Flue Gas Dilution
CO₂ safe dispersal ventilation

KEY FEATURES

- Multi size flue dilution fans
- Ecodesign ErP 2015 compliant
- Easy electrical installation
- Safe operation - internal differential pressure switch for boiler shut off
- Avoid unsightly or expensive discharge flues
- Quiet and efficient
- 1% CO₂ content at outlet
- High levels of corrosion resistance allow use with condensation boilers
- Ecodesign EuP compliant IE2
- Dynamically balanced to DIN ISO 1940 - Grade 6.3

Flue Dilution GBDF & SSDF Fans Safety

Their main advantage is avoiding the use of unsightly and expensive flues as shown below. The 1993 Clean Air Act and Institute of Gas Engineers UPE 10/Part 1 (issue 3) Regulations requires that if the products of combustion are dispensed at low level then the CO₂ content must be 1% or less. Airflows' flue dilution range achieves this by introducing fresh air into the boilers discharge flue duct and diluting these flue gases. All fans dynamically balanced to ISO DIN 1940 – Grade 6.3.

A differential pressure safety switch ensures boiler shutdown in the event of fan failure on blocked flue, the switch consists of a relay circuit which will fall safe and prevent operation of the gas burner under the following conditions.

- Loss of fan air supply (blocked intake / fan motor inlet)
- Stalled fan motor
- Interrupted power supply
APPLICATIONS

- Flue dilution
- Condensate air handling

The range of dilution fans come in two variations, GBDF for standard atmospheric installations and SSDF for enhanced corrosion resistance especially in use with high condensate content and or condensation boilers. 5 sizes in each range allow selection for industrial and commercial boilers rated up to 650 Kw (2,200,000 Btu).

CHOOSING THE CORRECT TYPE OF FAN

These fans feature EC driven forward curved impellers constructed from mild steel with cases fabricated from mild steel. For ease of installation all units have fitted outlet flanges, and can be mounted vertically or horizontally. Supplied with connection to terminal box from electrical supply. Low maintenance achieved by ‘sealed for life’ type bearings allowing a typical bearing life L10 – 25,000 hours at ideal conditions. Impellers balanced to ISO DIN 1940 Grade 2.5. Test data in accordance with BS 848 Part 1/ ISO 5801-2007.

PERFORMANCE TABLE AT 20°C

Where possible there should be at least 2 metres of flue ducting from the fan to the outlet. To ensure a maximum of 1% CO₂ content at the outlet, the volume flow rate of diluted flue gases necessary for a given boiler can be calculated as follows:

Flow rate in l/sec = 2.69 x rated input of boiler in kW.

Where 2 metres of discharge ducting is not possible then the calculation is:

Flow rate in l/sec = 4.44 x rated input of boiler in kW.

When the specification of regulations call for stainless steel ducting and when higher efficiency condensate boilers on modular burners are more likely to produce condensation the SSDF range should be selected due to its Aisi 316 stainless steel case construction. Test data in accordance with BS 848 Part 1/ ISO 5801-2007.

The volume flow rate provided by the fan will depend on the static pressure imposed by the size and length of flue ducting and the number of bends, louvres etc. comprising the installation. The performance table below enables selection of the correct dilution fan based on the flow rate requirement and the fans ability to overcome duct system resistance.

(Note: if LPG or Butane are being used then the factors above should be increased to 3.23 and 5.33 respectively. These flue dilution fans must not be used for any other fuels).

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Dimensions are for guidance only - certified drawings available

Fan size | Units | GBDF 2 | GBDF 3 | GBDF 4 | GBDF 5 | GBDF 6 |
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<tr>
<th>Fan size</th>
<th>Min. Duct resistance</th>
<th>Max. Line current</th>
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<td>GBDF 5 SSDF 5</td>
<td>90 Pa</td>
<td>2.6 Amps</td>
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<tr>
<td>GBDF 6 SSDF 6</td>
<td>180 Pa</td>
<td>2.9 Amps</td>
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Minimum duct resistance required on model size 5 and 6 to avoid overloading motors.
In all classes of installation, it is essential that the pressure safety switch is connected into the supply circuit of the appliance gas valve so that the gas valve is shut off in the event of a fan failure or flue system blockage. After the fan has been installed and electrically connected, a check should be made to ensure that the pressure safety switch causes the boiler to be switched off when failure or blockage is simulated.

FLUE ASSISTANCE

The GBDF range can also be used for flue assistance rather than flue dilution (i.e., the fan handles all the products of combustion). It is important that the air into the motor side of the fan is ducted from outside the building. The maximum temperature allowed at the inlet of the non-drive side of the fan is 110°C (230°F) to maintain acceptable motor bearing and winding temperature. Experience has shown that if a fan is chosen to give a maximum CO₂ concentration of 2% that this maximum temperature will not be exceeded.

Should you wish to use any of our fans purely as an induction fan WITHOUT dilution then the volume rate needed will be:
Flow rate (induction only) in l/sec = 1.35 x rated input of boiler in Kw.

SAFETY AND EASE OF USE

- Differential pressure safety switch which will activate if the fan stops operating or if the duct system becomes blocked, thus shutting down the boiler.
- 6 or 10 pole plug and socket for easy wiring and installation.

TYPICAL INSTALLATIONS

Important when designing and installing a dilution system incorporating Airflow flue dilution fans, attention should be paid to the latest edition of the following standards and guides.

(i) BS 6644: 2005 Installation of gas fired hot water boilers of rated input between 60 kW and 2 MW.


The boiler is connected by a vertical flue to a header which is open to the “outside” air at both ends. One end of the header acts as the primary air intake for the dilution air and the other as the discharge. The fan is located on the discharge side of the header duct.

THE RANGE

The Airflow range of Ecodesign ErP 2013/2015 Compliant flue dilution fans is available in 5 sizes to satisfy the dilution needs of industrial and commercial boilers rated up to 650 kW (2,200,000 Btu) input.

Each size is available in standard form (GBDF series) for atmospheric boilers and water heaters of circa 75% efficiency. If excessive corrosion causing the failure of a GBDF series unit is due to the presence of residual condensate, then this will not be covered by our warranty.

Enhanced corrosion resistance versions (SSDF series) with stainless steel fan cases are also available for installation where regulations or the specification calls for stainless steel ducting, and when higher efficiency boilers such as modular designs are likely to produce condensation. SSDF’s are therefore recommended for installations where condensation will occur.
Diluted Flue Gases Out 1% CO₂ or less!