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## ATTENTION

Observe the following publications in relation to installation, start-up and maintenance:  
DVGW - work sheets G 491 and G 600  
Operating and Maintenance Instructions DF100

## List of abbreviations and formula symbols

|                 |                                                            |               |                                |      |                                                                              |
|-----------------|------------------------------------------------------------|---------------|--------------------------------|------|------------------------------------------------------------------------------|
| PS              | Maximum allowable pressure                                 | t             | Temperature                    | AMSL | Above mean sea level                                                         |
| $p_u$           | Inlet pressure                                             | $p_{\bar{u}}$ | Overpressure in bar            |      | The "Normalnull" (German                                                     |
| $\Delta p$      | Pressure difference from inlet pressure to outlet pressure | $p_{amb}$     | Ambient pressure               |      | word for "mean sea level", abbreviated as "NN" or "N.N.") represented the de |
|                 |                                                            | $Q_n$         | Standard volumetric flow rate  |      | fin                                                                          |
|                 |                                                            | $Q_b$         | Operating volumetric flow rate |      | ned zero level of the official                                               |
| $w_u$           | Gas inlet velocity                                         |               |                                |      | reference height in Germany                                                  |
| $\rho_{n\ Gas}$ | Standard gas density                                       |               |                                |      | from 1879 to 1992                                                            |

# Application, Characteristics, Technical Data

## Application

Type DF 100 cellular gas filters are intended to separate gas impurities such as dust, rust, and other solids in gas-carrying lines at a defined point.

They are mainly used in gas systems and in front of such devices whose function is impaired by contamination.

Can be used as an equipment component on gas consumption facilities as defined in Regulation (EU) 2016/426.

These filters can be used for gases according to DVGW work sheet G 260/G 262 and for neutral non-aggressive gases. (other gases on request)

## Characteristics

- Open-air model as standard
- Easily replaceable filter cartridge with hydrophobic filter medium
- High separation efficiency thanks to optimized flow guidance
- Optionally with differential pressure gauge  
(for electrical remote transmission, differential pressure gauge with limit switch)

## Type of models / Options (see page 10)

- with differential pressure gauge  
(for electrical remote transmission, differential pressure gauge with limit switch)
- Hydrogen model
- Coating with epoxy resin in RAL colors



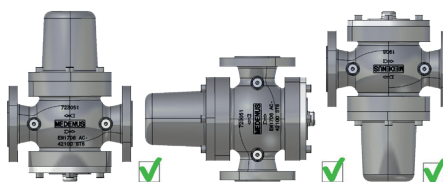
Cellular gas filter DF 100 DN 50



Cellular gas filter DF 100 DN 50 with differential pressure gauge

## Preferred installation position

The cellular gas filter DF100 shall be installed in the pipeline preferably in vertical or horizontal position. An installation upside down is possible but not recommended. For all nominal widths, the direction of flow is indicated by an arrow on the housing.



Note: Observe the following documents in relation to installation, start-up, and maintenance:

- DVGW - work sheets G 491 and G 600
- Operating and Maintenance Instructions DF100

## Technical data

|                                                             |                                                                                                                                                                                                                                           |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type                                                        | DF 100                                                                                                                                                                                                                                    |
| Max. allowable pressure PS                                  | 16 bar                                                                                                                                                                                                                                    |
| Nominal width                                               | DN 25 / 50 / 80 / 100 / 150 / 200                                                                                                                                                                                                         |
| Connection type                                             | DIN PN 16 flanges<br>ASME - ANSI B16.5 flanges Class 150 RF                                                                                                                                                                               |
| Material                                                    | Housing - Aluminium<br>Filter - Polyester-reinforced cellulose paper<br>Seals - NBR                                                                                                                                                       |
| Corrosivity category                                        | DIN EN ISO 12944-2<br>C1 to C5-I without additional coatings<br>C5-M an epoxy resin coating is recommended (see page 10)                                                                                                                  |
| Temperature range<br>(operating/ambient temperature)        | - 20°C to + 60°C<br>(optional - 40°C to + 70°C)                                                                                                                                                                                           |
| Filter area                                                 | DN 25 - 0.0510 m <sup>2</sup>   DN 100 - 0.9300 m <sup>2</sup><br>DN 50 - 0.2430 m <sup>2</sup>   DN 150 - 2.5000 m <sup>2</sup><br>DN 80 - 0.4500 m <sup>2</sup>   DN 200 - 3.0000 m <sup>2</sup>                                        |
| Filtration efficiency                                       | Standard 99.9 % of the particle size > 2 µm                                                                                                                                                                                               |
| Δp Reference value for new filter cartridge                 | Δp = 50 mbar at a gas inlet flow velocity of w <sub>u</sub> = 20 m/s *                                                                                                                                                                    |
| Δp Reference value for cartridge replacement                | 800 to 1,000 mbar                                                                                                                                                                                                                         |
| Δp <sub>max</sub> Limit value<br>for dirty filter cartridge | Δp <sub>max</sub> = 2,000 mbar                                                                                                                                                                                                            |
| Dust holding capacity                                       | 135 mg/cm <sup>2</sup>                                                                                                                                                                                                                    |
| Function, strength, and tightness                           | DIN 3386, DVGW work sheet G 498 and DIN 30690-1                                                                                                                                                                                           |
| CE mark acc. to PED / PIN number                            | CE-0085CP0531                                                                                                                                                                                                                             |
| Ex protection                                               | The mechanical parts of the device do not have any potential ignition sources of their own and therefore do not fall within the scope of ATEX 95 (94/9/EC). Electrical components fitted to the device comply with the ATEX requirements. |

\* ) With a gas inlet flow velocity of 20 m/s, the gas velocity through the filter element is approx. 0.14 - 0.22 m/s depending on the nominal size. (In case of high dust formation, a significantly lower flow rate is recommended)

## Structure and function

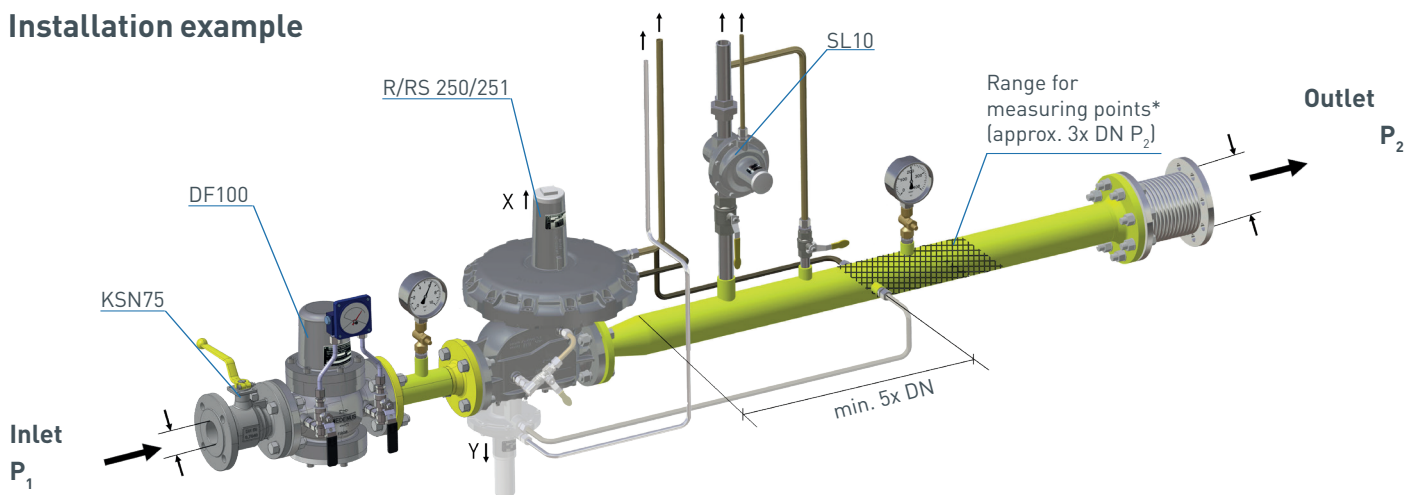
The gas flows through the inlet flange into the filter housing. The more than 100-fold increased filter area compared with the cross-section of the inlet flange reduces the flow rate accordingly. The dust particles entrained in the gas are retained by the filter element. The cleaned gas flows off through the outlet flange.

The filters mainly consist of the housing, the cover, and the filter cartridge. Taking off the cover for maintenance and replacement of the filter cartridge guarantees easy access. The filter cartridge consists of the filter basket and the filter element.

Depending on the application and the particle size to be separated, the filter cartridge to be used must have a suitable pore size.

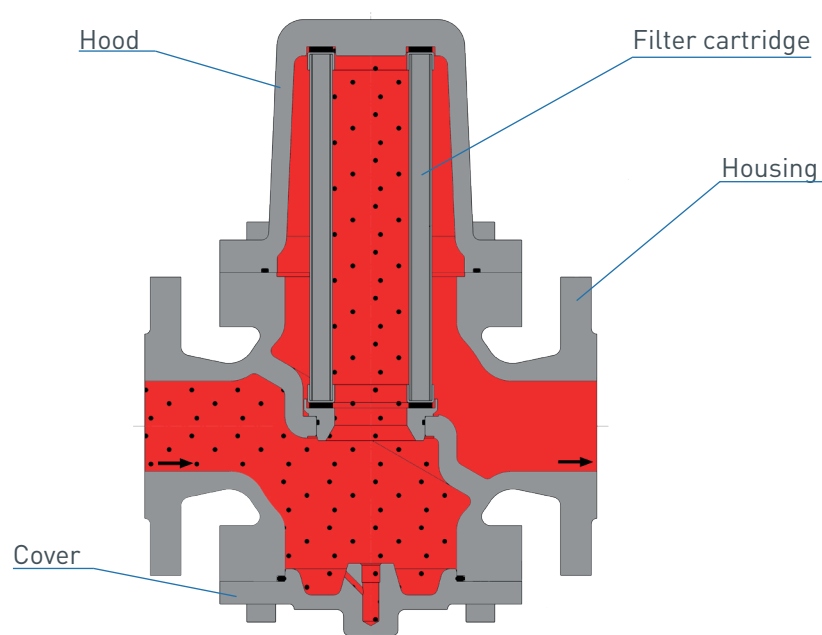
The filter cartridge is sealed against the housing or against the hood by means of two sealing rings which are in large part integrated in the filter cartridge. The lid at the bottom of the filter allows convenient removal of any residues formed (dismounting dimension 40 mm). For this reason, the upright or horizontal mounting position is preferable. The nominal widths DN 150 and DN 200 are equipped in addition with an eye bolt M10.

## Installation example



\*) Recommended max. velocity at the measurement line port 25 m/s

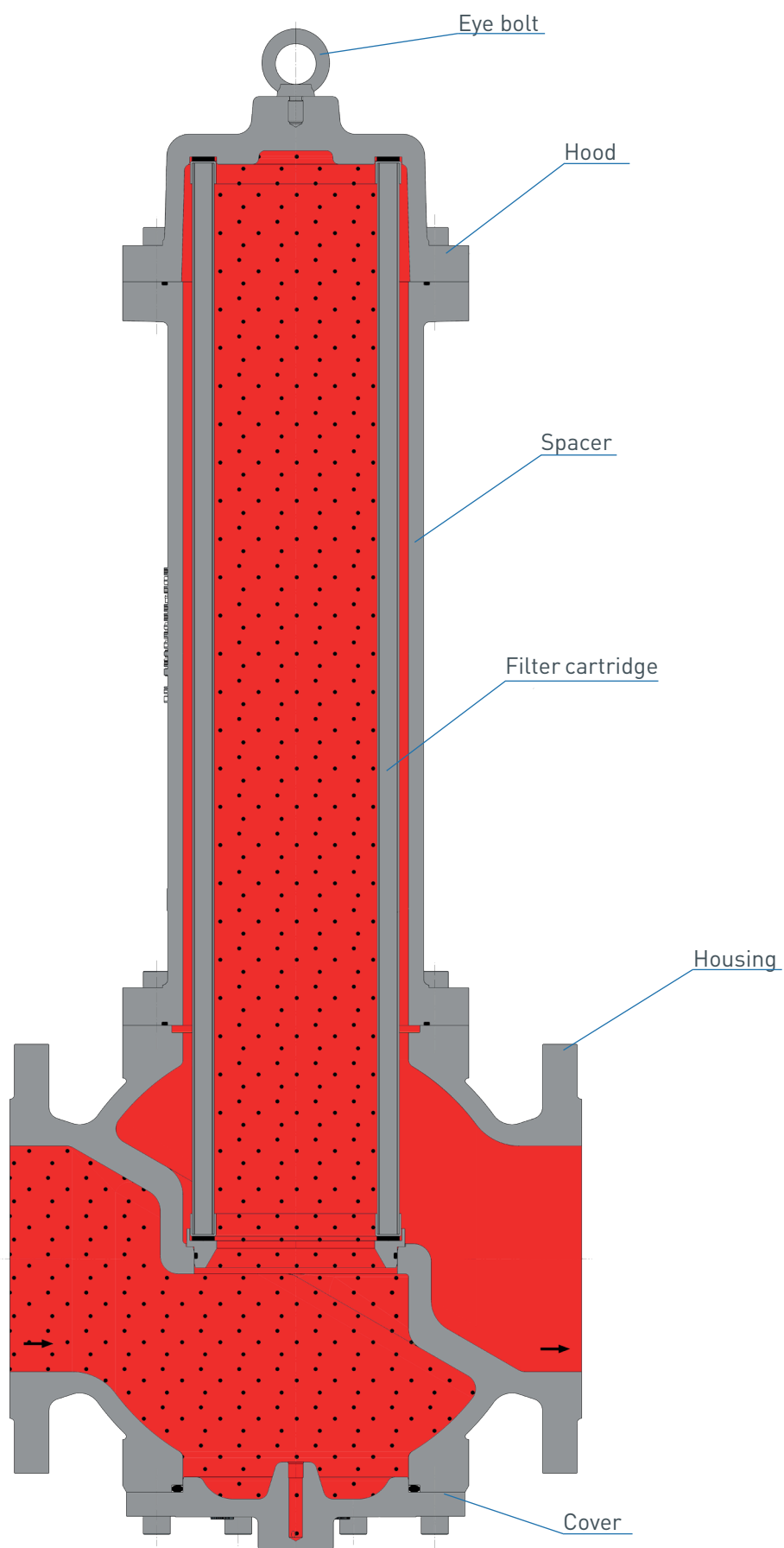
## Sectional view DN 25 / 50 / 80 / 100



shown DN 50

## Sectional view DN 150 / 200

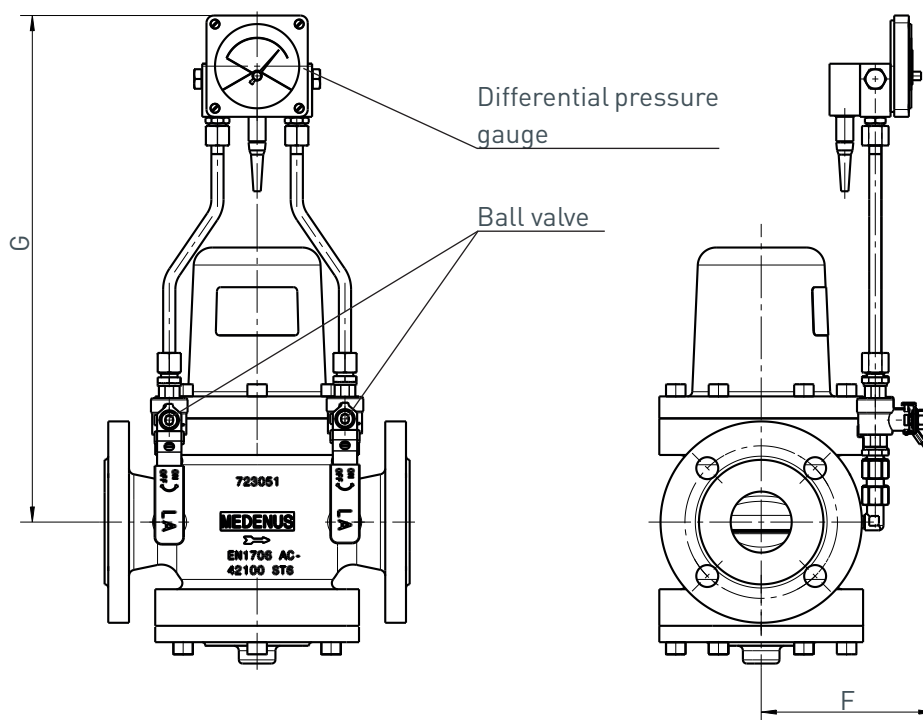
(with spacer and eye bolt)



shown DN 150

## Design of the Differential Pressure Gauge

DN 25 / 50 / 80 / 100 / 150 / 200



DN 50 PN 16 with differential pressure gauge with reed contact is shown  
(ball valve in operating position)

In order to monitor the degree of soiling, all nominal widths can be equipped or retrofitted with a differential pressure gauge.

For the version with electrical remote transmission, a differential pressure gauge with reed contact is provided.

The differential pressure gauge can be mounted depending on the ordered flow direction of the filter.

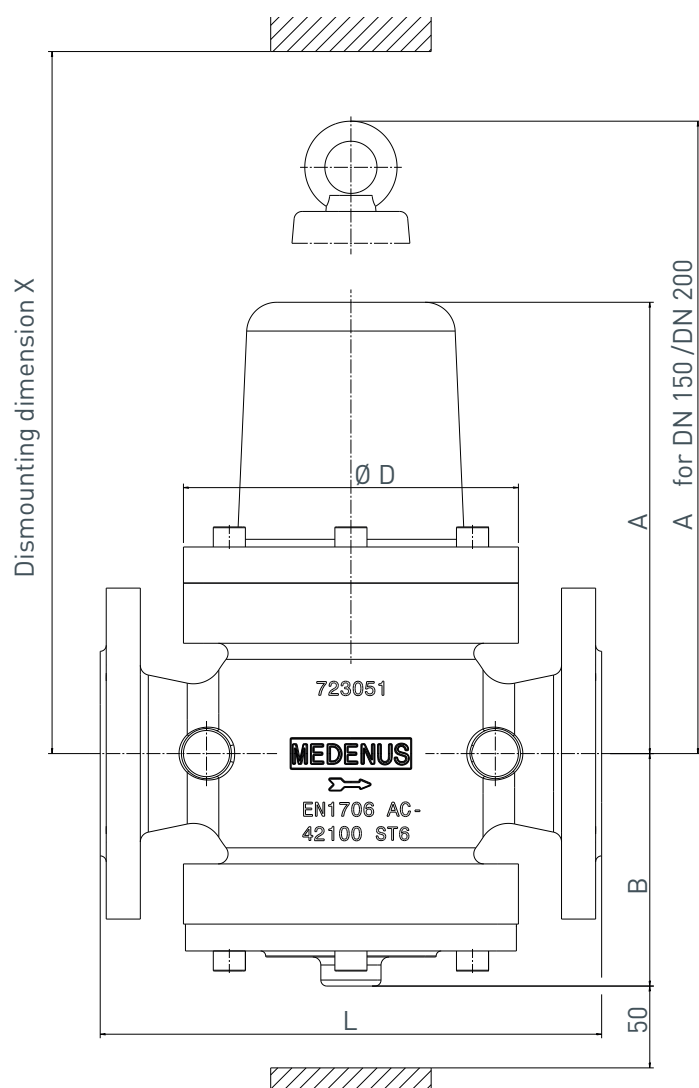
On request, every connecting line is equipped with a ball valve.

### Dimensions of the differential pressure gauge (mm)

| Nominal width | G   | F   |
|---------------|-----|-----|
| DN 025        | 355 | 146 |
| DN 050        | 415 | 141 |
| DN 080        | 432 | 153 |
| DN 100        | 452 | 171 |
| DN 150        |     | 193 |
| DN 200        |     | 234 |



## Dimensions, Connection, and Weight



| Nominal widths                     | DN 25 | DN 50 | DN 80 | DN 100 | DN 150 | DN 200 |
|------------------------------------|-------|-------|-------|--------|--------|--------|
| Dimensions                         |       |       |       |        |        |        |
| A [mm]                             | 102   | 225   | 317   | 404    | 817    | 954    |
| B [mm]                             | 80    | 116   | 138   | 188    | 195    | 225    |
| D [mm]                             | 92    | 167   | 167   | 200    | 230    | 280    |
| L [mm]                             | 160   | 250   | 280   | 350    | 380    | 420    |
| X [mm]                             | 192   | 350   | 512   | 546    | 905*   | 1040*  |
| Weight [kg]                        | 3.0   | 9.0   | 12.0  | 23.0   | 41.0   | 62.0   |
| Volume of the pressure chamber (l) | 0.6   | 2.7   | 4.8   | 12.6   | 25.4   | 46.6   |

- Connection for differential pressure gauge G 1/4"
- Eye bolt for DN 150 / DN 200 M10
- Type of connection (standard): on both sides DIN flange PN 16

\* ) we recommend: DN 150 - 1230 mm / DN 200 - 1475 mm

## Types of Models / Options

### Differential pressure gauge DP 900

The differential pressure gauge DP 900 has been designed to monitor differential pressures. It is mainly used in gas supply systems such as gas transfer, measurement and regulation stations (for all gases). Helium version with special leakage test available upon request. It is also used in air supply systems, for example on filters, and air treatment systems. Especially in systems that do not contain magnetic particles.

DDM without reed contact



DDM with reed contact

### Epoxy resin coating in RAL colors

To protect the filter from external influences, starting from a corrosivity category C5-M we recommend an epoxy resin coating.



### Types of models

Hydrogen version       $H_2$       (with helium leak test)

The Medenus gas pressure regulators are suitable for use with hydrogen as a medium up to a proportion of 100%. Further information can be found in the special edition (10/2019) of gwf Gas+Energie and on our homepage at ([www.medenus.de](http://www.medenus.de))



## Properties of Gases

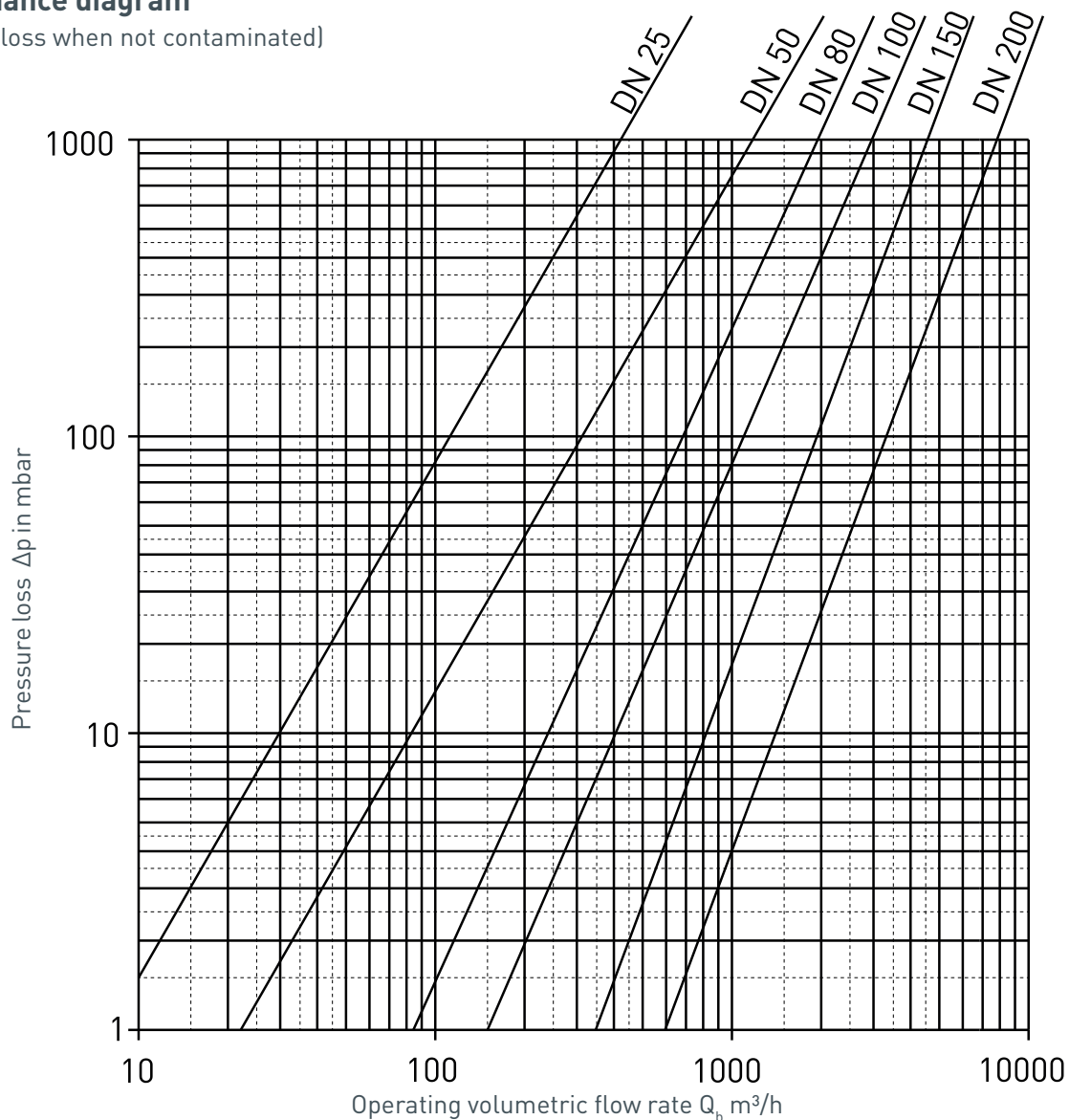
- for natural gas ( $\rho_n = 0.83 \text{ kg/m}^3$ ;  $t = 15^\circ\text{C}$ )
- f - natural gas conversion factor- L

| Gas                                | f            | Hs,n<br>[kWh/m <sup>3</sup> ] | Gas             | f    | Hs,n<br>[kWh/m <sup>3</sup> ] |
|------------------------------------|--------------|-------------------------------|-----------------|------|-------------------------------|
| Acetylene                          | 0.84         | 16.25                         | Sewage gas      | 0.84 |                               |
| Ammonia                            | 1.04         | 4.83                          | Carbon monoxide | 0.81 | 3.51                          |
| Butane                             | 0.55         | 37.23                         | Carbon dioxide  | 0.65 | -                             |
| Chlorine                           | 0.51         | -                             | Air             | 0.80 | -                             |
| Landfill gas                       | approx. 0.80 |                               | Methane         | 1.08 | 11.06                         |
| Natural gas L                      | 1.00         | 9.77                          | Propane         | 0.64 | 28.03                         |
| Natural gas H                      | 1.03         | 11.45                         | Oxygen          | 0.76 | -                             |
| Ethane                             | 0.78         | 19.55                         | Sulphur dioxide | 0.53 | -                             |
| Ethylene                           | 0.97         | 16.516                        | Nitrogen        | 0.81 | -                             |
| Mine gas<br>(30% CH <sub>4</sub> ) |              | 0.86                          | Hydrogen        | 3.04 | 13.43                         |
| Helium                             | 2.15         | -                             |                 |      |                               |

## Design

### Performance diagram

(pressure loss when not contaminated)



#### Recommended maximum operating volumetric flow rate $Q_b$

| DN 025   | DN 050   | DN 080    | DN 100    | DN 150    | DN 200    |
|----------|----------|-----------|-----------|-----------|-----------|
| 100 m³/h | 400 m³/h | 1000 m³/h | 1700 m³/h | 3800 m³/h | 6800 m³/h |

**Example:** for  $Q_b = 100 \text{ m}^3/\text{h}$  and DN 25:  $\Delta p_{\text{diagram}} = 80 \text{ mbar}$

#### Operating volumetric flow rate $\text{m}^3/\text{h}$ and standard volumetric flow rate $\text{m}^3/\text{h}$ :

$$Q_b = \frac{1.01325 \cdot Q_n \cdot (t + 273.15)}{273.15 \cdot (p_u + p_{\text{amb}})}$$

$$Q_n = \frac{273.15 \cdot Q_b \cdot (p_u + p_{\text{amb}})}{1.01325 \cdot (t + 273.15)}$$

| AMSL<br>[m]            | 0       | 200   | 500   | 1000  | 2000  | 4000  | 6000  | 8000  | 11000 |
|------------------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|
| $P_{\text{amb}}$ [bar] | 1.01315 | 0.989 | 0.955 | 0.899 | 0.795 | 0.616 | 0.472 | 0.356 | 0.226 |

#### Note

The values apply to natural gas  $L \rho_{\text{n gas}} = 0.83 \text{ kg}/\text{m}^3$  and  $t = 15 \text{ }^\circ\text{C}$

When using other types of gas, the pressure loss is calculated to give  $\Delta p = \rho_{\text{n gas}} / 0.83 \cdot \Delta p_{\text{diagram}}$

## Order Data

### Example:

Cellular gas  
filter: DF100/050/left/D/R/T/WAZ/So

|                                                          |             | Order code: |     |   |      |     |   |     |    |
|----------------------------------------------------------|-------------|-------------|-----|---|------|-----|---|-----|----|
|                                                          |             | DF100       | 050 | - | left | D/R | T | WAZ | So |
| Order selection                                          | Designation |             |     |   |      |     |   |     |    |
| <b>Type</b>                                              |             |             |     |   |      |     |   |     |    |
| DF100                                                    | DF100       | DF100       |     |   |      |     |   |     |    |
| <b>DN - Nominal width</b>                                | Table p. 12 |             | 050 |   |      |     |   |     |    |
| <b>Flange model</b>                                      |             |             |     |   |      |     |   |     |    |
| PN 16                                                    | -           |             |     | - |      |     |   |     |    |
| Class 150                                                | C           |             |     |   |      |     |   |     |    |
| <b>Direction of flow</b>                                 |             |             |     |   |      |     |   |     |    |
| Right (from left to right)                               | -           |             |     |   |      |     |   |     |    |
| Left (from right to left)                                | left        |             |     |   | left |     |   |     |    |
| <b>Differential pressure gauge</b>                       | Fig. S. 10  |             |     |   |      |     |   |     |    |
| without differential pressure gauge                      | -           |             |     |   |      |     |   |     |    |
| with differential pressure gauge<br>without reed contact | D/-         |             |     |   |      |     |   |     |    |
| with differential pressure gauge<br>with reed contact    | D/R         |             |     |   |      | D/R |   |     |    |
| <b>Temperature range</b>                                 |             |             |     |   |      |     |   |     |    |
| -20°C to +60°C                                           | S           |             |     |   |      |     |   |     |    |
| -40°C to +70°C                                           | T           |             |     |   |      |     | T |     |    |
| <b>Acceptance test certificate to EN 10204/3.1</b>       |             |             |     |   |      |     |   |     |    |
| without acceptance test certificate                      | -           |             |     |   |      |     |   |     |    |
| with acceptance test certificate                         | WAZ         |             |     |   |      |     |   | WAZ |    |
| <b>Special model</b>                                     |             |             |     |   |      |     |   |     |    |
| - Coating with epoxy resin in<br>RAL colors              |             |             |     |   |      |     |   |     |    |
| - Hydrogen model H <sub>2</sub>                          | So          |             |     |   |      |     |   |     | So |

In every selection group, only one option can be selected in each case.

| DN - Nominal width |     |     |     |     |     |     |
|--------------------|-----|-----|-----|-----|-----|-----|
| Type               | 025 | 050 | 080 | 100 | 150 | 200 |
| DF100              | X   | X   | X   | X   | X   | X   |

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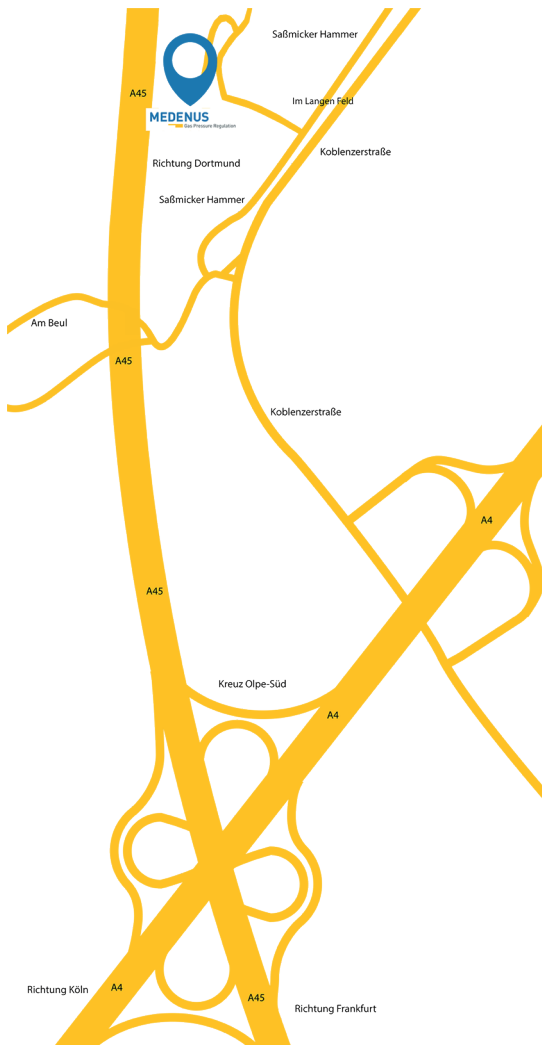
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## Notes

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