Weishaupt WKGL70 dual fuel burner
Version 3LN (Low NO_x) multiflam®
Modern, proven combustion technology
The patented fuel distribution principle has opened a new chapter in the history of LowNOx burners.

A small proportion of the fuel is combusted centrally with a yellow-coloured core or primary flame. Simultaneously, the larger part of the fuel is sprayed from the combustion head via the concentrically arranged atomising nozzles into the fast moving combustion air.

This fuel/air mixture mixes in the combustion chamber with hot, recirculated combustion gases. The heat causes the finely atomised fuel to begin to gasify. The mixture ignites and is fully combusted in the main flame. Along with the core flame, a narrow continuous main flame is formed, which is almost blue like a gas flame.

Weishaupt multiflam® burners have proved themselves well during hard, daily operation. In Switzerland particularly, which has Europe’s most stringent emission limits, there are many Weishaupt multiflam® burners in use already on combustion plant.

Exemplary emission figures
Weishaupt multiflam® technology enables even industrial sized burners to reduce emissions to levels that for years were considered to be unachievable. With suitable combustion chamber conditions, Weishaupt multiflam® burners can considerably undercut all the emission limits for larger combustion plant currently in force worldwide.

Digital combustion management
The W-FM 100 and W-FM 200 combustion managers ensure the simple and safe operation of combustion plant.

All important functions, such as fuel and air feed or flame monitoring are controlled with digital precision. The aim is the optimisation of operational functions, the maximisation of economy, and the minimisation of emissions. Thanks to digital combustion management such an optimisation is available today at limited cost. The outlay for installation and service is substantially lower than with conventional technologies.

For example, a separate control panel for the burner switchgear is no longer necessary. Furthermore, remote operation, diagnosis and monitoring of the plant can be realised. That makes things safer and simpler for the operator.

Applications
The burners can be used with heat exchangers such as hot water boilers, steam boilers, air heaters, and for certain process applications.

Low NOx operation
The dimensions and volume loading of the combustion chamber are critical for Low NOx emissions. The various NOx levels and the combustion chamber requirements can be found in the publication “Conditions for attaining the NOx emission values for Weishaupt burners”.

The burner is not suitable for use on reverse flame boilers.

Saving energy with speed control and O2 trim
Electrical consumption is a cost factor for large plant. Speed control utilises a frequency convertor to vary the speed of the fan to match the amount of combustion air to the current fuel throughput.

This enables a considerable saving of electrical energy, particularly at partial load.

O2 trim ensures optimal combustion, efficiency by continually monitoring the flue gases, thus reducing fuel consumption.

Both speed control and O2 trim are effected by the W-FM 200 digital combustion manager.

Fuels
- Light fuel oil EL - DIN 51603-1
- Natural Gases E and LL - EN 437

Installation sites
In standard execution (materials, construction, protection), the burners are suitable for use indoors at temperatures between -15°C and +40°C and with a maximum relative humidity of 80%.

Certification
The burners have been independently tested and comply with the following European standards and EC directives:
- EN 267 / 676 (Best, Class 3 emission levels for light oil and natural gas)
- Machinery Directive 98/37/EC
- Low Voltage Directive 73/23/EEC
- Gas Appliance Directive 90/396/EEC
- Pressure Vessel Directive 97/23/EC

Outstanding service
Weishaupt maintains an extensive global sales and service network. Customer service is available every day around the clock. In-house training by Weishaupt ensures the high standard of their service engineers.
Diagram of Weishaupt WKGL70 burner

- multiflam® mixing head
- Flame tube
- Flame sensor
- Gas pilot line
- Sight glass
- Mixing head servomotor
- Pressure switch
- Solenoid valve
- Air damper
- Controls including oil supply system, stepping motors for the mixing head and oil regulator, ignition unit

Diagram of the mixing head

- Primary nozzle
- Primary diffuser disc
- Primary air
- Secondary nozzle 1
- Secondary nozzle 2
- Secondary diffuser disc
- Secondary nozzle 3
- Secondary nozzle 4
- Secondary air

Out performance of the most stringent emission levels

<table>
<thead>
<tr>
<th>NOx mg/m³</th>
<th>Fuel oil EL</th>
<th>Natural Gas E/LL</th>
</tr>
</thead>
<tbody>
<tr>
<td>140</td>
<td>130</td>
<td>150</td>
</tr>
<tr>
<td>120</td>
<td>110</td>
<td>120</td>
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<tr>
<td>100</td>
<td>90</td>
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<td>80</td>
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<td>60</td>
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<td>40</td>
<td>30</td>
<td>40</td>
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<tr>
<td>20</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>
The advantages of digital combustion management

Digital combustion management means optimal combustion figures, continually reproducible setting figures, and ease of use.

Weishaupt burners are equipped with electronic compound and digital combustion management since modern combustion technologies demand a precise, continually reproducible dosing of fuel and combustion air. Only in this way can optimal combustion figures be ensured over extended periods.

If required, the burners can also be equipped with O₂ trim and speed control.

Error free operation via a clear text display.

Setting and control of the burner functions is achieved using a control and display unit with a clear text display. The CDU is linked to the combustion manager via a safety bus system and can be placed anywhere the user chooses within 100 m of the burner.

Flexible communication possibilities

The inbuilt interface enables all necessary information and functions to be relayed to a BMS system. If required, a modem enables a telephone connection to be installed for remote operation (e.g. oil/gas change-over, adjustment of setting values) and remote diagnosis.

Communication with external systems via Bus.

If data has to be exchanged between burners and other heating systems with PLC devices, Weishaupt E-Gate acts as a gateway and translates the eBus protocol into the standard Profibus DP protocol.

Integration with building management

For the control and management level, Weishaupt offers ProGraf NT - a software product that provides a real time solution to meet all requirements.

The price advantage of new technology

With improved technology and ease of use, combustion plant is becoming even more economical.

• No additional burner controls are required, since this effected by the combustion manager. Contactors and burner motor fuses are the only additional items required.

• Less installation work means fewer errors: the burners are tested as a complete unit at the factory.

• No additional costs for valve proving.

• If required, the W-FM 100 can be fitted with a capacity regulator and speed control module. No separate equipment is required. The capacity regulator and speed control module are included as standard with the W-FM 200.

• Commissioning and service work takes less time. The initial pre-setting of the burner is carried out at the factory. On site, only the site specific load points have to be determined.

• To facilitate O₂ trim, only an O₂ probe and O₂ module have to be installed and connected with the W-FM 200 via the internal safety bus.
Capacity overview

<table>
<thead>
<tr>
<th>Burner type</th>
<th>Version</th>
<th>Fuel</th>
<th>Capacity range kW</th>
<th>Capacity kg/h</th>
<th>0</th>
<th>2000</th>
<th>4000</th>
<th>6000</th>
<th>8000</th>
<th>10000</th>
<th>12000</th>
</tr>
</thead>
<tbody>
<tr>
<td>WKGL70/1-B</td>
<td>3LN</td>
<td>Nat. Gas</td>
<td>1000 – 10000</td>
<td>130 – 840</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Oil</td>
<td>1550 – 10000</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>WKGL70/2-A</td>
<td>3LN</td>
<td>Nat. Gas</td>
<td>1100 – 12000</td>
<td>150 – 1007</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Oil</td>
<td>1800 – 12000</td>
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</tbody>
</table>

The full-tone and half-tone areas together show the total ratings range. When sizing burners ensure that the required nominal rating lies within one of the full-tone areas.

The stated oil throughputs refer to light oil EL with a calorific value of 11.91 kWh/kg.

Nat. Gas = Natural gas E/LL

Turndown on dual fuel burners
Oil side: < 1:4  Gas side: < 1:8  The lower rating must lie with the capacity range of the burner.

Type overview

<table>
<thead>
<tr>
<th>Burner type</th>
<th>Version</th>
<th>Regulation</th>
<th>Capacity kW</th>
<th>Capacity range kW</th>
<th>Capacity kg/h</th>
<th>0</th>
<th>2000</th>
<th>4000</th>
<th>6000</th>
<th>8000</th>
<th>10000</th>
<th>12000</th>
</tr>
</thead>
<tbody>
<tr>
<td>WKGL70/1-B</td>
<td>3LN</td>
<td>Modulating</td>
<td>1000 - 10000</td>
<td>130 - 840</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WKGL70/2-A</td>
<td>3LN</td>
<td>Modulating</td>
<td>1100 - 12000</td>
<td>150 - 1007</td>
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</tbody>
</table>

Technical equipment

<table>
<thead>
<tr>
<th>Technical equipment</th>
<th>Digital combustion manager</th>
<th>Servomotor</th>
<th>Ignition unit</th>
<th>Oil solenoid valve</th>
<th>Flame sensor</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>WKGL70/1-B</td>
<td>W-FM100 or W-FM200</td>
<td>Air damper: SQM48/20Nm Oil regulator: SQM45 Gas butterfly: SQN45 Mixing head: SQM48/3SNm</td>
<td>Ignition transformer 2 x 7000 V</td>
<td>Flow: 31H2522 Return: 121G2520</td>
<td>QRI</td>
<td>310 kg</td>
</tr>
<tr>
<td>WKGL70/2-A</td>
<td>W-FM100 or W-FM200</td>
<td>Air damper: SQM48/20Nm Oil regulator: SQM45 Gas butterfly: SQN45 Mixing head: SQM48/3SNm</td>
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<td>QRI</td>
<td>310 kg</td>
</tr>
</tbody>
</table>

Electrical data

<table>
<thead>
<tr>
<th>Mains voltage</th>
<th>Frequency</th>
<th>Capacity at start</th>
<th>Capacity in operation</th>
<th>Nominal load</th>
<th>W-FM internal fusing</th>
<th>External fusing</th>
</tr>
</thead>
<tbody>
<tr>
<td>230 V</td>
<td>50 Hz</td>
<td>0.5 kW</td>
<td>0.3 kW</td>
<td>1.5 A</td>
<td>6.3 A Slow</td>
<td>10 A Slow</td>
</tr>
</tbody>
</table>

Nominal load of the fan motor: see planning documents for Weishaupt WK40 to WK70 burners, print N°. 83112402

Burner fuel system (oil side)
Burner resistance dependent on the burner rating at full load, with combustion air at a temperature of 20°C. The figures given for calorific value $H_i$ are based on 0°C and 1013 mbar.

Note: The combustion chamber pressure in mbar must be added to the minimum gas pressure required. Please select combustion air fans from the WK40 - 70 Planning Documents (print No. 83112402).

For low pressure supplies, pressure regulating devices with safety membrane in accordance with EN 88 are used. The maximum permissible supply pressure before the shut off valve is 300 mbar. For high pressure supplies, high pressure regulating devices in accordance with EN 3380 can be selected from the brochure ‘Pressure regulating units with safety assemblies for Weishaupt gas and dual fuel burners’. This details high gas pressure sets suitable for supply pressures of up to 4 bar.

Voltages and frequencies: As standard, the burners are suitable for three phase alternating current 400 V, 3 ~, 50 Hz. Other voltages and frequencies available on request at no extra cost.

Standard burner motor: Isolation class B, IP 54 protection. Additional price for isolation class F motors available on request.

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**WKGL70/1-B, vers. 3LN**

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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>WKGL70/1-B 3LN</td>
<td>CE-0085AS0410</td>
<td>DN 65</td>
<td>278 703 34</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>DN 80</td>
<td>278 703 44</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>DN 100</td>
<td>278 703 54</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>DN 125</td>
<td>278 703 64</td>
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</tr>
</tbody>
</table>

**WKGL70/1-A, vers. 3LN**

<table>
<thead>
<tr>
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<tr>
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<td>CE-0085AS0410</td>
<td>DN 100</td>
<td>278 704 54</td>
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<td>DN 125</td>
<td>278 704 64</td>
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<tr>
<td></td>
<td></td>
<td>DN 150</td>
<td>278 704 74</td>
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</tr>
</tbody>
</table>

**Fuel requirement at full load**

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Max. pump supply rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 500 kg/h</td>
<td>SPF / SPZ 20-38</td>
</tr>
<tr>
<td>up to 600 kg/h</td>
<td>SPF / SPZ 20-46</td>
</tr>
<tr>
<td>600 - 1007 kg/h</td>
<td>SPF / SPZ 40-38</td>
</tr>
</tbody>
</table>

This arrangement for the pump selection differs from the WK planning documents.

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**WKGL70/1-B**

**WKGL70/2-A**

<table>
<thead>
<tr>
<th>Burner type</th>
<th>Burner rating</th>
<th>Burner resistance (kW)</th>
<th>Low pressure supply (flow pressure in mbar before shut off valve)</th>
<th>High pressure supply (flow pressure in mbar before solenoid valve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WKGL70/1-B 3LN</td>
<td>CE-0085AS0410</td>
<td>DN 65</td>
<td>278 703 34</td>
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<td></td>
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<td>DN 80</td>
<td>278 703 44</td>
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<td>DN 100</td>
<td>278 703 54</td>
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<td></td>
<td>DN 125</td>
<td>278 703 64</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>DN 150</td>
<td>278 704 74</td>
<td></td>
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**Standard burner motor:**

Isolation class B, IP 54 protection. Additional price for isolation class F motors available on request.

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**With DMV and W-FM 100 valve proving**

**With 2 solenoid valves and W-FM 100/200 valve proving**

1. Isolating cock
2. Gas filter
3. Governor
4. High pressure gas switch (for TRD)
5. Low gas pressure switch
6. W-FM 100 valve proving
7. Double gas solenoid valve (DMV)
8. Gas butterfly valve
9. Gas pressure gauge and cock
10. Pilot line gas solenoid valve
11. Burner
12. Single gas solenoid valve
Dimensions

Burner type | l1 | l2 | l3 | l4 | l5 | l6 | l7 | l8 | l9 | b1 | b2 | b3 | b4 | b5
---|---|---|---|---|---|---|---|---|---|---|---|---|---|---
WGK70/1-B, 3LN | 1690 | 650 | 315 | 90 | 475 | 730 | 1034 | 44 | 542 | 700 | 510 | 58 | 160 | 205
WGK70/2-A, 3LN | 1690 | 650 | 315 | 90 | 475 | 730 | 1034 | 44 | 542 | 700 | 510 | 58 | 160 | 205

Burner type | h1 | h2 | h3 | h4 | h5 | h6 | h7 | h8 | h9
---|---|---|---|---|---|---|---|---|---
WGK70/1-B, 3LN | 510 | 628 | 700 | 978 | 589 | 450 | 915
WGK70/2-A, 3LN | 510 | 628 | 700 | 978 | 589 | 450 | 915

Combustion head | d1 | d2 | d3 | d4 | d5
---|---|---|---|---|---
G70/2-3LN | 444 | 520 | M16 | 530 | 735
WK70/2-3LN | 480 | 520 | M16 | 530 | 735

All measurements are approximate. Weishaupt reserve the right to make alterations in light of future developments.