### Hydraulic unit, AS single

**For part no., see pricelist**
Hydraulic unit for actuating single pushrod drives with discharge function. When the required fill level of the push floor screw conveyor is reached, the discharge function switches off.

**Hydraulic unit, comprising:**
- Gear pump 3 x 400 V
- Oil container
- Non-return valve
- Pressure limiter valve
- Pressure diverter valve
- Return filter
- Oil level indicator
- Pressure gauge
- Shut-off valve
- Oil filling
- Hydraulic hoses
- Wall mounting supports

**Switching:**
By boiler control unit, protected by temperature and level switches in the oil container

**Use of the hydraulic units (drives plus rods)**

<table>
<thead>
<tr>
<th>Hydraulic unit, AS single</th>
<th>V9</th>
<th>V18</th>
<th>V40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated heating output of the boiler(s)</td>
<td>kW</td>
<td>100 - 720</td>
<td>750 - 1250</td>
</tr>
<tr>
<td>Gear pump rating</td>
<td>kW</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Supply volume</td>
<td>l/min</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Stage 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Draught</td>
<td>bar (MPa)</td>
<td>200 (20)</td>
<td>200 (20)</td>
</tr>
<tr>
<td>Stage 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply volume</td>
<td>l/min</td>
<td>—</td>
<td>18</td>
</tr>
<tr>
<td>Draught</td>
<td>bar (MPa)</td>
<td>—</td>
<td>100 (10)</td>
</tr>
<tr>
<td>Oil content</td>
<td>l</td>
<td>30</td>
<td>55</td>
</tr>
<tr>
<td>Max. number of pushrods</td>
<td>pce</td>
<td>3</td>
<td>3 (4)</td>
</tr>
</tbody>
</table>

**Note**
Additional equipment is possible for driving hydraulically actuated fuel store covers.

*17 Values in brackets: option only in coordination with project management at the factory
**Fuel discharge** (cont.)

**Note**

Gear pump function: with a two-stage gear pump, the pump runs in standard mode at stage 2. This means that the pushrods move quickly. The pump only switches to stage 1 when the resistance increases.

**Hydraulic drive, AS twin**

For part no., see pricelist

Hydraulic unit for the actuation of the twin pushrod drives with discharge and fill function. When the required fill level of the push floor screw conveyor is reached, the discharge function switches off. If there is free space above the discharge push floor to accommodate top-up fuel, the top rear pushrod carries out the fill function. When the heating system requires fuel, the control unit interrupts the fill function and the discharge function is switched to the bottom front pushrod.

- Hydraulic unit, comprising:
  - Gear pump 3 x 400 V
  - Oil container
  - 4/2-way solenoid valve
  - Non-return valve
  - Pressure limiter valve
  - Pressure diverter valve
  - Return filter
  - Oil level indicator
  - Pressure gauge
  - Shut-off valve
  - Oil filling
  - Hydraulic hoses
  - Wall mounting supports
- 2 infrared light barriers for fuel store level monitoring

**Use of the hydraulic units (drives plus rods)**

<table>
<thead>
<tr>
<th>Hydraulic drive, AS twin</th>
<th>V18</th>
<th>V40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated heating output of the boiler(s) kW</td>
<td>100 - 1250</td>
<td>1250 - 2500</td>
</tr>
<tr>
<td>Gear pump rating kW</td>
<td>4</td>
<td>7.5</td>
</tr>
<tr>
<td>Supply volume l/min</td>
<td>9</td>
<td>20</td>
</tr>
<tr>
<td>Stage 1 Draught bar (MPa)</td>
<td>200 (20)</td>
<td>200 (20)</td>
</tr>
<tr>
<td>Stage 1 Supply volume l/min</td>
<td>18</td>
<td>40</td>
</tr>
<tr>
<td>Stage 2 Draught bar (MPa)</td>
<td>100 (10)</td>
<td>100 (10)</td>
</tr>
<tr>
<td>Stage 2 Oil content l</td>
<td>55</td>
<td>80</td>
</tr>
<tr>
<td>Max. number of pushrods pce</td>
<td>3 (4)</td>
<td>3 (4)</td>
</tr>
</tbody>
</table>

**Note**

Additional equipment is possible for driving hydraulically actuated fuel store covers.

**Push floor screw conveyor, D = 190 mm**

For part no., see pricelist

In order to remove the fuel discharged by the pushrods, the push floor screw conveyor extends over the entire push floor width as an open trough screw conveyor. For further transportation, the push floor screw conveyor is designed, depending on the transfer situation, as a sealed trough or a pipe.

**Standard delivery:**

- Push floor screw conveyor as per project drawing

**Note**

Gear pump function: with a two-stage gear pump, the pump runs in standard mode at stage 2. This means that the pushrods move quickly. The pump only switches to stage 1 when the resistance increases.

**VITOCAK 300-UF**
Push floor screw conveyor, D = 250 mm

For part no., see pricelist
In order to remove the fuel discharged by the pushrods, the push floor screw conveyor extends over the entire push floor width as an open trough screw conveyor. For further transportation, the push floor screw conveyor is designed, depending on the transfer situation, as a sealed trough or a pipe.

Standard delivery:
- Push floor screw conveyor as per project drawing

Note
Article price per m

Push floor screw conveyor drive, standard

For part no., see pricelist
Standard version for the push floor screw conveyor with pulling drive and discharge into a drop section. The system is driven by a spur geared motor and chain with a dust-proof chain guard.

Standard delivery:
- Drive unit with spur geared motor 400 V and chain drive
- Light barrier across the entire open area for monitoring the fill level (overfill protection)
- Discharge with inspection cover, safety limit switch and drop chute/adaptor for the following conveyor device (not required in pushing version)

Standard push floor screw conveyor drive

<table>
<thead>
<tr>
<th>Screw conveyor torque</th>
<th>Nm</th>
<th>approx. 800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push floor screw conveyor</td>
<td>Type</td>
<td>AQ-L190</td>
</tr>
<tr>
<td>Push floor screw conveyor, function</td>
<td></td>
<td>Pulling</td>
</tr>
<tr>
<td>Push floor screw conveyor, max. length</td>
<td>m</td>
<td>10</td>
</tr>
<tr>
<td>Max. boiler output with woodchips</td>
<td>kW</td>
<td>1250</td>
</tr>
</tbody>
</table>

Drive, push floor screw conveyor, high power

For part no., see pricelist
Special powerful version of the push floor screw conveyor for more difficult applications (high pump rate and/or pushing function).

The following are reinforced:
- Spur geared motor
- Bearings
- Chain with dust-proof chain guard

Standard delivery:
- Drive unit in a robust design with additional axial bearing for pushing function with spur geared motor 400 V and chain drive
  - Matching and switching on a project-specific basis
- Light barrier across the entire open area for monitoring the fill level (overfill protection)
- Discharge with inspection cover, safety limit switch and drop chute/adaptor for the following conveyor device (not required in pushing version)

Push floor screw conveyor drive, high power

<table>
<thead>
<tr>
<th>Screw conveyor torque</th>
<th>Nm</th>
<th>approx. 1200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push floor screw conveyor</td>
<td>Type</td>
<td>AQ-L190</td>
</tr>
<tr>
<td>Push floor screw conveyor, function</td>
<td></td>
<td>AQ-L250</td>
</tr>
<tr>
<td>Push floor screw conveyor, max. length</td>
<td>m</td>
<td>10</td>
</tr>
<tr>
<td>Max. boiler output with woodchips</td>
<td>kW</td>
<td>1500</td>
</tr>
</tbody>
</table>

Push floor screw conveyor cover

For part no., see pricelist
Cover for:
- Open trough of the push floor screw conveyor
- Open slot of the fuel store

The cover is mounted on the front panel of the fuel store. It is opened via a hinge and serves as a touch guard for maintenance personnel.

Standard delivery:
- Cover of the push floor screw conveyor with wall mounting support and hinge as per project drawing
- Limit switch for emergency stop of the push floor and the push floor screw conveyor when opening the cover

Note
Article price per m
Total price = fuel store width in m x article price
### Fuel transport

#### 6.1 Application options for transport systems by fuel

**Overview**

<table>
<thead>
<tr>
<th>Transport system</th>
<th>Page</th>
<th>Pellets according to EN ISO 17225-2</th>
<th>Woodchips according to ÖNORM M 7133</th>
<th>Woodchips according to EN ISO 17225-4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>G 30</td>
<td>G 50</td>
<td>P16S</td>
</tr>
<tr>
<td><strong>Trough screw conveyors</strong></td>
<td>From p. 66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trough screw conveyor D = 150 mm</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Trough screw conveyor D = 190 mm</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Trough screw conveyor D = 250 mm</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Pipe screw conveyors</strong></td>
<td>From p. 67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe screw conveyor D = 120 mm</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe screw conveyor D = 190 mm</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Pipe screw conveyor D = 250 mm</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

*19 With coarse fraction limitation (< 1 %) to 125 mm*
6.2 Fuel transport with screw conveyor

Trough screw conveyor

For part no., see pricelist
- For trough screw conveyor with 150 mm diameter
- For trough screw conveyor with 190 mm diameter
- For trough screw conveyor with 250 mm diameter

The trough screw conveyor is a very reliable means of transportation for all granulated fuels. Observe the restriction on the angle of inclination.

Standard delivery:
- Trough screw conveyor as per project drawing

Note
- Article price per m
- Total price: length L in m x article price

---

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Trough screw conveyor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>MF 150</td>
</tr>
<tr>
<td>a</td>
<td>mm</td>
</tr>
<tr>
<td>b = transition diameter</td>
<td>mm</td>
</tr>
<tr>
<td>c (woodchips)</td>
<td>°</td>
</tr>
<tr>
<td>c (wood pellets)</td>
<td>°</td>
</tr>
<tr>
<td>d</td>
<td>mm</td>
</tr>
<tr>
<td>e</td>
<td>mm</td>
</tr>
<tr>
<td>f</td>
<td>mm</td>
</tr>
<tr>
<td>g</td>
<td>mm</td>
</tr>
<tr>
<td>h</td>
<td>mm</td>
</tr>
<tr>
<td>k</td>
<td>mm</td>
</tr>
<tr>
<td>l</td>
<td>mm</td>
</tr>
</tbody>
</table>

Standard trough screw conveyor drive

For part no., see pricelist
Proven version for the trough screw conveyor with pulling drive and discharge into a drop section. The system is driven by a spur geared motor and a chain with a dust-proof chain guard.

Standard delivery:
- Drive unit with spur geared motor 3 x 400 V and chain drive
- Inlet with light barrier for monitoring the fill level (overfill protection)
- Discharge with inspection cover, safety limit switch and drop chute/adapter for the following conveyor device
### Fuel transport (cont.)

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Trough screw conveyor drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw conveyor torque</td>
<td>Nm</td>
</tr>
<tr>
<td>Screw conveyor diameter</td>
<td>mm</td>
</tr>
<tr>
<td>Function</td>
<td></td>
</tr>
<tr>
<td>Max. length</td>
<td>m</td>
</tr>
<tr>
<td>Max. boiler output (wood pellets)</td>
<td>kW</td>
</tr>
<tr>
<td>Max. boiler output (woodchips)</td>
<td>kW</td>
</tr>
</tbody>
</table>

### Pipe screw conveyor

**For part no., see pricelist**
- For pipe screw conveyor with 120 mm diameter
- For pipe screw conveyor with 190 mm diameter
- For pipe screw conveyor with 250 mm diameter

The pipe screw conveyor is ideal for conveying pourable fuel and/or in the case of steep inclines.

**Standard delivery:**
- Pipe screw conveyor as per project drawing

**Note**
- Article price per m
- Total price: Length L in m x article price
- The pipe screw conveyor with 120 mm diameter is only suitable for wood pellets.

### Trade name

<table>
<thead>
<tr>
<th>Max. screw conveyor diameter</th>
<th>Pipe screw conveyor</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>120</td>
</tr>
<tr>
<td>a</td>
<td>140</td>
</tr>
<tr>
<td>b</td>
<td>150 x 150</td>
</tr>
<tr>
<td>c</td>
<td>140</td>
</tr>
<tr>
<td>d</td>
<td>120</td>
</tr>
</tbody>
</table>

**Max. angle of inclination with pushing screw conveyor**
- 90°

**Max. angle of inclination with pulling screw conveyor**
- 50°

| f   | mm  | 150 | 200 | 200 |
| g   | mm  | 140 | 280 | 380 |
| h   | mm  | 540 | 540 | 665 |
| k   | mm  | 130 | 130 | 154 |
| l   | mm  | 260 | 260 | 350 |
Pipe screw conveyor drive, pellets

For part no., see pricelist
Simple design pipe screw conveyor with 120 mm diameter with pulling or pushing drive. It is only approved for wood pellets. The system is driven by a spur geared motor and a chain with a dust-proof chain guard.

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Pipe screw conveyor drive, pellets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. screw conveyor diameter</td>
<td>mm</td>
</tr>
<tr>
<td>Screw conveyor torque</td>
<td>Nm</td>
</tr>
<tr>
<td>Function</td>
<td></td>
</tr>
<tr>
<td>Max. screw conveyor length</td>
<td>m</td>
</tr>
<tr>
<td>Max boiler output</td>
<td>kW</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>approx. 800</td>
</tr>
<tr>
<td></td>
<td>Pulling</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>1250</td>
</tr>
</tbody>
</table>
Pipe screw conveyor drive, standard

For part no., see pricelist
Standard version for pipe screw conveyor with pulling drive and discharge into a drop section. The system is driven by a spur geared motor and a chain with a dust-proof chain guard.

Standard delivery:
- Drive unit with spur geared motor 3 x 400 V and chain drive
- Inlet with light barrier for monitoring the fill level (overfill protection)
- Discharge with inspection cover, safety limit switch and drop chute/adaptor for the following conveyor device (not required in pushing version)

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Pipe screw conveyor drive, standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. screw conveyor diameter mm</td>
<td>120</td>
</tr>
<tr>
<td>Screw conveyor torque Nm</td>
<td>approx. 800</td>
</tr>
<tr>
<td>Function</td>
<td>Pulling/pushing</td>
</tr>
<tr>
<td>Max. screw conveyor length m</td>
<td>10</td>
</tr>
<tr>
<td>Max. boiler output (wood pellets) kW</td>
<td>1250</td>
</tr>
<tr>
<td>Max. boiler output (woodchips) kW</td>
<td>3200</td>
</tr>
</tbody>
</table>

Pipe screw conveyor drive, high power

For part no., see pricelist
Special, powerful version of the pipe screw conveyor for more difficult applications (high pump rate and/or pushing function).

The following are reinforced:
- Spur geared motor
- Bearings
- Chain with dust-proof chain guard

Note
This drive is required for a direct transition (forced transfer).

Standard delivery:
- Drive unit in a robust design with additional axial bearing for pushing function with spur geared motor 3 x 400 V and chain drive
- Inlet with light barrier for monitoring the fill level
- Discharge with inspection cover, safety limit switch and drop chute/adaptor for the following conveyor device

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Pipe screw conveyor drive, high power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. screw conveyor diameter mm</td>
<td>190</td>
</tr>
<tr>
<td>Screw conveyor torque Nm</td>
<td>approx. 1100</td>
</tr>
<tr>
<td>Function</td>
<td>Pulling/pushing</td>
</tr>
<tr>
<td>Max. screw conveyor length m</td>
<td>10</td>
</tr>
<tr>
<td>Max. boiler output (woodchips) kW</td>
<td>1500</td>
</tr>
<tr>
<td>Max. boiler output (woodchips) kW</td>
<td>2500</td>
</tr>
</tbody>
</table>
7.1 Fuel storage in on-site pellet store

Sizing the pellet storage room

The storage room should ideally be rectangular and large enough to accommodate a year’s supply of fuel. This reduces the number of deliveries. The size of the storage room depends on heat load of the building, which in turn depends on the building’s heat demand. However, the floor area of the pellet storage room should not be less than 2 x 3 m.

To calculate the annual fuel demand in pellets in m$^3$, as defined by the heat load of a building, use the following rule of thumb according to the ÖNORM M 7137.

Calculating the annual fuel demand in pellets, as defined by the heat load of a building:

Annual fuel demand [m$^3$] = heat load of a building [kW] x factor 0.6 [m$^3$/kW]

Storage rooms without sloping floor

- The volume for the annual fuel demand [m$^3$] corresponds to the volume of the storage room [m$^3$].
- Volume of a storage room without sloping floor [m$^3$] = volume for annual fuel demand [m$^3$]

Example:

Pellet storage room with sloping floor

Heat load of building (e.g. detached house) 50 kW
Volume for annual heat demand [m$^3$] = 50 kW x 0.6 m$^3$/kW = 30 m$^3$
Amount of pellets [t] = 30 m$^3$ x 0.65 t/m$^3$ = 19.5 t

Storage rooms with sloping floor

- Empty space must also be taken into account to ensure that the volume for the annual fuel demand [m$^3$] is covered. About 1/3 of the volume is lost due to the sloping floor.
- Volume of a storage room with sloping floor [m$^3$] = volume for annual fuel demand [m$^3$] x factor 1.5

Converting storage room volume into the amount of pellets:

Amount of pellets [t] = storage room volume [m$^3$] x 0.65 t/m$^3$

Volume of a storage room with sloping floor [m$^3$] = 30 m$^3$ x 1.5 = 45 m$^3$
Room height: 2.3 m, floor area of the storage room = 45 m$^3$ ÷ 2.3 m = approx. 20 m$^2$

A minimum room size of 4 x 5 m is adequate for storing a year’s supply of fuel.

Stored amount of energy = 19,500 kg x 5 kWh/kg = 97,500 kWh

---

**Diagram:**

- A: Fill connector
- B: Return air connector
- C: Air space
- D: Sloping floor
- E: Empty space
- F: Viessmann discharge system
- G: Available volume = ⅔ of the room
General requirements for the pellet storage room and required system components

Note
For further information, we advise consulting VDI 3464 “Storage of wood pellets at the consumer’s premises” and leaflet “Recommendations for the storage of wood pellets” issued by DEPV e. V. and DEPI.

- The pellet storage room must be dry, as pellets will swell up markedly if exposed to moisture. This leads to substantial difficulties in supplying pellets to the boiler.
- The pellet storage room must be dust-tight and of solid construction since filling creates dust and exerts high pressure on the walls.
- The pellet storage room or the installation room for prefabricated stores must be vented. Vents should not be positioned directly below windows or supply air apertures. Observe the requirements for the ventilation of pellet stores according to VDI Directive 3464. Vents should be closed during filling, so that the vacuum fan can create a slight negative pressure in the storage room.
- According to static requirements, the following wall thicknesses have proven to be useful:
  - For example, bricks 17 cm, rendered on both sides; hollow breeze blocks 12 cm, rendered on both sides; concrete 10 cm, plaster block 12 cm.
  - If the stored amount of pellets exceeds 6.5 t, surrounding walls and intermediate ceilings must comply with fire resistance category F90.
- Doors or access hatches into the pellet storage room must open outwards and must be dust-tight (with an all-round gasket). With a stored amount of pellets in excess of 6.5 t, doors must be self-closing and have a fire resistance rating of T30.
- Fit protective boards on the inside of the door opening, so that pellets do not push against the door (see chapter “Protective boards with Z brackets”).
- There should be no electrical installations inside the pellet storage room. Essential electrical installations must be explosion-proof – in accordance with current regulations.
- In Austria, surrounding walls and ceilings in the storage room must be designed in accordance with fire resistance class F90, and doors or access hatches in accordance with T30. Observe fire regulations according to TRVB H-118 and the respective statutory requirements. For more information, please refer to ÖNORM M 7137.
- Due to condensation and the risk of burst pipes, the installation of water pipes inside the storage room should be avoided.
- Pellet storage rooms should be equipped with a fill connector and a return air connector with a Storz coupling, type A, Ø 100 mm (fire hose connector), with extension pipes leading into the pellet storage room. Pipes should be metal, connected to the brickwork and earthed.
- Fit a baffle mat opposite the fill connector to protect the pellets and the brickwork.
- The pellet storage room must be free from foreign bodies (small stones, wood particles, etc.).
- The wall duct for the room discharge should be sealed from the storage room side with fireproof material (e.g. rendered).
Fuel storage (cont.)

- The pellet storage room must be inaccessible to children. The pellet boiler should be shut down approximately one hour before the storage room is filled. The storage room should be sufficiently ventilated before anyone enters.
- The sloping floor in the pellet storage room should preferably be made from wood-based materials and have a smooth surface. Three-ply shuttering panels and multi-layer plywood boards have proven useful in practice. Plain chipboard is not suitable however.

Note
To ensure a permanent fault-free fuel supply to the boiler, the fuel store must be cleaned regularly. This includes carefully removing fines in the fuel store. After two to three deliveries, the fuel store should be cleaned prior to the next pellet delivery. Over time, pellet dust accumulates in the lower part of the fuel store and can cause faults in the fuel supply. Wood pellets of inferior quality with an increased percentage of fines cause increased accumulations of dust in the storage room. However, fines are also produced by the mechanical stresses that wood pellets are subjected to during transport and injection (injection pressure, installations, etc.) into the storage room. With its strict requirements for wood pellets, the ENplus certificate ensures flawless pellet quality. This involves monitoring the entire value chain from production to delivery. Manufacturers and suppliers of high quality wood pellets as well as further information can be found at www.enplus-pellets.de.

Additional safety instructions for pellet stores
- Access by unauthorised persons is forbidden and doors must be kept locked.
- Smoking, fires and other sources of ignition are prohibited.
- Risk to life due to odourless carbon monoxide (CO) and a lack of oxygen
- Before entering, ensure sufficient ventilation is in place – keep door open while inside.
- Entry is only permitted under the supervision of a person standing outside the storage room
- Risk of injury caused by moving parts
- Ensure filling is carried out under the conditions stipulated by the heating system installer and pellet supplier
- Protect the wood pellets from moisture.

Protective boards with Z brackets

Z brackets are available as accessories for installation of the protective boards. To facilitate the addition or removal of protective boards, do not install Z brackets up to the ceiling.

Fill connector and return air connector
- Arrange the connectors so that no overpressure can develop in the pellet storage room during the filling process. The return air connector must remain free from blockage at all times.
- The connectors should be located high up inside the pellet storage room to enable the room to be filled to the maximum. To prevent pellets hitting the ceiling, the fill connector must be at least 20 cm below the ceiling. (Fit a protective panel if the ceiling is plastered.)
- Ideally, the connectors should be located on the narrow side of the storage room.
- With straight fill connectors, the fill width is approx. 4 - 5 m.
- If 2 x 45° bends are located before the inlet into the storage room, fit a straight pipe of at least 0.5 m length on the other side to protrude into the storage room. This enables the pellets to reach the required filling velocity and therefore the required fill width.

Earth
The connectors must be earthed to prevent static charging during the filling process. We recommend connecting each pipe element to the equipotential bonding of the building. At the very least, connect each pipe element securely to the brickwork, either by setting the pipe into the brickwork (without thermal insulation) or by means of pipe clips anchored into the brickwork.
**Fuel storage (cont.)**

**Connector length and location**
The length of the fill connector depends on the distance to the return air connector. Connector spacing of < 500 mm may occur if both connectors are set into a cellar window.

If connectors have to be located on the long side of the storage room, we recommend alternating filling between both connectors. This ensures more efficient filling of the storage room. Both connectors must always be earthed. Install a baffle mat opposite both connectors.

**Internal pellet storage room**
If the fill and return air connectors have to be routed through an adjacent room, clad them with a material with a fire rating of F90 (rock wool or similar). Earth each extension pipe using pipe clips. Plastic pipes must not be used as extension pipes.
Fuel storage (cont.)

Connector installation options

Setting into brickwork
The connector is set into the outlet with mortar and without thermal insulation.

Wall installation with screws
The connector is secured to the outside wall with screws and earthed with a pipe clip.
**Fuel storage (cont.)**

**Window installation with screws**
A plate is set into the window opening. The connector is fitted through the plate, secured with screws and earthed with a pipe clip.

![Diagram of window installation with screws]

- Fill connector
- Screws
- Pipe clip for earthing
- Outlet Ø 110 mm
- Window opening

**Installation in the light well**
The following types of installation are possible:
- Into the wall
- Into the window opening

The shortened fill and return air connectors are each inserted into a 45° bend. Insert the bend into the extension pipe that passes through the wall or window opening.

![Diagram of installation in the light well]

- Fill connector
- Pipe clip for earthing
- Extension pipe
- Wall duct Ø 110 mm
- Outlet Ø 110 mm
- 45° bend

**Accessories for the on-site pellet store**

**Baffle mat 1.42 x 1.25 m**

**For part no., see pricelist**
The baffle mat consists of a 4.0 mm thick pressed rubber mat with fibre-reinforcement for high strength.

Install baffle mat **B** with a clearance of at least 200 mm from the wall opposite the fill connector. The baffle mat protects the wood pellets, the brickwork and the plaster/render.

Pieces of plaster/render or wall that have been knocked off can hinder the pellet supply or block the ash removal from the boiler.

**Standard delivery**
- Baffle mat 1.42 x 1.25 m
- Section anchor with carbine fastening
Fuel storage (cont.)

Fill connector and return air connector, straight

For part no., see pricelist

Standard delivery:
- Fill connector with Storz coupling 4"
- Mounting flange 200 x 200 x 2 mm
- Connecting aluminium pipe
- Dummy coupling with imprint and padlock

Fill connector and return air connector, 45°

For part no., see pricelist

Standard delivery:
- Fill connector with Storz coupling 4"
- Mounting flange 200 x 200 x 2 mm

Extension for fill connector and return air connector

For part no., see pricelist

Standard delivery:
- Extension DN 100, 1000 mm long
- Connecting aluminium pipe
- Clip for fastening

Extension, 45° bend

For part no., see pricelist

Standard delivery:
- Bend DN 100
- Connecting aluminium pipe

Fill level meter for wood pellets

For part no., see pricelist
Stationary ultrasound measuring system to capture the fill levels in the pellet store, made by Sonavis.
For on-site installation in the pellet storage room.
Up to 54 sensors can be linked to each other and connected to a fill level meter.

Standard delivery
Sonavis Profi EA standard pack
- Display unit
- 3 sensors
- Power cable, 1000 mm long
- Sensor extension cable, 2500 mm long

Extension set
- Sensor unit
- Sensor extension cable, 2500 mm long
7.2 Filling the on-site fuel store

Manual silo cover FDM 2.9/1.3 m

For part no., see pricelist
Cover for secure sealing of openings for fuel delivery to the fuel store.
The cover is operated manually with leg springs as an opening aid.
The opening has a fall protection grille to prevent falling.

**Note**
For the filling process (opening, filling, closing), local accident prevention regulations must be observed (e.g. enclosure, safety personnel).

Standard delivery:
- Steel supporting structure
  - Permissible load 250 kg/m²
  - Sand-blasted
  - Primed with zinc dust and painted
- Welded fall protection grille with 150 mm bar spacing

To be carried out by the customer:
- Preparation of the ceiling recess with concrete collar
- Seal between cover frame and concrete collar bearing surface
- Padlock to protect against incorrect operation

All-round seal required. Not included in the standard delivery.
We recommend Kemperol Kombi roof seals.

| A | All-round seal required. Not included in the standard delivery. We recommend Kemperol Kombi roof seals. |
| B | Bar spacing, fall protection grille |
| C | 10 x secured with screws |
FDH hydraulic bunker cover

For part no., see pricelist
Cover for secure sealing of openings for fuel delivery to the fuel store
The cover is actuated by means of a hydraulic cylinder. A stay prevents the cover from falling shut.

Note
For the filling process (opening, filling, closing), local accident prevention regulations must be observed (e.g. enclosure, safety personnel).

Note
The cover must not be opened in windy conditions (> 10 m/s).

Standard delivery:
- Steel supporting structure
  - Permissible load 250 kg/m²
  - Sand-blasted
  - Primed with zinc dust and painted
- Cover
  - Aluminium button plate surface
  - Welded watertight
- Hydraulic cylinder
  - With hinge lug connection, pipe break protection, bearing block
  - Hydraulic hoses, 1 m long
- Rubber apron to deflect woodchips on the hinge side

To be carried out by the customer:
- Preparation of the ceiling recess with concrete collar
- Seal between cover frame and concrete collar bearing surface

Fuel storage (cont.)

78
**Fuel storage (cont.)**

- **A** Fall protection grille (optional)
- **B** Rubber apron
- **C** All-round seal required. Not included in the standard delivery.
  We recommend Kemperol Kombi roof seals.

**Specification**

<table>
<thead>
<tr>
<th>Type</th>
<th>FDH 4.0/2.4</th>
<th>FDH 5.5/2.4</th>
<th>FDH 7.0/2.4</th>
<th>FDH 8.5/2.4</th>
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</thead>
<tbody>
<tr>
<td><strong>Opening length x width</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>mm</td>
<td>4020</td>
<td>5520</td>
<td>7020</td>
</tr>
<tr>
<td>c</td>
<td>mm</td>
<td>2400</td>
<td>2400</td>
<td>2400</td>
</tr>
<tr>
<td><strong>Concrete collar dimensions</strong></td>
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<tr>
<td>b</td>
<td>mm</td>
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<td>5920</td>
<td>7420</td>
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<tr>
<td>d</td>
<td>mm</td>
<td>2800</td>
<td>2800</td>
<td>2800</td>
</tr>
<tr>
<td>e</td>
<td>mm</td>
<td>250</td>
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<tr>
<td><strong>External cover dimensions</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>mm</td>
<td>3025</td>
<td>3025</td>
<td>3025</td>
</tr>
<tr>
<td>g</td>
<td>mm</td>
<td>4500</td>
<td>6000</td>
<td>7500</td>
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<td>h</td>
<td>mm</td>
<td>2924</td>
<td>2924</td>
<td>2924</td>
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<td><strong>Number of hydraulic cylinders</strong></td>
<td>pce</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Cover weights</strong></td>
<td>kg</td>
<td>1029</td>
<td>1231</td>
<td>1516</td>
</tr>
</tbody>
</table>

20 Type 7.0/2.4 and 8.5/2.4 with covered expansion joint for thermal expansion
Fall protection grille 120 for FDH

For part no., see pricelist
Fall protection grille (in multiple elements) to prevent anyone falling when the cover is open. Matching corresponding fuel store cover. Each element is prepared for installation of a shaker motor (shaker motor at an additional charge).
Max. load 200 kg/m²

<table>
<thead>
<tr>
<th>Specification</th>
<th>FDH 4.0/2.4</th>
<th>FDH 5.5/2.4</th>
<th>FDH 7.0/2.4</th>
<th>FDH 8.5/2.4</th>
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</thead>
<tbody>
<tr>
<td>Number of elements</td>
<td>pce</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Weight per pce</td>
<td>kg</td>
<td>117</td>
<td>161</td>
<td>133/141</td>
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</tbody>
</table>

Fall protection grille 200 for FDH

For part no., see pricelist
Fall protection grille (in multiple elements) to prevent anyone falling when the cover is open. Matching corresponding fuel store cover. Each element is prepared for installation of a shaker motor (shaker motor at an additional charge).
Max. load 200 kg/m²

<table>
<thead>
<tr>
<th>Specification</th>
<th>FDH 4.0/2.4</th>
<th>FDH 5.5/2.4</th>
<th>FDH 7.0/2.4</th>
<th>FDH 8.5/2.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of elements</td>
<td>pce</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Weight per pce</td>
<td>kg</td>
<td>104</td>
<td>143</td>
<td>118/125</td>
</tr>
</tbody>
</table>

FDB drive-over bunker cover

For part no., see pricelist
Cover that can be driven over for secure sealing of openings for fuel delivery to the fuel store. The cover closes flush with the road surface. The substructure is equipped with a drain channel. The cover is actuated by means of a hydraulic cylinder. A stay prevents the cover from falling shut.

Standard delivery:
- Steel supporting structure
  - Permissible axle load
    - FDB 3.0/2.0: 7.5 t
    - FDB 3.8/2.4: 10.0 t
    - FDB 3.2/3.2: 10.0 t
    - Sand-blasted
    - Primed with zinc dust and painted
- Cover surface
  - For filling with asphalt or concrete by the customer

- Substructure
  - With drain channel and two DN 100 drain connectors
- Hydraulic cylinder
  - With hinge lug connection, pipe break protection, bearing block
  - Hydraulic hoses, 1 m long

To be carried out by the customer:
- If the travel surface is sloping, the water flowing to the cover must be drained away upstream of the cover frame by means of a drain channel.
- Drain line for rainwater, channel heating
- Seal between cover frame and supporting surface of cover frame
- Filling of the cover surface with a bitumen layer and asphalt or concrete, watertight design. The max. permissible specific weight of the filling is 2400 kg/m³.
Fuel storage (cont.)

- A: Filling on site (concrete or asphalt)
- B: Channel for rainwater
- C: Rainwater drain (on site)
- D: Fitting
- E: Filling level
- F: Fall protection grille (optional)
- G: All-round seal required Not included in the standard delivery.
- H: Drain channel, running water (on site)
**Fuel storage (cont.)**

**Specification**

<table>
<thead>
<tr>
<th>FDB drive-over bunker cover</th>
<th>FDB 3.0/2.0</th>
<th>FDB 3.8/2.4</th>
<th>FDB 3.2/3.2</th>
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</thead>
<tbody>
<tr>
<td>a (mm)</td>
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<td>3800</td>
<td>3200</td>
</tr>
<tr>
<td>b (mm)</td>
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<td>c (mm)</td>
<td>2000</td>
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<tr>
<td>d (mm)</td>
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<td>3950</td>
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<tr>
<td>e (mm)</td>
<td>2530</td>
<td>2930</td>
<td>3730</td>
</tr>
<tr>
<td>f (mm)</td>
<td>2150</td>
<td>2550</td>
<td>3310</td>
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<tr>
<td>FDB cover weight (kg)</td>
<td>1520</td>
<td>2360</td>
<td>2680</td>
</tr>
<tr>
<td>Max. permissible axle load (t)</td>
<td>7.5</td>
<td>10.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>

**Fall protection grille 120 for FDB**

For part no., see pricelist

Fall protection grille (in multiple elements) to prevent anyone falling when the cover is open. Matching corresponding fuel store cover. Each element is prepared for installation of a shaker motor (shaker motor at an additional charge). Max. load 200 kg/m²

**Specification**

<table>
<thead>
<tr>
<th>Fall protection grille, type 120 for</th>
<th>FDB 3.0/2.0</th>
<th>FDB 3.8/2.4</th>
<th>FDB 3.2/3.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of elements (pce)</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Weight per pce (kg)</td>
<td>130</td>
<td>205</td>
<td>230</td>
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</tbody>
</table>

**Fall protection grille 200 for FDB**

For part no., see pricelist

Fall protection grille (in multiple elements) to prevent anyone falling when the cover is open. Matching corresponding fuel store cover. Each element is prepared for installation of a shaker motor (shaker motor at an additional charge). Max. load 200 kg/m²

**Specification**

<table>
<thead>
<tr>
<th>Fall protection grille, type 200 for</th>
<th>FDB 3.0/2.0</th>
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<th>FDB 3.2/3.2</th>
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<tr>
<td>Number of elements (pce)</td>
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<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Weight per pce (kg)</td>
<td>120</td>
<td>180</td>
<td>210</td>
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</tbody>
</table>

**Shaker motor for fall protection grille**

For part no., see pricelist

The shaker motor sets the fall protection grille in an oscillating motion. This prevents the delivered fuel from bridging the fall protection grille and therefore ensures a steady material flow during filling.

Standard delivery:
- Shaker motor, 3 x 400 V incl. control, thermal relay and installation material
- Key switch

To be carried out by the customer:
- Electrical connection of shaker motor and key switch

Note

One shaker motor is required per fall protection grille element. When using shaker motors, a large control panel must be included in the plans.

**Hydraulic unit for bunker charging cover**

For part no., see pricelist

Hydraulic unit used exclusively for a hydraulic bunker cover (FDH, FDB). The cover is opened by the hydraulic cylinder when the key switch is actuated. The load holding valve fixes the cover in position.
Fuel storage (cont.)

**Standard delivery:**
- Hydraulic unit, comprising:
  - Gear pump 4 l/min, incl. motor 1.5 kW, 3 x 400 V
  - Oil container 12 l, non-return valve
  - Pressure limiter valve
  - Pressure diverter valve
  - Return filter
  - Oil level indicator
  - Pressure gauge
  - Shut-off valve
  - Oil filling
  - Hydraulic hoses
  - Wall mounting brackets

- Control:
  - Via the boiler control unit, protected by temperature and level switches in the oil container
  - Key switch OPEN/OFF/CLOSED for installation of a locking cylinder on site
  We recommend installing the key switch near the cover. This lets you observe the movement of the cover.

**Note**
The hydraulic unit is required in fuel extraction systems without hydraulic actuation:
- Flexible agitator discharge AF
- Horizontal discharge AH
- Funnel discharge AP
- External discharge system

---

**Cover drive for hydraulic unit**

**For part no., see pricelist**
Use the cover drive if there is an existing hydraulic unit for the push-rod discharge.
The cover drive is used for a hydraulic bunker cover (FDH, FDB).
The cover is opened by the hydraulic cylinder when the key switch is actuated. The load holding valve fixes the cover in position.

**Standard delivery:**
- One valve block per cover, each equipped with:
  - 2 solenoid valves
  - 1 load holding valve
  - 2 non-return throttle valves

**Control:**
Via the boiler control unit
One key switch OPEN/OFF/CLOSED per cover for installation of a locking cylinder on site
We recommend installing the key switch near the cover. This lets you observe the movement of the cover.
8.1 Heating water buffer cylinder on request

Heating water buffer cylinder (customised)

Special order
We supply buffer cylinders for a wide variety of applications on customer request.

Version:
- Steel S 235 JRG2, untreated inside, anti-rust coating outside
- Max. temperature: 95 °C

Information required:
- Max. operating pressure in bar (MPa)
- Max. temperature in °C
- Capacity in litres
- Maximum dimensions: ø: height and height when tilted (without insulation)
- Connections: Type, number

**Thermal insulation for special version heating water buffer cylinders**

**Special order**
Suitable thermal insulation made from fleece or rigid foam shells (single or multi part) can be supplied on request.

**Note**
We are happy to assist you with the design of the heating water buffer cylinder.

---

9.1 System design

Selecting the rated heating output

Select solid fuel boilers according to the required heat load. The boiler must be planned as a base load boiler and always operated in conjunction with a buffer cylinder (management). The correct system design point therefore does not depend on the nominal load specification (i.e. the building heat load), but rather on the required duration of use (length of the heating season, heat demand).

**Note**
For locations over 1500 m above sea level, the project enquiry must include details about the precise geographical location (altitude and address of the location).

Safety temperatures

These boilers comply with EN 303 and DIN 4702. They can be used in accordance with EN 12828 in sealed unvented heating systems.

- Permissible flow temperatures (= safety temperatures):
  - Up to 110 °C
- Max. possible flow temperature:
  - Approx. 15 K below the safety temperature
- High limit safety cut-out of the boiler control unit:
  - Delivered condition 100 °C

9.2 Delivery

Viessmann delivers to the site. The system is unloaded on site. A special crane is required on site for unloading.

The personnel carrying out transportation must be aware of accident hazards and take appropriate measures to prevent them. The boiler should only be lifted when it is completely empty (water, fuel, ash).

Lifting the solid fuel boiler

Lifting eyes must be fastened to the points provided for lifting the combustion base. After unloading, the lifting eyes must be removed. The heat exchanger is lifted at the lifting eyes provided for this purpose and placed on the combustion base.

**Note**
See “Siting”, page 84.

9.3 Positioning

Handling

The combustion block has 4 lifting eyes that must be screwed in before lifting. Lifting gear can be attached to these lifting eyes. The heat exchanger of the Vitoflex 300-UF has 2 lifting eyes to which lifting gear can be attached.

A special crane (on site) is required to lift the combustion block and heat exchanger.

Viessmann experts undertake handling and siting on prepared foundations. Recommended minimum clearances to walls for installation and maintenance work must be observed. Provision should be made for a heat-resistant, vibration-absorbing boiler base if structure-borne noise attenuation is required.
Boiler room requirements

A separate dry boiler room must be provided for the system. No combustible materials may be stored in the boiler room.

The minimum clearances to the walls and ceiling required for cleaning and maintenance must be observed. These can be found on the dimensions sheet. Adequate fresh air supply must be ensured direct from the open air into the boiler room. Forced ventilation is required in the case of narrow and/or internal boiler rooms. The temperature in the boiler room when operating the system must not exceed +40 °C (point of capture: Approx. 1 m from the boiler). The temperature in the boiler room when operating the system must not fall below +10 °C (point of capture: Inside of exterior wall).

- Avoid air contamination by halogenated hydrocarbons (e.g. as contained in sprays, paints, solvents and cleaning agents)
- For rooms where air contamination through halogenated hydrocarbons is expected: Boilers and flue gas/water heat exchangers may only be installed if adequate measures are taken to provide a supply of uncontaminated combustion air.
- Prevent very dusty conditions
- Prevent high levels of humidity
- Prevent frost and ensure good ventilation

Note

If these instructions are not observed, any consequential losses directly related to any of these causes are excluded from our warranty.

If in doubt, consult Viessmann on this matter.

Boiler room floor requirements

The solid fuel boiler may only be installed on a fire- and temperature-resistant floor. No temperature-sensitive pipes or lines may be routed through the floor underneath the boiler.

The load bearing capacity of the boiler room floor must be designed for the system weight plus that of the water and the fuel it will contain. Floor load bearing capacity in the area of the boiler supporting surface: 2000 kg/m².
### Design information (cont.)

<table>
<thead>
<tr>
<th>Hatched area</th>
<th>Floor of a heat-resistant design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grey central area</td>
<td>Boiler supporting surface</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Foundation properties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trade name</strong></td>
</tr>
<tr>
<td><strong>Rated heating output</strong></td>
</tr>
<tr>
<td><strong>a</strong></td>
</tr>
<tr>
<td><strong>b</strong></td>
</tr>
<tr>
<td><strong>c</strong></td>
</tr>
<tr>
<td><strong>d</strong></td>
</tr>
<tr>
<td><strong>e</strong></td>
</tr>
</tbody>
</table>

#### Requirements of the Muster-Feuerungsverordnung [M-FeuVo Sample Combustion Ordinance - Germany]

Observe the specific building regulations and fire regulations in your country. The installation room must meet the standards laid down by the "Muster-Feuerungsverordnung". Combustion appliances for solid fuels with a total rated heating output of more than 50 kW and which are to be operated simultaneously, may only be installed in special rooms (boiler rooms).

**Emergency switch**

On combustion equipment for solid fuels with a rated heating output above 50 kW, it must be possible to switch off the burner, fuel supply equipment and burner control units at any time by means of an emergency stop switch located outside the installation room. Provide a sign adjacent to the emergency stop switch that reads "EMERGENCY STOP SWITCH – COMBUSTION EQUIPMENT”.

**Combustion air supply**

For open flue combustion equipment with a total rated heating output in excess of 35 kW, the combustion air supply is deemed to have been verified if the combustion equipment is located in areas which provide an aperture or duct leading outdoors. At 35 kW rated heating output, the cross-section of the aperture must be at least 150 cm². For every kilowatt rated heating output in excess of 35 kW, the aperture must be 2 cm² larger than stated above.

Pipes must be sized to provide equivalent flow rates. The required cross-section may be split over up to 2 apertures or pipes.

\[
A = 150 \text{ cm}^2 + 2 \times \frac{\text{cm}^2}{\text{kW}} \times (\Sigma \dot{Q}_n - 35 \text{ kW})
\]

\[
\Sigma \dot{Q}_n = \text{sum of all rated heating outputs in kW}
\]
Never close or obstruct combustion air apertures or pipes. Use special safety measures to ensure that the combustion equipment can only be operated when the aperture is open. The required cross-section must be free.

Safety precautions

For gas combustion equipment installed in rooms, fuel lines must be equipped with the following safety equipment immediately upstream of the gas combustion equipment:

- In the event of an external thermal load in excess of 100 °C, the fuel supply must automatically shut off.
- Up to a temperature of 650 °C and over a period of at least 30 min, no more than 30 l/h (measured as air flow rate) must be able to flow through or out of the fuel line.

Combustion equipment must be installed at a sufficient distance from combustible materials and fitted furniture, or be shielded from them, to ensure that the temperature on such materials/furniture does not exceed 85 °C when the combustion equipment is delivering the rated heating output.

Room ventilation

Note
Means for adequate ventilation of the boiler room must be provided with all automatic heating systems.

Minimum clearances
### Dimensions and clearances

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Vitoflex 300-UF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated heating output</td>
<td>kW</td>
</tr>
<tr>
<td>a</td>
<td>mm</td>
</tr>
<tr>
<td></td>
<td>1350 1850 1800 1600 2100</td>
</tr>
</tbody>
</table>

### 9.4 Water connection

#### Heating connections

**Existing systems**
Before connecting the boiler to an existing heating system, flush the system thoroughly to remove dirt and sludge residues. Otherwise, this dirt and sludge will be deposited inside the solid fuel boiler and can lead to local overheating, noise and corrosion. Boiler damage caused by such deposits is excluded from our warranty. Where necessary, install dirt traps.

**Connections on the water side**
On site, ensure that there is a water supply independent of the power supply. This (redundant) design guarantees that the boiler is reliably cooled via the thermally activated safety valve in the event of a power failure. We also refer to the standards and regulations listed in this document.

**Boiler circuit and shunt pump**
In order to reliably prevent boiler corrosion caused by flue gas condensation, the boiler return temperature must never fall below 65 °C. The boiler has variable output-dependent control. This requires a constant boiler flow rate of the water to be heated. For this reason, the boiler circuit with boiler circuit pump and boiler mixer must be installed in accordance with the design recommendations.

The boiler circuit should be designed in such a way that the temperature differential between flow and return is 15 K or less. Control of the boiler circuit pump and valve of the return temperature raising facility is integrated in the supplied control unit.

#### System example

**General information**
- In order to reliably prevent boiler corrosion caused by flue gas condensation, the boiler return temperature must never fall below 65 °C. A boiler circuit pump with boiler mixer should be provided in accordance with the system scheme.
- The boiler circuit should be designed in such a way that the temperature differential between flow and return is 15 K or less.

- Integrating heat consumers
- The expansion vessel must be connected to the boiler, without shut-off devices, via the boiler flow.
Design recommendation for systems with sealed expansion, cylinder circuit if required

Example

A Additional heat generator
B 1 heating water buffer cylinder as low loss header (5 sensors)
C Heat consumer distributor

VITOFLEX 300-UF

VIESSMANN
In accordance with EN 12828, water heating systems must be equipped with a diaphragm expansion vessel. The size of the expansion vessel to be installed is subject to the heating system specification.

The specific water capacity \( v \) was determined as follows:

- Radiators: 13.5 l/kW
- Panel radiators: 8.5 l/kW
- Underfloor heating system: 20 l/kW

Calculation:

\[ V_A = Q \times v + 1000 \]
\[ V_A = 18 \text{ kW} \times 8.5 \text{ l/kW} + 1000 \text{ l} = 1153 \text{ l} \]

If possible, when calculating the gas pre-charge pressure, select a supplement of 0.2 bar:

\[ p_0 \geq H/10 + 0.2 \text{ bar} \]
\[ p_0 \geq (13/10 + 0.2 \text{ bar}) = 1.5 \text{ bar} \]

From the table:

With \( p_{sv} = 3 \text{ bar} \), \( p_0 = 1.5 \text{ bar} \), \( V_A = 1153 \text{ l} \)
\[ V_A = 250 \text{ l} \text{ (for } V_A \text{ max. 1360 l)} \]

Selected:

- All details relate to a flow temperature of 90 °C.
- The tables have allowed for a hydraulic seal to DIN 4807-2.

Recommendation:

- Select a sufficiently high safety valve response pressure:
  \[ p_{sv} \geq p_0 + 1.5 \text{ bar} \]
- For circulation pumps, due to the inlet pressure required, select at least 0.3 bar above the pre-charge pressure even for attic installations:
  \[ p_0 \geq 1.5 \text{ bar} \]
- Set the fill or starting pressure on the water side of vented systems in their cold state at least 0.3 bar above the pre-charge pressure:
  \[ p_v \geq p_0 + 0.3 \text{ bar} \]

Divide the vessel size found in accordance with the above tables by the conversion factor.
9.5 Electrical installation

Requirements
The electrical installation should be carried out in accordance with the wiring diagram. In the vicinity of hot parts (flue gas fan, flue pipe), cables must be routed in steel pipes and with appropriate clearances for temperature protection. The cable entries for motors and appliances must be dust-proof and provided with strain relief.

Note
The regulations of the local power supply utility must be observed.

Positioning the control panel
Optimal positioning of the control panel can minimise cable lengths and therefore reduce costs. The location of the control panel must be selected so that negative influence caused by thermal radiation (boiler front panel, boiler back panel with flue gas collector and flue gas fan, as well as flue pipe) and exposure to dust during cleaning is minimised.

The ambient temperature of the control panel (approx. 10 cm away from the control panel) must not exceed 40 °C. In case of doubt, locating the control panel outside the boiler room near the boiler room door is preferred.

Note
The regulations of the local power supply utility must be observed.

9.6 Safety equipment to EN 12828

The safety equipment for the heating system must be installed by the authorised heating contractor.

EN 12828 applies to the design of hot water heating systems with safety temperatures up to 105 °C and a maximum rated output of 1 MW.

In the case of sealed unvented hot water heating systems, boilers with a rated heating output of up to 300 kW must be fitted with the following safety equipment:

- Diaphragm expansion vessel
- Safety valve
- Drain & fill facility
- High limit safety cut-out
- Thermometer
- Pressure gauge
- Low water indicator

Expansion
In a sealed unvented system, the pre-charge pressure of the expansion vessel must be equal to the maximum system height plus 0.2 bar (0.02 MPa). For sizing the expansion vessel, see chapter "Expansion vessel sizing".

Safety valve
Equip the boilers with a type-tested safety valve. For all other operating conditions, this must be identified in accordance with TRD 721 with "D/G/H". Install the safety valve at an easily accessible location at the highest point of the boiler or in the immediate vicinity of the flow line. It must not be possible to shut off the line between the boiler and the safety valve. Pumps, fittings or constrictions must not be present in the line. The discharge pipe must be designed in such a way that no pressure increase is possible. Any expelled heating water must be drained off safely. The outlet point of the discharge pipe must be arranged in such a way that any water expelled from the safety valve can be drained off safely and visibly.

Note
The safety valve is not part of the standard delivery of the boiler.

High limit safety cut-out
Equip each directly heated boiler with a high limit safety cut-out that will shut down the combustion system when the permissible flow temperature is exceeded and prevent automatic restarting. A reset can only be performed manually by specialist personnel.

Minimum pressure limiter
Recommended for flow temperatures in excess of 100 °C. One required per multi boiler system.

Maximum pressure limiter
Every heat generator with a rated heating output in excess of 300 kW must be equipped with a pressure limiter to prevent the pressure from exceeding the maximum set pressure (see EN 12828, Point 4.6.2.2.2).
9.8 Safety equipment to protect against overfilling with fuel and burn-back

Automatic extinguishing device (SLE)

The purpose of the automatic extinguishing device on the feed is to safely prevent burn-back in the event of a fault, e.g. a power failure. The automatic extinguishing device is fitted with a 25 l extinguishing water tank and a float switch. In the event of excessive temperature, the feed screw conveyor is flooded just enough to ensure the system is safe. The float switch monitors the fill level or level of the extinguishing water tank. If the level is not reached, the solid fuel boiler shuts down and sets a fault message. For safety reasons and in order to avoid damage caused by flooding, it is not advisable to connect the extinguishing device directly to the water mains (cold water supply).

Extinguishing device with extinguishing water container

For part no., see pricelist

Standard delivery:
- Danfoss AVTA extinguishing valve, adjustable 50 - 90° with dirt trap
- Extinguishing water container, 25 l, with retainer and water level monitoring (float switch)

Note
- The automatic extinguishing device is included in the standard delivery of the boiler.

Note
- Valve setting 50 - 90 °C
  3 corresponds to approx. 80 °C
- The lines must be secured in metal pipes (½”).
Extinguishing device with cold water supply

For part no., see pricelist

A B

KW

A B

KW

A

Combustion
B Dosing container with barrier layer
KW Cold water supply DN 15 ½”
min. 2.0 bar (0.2 MPa), max. 3.0 bar (0.3 MPa)

Note
■ The lines must be secured in metal pipes (½”).
■ It must not be possible to shut off the cold water supply without the aid of tools.

Note
Alternative or additional safety equipment
A shut-off gate valve is standard for an unpressurised material store or a rotary lock valve for a material store with overpressure (charging with fan, e.g. wood processing operations).

Preventing overfilling with fuel

To avoid overfilling the combustion chamber, install a fill level monitor in accordance with TRVB H-118. The light barrier installed in the boiler is used for this purpose.

Burn-back protection device (RHE)

A sensor located directly on the feed pipe detects any sign of burn-back risk. Briefly increasing the output (increasing the infeed of the material) counteracts the risk in good time.

By combining with the fuel overfill protection, activation of any specified protection device is prevented and standard mode is maintained to ensure extremely reliable heat supply.

Reignition protection (RZS)

In accordance with TRVB H-118 and EN 303-5, automatic wood combustion systems in which there is a risk of reignition due to a shower of sparks or the ignition of combustible gases flowing back into the conveyor pipe must be equipped with reignition protection.

Protection against solid fuel boiler reignition
■ Permanent and monitored barrier layer
■ Permanent monitored negative pressure operation
■ Combination with the RSE (rotary lock valve or shut-off gate valve)

Note
The RSE is not included in the standard delivery and must be ordered separately.

Temperature and flame monitor (TÜF, FÜF)

In accordance with TRVB H-118, the solid fuel boiler is monitored for falling below the temperature limit. If the initial burn does not develop, the system is stopped.
Burn-back protection device (RSE)

Note
See page 40.

Additional "material transport burn-back protection" depends on the respective requirements (location, size of the fuel store, material, pressure, regulations) and is a separate item from the standard delivery ordered.

Available burn-back protection devices (RSE):
■ Shut-off gate valve
■ Rotary lock valve

Available extensions for burn-back protection devices (RSE):
■ Dual rotary lock valve
■ Drop chute

Shut-off gate valve
A shut-off gate valve is permitted in all non-pressurised fuel stores. According to TRVB H-118 (test certificate BV 2979/89), it is deemed a suitable burn-back protection device.

Rotary lock valve
Due to the pressure load, at least one rotary lock valve is required to reduce pressure between the fuel store and the boiler if wood remnants are blown into fuel storage rooms by fans. The rotary lock valve is suitable for reducing pressure. It is deemed a suitable burn-back protection device both in EN 303-5 and TRVB H-118 (test certificate BV 2979/89).

Dual rotary lock valve with pressure compensation
If, due to special circumstances, extremely high overpressure can be expected in the fuel store, then in accordance with the relevant project plan, 2 rotary lock valves with a pressure compensation line to the open air must be installed in the material transport path. The maximum pressures to be expected must be confirmed by the supplier of the chip extraction system. Leaks may occur in the rotary lock valve under the discharge system as a result of wear on the sealing elements or due to larger pieces of wood that cannot be transported. Such leaks may allow the back flow of low temperature carbonisation gases from the combustion system into the fuel store. A flue gas alarm must be installed between the rotary lock valve and the discharge system which, when responding, switches off the system causing the negative pressure. Note
Max. permissible positive pressure in the fuel store: + 1200 Pa
Max. permissible negative pressure in the fuel store: + 0 Pa

Drop chute
A drop chute may be required in order to provide a sufficient distance between the RSE and the charging device. This prevents combustible material from being conveyed back (possibly by embers or sparks).

Note
The drop chute must be used in conjunction with an additional RSE. The design (diameter, profile) of the drop chute is matched to the relevant project at the factory.

9.9 Fire safety

The fire safety regulations for wood combustion systems vary from country to country. The regulations applicable to the specific installation location must be observed.

Fuel store fire safety

The measures required for this (such as for example, temperature monitoring devices in the fuel store/hopper ("TÜB"); manually actuated extinguishing device ("HLE")) are not part of the Viessmann Holzheiztechnik GmbH standard delivery.

Note
In this regard, the conditions of the local planning office must be met by the operator.

9.10 Commissioning

Initial commissioning of a newly installed system may only be carried out by Viessmann or another heating contractor trained and authorised by Viessmann. Prior to commissioning, the system must be filled with water, fuel must be provided for commissioning and the installation must be checked.
Fuel for commissioning

As the boiler system is cold and residual humidity is also extracted from the refractory concrete during commissioning, we recommend using logs when heating the boiler system for the first time. The first three hours of the heat-up process should be carried out with a low output.

Before storing the fuel, the function of the silo discharge system must be tested by an authorised contractor. Consequently, the fuel should not be stored until after the authorised contractor has arrived.

Amount of fuel to be stored for commissioning

<table>
<thead>
<tr>
<th>Rated heating output</th>
<th>Volume of fuel to be stored</th>
</tr>
</thead>
<tbody>
<tr>
<td>390 kW</td>
<td>approx. 2500 kg</td>
</tr>
<tr>
<td>530 kW</td>
<td>approx. 3000 kg</td>
</tr>
<tr>
<td>720 kW</td>
<td>approx. 4000 kg</td>
</tr>
<tr>
<td>950 kW</td>
<td>approx. 5300 kg</td>
</tr>
<tr>
<td>1250 kW</td>
<td>approx. 6800 kg</td>
</tr>
</tbody>
</table>

The quantity corresponds to consumption of approx. 10 – 24 full operating hours. This allows the discharge to be cleared quickly in the event of a fault.

Note

For a list of permitted fuels for commissioning the Vitoflex 300-UF, see the chapter on "Fuels". Page 95.

9.11 Fuels

The Vitoflex 300-UF has been specially developed for the automatic combustion of dry and moist fuels (wood remnants, wood pellets or woodchips from forest thinnings up to max. M50). The Vitoflex 300-UF combines the benefits of underfeed combustion with the advantages of grate combustion to optimum effect.

The Vitoflex 300-UF is suitable for the following fuels:

- Woodchips according to EN 17225-4 up to a moisture content of 50 % (M50/P31S)
- Pellets to EN 17225-2, Class A2

Note

See information on fuels in chapter 1 from page 6.

9.12 Standard values for water quality

The service life of any boiler as well as that of the complete heating system is influenced by the quality of the water.

The cost of a water treatment facility is always going to be less than that of repairing damage to your heating system.

Observing the following requirements is necessary to safeguard your warranty rights. The manufacturer's warranty excludes damage due to corrosion and scaling.

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

The water used in heating systems must comply with the chemical values of the Drinking Water Ordinance [Germany]. If well water or similar is used, check its suitability before filling the system.

Avoid excessive scale deposits (calcium carbonate) on the heating surfaces. For heating systems with operating temperatures up to 100 °C, Guideline VDI 2035 Part 1 "Prevention of damage in water heating installations - Scaling in domestic hot water supply installations and water heating installations" applies together with the following standard values. For more information, see the explanations for guideline VDI 2035.

The standard values assume the following conditions:

- The total volume of fill and top-up water will not exceed three times the water content of the heating system during its service life.
- 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 Part 2 have been implemented.

Soften the fill and top-up water in heating systems with 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.
- The specific system volume is greater than 20 l/kW heating output. In multi boiler systems, apply the output of the smallest boiler.
When designing the system, observe the following:

- Install shut-off valves in each section. This prevents the need for draining all the heating water in the case of repairs or system expansion.
- Install a water meter to record the volume of fill and top-up water. The volumes and hardness of the topped-up water volumes must be entered in the boiler service instructions.
- For systems with a specific volume greater than 20 litres/kW heating output (for multi boiler systems, the output of the smallest boiler should be used), the requirements of the next highest total heating output group should be applied (using the table). If even bigger (> 50 litres/kW), soften the water down to a total of alkaline earths of ≤ 0.02 mol/m³.

Operating information:

- Start the system gradually at a high heating water flow rate, starting with the lowest boiler output. This prevents localised concentration of limescale deposits on the heating surfaces.
- For multi boiler systems, all boilers should be started at the same time to prevent the entire volume of limescale settling on the heat transfer surface of only one boiler.
- During expansion or repair work, only drain the necessary sections.
- 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 for any system expansion.
- Periodically inspect, clean and activate all filters, dirt traps or other blow-down or separating facilities in the heating water circuit after reinstalling or installing for the first time. Thereafter, this may be one as required, depending on the type of water treatment applied (e.g. water softening).

The build-up of limescale deposits on the heating surfaces will be minimised if these instructions are followed. If failure to observe guideline VDI 2035 results in harmful limescale deposits, the service life of the installed boilers will in most cases have already been reduced. Removing limescale deposits may be an option to restore the operating capability. This must be carried out by Viessmann Industrieservice or a specialist contractor. Inspect the heating system for possible damage prior to returning it into use. The faulty operating parameters must be corrected in order to prevent excessive scale build-up from reoccurring.

---

**Filling the heating system**

The charge pressure of the cold hydraulic seal must be approx. 0.1 bar (0.01 MPa) higher than the pre-charge pressure of the sealed expansion vessel. However, it must not exceed a maximum of 3 bar (0.3 MPa).

---

**9.13 Frost protection**

Special antifreeze suitable for heating systems can be added to the fill water. The antifreeze manufacturer must verify its suitability, since otherwise damage to gaskets and diaphragms can occur as well as noisy heating operation. Viessmann accepts no liability for any resulting damage or consequential losses.

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**9.14 Connection on the flue gas side**

**Chimney**

The system is equipped with a flue gas fan and therefore the combustion equipment does not require a draught. The chimney must be designed in the same way as for combustion equipment with a pressure-jet oil or gas burner without draught requirement (flue gas temperature at rated load 160 - 200 °C). The Vitoflex 300-UF has output-dependent control modulating between 25 - 100 % of the rated heating output. This results in flue gas temperatures in the range of min. 100 °C up to max. 250 °C. In order to avoid a risk of soot contamination, there should be an insulated chimney. The route from the flue gas fan to the chimney should be as short as possible. If at all possible, avoid 90° bends in the flue system. Flue pipes over 1 m long must be thermally insulated. The connection to the chimney should be made with a rise at an angle of 30 - 45°. The flue pipe, including the inlet to the chimney, must be gas-tight.

A chimney compliant with regulations relevant to the rated boiler heating output is required for efficient boiler operation. Provide verification to EN 13384.

Flue gas temperatures below 90 °C can occur in the lower output range. Therefore, connect the boiler to a moisture-resistant chimney (thermal resistance class I according to DIN 18160 Part 1).

**Note**

If the boiler is not to be connected to a moisture-resistant chimney, carry out a chimney calculation or request a chimney assessment (values for a chimney calculation, see page 14).

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**Flue pipe**

Acoustic transmission may arise from the flue gas fan, which can lead to excessive noise. We therefore recommend making the connection to the chimney with a flexible flue pipe inlet.
Design information (cont.)

Observe the following when connecting the flue pipe:

- Install the flue pipe with a rise to the chimney (45° if possible).
- Never push the flue pipe too far into the chimney.
- Ensure the entire flue gas path (including cleaning aperture) is gas-tight.
- Do not brick the flue pipe into the chimney; connect it with a flexible flue pipe inlet instead. Provide a cleaning aperture.
- Use wall liners to adapt to flue systems from other manufacturers.
- Provide the flue pipe with thermal insulation of at least 30 mm thickness.

9.15 Sound insulation

The fans, circulation pumps and other units used in heating systems generate noise. Noise is transferred from the installation room via the floor, ceiling and walls to neighbouring rooms and via the ventilation air and extract air apertures to other rooms and to the outside. There it may be considered a nuisance. To avoid this happening, additional protective measures may be required which should be considered at the design stage. Subsequent measures to reduce noise development frequently require extensive effort and expenditure.

Airborne noise attenuation

To assess the noise emissions to the surrounding area, it is therefore advisable to consider the sound power level measured at the flue system terminal. It should be considered at the engineering stage whether a flue gas silencer will be necessary. It is important to ensure there will be sufficient space for the flue gas silencer behind the boiler. In accordance with EN 13384, the pressure drop of the flue gas silencer on the flue gas side will be required for calculating the flue system.

Structure-borne noise attenuation

Anti-vibration supports for the heat generator are an economical and effective measure. We therefore offer anti-vibration supports for this purpose. When sizing such supports, take the entire operating weight of the boiler system into consideration and, when using linear anti-vibration brackets, the condition of the supporting surface. Effective structure-borne noise attenuation is particularly important when installing boilers in attics. Compensators may be used to physically separate the combustion equipment from the building. These should be installed as near as possible to the boiler in the flow, return and safety line. Also insulate any braces or brackets, if installed, against sound/vibration transmission to the building. Detailed information for reducing noise emissions from combustion equipment in heating systems can be found in Information Sheet No. 10 of the BDH (Federation of German Heating Industry).

Appendix

10.1 General information on low pressure hot water boilers with safety temperatures of up to 110 °C

The pressure vessel (hot water boiler) is built in accordance with TRD 702 and must be equipped in line with this directive. Observe the operating conditions in this directive. Depending on type, the boiler meets the following standards regarding the stated rated heating output and technical requirements:

- DIN 4702 or EN 303
- EN 297
- EN 483
- EN 677

See details on the type plate and in the enclosed documentation.
During installation and commissioning of this boiler, observe all local Building Regulations and regulations concerning combustion systems, as well as the following Standards, Regulations and Directives:

- **DIN 18160-1**: Chimneys (design and performance)
- **DIN 1988**: Codes of practice for drinking water installations (TRWI)
- **DIN 4753**: DHW systems for potable water and for process water
- **EN 12828**: Heating systems in buildings – Design of hot water heating systems
- **EN 13384**: Chimneys – Thermal and fluid dynamic calculation methods
- **TRD 702**: Equipment for steam boiler systems with class II hot water boilers
- **Also observe EN 12953** in the case of:
  - Low pressure hot water boilers with safety temperatures > 110 to 120 °C
- **EN 12953-1**: Shell boilers – General
- **EN 12953-6**: Shell boilers – Requirements for equipment for the boiler
- **EN 12953-7**: Shell boilers – Requirements for firing systems for liquid and gaseous fuels for the boiler
- **EN 12953-8**: Shell boilers – Requirements for safeguards against excessive pressure
- **EN 12953-10**: Shell boilers – Requirements for feedwater and boiler water quality

**Use of oil combustion**

- **DIN 4755**: Oil firing installations
- **DIN 4787-1**: Atomising oil burner (above 100 kg/h)
- **DIN 51603-1**: Liquid fuels; fuel oil EL, minimum requirements
- **EN 230**: Specification for monobloc oil burners – Safety, control and regulation devices and safety times
- **EN 267**: Pressure-jet oil burner with fan
- **TRD 411**: Oil combustion for steam boilers (where applicable)

**Use of gas combustion**

- **EN 298**: Automatic gas burner control systems for gas burners and gas burning appliances with or without fans
- **EN 676**: Gas burners with fans
- **DVGW Code of Practice G 260/I and II**: Technical rules for gas quality
- **DVGW-TRGI 2008**: Technical rules for gas installations
- **TRD 412**: Gas combustion for steam boilers (where applicable)
- **TRF 1996**: Technical rules liquid gas

### 10.2 Pipe connections

All pipe connections to solid fuel boilers should be made free of load and torque stress.

### 10.3 Electrical installation

Carry out the electrical connection and installation in accordance with VDE regulations (DIN VDE 0100 and DIN VDE 0116) and the technical connection requirements laid down by your electricity supply company.

- **DIN VDE 0100**: Installation of HV systems with rated voltages up to 1000 V
- **DIN VDE 0116**: Electrical equipment for combustion systems

### 10.4 Operating instructions

According to EN 12828 section 5 and EN 12170/12171, the system installer must provide operating instructions for the whole system.

### 10.5 Checks as part of the Building Regulations approval procedure

As part of the building inspectorate approval process, condensing combustion equipment is tested by the flue gas inspector (where applicable) for adherence to Building Regulations and any general recognised technical rules to be observed.

The State Building Regulations, their implementation orders and the combustion equipment ordinances, as well as the general building inspectorate approvals and permits of the higher supervisory authority, in individual cases, are part of the Building Regulations requirements.
Keyword index

A
Accessories
- Ash removal.................................................................35
- Cleaning equipment..................................................38
- Flue gas extraction....................................................30
- Flue gas routing.........................................................33
- For control unit.........................................................20, 21, 22
- Function extension.....................................................23, 24
- Sound insulation........................................................34
Agitators
- Horizontal discharge..................................................45
Airborne noise attenuation..........................................97
Anti-vibration fittings...................................................34
Ash removal
- Ash container 240 l.....................................................36
- Ash container 800 l.....................................................36
Automatic extinguishing device (SLE).........................92

B
Boiler
- Safety equipment.......................................................28
- Boiler circuit pump......................................................88
- Boiler room.................................................................85
- Boiler room requirements
  - Combustion air supply..............................................86
  - Combustion Ordinance..............................................86
  - Fuel lines.................................................................87
- General.......................................................................85
- Minimum clearances.................................................87
- Boiler sequence control.............................................25
- Boiler specification
  - Actuator and sensor overview.................................17
  - Dimensions..........................................................16
- Buffer cylinder.........................................................84
- Building Regulations approval procedure..................98
Bunker cover
- Bunker filling............................................................78
- Drive-over.................................................................80
Burn-back protection
- RSE..........................................................................40

C
Charging control panel...............................................25
Chimney......................................................................96
Cleaning, pneumatic
- Accessories..............................................................26
Cleaning equipment....................................................38
Clearances.................................................................87
Combustible materials...............................................87
Combustion air...........................................................86
Combustion Ordinance
- M-FeuVo.................................................................86
Commissioning
- Fuel quantities to be stored.......................................95
Controller
- Boiler sequence control............................................25
- Charging control panel.............................................25
- Standard delivery.....................................................19
- Controller module....................................................23
Control unit
- Accessories..............................................................20, 21, 22, 23, 24
- Controller module....................................................23
- Modbus TCP/IP.........................................................22
- Sensors......................................................................24
- Standard delivery.....................................................19
Conveyor systems
- Application options by fuel.......................................42

D
Delivered condition.......................................................12
- Sensors and switches................................................12
Delivery.................................................................84
Design.................................................................84
Design of pellet storage room.....................................71
Design recommendation............................................90
Diaphragm expansion vessel......................................90
Discharge
- Push floor.................................................................54

E
Ecocontrol
- Functions.................................................................19
- Operation..............................................................19
- Standard delivery.....................................................19
- Touchscreen..........................................................19
Ecotronic
- Controller module connection options....................23
- With cold water supply.............................................93
Extinguishing device
- Automatic...............................................................92
- With cold water supply.............................................93

F
Fall protection grille
- Bunker filling............................................................80
Fault message device..................................................22
Feed screw conveyor, 2-stage......................................27
Fire safety
- Fuel store.................................................................94
Fire safety requirements
- Safety equipment.....................................................92
- Flue gas dust extractor..............................................30
- Flue gas fan.............................................................12
- Flue gas routing.........................................................33
- Flue gas side connection..........................................96
- Flue pipe.................................................................96
- Fuel.......................................................................8, 9, 95
- Amount for commissioning.....................................95
- Limits.....................................................................10
- Principles.............................................................6
- Wood pellets..........................................................8
Fuel extraction
- Application options..................................................42
- Fan discharge..........................................................52
- Overview..............................................................42
- Pellet extraction screw conveyor............................43
- Push floor discharge................................................54
- With screw conveyor..............................................43
Fuel store
- Filling.....................................................................77
- Fuel transport
  - Application options..............................................65
  - Overview...........................................................65
- Trough screw conveyor..........................................66
Funnel discharge AP................................................52