

Technical User Manual

Cartridge Gas Filter GH Serie up to DN300

Main Features



Cartridge Gas Filters GH Serie According to 2014/68/EU Directive, EN 13445 standard.

Type GH Serie cellular gas filters are designed for retaining gas impurities, such as dust, rust and other solid particles, in gas-carrying lines at a defined location. They are mainly used in gas pressure regulating and measuring stations, power plant and upstream of equipment, the function of which would be impaired by contaminants. The filters are suitable for gases in accordance with DVGW Code of Practice G 260 / G 262 and neutral non-corrosive gases. (Other gases on request). According to 2014/68/EU directive.

- High filtration efficiency
- Large particle chamber
- High flow capability
- Outdoor version as standard
- Wide range of accessories
- Replaceable cartridge structure
- Eco-friendly cartridge
- Easy maintenance

Technical Features

Maximum allowable pressure –PS	25 bar / 50 bar
Allowable temperature –TS ⁽¹⁾	-10 °C to +60 °C
Inlet gas temperature	-10 °C to +60 °C
Nominal size –DN	DN25 DN32 DN40 DN50 DN65 DN80 DN100 DN125 DN150 DN200 DN250 DN300 It is possible to produce filters with different inlet and outlet diameters to order.
Connections ⁽²⁾	PN16, PN25, PN40 according to ISO 7005 Class 150 – 300 RF according to ASME B16.5 and
Filtration efficiency ⁽³⁾	Standard 99.9% of particle size > 2 µm
Limit for soiled filter insert	Δpmax = 500 mbar
Explosion protection	Mechanical components of filter do not contain a potential ignition source, thus do not fall in limits of ATEX 95 (94/9/EG). (Used electronic accessories comply with ATEX-demands.)

⁽¹⁾ Low temperature version -40°C: available on request

⁽²⁾ On request for other connection class

⁽³⁾ On request cartridge 5µm and 10µm

Metarials

Body ⁽¹⁾	ASTM A 106 Gr. B
Cartridge ⁽²⁾	Polyester
Filter basket ⁽³⁾	Steel perforated plate, galvanised

⁽¹⁾ on request A 216 WCB available

⁽²⁾ On request paper

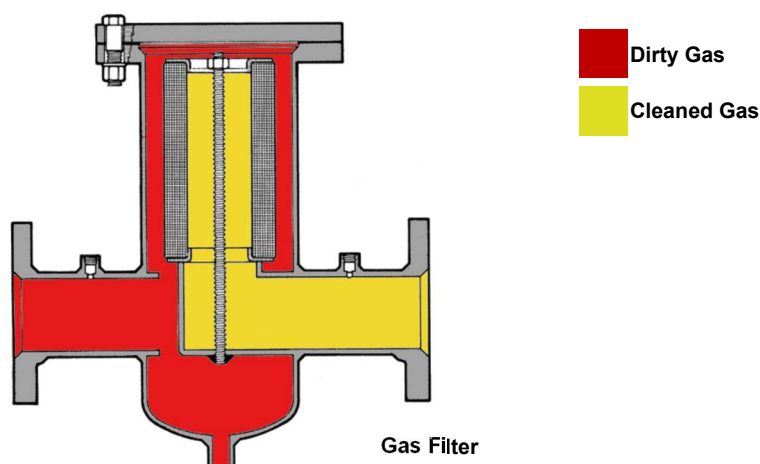
⁽³⁾ On request stainless steel

Gas Filter, GH Serie

**Desing,
 Operational Diagram**

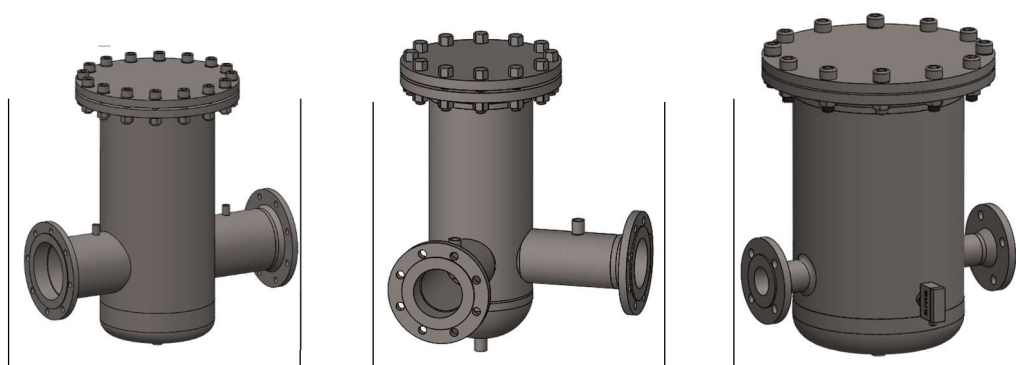
Main purpose; is to clean the gas by keeping the solid particles in the gas

Gas velocity entering into the chamber of filter body is reduced, big solid particles falls into the stock chamber, the gas advancing with small particles encounters the cartridge. in the cartridge, the gas filtration are starting again and the solid particle is kept .



Gas Filter
 DN25 | 1" – DN300 | 12"

Configurations



Z Serie Standard Gas Filter

Z Serie Gas Filter Angle

Z Serie Gas Filter with

Gas Filter, GH Serie

Change & revision history

Date	Page	Reason	Statement

Safety and Safe Use

Warning Notes!

To safely use the equipment, observe the environmental conditions allowed and the data provided on the nameplate of the filter and any accessories.

To avoid injury to persons, damage to property or the environment, the following warning notes must be observed!

Any opening of the filter, replacement of parts or modifications to the original product is the user's responsibility and is done at his own risk.

Caution!

- All activities (mounting, installation and service work, etc.) must be carried out by qualified staff.
- Ensure that the relevant national safety regulations are complied with.
- Any gas filter that experience a fall or shock must not be put into operation, as this can adversely affect the safety functions even if they do not exhibit any external signs of damage.
- Unsuitable gases or gas components lead to a loss of the zero leakage function.
- It must not be possible for liquid to enter the gas filter, as this could have an adverse effect on the cartridge function.
- Gases with concentrations of >0.1% for H₂S and NH₃ are only permissible in connection with biogas version.
- Condensation is not permitted in the gas filter. If not observed, the filtration functions are no longer ensured.
- The GH serie gas filters are designed to withstand gas pressures up to 50 bar in standby mode or working. At a pressure of 50 bar, the GH serie gas filter remains safely closed or will safely work. If the maximum permissible operating pressure is exceeded, a pressure relief must be start
- The impulse pipe (pressure feedback) must be connected to the main outlet gas pipe, downstream from the gas pressure regulator observing a distance of at least 4 x the diameter of the main outlet pipe.
- The upstream and downstream pipes must be cleaned after being laid. Before commissioning, it is essential to ensure that extra no dirt particles have remained that could enter the gas filter.
- When the discharge valve on the filter is opened, be careful so that the vented gas does not cause ignition or explosion, do not vent in closed environments.
- The gas filter supplied by Gastech may only be repaired by Gastech Repair Centers.

Summary of symbols, terms and units

The following table summarizes the symbols and relevant descriptions and unit considered in this chapter and/or used in this document. The symbols are listed in alphabetic order.

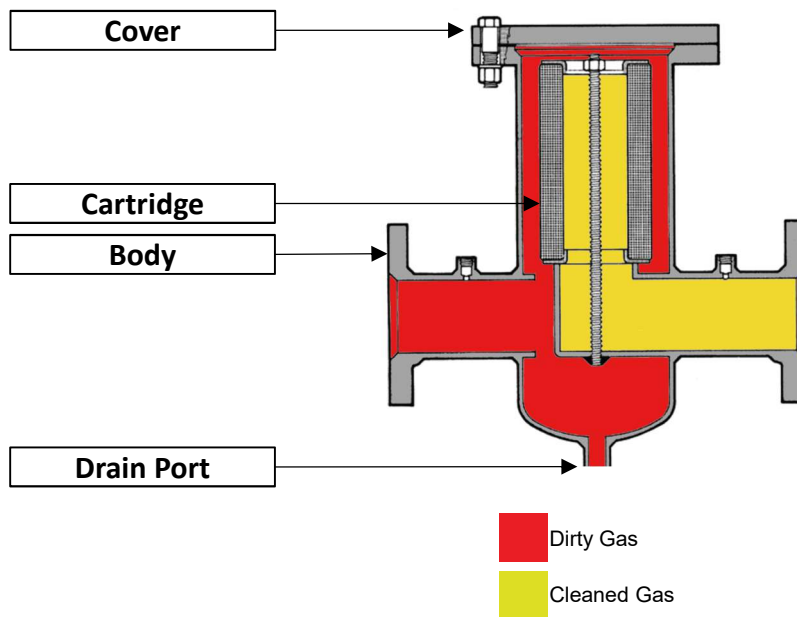
Symbol	Terms	Unit
AC	Accuracy class	%
AG	Accuracy group	%
bpu	Inlet pressure range	bar
d	Relative density of natural gas at actual conditions	/
DN	Nominal size	/
DS	Differential strength	/
Δp	Differential pressure	bar
Δp_{min}	Minimum operating differential pressure	bar
IS	Integral strength	/
KG	Flow coefficient	See definition
LpA	Sound pressure level	EN 61672-1
MIPd	Downstream maximum incidental pressure	Bar
p	Component operating pressure	Bar
pb	Atmospheric pressure (absolute pressure)	bar abs
pd	Outlet pressure	Bar
pdmax	Maximum outlet pressure	Bar
pds	Set point	Bar
pf	Lock-up pressure	Bar
pmax	Maximum component operating pressure	Bar
pn	Reference absolute pressure for normal conditions	bar abs
PS	Maximum allowable pressure	Bar
PSD	Specific maximum allowable pressure	Bar
pu	Inlet pressure	Bar
pumax	Maximum inlet pressure	Bar
pumin	Minimum inlet pressure	Bar
SG	Lock-up pressure class	%
SZ	Class of lock-up pressure zone	Lock-up time
TS	Maximum/minimum allowable temperature	°C
V	Gas velocity	m/s
Wd	Set range	Bar
Wds	Specific set range	Bar

Gas Filter, GH Serie

General Description and Operation

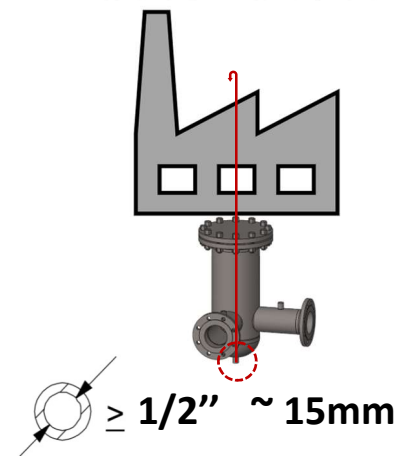
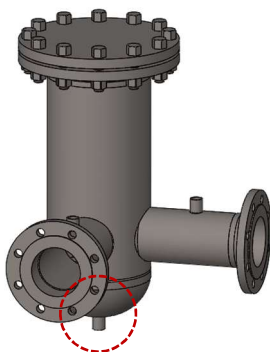
Main purpose; is to clean the gas by keeping the solid particles in the gas

Gas velocity entering into the chamber of filter body is reduced, big solid particles falls into the stock chamber, the gas advancing with small particles encounters the cartridge. in the cartridge, the gas filtration are starting again and the solid particle is kept .



Vent Lines for Safety (indoor or cabinet)

The discharge outlets on the regulator must be transported to the outside with a pipe. In indoor use, if the vent lines are not carried outside, gas may leak into the environment when the regulator fails. Creates a risk of fire and explosion.

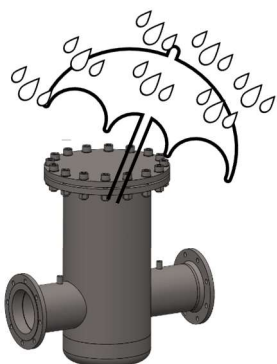


Make sure the gas is conveyed to a non-hazardous area with the vent line. Natural gas will rise due to lower density than air, GPL will go down due to greater density than air. The density of the gas used should be analyzed and accumulations should be prevented.

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Environmental conditions

Gastech guarantees the product under the following storage and transportation conditions. All functions of products that are stored unused for more than 3 years should be checked.



Storage IEC 60721-3-1

Climatic conditions	Class 1K3
Mechanical conditions	Class 1M2
Temperature range	-20...60 °C
Humidity	< 95 % r.h.

Transport IEC 60721-3-2

Climatic conditions	Class 2K2
Mechanical conditions	Class 2M2
Temperature range	-15...60 °C
Humidity	< 95 % r.h.

Pipe installation

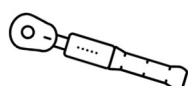
Maximum tightening torque of flange bolts



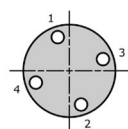
	25 1"	40 1 1/2"	50 2"	65 2 1/2"	80 3"	100 4"	150 6"	200 8"	250 10"	300 12"
PN										
25/40	40	120	120	120	120	120	200	318	504	504
ANSI										
300	40	120	120	120	120	200	300	318	504	504

1. Clean flanges
2. Insert gasket between flanges
3. Insert screws, washers and nuts, tighten by hand
4. Tighten screws crosswise in three steps as per the order indicated.

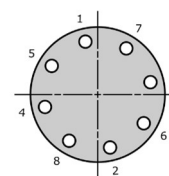
- Step 1: 25% M
- step 2: 50% M
- step 3: 100% M



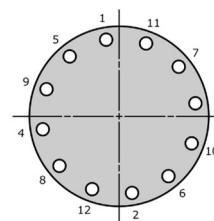
M = max. tightening torque



Circular 4-Bolt



Circular 8-Bolt



Circular 12-Bolt



use new sealing gaskets with every maintenance

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Flow Calculations

Can use the formula below to calculate the filter diameter

$$d = 18,8 \times \sqrt{\frac{Q}{P \times V}}$$

Acronyms

d	Filter diameter (mm)
Q	volumetric flow rate in (m ³ /h)
P	absolute inlet pressure in (bar)
V	Velocity (m/s)
18.8	Numerical constant

 the recommended gas velocity should be a maximum of 20 m/s

Select the diameter of the filter with higher than calculated value .
After finding the DN of the filter, check that gas speed on the seat does not exceed 20 m/sec, using the following formula:

$$V = 345.92 \times \frac{Q}{DN^2} \times \frac{1 - 0.002 \times P}{1 + P}$$

V	Velocity (m/s)
345.92	Numerical constant
Q	Flow rate under standard conditions (Stm ³ /h)
DN	Filter nominal diameter (mm)
P	absolute pressure in (bar)

Calculation of cartridge area of the filter

$$A = \frac{Q}{P \times V \times 3600}$$

A	Filtering area (m ²)
345.92	Numerical constant
Q	Flow rate under standard conditions (Stm ³ /h)
V	Velocity (m/s)
P	absolute pressure in (bar)

Cartridge area

Diemension	G 0.5	G 1	G 1.5	G 2	G 2.5	G 3	G 4	G 5	G 6
Surface m ²	0.060	0.125	0.230	0.470	0.725	0.95	1.45	2.3	4.2

Gas Filter, GH Serie
Capacity Tables (Stm3/h)
G 0.5 Cartridge – DN50 | 2"

Inlet Pressure (Bar)	Δp Pressure loss in (mbar)							
	10	25	50	75	100	150	250	500
0,5	74	108	118	118	-	-	-	-
1	88	137	167	167	-	-	-	-
2	108	167	245	245	245	-	-	-
5	-	-	343	368	490	490	-	-
10	-	-	-	-	637	686	686	-
16	-	-	-	-	-	-	980	980

G 1 Cartridge – DN65 | 2 1/2"

Inlet Pressure (Bar)	Δp Pressure loss in (mbar)							
	10	25	50	75	100	150	250	500
0,5	147	216	333	400	-	-	-	-
1	176	274	392	450	-	-	-	-
2	216	333	490	686	-	-	-	-
5	314	490	686	980	1176	-	-	-
10	441	637	980	1274	1568	2156	-	-
16	539	784	1176	1470	1666	1960	2695	3724

G 1.5 Cartridge – DN80 | 3"

Inlet Pressure (Bar)	Δp Pressure loss in (mbar)							
	10	25	50	75	100	150	250	500
0,5	294	421	637	784	-	-	-	-
1	333	539	735	882	-	-	-	-
2	392	637	931	1078	1274	-	-	-
5	588	882	1274	1568	1862	196	-	-
10	833	1176	1764	2156	2450	2940	3675	-
16	980	1372	2156	2744	3136	3920	4410	5880

G 2 Cartridge – DN100 | 4"

Inlet Pressure (Bar)	Δp Pressure loss in (mbar)							
	10	25	50	75	100	150	250	500
0,5	588	882	1274	1274	-	-	-	-
1	686	1078	1470	1666	-	-	-	-
2	833	1274	1862	2156	2156	-	-	-
5	833	1274	2695	3136	3675	4655	-	-
10	1176	1764	2940	3430	4900	6125	8330	-
16	1372	2156	3136	3920	5390	6370	9800	11760

G 2.5 Cartridge – DN125 | 5"

Inlet Pressure (Bar)	Δp Pressure loss in (mbar)							
	10	25	50	75	100	150	250	500
0,5	882	1274	1960	1960	-	-	-	-
1	980	1568	2695	2695	-	-	-	-
2	1225	1960	2744	2940	3430	-	-	-
5	1470	2156	3920	4900	5390	5880	-	-
10	2156	3136	4900	5880	7350	8330	9800	-
16	2450	3920	5880	6860	7840	9800	11760	17640

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Capacity Tables (Stm3/h)
G 3 Cartridge – DN150 | 6”

Inlet Pressure (Bar)	Δp Pressure loss in (mbar)							
	10	25	50	75	100	150	250	500
0,5	1568	2450	2940	2940	-	-	-	-
1	1862	2940	3675	3675	-	-	-	-
2	2450	3920	4410	4655	5390	-	-	-
5	2940	4410	7350	8820	9800	10780	-	-
10	3430	5096	7840	9800	11760	14700	17640	-
16	3920	6370	8820	11760	12740	15680	21560	30380

G 3.5 Cartridge – DN150 or DN200 | 6” or 8”

Inlet Pressure (Bar)	Δp Pressure loss in (mbar)							
	10	25	50	75	100	150	250	500
0,5	1862	2744	3430	3430	-	-	-	-
1	2156	3430	3920	3920	-	-	-	-
2	2695	4165	5880	5880	5880	-	-	-
5	3920	5880	8820	9800	11270	11760	-	-
10	5390	7840	12740	14700	16660	19600	21560	-
16	6370	9800	14700	17640	21560	25480	30380	30380

G 4 Cartridge – DN200 | 8”

Inlet Pressure (Bar)	Δp Pressure loss in (mbar)							
	10	25	50	75	100	150	250	500
0,5	2205	3332	4900	4900	-	-	-	-
1	2450	3920	5390	6860	-	-	-	-
2	2940	4900	6860	8820	9800	-	-	-
5	4410	6860	9800	12250	14700	17150	-	-
10	6370	9800	14700	17640	19110	21560	29400	-
16	7840	11760	17640	21560	24500	30380	34300	49000

G 5 Cartridge – DN250 | 10”

Inlet Pressure (Bar)	Δp Pressure loss in (mbar)							
	10	25	50	75	100	150	250	500
0,5	3430	5390	7840	7840	-	-	-	-
1	3675	6860	10780	10780	-	-	-	-
2	6370	8330	12250	15680	15680	-	-	-
5	8330	12740	17150	20580	25480	31360	-	-
10	11760	17640	26460	31360	34300	39200	55860	-
16	13720	21560	31360	39200	44100	53900	63700	88200

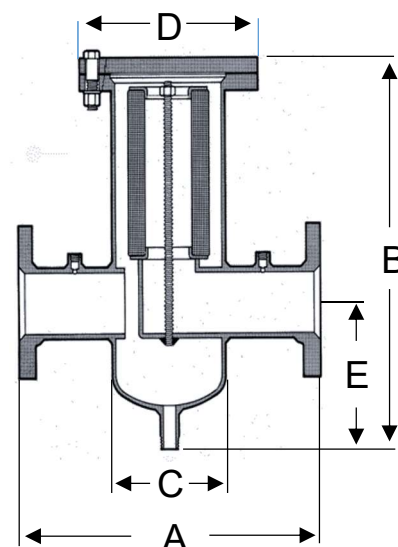
G 6 Cartridge – DN300 | 12”

Inlet Pressure (Bar)	Δp Pressure loss in (mbar)							
	10	25	50	75	100	150	250	500
0,5	5880	8820	10780	11270	-	-	-	-
1	6860	9800	14700	14700	-	-	-	-
2	7840	12740	18620	22540	22540	-	-	-
5	13230	19600	24500	29400	34300	44100	-	-
10	18620	27440	41160	47040	49000	58800	83300	-
16	21560	34300	49000	60760	68600	83300	88200	127400

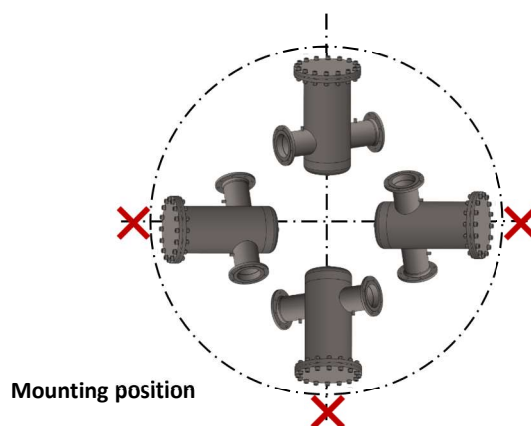
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Dimensions and Weights

Standard Filters



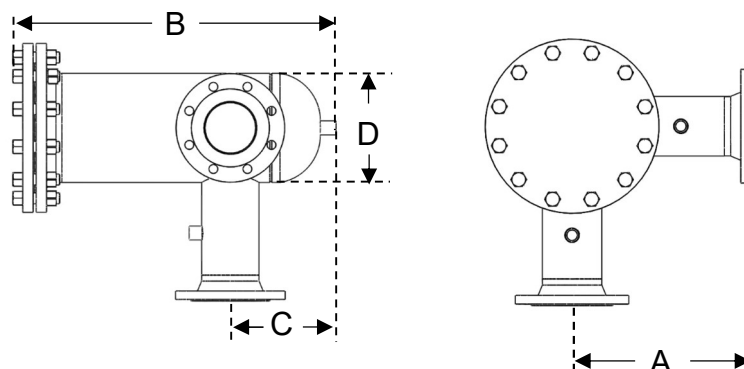
Diameter	A	B	C	D	E	Cartridge Surface	Cartridge Type	Internal Volume Lt	Wgt kg
DN25 1"	300	400	114,3	220	166	0,060	G 0.5	3,5	23
DN32 1 1/4"	300	400	114,3	220	166	0,060	G 0.5	3,5	23
DN40 1 1/2"	300	400	114,3	220	166	0,060	G 0.5	3,5	24
DN50 2"	300	400	114,3	220	166	0,060	G 0.5	3,5	25
DN65 2 1/2"	400	460	141,3	250	188	0,230	G 1	6	30
DN80 3"	450	540	168,3	285	220	0,230	G 1.5	12	40
DN100 4"	500	695	219,1	340	245	0,230	G 2	23	80
DN125 5"	600	795	273	405	280	0,725	G 2.5	40	93
DN150 6"	650	855	323,8	460	310	0,725	G 3	66	130
DN200 8"	800	1085	406,4	580	375	1,450	G 4	132	228
DN250 10"	900	1245	508	715	460	2,300	G 5	246	340
DN300 12"	1100	2135	610	812	800	4,200	G 6	390	510



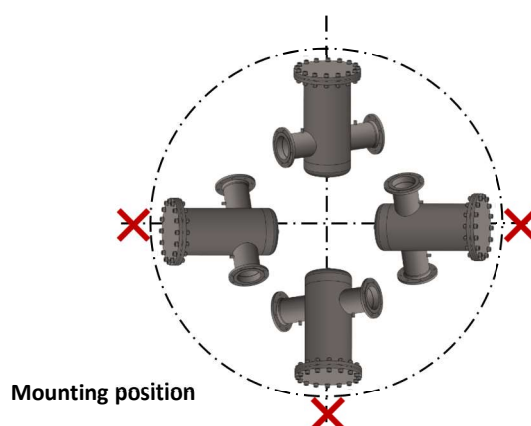
Gas Filter, GH Serie

Dimensions and Weights

Angle Filters



Diameter	A	B	C	D	Cartridge Surface	Cartridge Type	Internal Volume Lt	Wgt kg
DN25 1"	150	370	138	114,3	0,060	G 0.5	3,5	23
DN32 1 1/4"	150	370	138	114,3	0,060	G 0.5	3,5	23
DN40 1 1/2"	150	370	138	114,3	0,060	G 0.5	3,5	24
DN50 2"	150	370	138	114,3	0,060	G 0.5	3,5	25
DN65 2 1/2"	200	430	160	141,3	0,230	G 1	6	30
DN80 3"	230	510	180	168,3	0,230	G 1.5	12	40
DN100 4"	250	625	215	219,1	0,230	G 2	23	80
DN125 5"	300	730	255	273,0	0,725	G 2.5	40	93
DN150 6"	350	800	295	323,8	0,725	G 3	66	130
DN200 8"	400	1020	340	406,4	1,450	G 4	132	228
DN250 10"	450	1200	430	508,0	2,300	G 5	246	340
DN300 12"	600	1400	550	610,0	4,200	G 6	390	510



Mounting position

REPLACING the CARTRIDGE GAS FILTER

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Equipment List for Maintenance and Repair

You must have the following hand tools for maintenance and repair. Check that the hand tools you use comply with the standards in your country.

Equipment	DN25	DN65	DN80	DN100	DN125	DN150	DN200	DN250	DN300	Images
	DN50									
Combination Wrench	19/24	19/24	19/24	19/24	24/30	24/30	24/30	24/30	24/30	
Adjustable Wrench	300	300	300	300	300	300	300	300	300	

 the unit of all dimensions is mm









Abbreviations will be used in maintenance and repair instructions

Equipment	Abbreviations
Combination Wrench	CW
Adjustable Wrench	AW

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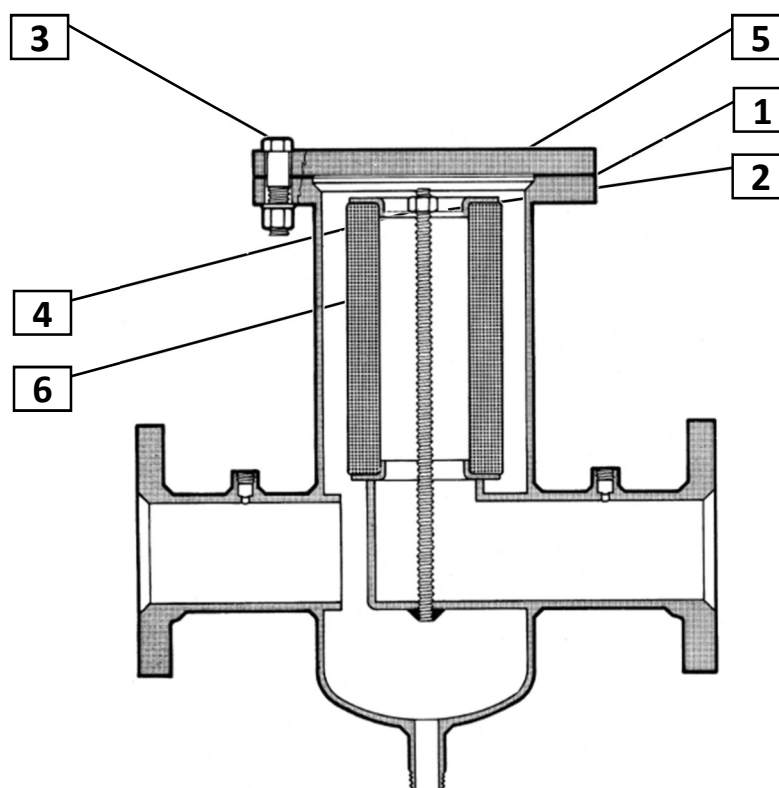
Personal Protective Equipmen List

All certified technical personnel must wear personal protective equipment. You must comply with the occupational safety rules of the local authorities you are in. You should use personal protective equipment that complies with the standards of the country you are in. Personal protective equipment must meet at least the following standards

Equipment	Standard	Images
Industrial safety helmet	EN 397:2012+A1:2012	
Safety goggles	EN 166:2001	
Ear muffs	EN 352-1:2002	
Protective coverall	EN 14605+A1	
Visibility vest	EN 20471 : 2013	
Safety shoes	EN 20345: 2004	
Protective mask	EN149:2001	
Safety glove	EN 1082-1:1996	

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GH Serie



Step	Practice	Equipment and size
1	Turn counterclockwise and remove the bolt and nut (3)	CW
2	Remove the cover (5)	
3	Remove the gasket (1) from the cover (5). Clean the surface where the gasket (2) is attached. Lubricate and replace new gasket (2) with synthetic grease	
4	Turn counterclockwise and remove the nut (4)	
5	Remove the leakage plate (2) and cartridge (6)	
6	Fit the new cartridge (4) and leakage plate (2)	
7	Turn clockwise and screws the nut (4).	
8	Fit the cover (5)	
9	Turn clockwise and screws the bolt and nut (3).	CW
10	Pressurize the line slowly and perform the leak tests is mandatory	

Before carrying out any work, it is important to ensure that the line on which the filter is installed has been shut off upstream and downstream, and discharged. Tighten all threaded parts with the correct torque.

Gas Filter, GH Serie

NOTES

For more information, contact your local sales representative or agency.



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