Flow Conditioners

Plug-in version BLN and clamped joint version K

Applications

- **Media:**
  natural gas, town gas, propane, inert gases
- **Branches:**
  gas industry, chemical industry, district heating, power plants.
- **Function:**
  Reduction of flow perturbations to such an extent that the metering results remain within prescribed error limits.

Operation

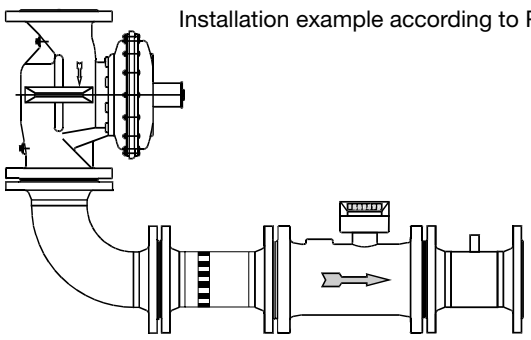
Elster flow conditioners in the BLN and K series have been specially designed for gas systems where there are turbulences, swirls or asymmetric flow profiles caused by the pipe network or by the system itself. Such turbulence, swirl and asymmetric flow profiles or pulsations in the flow stream of a turbine gas meter or quantometer lead to deviations in the metering results.

By installing a flow conditioner, these flow disturbances can be eliminated to such an extent that the metering results remain within prescribed error limits.
The cross sectional area which meets the flow has been designed in such a way that, while ensuring the best possible reduction in flow disturbance, a minimum pressure loss is achieved. The flow conditioners BLN are available for flanges DN 50 – 200 and for pressure levels PN 10 and 16. The main advantage of the BLN flow conditioners is the low installation cost. They also requires no maintenance. Designed to allow a simple clamp installation in the pipe, cleaning the flow conditioner is also made as simple as possible.
The figures below show how favourable flow conditions can be achieved even in a minimum of space. With typical flow disturbances, we can show here the best possible installation to minimize the metering deviations. Gas pressure regulators and diffusers with bends in the pipeline are particularly wellknown for causing twisting and swirling flow profiles.

Main features

- **Flow-optimized**
- **Pressure levels:**
  PN 10 - ANSI 600
- **Nominal diameters:**
  DN 50 - DN 400
- **Gas-/ambient temperature**
  -20°C to +60°C
- **Two different designs**
  - **types K 2 and K 3 in a wedge attachment**
  - **types BLN with 1 and 2 plates**
- **Type BLN can be supplied in a version which would be installed in the pipe without using any additional attachments in the pipe**
- **Simple installation**
- **Can be mounted in any position**
- **In accordance with**
  DIN EN ISO 5167-1
- **Alternative: pipe bundle flow conditioners on request**

Installation example according to PTB TR G13

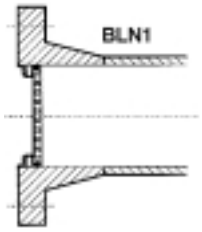


BLN 1 flow conditioner for installation in the inlet pipe and for use with high level perturbations

ELSTER AMCO

Installation Instructions

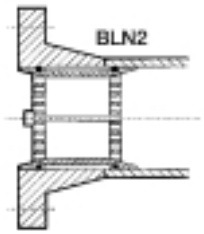
Installation, type BLN 1, DN 50 – N 200



BLN 1 flow conditioners are inserted into the pipe, the best position being in the flange before the welding point (see sketch).

1. Place the flow conditioner in the flange; the flow conditioner will centre itself.
2. Tighten the screws; make sure the flow conditioner is centred in the pipe.
3. Finally, check the flow conditioner is firmly in position.

Installation, type BLN 2, DN 80 – DN 200

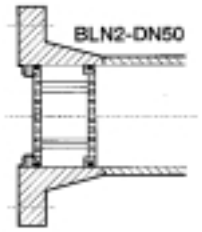


BLN 2, DN 50 – DN 200 flow conditioners are inserted into the pipe.

Ensure that the welding joints (see sketch) near the flange do not extend too far into the pipe.

1. Insert the flow conditioner into the pipe. If necessary loosen the centre screw.
2. Tighten the centre screw; make sure the flow conditioner is centred by using the chucking wedge.
3. Finally, check the flow conditioner is firmly in position.

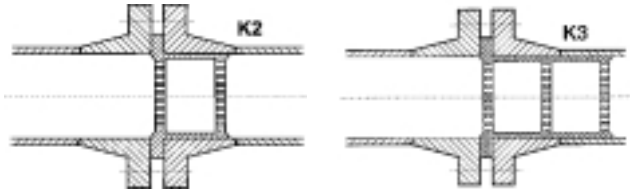
Installation, type BLN 2, DN 50



BLN 2, DN 50 flow conditioners are inserted into the pipe, the best position being in the flange before the welding point (see sketch).

1. Place the flow conditioner in the flange; the flow conditioner will centre itself.
2. Tighten the screws; make sure the flow conditioner is centred in the pipe.
3. Finally, check the flow conditioner is firmly in position.

Installation, type K 2 and K 3



The K 2 and K 3 DN 50 – DN 400 flow conditioners are inserted into the pipe. Ensure that the welding joints (see sketch) near the flange/pipe transition do not extend too far into the pipe. Alternative flow conditioners are available to cater for the various thicknesses of the pipe walls.

1. Insert the flow conditioner into the pipe. Gaskets must be used on both sides of the flange connections.
2. The flow conditioner is centred through the bore holes on the flanges.

Technical Data

The BLN series is centred in the pipe by tightening three screws with hexagonal recessed holes (1 plate) or by tightening the centre screw (2 plates).

Flow conditioner BLN 1, DN 50 - 200

Version with one plate
Pressure levels PN 10 – PN 16

Material
Aluminium
Set screws made of steel

Gasket material
O-ring NBR

Inlet ratio
Total area of boreholes to total surface
area 0.4 = 40%

Flow conditioner BLN 2, DN 50

Version with two plates
Pressure levels PN 10 – PN 16
DN 50 has no centre screw

Material
Aluminium
Distance bolts made of galvanized steel
Set screws made of steel

Gasket material
O-ring NBR

Inlet ratio
Total area of boreholes to total surface
area 0.4 = 40%

Flow conditioner BLN 2, DN 80 - 200

Version with two plates
Pressure levels PN 10 – PN 16
Flow conditioner with centre screw

Material
Aluminium
Wedge made of steel (UST37-2)
Set screws made of steel

Gasket material
O-ring NBR

Inlet ratio
Total area of boreholes to total surface
area 0.4 = 40%

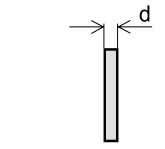
Flow conditioner K 2, K 3 DN 50 – 400

The flow conditioner, type K, is mounted between two flanges. The flow conditioner is centred by means of the bolts in the flange connections.

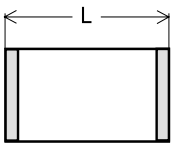
Version with two or three plates
Pressure levels PN 10, PN 16, PN 25
PN 40, ANSI 150, 300, 600

Material
Steel

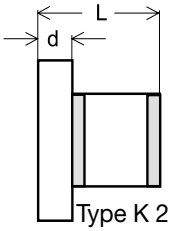
Inlet ratio
Total area of boreholes to total surface
area 0.2 – 0.36 = 20% - 36% depending on version



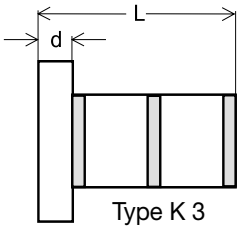
Type BLN 1



Type BLN 2



Type K 2



Type K 3

Technical data see following table:

Nominal diameter	Type	Pressure level	Inlet ratio	d mm	L mm	$\Delta p / Q_x$ Pressure loss Δp in mbar at Q_x m³/h	Order number
DN 50	BLN 1	PN 10; PN 16	0.40	2,5	-	4 / 100	73014938
DN 50	BLN 2	PN 10; PN 16	0.40	-	25 - 50	6 / 100	73014944
DN 50	K 2	PN 10 - PN 40	0.30	15	49,3	6 / 100	73016883
DN 50	K 3	PN 10 - PN 40	0.30	15	74,3	14 / 100	73011231
DN 80	BLN 1	PN 10; PN 16	0.40	4	-	4 / 250	73014939
DN 80	BLN 2	PN 10; PN 16	0.40	-	40 - 80	8 / 250	73014945
DN 80	K 2	PN 10 - PN 40	0.29	15	67,5	8 / 400	73016884
DN 80	K 3	PN 10 - PN 40	0.29	15	107,5	15 / 400	73011237
DN 100	BLN 1	PN 10; PN 16	0.40	5	-	13 / 650	73014940
DN 100	BLN 2	PN 10; PN 16	0.40	-	50 - 100	8 / 400	73014946
DN 100	K 2	PN 10; PN 16	0.29	15	77,5	11 / 650	73016885
DN 100	K 3	PN 10; PN 16	0.29	15	127,5	22 / 650	73011243
DN 150	BLN 1	PN 10; PN 16	0.40	7,5	-	6 / 1000	73014941
DN 150	BLN 2	PN 10; PN 16	0.40	-	75 - 150	10 / 1000	73014947
DN 150	K 2	PN 10; PN 16	0.28	15	102,5	6 / 1000	73016886
DN 150	K 3	PN 10; PN 16	0.28	15	177,5	11 / 1000	73011251
DN 200	BLN 1	PN 10; PN 16	0.40	10	-	4 / 1600	73014942
DN 200	BLN 2	PN 10; PN 16	0.40	-	100 - 200	8 / 1600	73014948
DN 200	K 2	PN 10; PN 16	0.28	15	132,5	15 / 2500	73016887
DN 200	K 3	PN 10; PN 16	0.28	15	232,5	30 / 2500	73011259
DN 250	K 2	PN 10; PN 16	0.29	15	157,5	13 / 4000	73016888
DN 250	K 3	PN 10; PN 16	0.29	15	282,5	25 / 4000	73011269
DN 300	K 2	PN 10	0.30	15	190	20 / 6500	73016889
DN 300	K 2	PN 16	0.30	15	190	20 / 6500	73017733
DN 300	K 3	PN 10	0.30	15	340	40 / 6500	73011274
DN 300	K 3	PN 16	0.30	15	340	40 / 6500	73011275
DN 400	K 2	PN 10	0.32	15	240	18 / 10000	73016890
DN 400	K 2	PN 16	0.32	15	240	18 / 10000	73017734
DN 400	K 3	PN 10	0.32	15	440	35 / 10000	73011938
DN 400	K 3	PN 16	0.32	15	440	35 / 10000	73011939

All K 2 and K 3 flow conditioners are also available in PN 25, PN 40, ANSI 150, ANSI 300 and ANSI 600

Calculating the pressure loss

To calculate the pressure loss, the following data must be taken into account:

ρ_{nGas} = 0,83 kg/m³ for natural gas;

ρ_{nAir} = 1.29 kg/m³;

$\frac{\rho_{nGas}}{\rho_{nAir}}$ = 0.64

Q_b = operating load m³/h

Q_x = load according to table m³/h

Δp_x = Δp from table in mbar

p_{abs} = absolute pressure in bar

Formula for calculation the pressure loss only for natural gas

$$\Delta p_{vb} = \frac{\rho_{nGas}}{\rho_{nAir}} \cdot \frac{p_{abs}}{1\ bar} \cdot \frac{Q_b^2}{Q_x^2} \cdot \Delta p_x$$

$$\Delta p_{vb} = 0{,}64 \cdot \frac{p_{abs}}{1\ bar} \cdot \frac{Q_b^2}{Q_x^2} \cdot \Delta p_x \text{ only for gas}$$

Example of the calculation of pressure loss at operating conditions
Operating load = 500 m³/h
Operating excess pressure = 1.5 bar
Pressure absolute p_{abs} = 1.5 bar + 1 bar = 2.5 bar
Nominal diameter = DN 150
Pressure loss for type BLN 1 at 1000 m³/h = 6 mbar

$$\Delta p_{vb} = 0.64 \cdot \frac{p_{abs}}{1\ bar} \cdot \frac{Q_b^2}{Q_x^2} \cdot \Delta p_x$$

$$\Delta p_{vb} = 0.64 \cdot \frac{2.5\ bar}{1\ bar} \cdot \frac{(500\ m^3/h)^2}{(1000\ m^3/h)^2} \cdot 6\ mbar$$

Δp_{vb} = 2.4 mbar

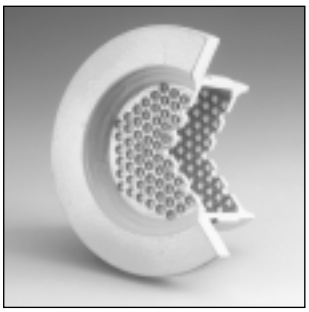
Ordering

The following information is essential to process your order:
- nominal diameter DN
- operating pressure
- pressure level PN or ANSI
- temperatures at site
- types of gas / special gases

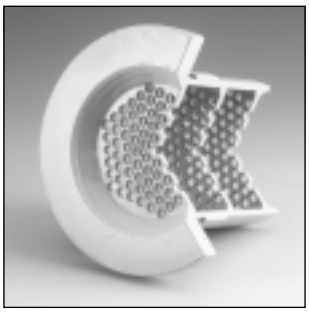
Required version
Types BLN 1, BLN 2 (only PN 10/16)
Types K 2, K 3 (all pressure levels)

Type BLN 1

Type BLN 2



Type K 2



Type K 3

Additional information for ordering BLN flow conditioners
BLN flow conditioners are designed in such a way that they meet the current standard sizes (DIN 2633). If the inner diameter of the flange Di is different from those given in the table on the right, please include this information when ordering.

Nominal diameter	Flange inner diameter D_i in mm
DN 50	54.0 - 55.5
DN 80	82.0 - 83.5
DN 100	106.5 - 108.1
DN 150	158.7 - 160.3
DN 200	206.5 - 208.3

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GLR EN02

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