

# BAMO



**Kirchner und Tochter**  
Durchflussmesstechnik seit 1951



Gas and liquid flow meters

# The benchmarks by which you should measure us

## The know-how of our specialists

Competence, experience and years of expertise are the foundations of our success. As a long-native Duisburg company, since our founding in 1951 we have specialised in the production of equipment for flow metering and monitoring, in particular for applications in the water and chemical industries and in furnace and system design.

## Well-founded consulting

Your measurement task is the focus of our service offering. Our staff work as needed in close consultation with the customer to develop customised solutions, designs and offers for you.

## Our quality management

Our quality management system is monitored and certified by the DVGW in compliance with DIN EN ISO 9001:2015. Kirchner und Tochter is a recognised pressure equipment manufacturer in compliance with the Pressure Equipment Directive (PED) 2014/68/EU.

Nearly all Kirchner und Tochter flow meters can be used in Ex areas. The devices have either a statement from TÜV-Rheinland or a type testing certificate in compliance with the ATEX Directive 2014/34/EU.

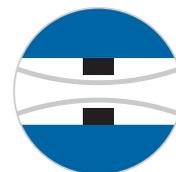
We are an approved production facility for VdS-approved products. The SMB/SMB-OE sprinkler measuring orifice is listed by VdS loss prevention as a recognised component for use in stationary sprinkler systems.

## Our delivery reliability

Due to the possible vertical range of manufacture, we can react flexibly to customer needs and market requirements. Because you appreciate, among other things, the timely and customer-oriented execution of the delivery, many of our customers have been regular customers for years.

## Our wide range of products

Close collaboration with customers who continually provide suggestions for new product developments has resulted in our wide offering. The continuous further development products is part of the benchmark by which you should measure us. The VdS-approved SMB sprinkler measuring orifice is also a result of consistent cooperation with customers.



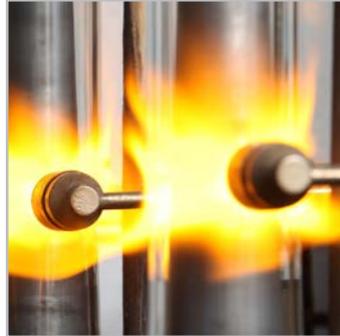


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## Variable area flow meters

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### Short-tube VA flow meters



A single source,  
from raw parts to final  
assembly

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### Flap type flow meters

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### Differential pressure flow meters

Economical warehousing  
make short delivery  
times and just-in-time  
production easy for us



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### Bypass flow meters

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### Level indicators



Order-specific  
measuring unit scales  
in lot sizes as small  
as one as default

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### Sight glass

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### Electrical accessory equipment

Rational assembly  
at a high  
standard of quality





# RA/FA 60/65

## Application

Variable area flow meters with a glass cone are a classical and reliable technique. They are used in all areas of industry, particularly in furnace construction, to monitor cooling and flushing processes, in the chemical industry and in water and waste water systems.

## Measurement materials

Water, air, any type of transparent liquids or gases.

## Operating principle

The conical measuring glass allows the measuring float to move freely up and down. The height position of the float, which depends on the flow rate of the fluid measured, is a measure of the volume flow. This can be read directly off the scale on the measuring glass.



## RA/FA 60/65

- Classical variable area flow meter
- Calibrated measuring cone of borosilicate glass
- Fitting with protective steel tube
- Reliable due to simple functionality
- Medium-specific scale
- Wide range of connection variants
- Optional
  - Limit switch for process control
  - 4 ... 20 mA analogue output
  - Explosion-protected variant

## Technical data

Device	Measurement ranges				Precision class	Operating data Max. temperature
	Water		Air at STP*			
RA/FA 60/65	Min. 0.1 Max. 13	- 1 l/h - 130 m³/h	Min. 0.8 Max. 150	- 8 l/h - 1,500 m³/h	1.6	80/100 °C
RA/FA 77	Min. 0.1 Max. 2	- 1 l/h - 20 m³/h	Min. 2 Max. 20	- 20 l/h - 200 m³/h	1.6	40/80 °C
RA/FA 87	Min. 0.3 Max. 1.6	- 3 l/h - 16 m³/h	Min. 6 Max. 16	- 60 l/h - 160 m³/h	1.6	80/100 °C

\* At STP: at standard conditions (0 °C and 1013 mbar abs.)

Measuring ranges for other media and operating conditions

# RA/FA 77

# RA/FA 87



## RA/FA 77

- Calibrated measuring cone of borosilicate glass
- Medium-specific scale
- Device entirely of plastic
- Perspex half-shell as shatter guard
- Reliable due to simple functionality
- Resistant to aggressive media
- Cost-effective
- Optional limit switch for process control



## RA/FA 87

- Calibrated measuring cone of borosilicate glass
- Device entirely of stainless steel
- Perspex half-shell as shatter guard
- Reliable due to simple functionality
- Medium-specific scale
- Wide range of connection variants
- Optional
  - Limit switch for process control
  - 4 ... 20 mA analogue output
  - Explosion-protected variant

Max. pressure	Materials		Connections		Installation height	Boundary value contact	Measuring value transformer	Device
	Measuring cone	Materials in contact with medium	Screw connector	Flange				
3 – 10 bar	Borosilicate glass	Steel, stainless steel, cast iron, aluminium, NBR	Rp ¼ – 3	DN 10 – 200	308 – 655 mm	Reed contact	4 ... 20 mA	RA/FA 60/65
5 – 10 bar	Borosilicate glass	PVC, PP, PE, PVDF, EPDM	DN 10 – 80	DN 10 – 80	250 – 497 mm	Reed contact	–	RA/FA 77
8 – 10 bar	Borosilicate glass	Stainless steel, PTFE, FKM	Rp ¼ – 2	DN 10 – 65	266 – 462 mm	Reed contact	4 ... 20 mA	RA/FA 87

available upon request. See the detailed data sheets for more information.



# SKT/SKP

## Application

Devices with plastic cones (SKT/SKP/SKPVC) are a cost-effective technique for flow measurement. They are used in water and waste water systems as well as in swimming pools.

Devices with a metal measuring tube (SGM) are the perfect solution at high temperatures and pressures. Due to their extensive electronic module options, they are a natural fit for use in process systems in the chemical industry.

## Measurement materials

Water, air, any type of transparent liquids or gases.

## Operating principle

A measuring cone allows the float to move freely up and down. The height adjustment of the float, which depends on the flow rate of the fluid measured, is a measure of the volume flow. This can be read directly off the scale on the measuring glass.

In the SGM, the height of the float is transmitted magnetically to the indicator.



## SKT/SKP/SKPVC

- Shatter-proof and corrosion-resistant
- Radially extensible
- Special scales for air, NaOH and HCl
- Cost-effective
- Injection moulded cone of Trogamid/polysulfone/PVC
- Wide range of connection variants
- Optional
  - Limit switch for process control
  - 4 ... 20 mA analogue output

## Technical data

Device	Measurement ranges		Precision class	Operating data Max. temperature
	Water	Air at STP*		
SKT/SKP/ SKPVC	Min. 1.5 – 15 l/h Max. 8,000 – 60,000 l/h	Min. 100 – 150 l/h Max. 80 – 758 m <sup>3</sup> /h	4	40/60/100 °C
SGM SGM-PP SGM-PVC	min. 1,6 – 16 l/h max. 11 – 110 m <sup>3</sup> /h	min. 6 – 60 l/h max. 16 – 160 m <sup>3</sup> /h	1,6 2,5 2,5	-80 ... 300 °C 0 ... 80 °C 0 ... 40 °C

\* At STP: at standard conditions (0 °C and 1013 mbar abs.)

Measuring ranges for other media and operating conditions

# SGM



## SGM

- All-metal unit, display using magnetic coupling
- High pressure and temperature resistance
- Variants: stainless steel, stainless steel/PTFE cladding
- Wide range of connection variants
- Optional
  - Limit switch for process control
  - 4 ...20 mA/0...10 V analogue output
  - Measuring transducer with totalizer and LCD
  - Horizontal installation possible



## SGM-PP/PVC

- All-plastics unit, display using magnetic coupling
- high chemical resistance
- Cost-effective alternative to devices with PTFE lining
- DN 25 to DN 100
- Optional
  - Limit switch for process control
  - 4 ...20 mA/0...10 V analogue output
  - Measuring transducer with totalizer and LCD

Max. pressure	Materials		Connections		Installation height	Boundary value contact	Measuring value transformer	Device
	Measuring cone	Materials in contact with medium	Screw connector	Flange				
10 bar	Trogamid, polysulfone, PVC	PVC, PVDF, EPDM	Rp 3/8 – 2 1/2	DN 10 – 65	199 – 429 mm	Reed contact	4 ... 20 mA	SKT/SKP/SKPVC
16 ... 400 bar 10 / 16 bar	Stainless steel, PTFE PP PVC	Stainless steel, PTFE PP PVC	G 1/4 – G 2	DN 15 – 100 ANSI 1/2" – 4"	250 – 300 mm	Inductive contact, electronic contact	4 ... 20 mA, pulse output, counter, LCD	SGM

available upon request. See the detailed data sheets for more information.



### Application

Short-tube VA flow meters for small and ultra-small flow volumes in different variants, with adjustment valves or limit switches. These units are used, for example, in furnace construction, laboratory technology and to control small volumes in cooling processes.

### Measurement materials

Water, air, transparent liquids and gases.

### Operating principle

The measuring units work on the variable area float principle. The conical measuring glass allows the measuring float to move freely up and down. The height adjustment of the float, which depends on the flow rate of the fluid measured, is a measure of the volume flow. This can be read directly off the scale on the measuring glass.



### SGK

- Measurement of small and ultra-small volumes
- Short design
- Calibrated measuring cone of borosilicate glass
- Medium-specific scale
- Variants in PVC, galvanised aluminium, stainless steel, PP, PVDF
- Optional
  - Metering valve
  - Limit switch for process control
  - Explosion-protected variant

### Technical data

Device	Measurement ranges		Precision class	Operating data Max. temperature
	Water	Air at STP*		
SGK	Min. 0.1 – 1 l/h Max. 0.12 – 1.2 m³/h	Min. 0.8 – 8 l/h Max. 1.6 – 16 m³/h	1.6	40/80/100 °C
SKM	Min. 1.5 – 4.5 l/min Max. 90 – 280 l/min	–	4 % FS**	100 °C

\* At STP: at standard conditions (0 °C and 1013 mbar abs.)

Measuring ranges for other media and operating conditions

\*\* FS = Full Scale

## Application

The SKM piston-type flow meter is used for the positionally independent measurement of water, oils or other liquids. The SKM can be used in horizontal or vertical pipelines.

## Measurement materials

Water, oils, transparent and even viscous liquids.

## Operating principle

The SKM unit is a piston-type flow meter. These units have a spring-loaded piston located in a cylindrical measurement tube made of borosilicate glass. The position of the spring-loaded piston, which changes depending on the medium flowing through, is a measure of the flow and can be read directly off the scale.



## SKM

- Compact design
- Vertical or horizontal installation
- Accuracy 4 % FS
- Borosilicate glass
- Stainless steel variant
- For water, oils and liquids
- Largely viscosity-independent
- Perspex half-shell as shatter guard
- Optional limit switch

Max. pressure	Materials		Connections		Installation height	Boundary value contact	Device
	Measuring cone	Materials in contact with medium	Screw connection	Flange			
10 bar	Borosilicate glass	PVC, aluminium, stainless steel, brass, NBR	G ¼, G ½	–	238 – 363 mm	Reed contact, inductive contact	SGK
10 bar	Borosilicate glass	Stainless steel, NBR, FKM	G ¼ – G 2	–	156 – 200 mm	Reed contact	SKM

available upon request. See the detailed data sheets for more information.



## Application

Reliable measurement units even for large flow volumes in different variants, with limit switches and electrical measuring value transformers. These devices are used in water preparation systems, power plants, as controls in cooling processes and in systems for building and swimming pools.

## Measurement materials

Water, air, liquids, gases, in particular non-conducting liquids such as mineral oils as well as bases and acids, also high-viscosity media and liquids with high solid or gas content.

## Operating principle

The primary measuring mechanism of the flow meters is a flap that is moved by the medium flowing through. The angle of offset is a direct measurement of the flow through the pipe. In the KFS, the flap is spring-loaded, so the unit can also be used in flow directions from top to bottom. In the KLA flow display units, the medium can be observed directly through a sight glass.



## KFS

- Suitable for H<sub>2</sub>O, acids, bases and gases
- Installed between flanges
- Spring-loaded flap
- Horizontal or vertical flow direction
- Largely viscosity-independent
- Variants: Steel, stainless steel, PVC, PP, PVDF
- Optional
  - Limit switches for process control
  - 4 ... 20 mA analogue output
  - Totalizer
  - Explosion-protected variant

## Technical data

Device	Measurement ranges		Precision class	Operating data Max. temperature
	Water	Air at STP*		
KFS	Min. 0.5 – 7 m <sup>3</sup> /h Max. 165 – 1,650 m <sup>3</sup> /h	Min. 10 – 100 m <sup>3</sup> /h Max. 500 – 5,000 m <sup>3</sup> /h	5 % FS**	40/200 °C
KLA KLA-V4A	Min. 0.2 – 1 m <sup>3</sup> /h Max. 25 – 300 m <sup>3</sup> /h	– m <sup>3</sup> /h m <sup>3</sup> /h	5 % FS**	100/150 °C

\* At STP: at standard conditions (0 °C and 1013 mbar abs.) Measuring ranges for other media and operating conditions  
\*\* FS = Full Scale

# KLA

# KLA-V4A



## KLA

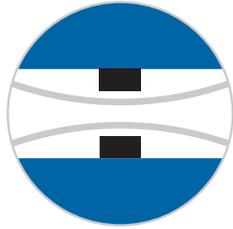
- Tough device for vertical and horizontal installation
- Large measurement range per rated width
- Low pressure loss
- Maintenance-friendly design
- Largely viscosity-independent
- Flow display on glass panel or aluminium scale
- Variants: cast iron, rubber-coated cast iron
- Optional
  - Limit switch for process control
  - Explosion-protected variant

## KLA-V4A

- KLA stainless steel variant
- Resistant to aggressive media
- Welded design
- Corrosion-resistant
- Optional
  - Limit switch for process control
  - Explosion-protected variant

Max. pressure	Materials		Connections Flange	Installation height	Boundary value contact	Measuring value transformer	Device
	Measuring flap	Materials in contact with medium					
40 bar	Hastelloy stainless steel	Steel, stainless steel, PVC, PP, PVDF, PTFE, Sil	DN 25 – 600	50 – 60 mm	Reed contact, inductive contact, electronic contact	4 ... 20 mA, pulse output, totalizer, LCD	KFS
10 bar	Stainless steel	Cast iron, stainless steel, PTFE, sodium calcium glass, borosilicate glass, NBR, EPDM, Sil	DN 15 – 200	170 – 550 mm	Inductive contact, electronic contact	–	KLA, KLA-V4A

available upon request. See the detailed data sheets for more information.



## Application

These devices are manufactured in a wide range of nominal diameters.

Devices with small rated widths are used, for example, in cooling circuits to monitor liquids and gases. Both a pure on-site display as well as limit switches and measuring value transformers for process monitoring are available.

## Measurement materials

Water, air, liquids, gases, in particular also non-conducting liquids such as mineral oils as well as bases and acids.

## Operating principle

These devices work on the differential pressure principle. A differential pressure occurs at a restriction in the pipe, which is proportional to the square of the volume flow through the piping.

The resulting differential pressure is applied to the pressure tap resp. is displayed directly on a scale/screen as a volume flow or triggers a switch when the desired volume flow is reached.



## DDM

- Wide range of connection variants
- Calibrated for liquids or gases according to customer specifications
- Horizontal or vertical installation
- Variants: steel, stainless steel, brass
- Wear-free, no moving parts
- Optional differential pressure indicators/transmitters in different variants

## Technical data

Device	Measurement ranges		Precision class	Operating data	
	Water	Air at STP*		Max. temperature	Max. pressure
DDM	Min. 0.05 – 0.3 m³/h Max. 122.5 – 735 m³/h	Min. 0.5 – 3 m³/h Max. 667 – 4,000 m³/h	2.5 % FS**	70/130 °C	16 bar
DDM-DS11	Min. 0.05 – 0.3 m³/h Max. 22.5 – 735 m³/h	Min. 0.5 – 3 m³/h Max. 667 – 4,000 m³/h	5 % FS**	70/130 °C	16 bar
DDM-EM	Min. 0.05 – 0.3 m³/h Max. 122.5 – 735 m³/h	Min. 0.5 – 3 m³/h Max. 667 – 4,000 m³/h	5 % FS**	70/130 °C	16 bar
DDW-DS31	Min. 0.05 – 0.3 m³/h Max. 122.5 – 735 m³/h	–	3 % FS**	80/100 °C	16 bar

\* At STP: at standard conditions (0 °C and 1013 mbar abs.)

Measuring ranges for other media and operating conditions

\*\* FS = Full Scale

# DDM/DDW

# DDM-EM



## DDM-DS11

- With DS11 differential pressure gauge
- Calibration according to customer specifications
- One device for all installation situations and flow directions
- Optional limit switch for process control

## DDW-DS31

- Differential pressure flow monitor for liquids
- Simple operation
- Compact design
- Switching point continuously adjustable
- High overload resistance

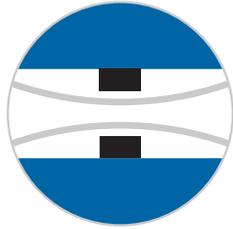
## DDM-EM

- With EM differential pressure transmitter
- Calibration according to customer specifications
- Digital LED on-site display in m<sup>3</sup>/h
- 4 ... 20 mA output
- Two programmable switching outputs
- Optional
  - Wall mounting
  - Other unit of measurement
  - Limit switch

Materials		Connections		Installation height	Boundary value contact	Measuring value transformer	Device
Measuring orifice	Materials in contact with medium	Screw connection	Flange				
Stainless steel, brass	Steel, stainless steel, brass	Rp ¼ – 2, Gi ¼ – 2, Ga ¾ – 2¾	DN 50 – 200	55, 80, 90 mm	–	–	DDM
Stainless steel, brass	Steel, stainless steel, brass, nickel-plated brass, aluminium, NBR	Rp ¼ – 2, Gi ¼ – 2, Ga ¾ – 2¾	DN 50 – 200	55, 80, 90 mm	Two microswitches	–	DDM-DS11
Stainless steel, brass	Steel, stainless steel, aluminium brass, silicon, PVC, FKM, NBR	Rp ¼ – 2, Gi ¼ – 2, Ga ¾ – 2¾	DN 50 – 200	55, 80, 90 mm	Two programmable Switching outputs	4 ... 20 mA, LCD display	DDM-EM
Stainless steel, brass	Steel, stainless steel, brass, nickel plated brass, FKM, NBR	Rp ¼ – 2, Gi ¼ – 2, Ga ¾ – 2¾	DN 50 – 200	55, 80, 90 mm	Microswitch	–	DDW-DS31

available upon request. See the detailed data sheets for more information.

# Sprinkler measuring orifice



# SMB

## Application

The SMB and SMB-OE sprinkler measuring orifices are installed between flanges in stationary water extinguishing systems and are approved by VdS loss prevention.

VdS approval no.: G 4990049

## Measurement materials

Extinguishing water

## Operating principle

These units work on the differential pressure principle. A differential pressure occurs at a restriction in the pipe, which is proportional to the square of the volume flow through the piping.

The resulting differential pressure is applied to the pressure tap and is displayed directly on the gauge as a volume flow or a percentage.



## SMB

- All flow directions with a single unit
- May be installed in any orientation
- Display can turn by  $\pm 180^\circ$
- Self-centring
- Approved nominal widths  
DN 80, DN 100, DN 150, DN 200, DN 250
- Accuracy 2.5 %
- Optional
  - Display with % scale (SMB-OE)
  - Minimesse hose connector

## Technical data

Device	Measurement ranges			Precision class	Operating data Max. temperature
	Water		Air at STP*		
SMB	Min. Max.	0.6 – 2.1 4 – 18.12	m <sup>3</sup> /min m <sup>3</sup> /min	2.5 % FS**	70 °C
DST	Min. Max.	20 – 160 300 – 1,800	l/h m <sup>3</sup> /h	2 % FS**	100/150 °C

\* At STP: at standard conditions (0 °C and 1013 mbar abs.)

Measuring ranges for other media and operating conditions

\*\* FS = Full Scale



## DST

### Application

The applications for bypass flow meters include systems for buildings and swimming pools. They are a cost-effective measurement technique for large nominal widths. The cost-effective device in PVC is frequently used in bath water systems. To measure the flow of aggressive media, for example in water preparation, the unit is available in PVDF, while the DST-1/2 in steel is primarily used for the measurement of air and gases.

### Measurement materials

Water, air, liquids, gases as well as bases and acids.

### Operating principle

In bypass flow meters, an orifice is used to generate a bypass flow that is proportional to the main flow. This is a measurement of the volume flow through the main line and can be read directly off the scale of the variable area flow meter.



### DST

- Extensive selection of materials
- High volume flows possible
- Orientation-independent installation of the measuring orifice
- Display requires no auxiliary power
- Rated accuracy  $\pm 2\%$  FS
- Medium-specific scale
- Optional
  - Limit switch for process control
  - 4 ... 20 mA analogue output
  - Extension of the bypass line

Max. pressure	Materials		Connections Flange	Installation height	Boundary value contact	Measuring value transformer	Device
	Measuring orifice	Materials in contact with medium					
16 bar	Aluminium (hard-coated)	Aluminium (hard-coated), nickel-plated brass, stainless steel	DN 80 – 250	40 mm	–	–	SMB
10 bar	PVC, PP, PVDF, stainless steel	Borosilicate glass, polysulfone, PVC, PP, PVDF, steel, stainless steel, NBR, EPDM	DN 32 – 400	50 mm	Reed contact	4 ... 20 mA	DST

available upon request. See the detailed data sheets for more information.



# NA/NA-V4A

## Application

The NA and NA-V4A level indicators are used to display fill levels. Depending on the application, two different variants are available. The NA is used to display above the container, and the NA-V4A beside the container.

## Measurement materials

Water, solvents, oils, bases and acids.

## Operating principle

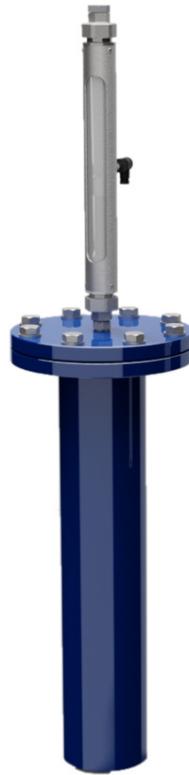
These units work on the buoyancy principle and are always installed in a vertical orientation.

### NA:

The floater tube and float are installed in the container. When the level rises, the buoyancy principle causes the float to rise. The deflection is transmitted through a rod to the indicator component and the fill level can be read off directly.

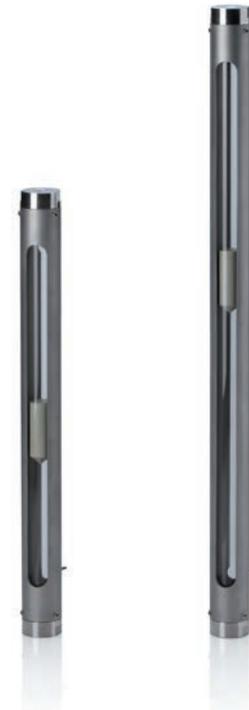
### NA-V4A:

The NA-V4A works on the communicating pipes principle and is installed outside the container. It is connected through a line and an overflow to the container. When the fill level in the container rises, it also rises in the measuring tube.



## NA

- On-Top installation
- Reliable due to simple functionality
- Installation height according to customer specification
- Optional
  - Limit switch
  - Measuring value transformer 4 ... 20 mA



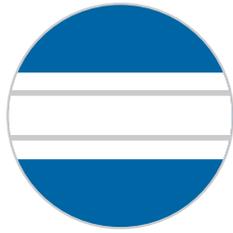
## NA-V4A

- Bypass installation
- Measuring tube of borosilicate glass
- Device with protective stainless steel tube
- Medium-specific float
- Optional
  - Limit switch
  - Explosion-protected variant

## Technical data

Device	Measurement ranges	Operating data		Materials
	Water	Max. temperature	Max. pressure	Materials in contact with medium
NA	acc. to customer specifications	80/100 °C	For open systems	Steel, stainless steel
NA-V4A	400 – 1,000 mm	80/100 °C	For open systems	Borosilicate glass, stainless steel, FKM, PP
SGL	–	100/150 °C	2.6 – 8 bar	Borosilicate glass, steel, stainless steel, NBR, optionally: Hastelloy, FKM

Measuring ranges for other media and operating conditions



## Application

The devices in the sight glass series are used for the visual display of fluid media.

The fittings consist of a sight glass of borosilicate glass, four spacers and two connecting flanges.

## Measurement materials

Water, oil and alkaline or acidic materials. By selecting the material appropriately, the sight glass can be also be used with aggressive media.

## Operating principle

Due to its simple design, the service is maintenance-free. Thanks to external radial seals, there are no changes in cross-section and thus no pressure loss.



## SGL

- Sight glass tube of borosilicate glass
- May be installed in either direction
- No pressure loss
- Reliable due to simple functionality
- Maintenance-free
- Variants: Steel, stainless steel, Hastelloy

Connections		Installation height	Boundary value contact	Measuring value transformer	Device
Screw connection	Flange				
-	acc. to customer specifications	40 mm	Reed contact	4 ... 20 mA	NA
G ¼ – G 1	Upon request	400 – 1,000 mm	Reed contact	-	NA-V4A
-	DN 50 – 250	600 mm	-	-	SGL

available upon request. See the detailed data sheets for more information.



## Application

Additional products for the integration of flow meters into control systems, PLCs, regulating systems, process automation and process data recording systems.



- Programmable digital displays
- Counters and meters
- Field display with Ex-protection
- Limit switch
- Power supply modules
- Control relays
- Multifunction relays
- Switch amplifiers
- Isolators

# Flow meters according to customer specifications



## Application

Measuring equipment and monitors in custom designs as well as series production to customer specifications for furnace construction, for cooling processes, process control, system design and water preparation.



**Our know-how goes directly into your application.**

**Call us.**

**We will be happy to advise you.**

**BAMO**



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