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FLARES

FOR BIOGAS
&
SEWAGE GAS

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BIOGAS – SEWAGE GAS FLARE TYPE GF-150, Tower model

TECHNICAL SPECIFICATION

Components, standard scope

Burner head & flame shroud
Igniters (2 pcs)
Flame arrestor & slam shut solenoid valve
Condensate eliminator
Gas pipe (DN150 mm) (within flare)
Control panel (IP54)
Support frame/tower with service latter to access flare top/igniters

Optionals

UV flame guard (alarm only)
Modulating valve (based on external analog signal)
Alternative inlet valves, ie. pneumatic operated ball valve

Technical data

- Nom. capacity : 650 Nm^3/h (~ 4225 kW at 65% CH_4)
- Turn down ratio(1) : 1:3 or better
- Methane content : 45 – 75 vol.% (LCV 16-27 MJ/Nm^3)
- Min. supply pressure(2) : 10 mbaro (at nom capacity)
- Connection dim.(3) : DN150, PN10/DIN2642
- Power supply : 230 VAC, 13A (or 10A slow)
- Activation : 24VDC (external) to activate relae

Dimensions

- Base : 4.5x4.5 m
- Height (above ground) : 10 m

Materials

- Burner head and shroud : Stainless Steel AISI 316L
- Gas pipe below burner head : Stainless Steel AISI 304 (min.)
- Flanges (4) : Stainless Steel AISI 304 DIN 2642, or
  : flange collar with coated Alu-flange
- Frame/tower : Galv. steel

Mounting

Flare to be mounted on 4 foundation blocks (one for each leg), with a ø1500x1500 mm drained concrete well beneath the center for slam shut valve and connection to burried gas supply pipe. Other arrangements on request.

Function/ignition

Once activated the flare will open and ignite continuously (every 3 sec.) needing no UV detector for flame ignition control. UV sensor for alarm is optional.

Notes

1./ Flare does not include active modulation (which is optional).
2./ At gas flare foot/inlet. Please add upstream pressure loss.
3./ Process should include upstream trim valve or orifice for adjustment.
4./ Equivalent to PN16/DIN2633

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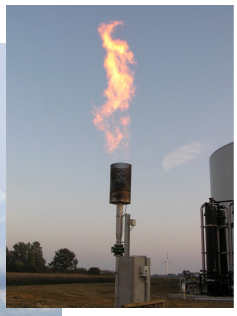


Gas Flare

Capacity Table

- Selection guide

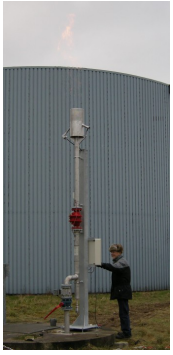
Type designation	Nom. biogas burning capacity (1) Nm3/h	Nom. pressure drop (2) solenoid valve mbar	Nom. pressure drop (2) ball valve mbar
Uni size models			
GF50	75	8,7	-
GF65	125	10,1	-
GF80	185	10,0	-
GF100	290	9,9	-
GF125	450	9,3	4,8
GF150	650	8,6	4,6
GF200	1150	8,4	5,1
Step size models			
GF50/65	125	23,8	11,8
GF65/80	185	22,0	9,8
GF80/100	290	24,2	10,1
GF100/125	450	23,2	9,6
GF125/150	650	19,3	9,9
GF150/200	1150	26,3	13,8
GF200/250	1800	20,4	12,2

Notes:

(1) Based on 65% CH4, 35% CO2, 25 oC, 1013 mbar

(2) At inlet flange to flare relative to barometric pressure

General: Lower pressure drop than indicated above can be achieved by applying flare with reduced capacity rating. Relative pressure drop at reduced rating will be approx. proportional to square of rating.
Ie. 70% rating ~ 50% pressure drop



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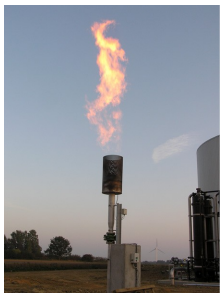
Flares for biogas - Type GF25 - GF200 - Functional details (FAQ)



General function

The flare is of the open combustion type, where biogas is released through a burner head and ignited, creating a visible flame (bluish/red depending on biogas composition) above the burner shroud.
The flame is protected from blowing out in strong winds by a flame shroud and continuous periodic re-ignition.

Capacity/modulation

In standard execution the flare is not modulating. When activated an on/off valve opens and the flare will burn the amount of biogas flowing to the flare, depending on upstream pressure and flow trimming.

The flare should be connected to a point in the process with a fairly constant pressure (minimum as specified for nominal capacity, typically 15-30 mbar). The branch pipe for the flare must contain an orifice or adjustable valve for flow/capacity trimming during commissioning at maximum pressure occurring under normal operation (ie. throttling away excess pressure).

Once trimmed burning capacity will vary with the square root of available pressure.

Flow to the flare may (outside standard scope) be modulated by addition of an actuated throttling valve (eg. controlled by a system pres sure or similar), but this feature is seldom needed in connection with a gas holder, where it is much simpler to burn batches of biogas with rated capacity.

Activation

The flare is activated by the process via a control signal.
Standard execution is with a 24VDC or 230 VAC relay coil which the process can energize when burning is needed.

The flare does not decide when to burn as this is most often determined by several parameters, eg. gas holder filling level, system pres sure, manual decision etc.

Once activated the process should ensure a minimum/reasonable burning time of min. 10 sec. or delayed reactivation, to avoid frequent on/ off commands when/if flare activation influence system pressure or other monitored parameters. Alternatively sensors determining need for flaring must be with sufficient hysteresis to ensure same function.

When the local control cabinet supplied with the flare is not powered, the flare will be in a closed condition. A flare can not be considered a primary protection device against excessive pressure. The process and tanks therefore have to be protected by safety valves, although the flare may be used/set to burn excess biogas before safety valve action will occur.

Local control cabinet

There is no active feed back from the flare in standard execution, except for a relay contact signaling that the local control cabinet is powered and ready.

The local control cabinet include an igniter test button and a burn test button.
The flare should be tested periodically (eg. once a week) to ensure it will open and ignite if needed.

Active feed back can be offered optionally, eg. in the form of an inlet valve open indication, flame detector or other. However, open air flame detection may not be entirely reliable and may lead to occasional false alarms and it therefore not recommended unless demanded by local authorities.
It is considered much more important by periodic testing to ensure the flare is functional.

Mounting

The various flare sizes are available for mounting in a tower construction (free standing version) or mounted on a frame suitable for bolting to a building (with the flare head raised above roof surface) or on a free standing R/C pillar.

Before deciding on location of the flare local fire fighting regulations should be consulted. Normally horizontal distance to fire sensitive installations, eg. gas holder, buildings etc. should be minimum 15 mtr.
If permitted locally "above roof" mounting may also be considered, especially for the flares up to size DN50 with limited capacity.

Connection

The pipe connecting from process to the flare shall be made with a well defined low point where condensate can be drained off.
The flare include a condensate eliminator to drain of rain water or condensate carried to the flare, but undrained condensate in the connec tion pipe will disturb flare function due to pressure fluctuations when activated.

Approvals

The flare is produced after EN60204-1:2006 and EN746-2:1997. CE market and delivered with a EC DECLARATION OF CONFORMITY
The flare is not ATEX approved as it is not intended for installation in classified areas for natural reasons. ATEX does not apply for equip ment with intentional ignition.
The flame will not be able to "burn back" to the process as long as the biogas system/piping mainly consist of an aerobically produced bio gas (ie. biogas is well above higher explosion limit). Nevertheless the potential ignition source is protected with a flame arrestor delivered with relevant certificate. The flare should not be powered/used when the biogas system after service or commissioning is not pure.