Vitoflame 100
Oil Burner (VEM Series)
for Vitola 200 boiler

Heating input: 83 to 300 MBH
24 to 88 kW

VITOFLAME 100

Vitoflame 100 oil burner
installed on a Vitola 200 boiler

IMPORTANT
Read and save these instructions for future reference.
Safety, Installation and Warranty Requirements

Please ensure that these instructions are read and understood before commencing installation. Failure to comply with the instructions listed below and details printed in this manual can cause product/property damage, severe personal injury, and/or loss of life. Ensure all requirements below are understood and fulfilled (including detailed information found in manual subsections).

- **Licensed professional heating contractor**
The installation, adjustment, service, and maintenance of this equipment must be performed by a licensed professional heating contractor.

  > Please see section entitled “Important Regulatory and Installation Requirements”.

- **Contaminated air**
Air contaminated by chemicals can cause by-products in the combustion process which are poisonous to inhabitants and destructive to Viessmann equipment.

  > For a listing of chemicals which cannot be stored in or near the boiler room, please see section entitled “Combustion Air Supply”.

- **Product documentation**
Read all applicable documentation before commencing installation. Store documentation near boiler in a readily accessible location for future reference by service personnel.

  > For a listing of applicable literature, please see section entitled “Important Regulatory and Installation Requirements”.

- **Fresh air**
This equipment requires fresh air for safe operation and must be installed ensuring provisions for adequate combustion and ventilation air exist.

  > For information pertaining to the fresh air requirements of this product, please see section entitled “Combustion Air Supply”.

- **Carbon monoxide**
Improper installation, adjustment, service and/or maintenance can cause flue products to flow into living space. Flue products contain poisonous carbon monoxide gas.

  > For information pertaining to the proper installation, adjustment, service and maintenance of this equipment to avoid formation of carbon monoxide, please see sections entitled “Combustion Air Supply” in these instructions and “Venting Connection” in the Installation Instructions of the boiler.

- **Equipment venting**
Never operate boiler without an installed venting system. An improper venting system can cause carbon monoxide poisoning.

  > For information pertaining to venting and chimney requirements, please see section entitled “Venting Connection” in the Installation Instructions of the boiler. All products of combustion must be safely vented to the outdoors.

- **Advice to owner**
Once the installation work is complete, the heating contractor must familiarize the system operator/ultimate owner with all equipment, as well as safety precautions/requirements, shut-down procedure, and the need for professional service annually before the heating season begins.

  > Installers must follow local regulations with respect to installation of carbon monoxide detectors. Follow manufacturer’s maintenance schedule of boiler.

- **Warranty**
Information contained in this and related product documentation must be read and followed. Failure to do so renders warranty null and void.
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Important Regulatory and Installation Requirements

**Installation**

Please carefully read this manual prior to attempting installation. Any warranty is null and void if these instructions are not followed.

The burner installation shall be in accordance with the regulations of the authorities having jurisdiction or, in the absence of such requirements, in accordance with National Codes. In Canada use CSA B-139 for oil boiler installations. In the U.S. use NFPA 31, “Standard for the Installation of Oil Burning Equipment” for oil boiler installations. Always use latest editions of codes.

All electrical wiring is to be done in accordance with the applicable codes. In Canada use the Canadian Electrical Code CSA C22.1 and/or local codes. In the U.S.A. use the latest edition of the National Electrical Code ANSI/NFPA 70.

We offer frequent installation and service seminars to familiarize our partners with our products. Please inquire.

**Working on the equipment**

The installation, adjustment, service, and maintenance of this boiler and burner must be done by a licensed professional heating contractor who is qualified and experienced in the installation, service, and maintenance of oil-fired hot water heating equipment. There are no user serviceable parts on the boiler, burner, or control.

Ensure main power supply to equipment, the heating system, and all external controls has been deactivated. Close main oil supply valve. Take precautions in all instances to avoid accidental activation of power during service work.

**Approvals and Standards**

Where required by the authority having jurisdiction, the installation must conform to the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1.

Follow all local codes.

The oil burner/boiler combinations as shown in Section 2.3 are approved by CSA to the latest editions of the following standards:

- CAN/CSA - B140.2.1 - Oil Burners, Atomizing Type
- UL 296 - Oil Burners
- CAN/CSA - C22.2 No. 0 - General Requirements - Canadian Electrical Code, Part II
- CSA C22.2 No. 3 - Electrical Features of Fuel Burning Equipment

**Literature**

Literature applicable to installation of the Vitoflame oil burner, VEM Series
- Installation Instructions
- Start-up/Service Instructions
- Operating Instructions and User’s Information Manual
- Installation codes mentioned in this manual
About these Installation Instructions

Take note of all symbols and notations intended to draw attention to potential hazards or important product information. These include "WARNING", "CAUTION", and "IMPORTANT". See below.

- **WARNING**: Indicates an imminently hazardous situation which, if not avoided, could result in death, serious injury or substantial product/property damage.

- **CAUTION**: Indicates an imminently hazardous situation which, if not avoided, may result in minor injury or product/property damage.

- **IMPORTANT**: Helpful hints for installation, operation or maintenance which pertain to the product.

- **This symbol indicates that additional, pertinent information is to be found in column three.**

- **This symbol indicates that other instructions must be referenced.**
Product Information

The Viessmann Vitoflame 100, VEM Series oil burner is intended for use with the Vitola 200, VB2 Series hot water heating boiler.

This burner is factory calibrated for use with fuel oil #2 or lighter. No other fuel shall be used.

Each burner is factory tested on the correct boiler size with the appropriate oil nozzle. The factory test includes oil flow rate and combustion measurements. Do not overfire or underfire the burner. The burner is for use with the rating plate input only. A record of the flow rate and combustion results is being provided with each burner.

Local performance must be verified in the field and adjusted, if necessary, via the air adjustment on the burner.

Combustion Air Supply

⚠️ WARNING
This burner/boiler combination requires clean fresh air for safe operation and must be installed so that there are provisions for adequate combustion and ventilation air.

Provisions for combustion and ventilation air must be made in accordance with “CSA B 139 - Installation Code for Oil Burning Equipment” (Canada), “NFPA 31 - Installation of Oil Burning Equipment” (U.S.) and local codes.

The recommended air supply duct size (see Technical Data on following page) should be used when installing a round duct to supply combustion air from the outside.

⚠️ WARNING
The boiler must not be located in areas or rooms where chemicals containing chlorine, bromine, fluorine, or other corrosive chemicals are stored. Examples include refrigerants, bleach, paint, paint thinner, hair spray, cleaning solvents, water softener salt, etc. The combustion air must not be contaminated with any amount of the above mentioned chemicals.

Do not locate the boiler where high humidity or high levels of dust exist. If above criteria are not properly observed and boiler damage results, any warranty on the boiler and related components will be null and void.

If burner activation occurs prior to completion of, or renovations to, the mechanical room, dirt and dust caused by construction will necessitate a cleaning and recalibration of the burner after all construction work is complete.

During drywall sanding the boiler should be turned off and properly covered including the controls. It is important for the burner to receive clean combustion air when operated during that time. All controls must be protected from dust and dirt.
## Technical Data

**For fuel oil #2 or lighter**

<table>
<thead>
<tr>
<th>Burner Model</th>
<th>Model No.</th>
<th>VEM-18</th>
<th>VEM-22</th>
<th>VEM-33</th>
<th>VEM-40</th>
<th>VEM-50</th>
<th>VEM-63</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boilers</td>
<td>Model No.</td>
<td>VB2-18</td>
<td>VB2-22</td>
<td>VB2-33</td>
<td>VB2-40</td>
<td>VB2-50</td>
<td>VB2-63</td>
</tr>
<tr>
<td>Input</td>
<td>MBH kW</td>
<td>83</td>
<td>107</td>
<td>135</td>
<td>170</td>
<td>219</td>
<td>300</td>
</tr>
<tr>
<td>Consumption at oil discharge pressure stated</td>
<td>GPH ltr/h</td>
<td>0.59</td>
<td>0.76</td>
<td>0.96</td>
<td>1.21</td>
<td>1.56</td>
<td>2.15</td>
</tr>
<tr>
<td></td>
<td>psig</td>
<td>240</td>
<td>170</td>
<td>170</td>
<td>180</td>
<td>180</td>
<td>175</td>
</tr>
<tr>
<td>Voltage</td>
<td>V</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Frequency</td>
<td>Hz</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Amperage</td>
<td>A</td>
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<td>2.0</td>
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<td>90</td>
</tr>
<tr>
<td>Motor revolutions</td>
<td>rpm</td>
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<td>3450</td>
<td>3450</td>
<td>3450</td>
<td>3450</td>
<td>3450</td>
</tr>
<tr>
<td>Max. oil pump flow capacity</td>
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<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
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<tr>
<td>Recommended combustion air supply duct size - round duct</td>
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<td>5</td>
<td>6</td>
<td>7</td>
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<td>mm</td>
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<td>535</td>
<td>650</td>
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<td>Height</td>
<td>inches</td>
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<td>23</td>
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<td>mm</td>
<td>580</td>
<td>580</td>
<td>580</td>
<td>660</td>
<td>660</td>
<td>660</td>
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<tr>
<td>Weight (shipping weight)</td>
<td>lbs</td>
<td>46</td>
<td>46</td>
<td>46</td>
<td>49</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>kg</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>22</td>
<td>22.5</td>
<td>22.5</td>
</tr>
</tbody>
</table>

1 Dimensions include burner hood.

**IMPORTANT**

Burners are approved for one input each. Do not change input of burner by oversizing or undersizing of nozzle.
Installing the Burner

*All component parts required for burner installation are part of the standard equipment shipped with the burner.*

1. Fasten the two burner hood holding mounts (supplied) on front panel of boiler.

2. Insert M8 studs (x3) into outer threaded holes on combustion chamber door.

3. Slide burner housing gasket onto studs.

4. Loosely screw M8 nuts onto studs.

5. Mount burner housing by sliding the key holes over nuts onto the studs. Rotate housing clockwise and tighten nuts.

6. Install oil filter (supplied) either on the left or right side panel of boiler, depending on swing direction of combustion chamber door.

**Fig. 1**

Mounting burner on combustion chamber door

A 7-pole plug from boiler control
Installation of Blocked Vent Safety Switch (for Canadian oil burning installations only)

See section entitled “Enclosure Panel Installation” in the Vitola 200 Installation Instructions.

Installation Instructions

Blocked Vent Safety Switch

1. Run the plug-in connector cable of the Vitotronic control down behind the front panel of the boiler and connect to the plug-in adaptor of the burner cable and blocked vent safety switch (see Fig. 10).

CAUTION
Always route all cables between nylon-backed insulation and metal enclosure panels. Never allow cables to come into direct contact with the pressure vessel.

2. The 4x4 junction box of the adaptor cable can be placed on the top of the boiler underneath the top panel.

3. Install blocked vent switch (see enclosed FieldControls WMO-1 Installation Instructions).

4. Run BX cable (armored cable) or any other approved wire (required by local authorities having jurisdiction) from switch to junction box.

5. Connect wire to the 3-pole terminal strip inside the junction box (see Fig. 11).

Legend
- **BK** Black
- **GN** Green
- **GNYE** Green/Yellow
- **WH** White
Connections

Oil Supply

Oil cartridge assembly

1. Check that all surfaces are clean before installing new O-ring A supplied with replacement filter cartridge.

2. Set O-ring A in place and mount new filter cartridge B.

3. Attach clear plastic cup C and tighten brass nut D.

**IMPORTANT**

Never tighten brass nut with a tool; hand tighten only. Cap and O-ring might deform and leak air.

**IMPORTANT**

The flare adaptors are tapped 3/8” BSP (British straight pipe) at the factory. Replacement flare adaptors must be ordered from Viessmann. Do not use 3/8” NPT flare adaptor as replacement.

Use only approved pipe sealant on filter adaptor to filter housing.

**CAUTION**

When new cartridge assembly is mounted, remove brass nut and plastic cup. Check for clean and proper O-ring and O-ring seats before starting oil flow.

**CAUTION**

Never use Teflon tape or compression fittings in fuel oil piping.

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**Diagram Labels:**

- A: O-ring
- B: Filter cartridge
- C: Plastic cup
- D: Brass nut
- E: Oil supply
- F: Oil supply to burner via flexible oil line (red)
- G: Oil return from burner via flexible oil line (blue)
- H: Filter adaptor
- I: Flare nut
- J: Manual oil shutoff valve
- K: Built-in flow check valve
- L: Grooves for mounting bracket
- M: Single-pipe copper conversion tee for single-pipe oil supply

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Fig. 2

Oil cartridge assembly
Viessmann strongly recommends two-pipe oil supply piping wherever possible. For optimum air venting and oil pump performance use a two-pipe oil supply.

A Viessmann oil filter assembly and flexible oil lines must be used in the oil supply system. The red flexible oil line connects the red manual valve side of the filter assembly to the inlet (suction) side of the oil pump. The blue flexible oil line connects the check valve side of the oil filter assembly to the return side of the oil pump.

The oil pump is shipped with the by-pass plug installed. The two flexible oil lines are to be used for all installations. The copper tee is used to convert to a single-pipe supply from tank to burner oil filter. See page 10.

Observe oil supply line dimensions on table below.
The oil pressure within the oil supply system must not exceed 10 psig / 0.7 bar.

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**CAUTION**
Pressurized or gravity feed installations must not exceed 10 psig / 0.7 bar on inlet line or return line at the pump. A pressure greater than 10 psig / 0.7 bar may cause damage to the shaft seal.

---

**CAUTION**
Ensure that there are absolutely no leaks on any oil lines and connections! Leaks in the oil lines draw in air, causing incomplete combustion.

---

<table>
<thead>
<tr>
<th>Suction height H</th>
<th>Inside diameter of suction line</th>
<th>Maximum supply line length (ft. / m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft / m</td>
<td>3/8&quot;</td>
<td>10 mm</td>
</tr>
<tr>
<td>13 / 4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 ½ / 3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 ¾ / 3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 ¼ / 2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 ½ / 2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 1/5 / 1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 ¾ / 1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 ½ / 0.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For #2 fuel oil, 6.0 CST viscosity is calculated with four 90° pipe elbows, one shut-off valve, and one foot valve.
Connections

Oil Supply (continued)

Tank below or at same level as burner (two-pipe)

Observe oil supply dimensions on table below.

The height difference (H) between the oil burner pump and the tank must not exceed 11.5 ft / 3.5 m. Greater heights will cause high vacuum pressures, burner malfunction and eventually, burner failure.

**CAUTION**

Ensure that there are absolutely no leaks on any oil lines and connections! Leaks in the oil lines draw in air, causing incomplete combustion.

<table>
<thead>
<tr>
<th>Suction height H</th>
<th>Inside diameter of suction line</th>
<th>Maximum supply line length (ft. / m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft</td>
<td>m</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>174 ft.</td>
</tr>
<tr>
<td>−1 1/2</td>
<td>−0.5</td>
<td>154</td>
</tr>
<tr>
<td>−3 3/4</td>
<td>−1.0</td>
<td>135</td>
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<tr>
<td>−5</td>
<td>−1.5</td>
<td>112</td>
</tr>
<tr>
<td>−6 1/2</td>
<td>−2.0</td>
<td>92</td>
</tr>
<tr>
<td>−8 1/4</td>
<td>−2.5</td>
<td>72</td>
</tr>
<tr>
<td>−9 3/4</td>
<td>−3.0</td>
<td>49</td>
</tr>
<tr>
<td>−11 1/2</td>
<td>−3.5</td>
<td>30</td>
</tr>
</tbody>
</table>
Oil supply in single-pipe system

A Viessmann oil filter assembly must be used in the oil supply system.

A copper tee must be used to connect the two-pipe filter assembly to a single-pipe oil supply system.

- A oil line from tank
- B to oil pump on burner
- C from oil pump on burner
- D return to tank

Fig. 6
Oil filter in single-pipe system
Connections

Oil Supply (continued)

Elevated tank, tank below or at same level as burner (single-pipe)

A Viessmann oil filter assembly must be used in the oil supply system. A copper tee must be used to connect the two-pipe filter assembly to a single-pipe oil supply system. For single-pipe oil supply installations Viessmann recommends the use of an automatic air removal vent which is installed between the oil filter assembly and the burner.

Size oil supply line according to table on following page. Suction height $H$ (see illustrations below) between the oil burner pump and the foot valve of the oil tank must not exceed 13 ft. / 4 m in an installation with the oil tank below the burner. A suction height exceeding 13 ft. / 4 m can lead to increased pump noise and wear on the pump.

If the suction height or the maximum supply line length in an installation with the tank below the burner is larger than stated in the table on the following page, a single-pipe oil “lift” system is required; in this case the pressure at the burner oil intake may at most be 10 psig / 0.7 bar and the burner must be protected with an additional solenoid coil.

If the oil supply must be converted from a two-pipe system to a single-pipe system, please observe supply line diameters provided in the illustrations below.

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**Elevated tank**

**Tank below or at same level as burner**

![Fig. 7 Elevated oil tank](image1)

![Fig. 8 Oil tank below burner](image2)

A) Foot valve  
B) Oil filter  
C) Air removal vent
### Oil Supply (continued)

See Fig. 7 on previous page.

<table>
<thead>
<tr>
<th>Suction height</th>
<th>Rated boiler input (in MBH)</th>
<th>Inside diameter of suction line</th>
</tr>
</thead>
<tbody>
<tr>
<td>H ft.</td>
<td>m</td>
<td>⅛” / 6 mm</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
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<tr>
<td>13</td>
<td>4.0</td>
<td>328 100</td>
</tr>
<tr>
<td>11½</td>
<td>3.1</td>
<td>328 100</td>
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<td>9½</td>
<td>3.0</td>
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<td>8½</td>
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<td>6½</td>
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<tr>
<td>5</td>
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<td>3½</td>
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</tr>
<tr>
<td>1½</td>
<td>0.5</td>
<td>328 100</td>
</tr>
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</table>

See Fig. 8 on previous page.

<table>
<thead>
<tr>
<th>Suction height</th>
<th>Rated boiler input (in MBH)</th>
<th>Inside diameter of suction line</th>
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</thead>
<tbody>
<tr>
<td>H ft.</td>
<td>m</td>
<td>⅛” / 6 mm</td>
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<tr>
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<td>---</td>
<td>---</td>
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<tr>
<td>0</td>
<td>0</td>
<td>328 100</td>
</tr>
<tr>
<td>–1½</td>
<td>–0.5</td>
<td>328 100</td>
</tr>
<tr>
<td>–3½</td>
<td>–1.0</td>
<td>328 100</td>
</tr>
<tr>
<td>–5</td>
<td>–1.5</td>
<td>328 100</td>
</tr>
<tr>
<td>–6½</td>
<td>–2.0</td>
<td>328 100</td>
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<tr>
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<td>144 44</td>
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<tr>
<td>–13</td>
<td>–4.0</td>
<td>39 12</td>
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</table>

*1 At a total pressure drop of 5.25 psig/0.35 bar for #2 fuel oil with 6.0 CST viscosity taking into account 4 x 90° elbows, 1 shutoff valve, 1 foot valve and 1 air removal vent.

---

**CAUTION**

Ensure that there are absolutely no leaks on any oil lines and connections! Leaks in the oil lines draw in air, causing incomplete combustion.

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### Electrical Connection

All power for the burner is supplied through a 7-pole plug from the boiler control.

Connect 7-pole plug of the control into the 7-pole plug of the burner subbase. Ensure plugs snap together, making a clicking sound.

Do not interchange connections “L1” and “N” at the power supply connection of the control.

*For Wiring Diagram see Vitoflame Start-up/Service Instructions.*
Installing the Burner Hood

1. Check whether reset extension is installed; if required install on reset button.

   Mount reset extension on reset button and snap into place, pressing lightly.

2. Hook claws of burner hood into boiler enclosure panel and pull upward to snap into place.

3. Secure boiler hood to holding mounts by turning lock mechanism clockwise using a Viessmann Allen key (supplied).

Start-up and Burner Adjustment

Vitoflame Start-up/Service Instructions