

VAF

INSTRUMENTS



MidFlow[®] / HiFlow[®]

Sliding Vane Meters DN 25-300 (1"-12")

127

Product Bulletin

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TO BE
REALLY
SURE

Introduction

VAF Instruments MidFlow®/HiFlow® positive displacement type liquid flowmeters are used in continuous metering applications, in-line blending processes and batch applications. MidFlow®/HiFlow® flowmeters have a simple, rugged design. With only few almost frictionless moving internal parts there is hardly any wear in the flowmeter which safeguards a typical long lasting lifetime. MidFlow®/HiFlow® meters have no mechanical seals saving you from regular maintenance and possible leakage of process liquids into the environment. The flowmeter is driven by the process liquid which makes it suitable for distant locations without power supply. The high accuracy of the flowmeter (better than 0.1% and repeatability 0.05%) is not influenced by process pressure or temperature, mechanical pipe strain or liquid turbulence and therefore straight inlet and outlet pipe pieces are not required.

Experience in flow measurement

In 1938 VAF Instruments started as a manufacturer of petrol delivery pumps. The flowmeters made by VAF for this pump already had to have the highest accuracy and had to meet the demands of the board of weights and measures. Innovation and research over the past 75 years helped VAF to make new types of flowmeters bearing in mind customer requirements and the need for accurate flow measurement.

VAF Instruments flowmeters are available in sizes from 8 mm up to 300 mm (1 l/hr up to 960 m³/hr). MidFlow®/HiFlow® flowmeters cover the middle and high part of this range.

Available MidFlow®/HiFlow® meters

MidFlow®/HiFlow® flowmeters are available in connection sizes from 25 mm up to 300 mm representing maximum flow ranges from 160 l/min up to 16000 l/min. A choice of material is available with ductile iron, steel and stainless steel. For registration of the measured amount of liquid, VAF MidFlow®/HiFlow® meters can be fitted with various combinations of counters and pulse transmitters.

Liquids

VAF positive displacement flowmeters series MidFlow®/HiFlow® are suitable for a wide range of liquids. Because liquids with higher viscosities do not degrade the accuracy of the sliding vane flowmeter, it is possible to use only one flowmeter for various liquids.

MidFlow®/HiFlow® meters are used for acids, alkalines, cleansing liquids, solvents, water, edible oils and fats, liquor, glucose, paint, all petrochemical liquids from LPG to bitumen, alcohol, printing ink, glue and many other organic and inorganic liquids.

Special versions

This brochure comprises only VAF Instruments' standard delivery program. Special flowmeter variants can be offered as tailor-made solutions.

Consult VAF Instruments for further information.

MidFlow®/HiFlow® are registered trade marks of VAF Instruments B.V.

Principle of operation

VAF Instruments positive displacement flowmeters operate on the sliding vane principle. The meter consists of a specially shaped housing in which a rotor can rotate freely.

Two pairs of vanes are placed into four slots in the rotor. Each pair is positioned by a rod and can move in and out of the rotor. The radial movement of the vanes is guided by the special inner shape of the housing. This patented construction provides a constant seal between the inlet and the outlet of the meter. The incoming liquid forces the rotor to rotate. The rotation of the rotor is transferred via a magnetic coupling to a read out device. This can be a counter in any desired engineering unit or a pulse transmitter for remote read out, flow data processing or connection to a process computer.

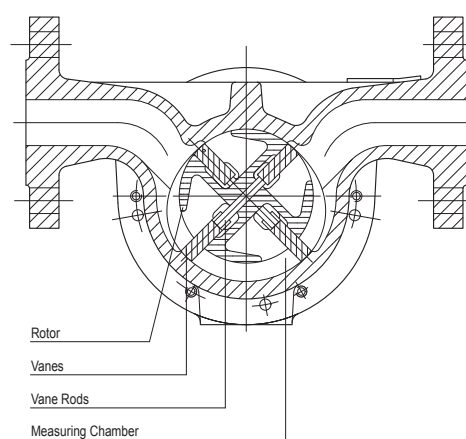


Fig. 1 Sectional view

Features & benefits

| Features | Benefits |
|---|---|
| High capacity and rangeability | One meter for a wide range of flows |
| | Lower investment |
| High accuracy | Exact registration of transferred amount of liquid |
| | No loss of valuable raw material |
| Design simplicity | Easy to service |
| | No complex replacement parts |
| | Low operation cost |
| Accuracy not degraded by: process pressure / process temperature / liquid viscosity / liquid conductivity / pipe strain / flow pattern (turbulence) | Easy to operate because no need for external settings saving time in operation and training |
| | One single meter model is suitable for different liquids resulting in a lower investment |
| | No straight pipe required before or behind meter thus less space required |
| Rugged design | Easy to integrate in compact systems |
| | Space saving |
| Certified by European Classification Authorities (MID - approval) for custody transfer applications | Calibration according standard procedures |
| | Time saving |
| Constructed to CE standards | No special adjustments necessary |
| From ISO 9001 registered company | Assured product quality |
| | Less wear |
| | Long lifetime |
| Few internal parts | Low operation cost |
| | No auxiliary power needed |
| Measurement driven by liquid | Suitable for many remote locations |
| | Standard flowmeter suitable for hazardous areas |



Fig. 2 MidFlow® meter

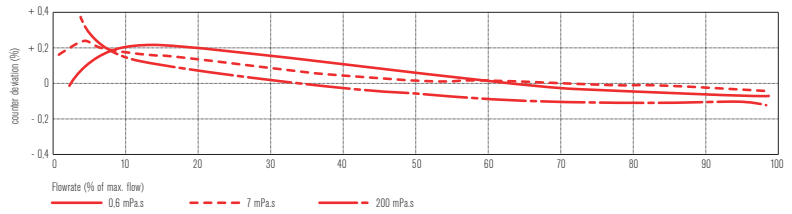


Fig. 3 MidFlow® meter

Technical specification

Typical calibration curves

VAF Instruments flowmeters perform liquid measurement with the highest accuracy. This graph shows typical calibration curves for liquids with different viscosities. Consult the factory for other values.



MidFlow®

| Basic model number | J5025 | J5040 | J5050 | J5080 | J5100 | J1025 | J1040 | J1050 | J1080 | J1100 | J3025 | J3040 | J3050 | J3080 | J3100 | | | | | |
|---|--|-------|-------|-------------|-------|--------------|----------------|-------|-----------|-----------|--|-------|-----------|-------|-------|-----------|--|--|--|--|
| Connection size, DN [mm] | 25 | 40 | 50 | 80 | 100 | 25 | 40 | 50 | 80 | 100 | 25 | 40 | 50 | 80 | 100 | | | | | |
| Capacity [l/min] | see graphs | | | | | | | | | | | | | | | | | | | |
| Maximum, 8 hrs/day discontinuous | 160 | 250 | 500 | 1900 | 2750 | 160 | 250 | 500 | 1900 | 2750 | 160 | 250 | 500 | 1900 | 2750 | | | | | |
| Maximum, continuous | 120 | 190 | 380 | 1450 | 2000 | 120 | 190 | 380 | 1450 | 2000 | 120 | 190 | 380 | 1450 | 2000 | | | | | |
| Minimum, range 1:10 ¹ | 16 | 25 | 50 | 190 | 275 | 16 | 25 | 50 | 190 | 275 | 16 | 25 | 50 | 190 | 275 | | | | | |
| Minimum, range 1:20 ² | 8 | 12.5 | 25 | 80 | 137.5 | 8 | 12.5 | 25 | 80 | 137.5 | 8 | 12.5 | 25 | 80 | 137.5 | | | | | |
| Displaced volume per revolution [litre] | 0.167 | 0.167 | 0.40 | 2.95 | 5.30 | 0.167 | 0.167 | 0.40 | 2.95 | 5.30 | 0.167 | 0.167 | 0.40 | 2.95 | 5.30 | | | | | |
| Measuring accuracy | | | | | | | | | | | | | | | | | | | | |
| Range 1:10 ¹ better than | ± 0.2 % | | | ± 0.1 % | | | ± 0.2 % | | | ± 0.1 % | | | ± 0.2 % | | | ± 0.1 % | | | | |
| Range 1:20 ² better than | ± 0.3 % | | | | | | | | | | | | | | | | | | | |
| Repeatability | better than ± 0.05 % | | | | | | | | | | | | | | | | | | | |
| Required starting pressure [kPa (bar)] | 3 (0.03) | | | | | | | | | | | | | | | | | | | |
| Materials | | | | | | | | | | | | | | | | | | | | |
| Body | ductile iron | | | | | AISI 316 | | | | | | | | | | | | | | |
| Rotor | ductile iron | | | cast iron | | ductile iron | | | cast iron | | AISI 316 | | | | | | | | | |
| Covers | ductile iron / steel on application | | | | | steel | | | | | | | | | | AISI 316 | | | | |
| Vanes | carbon | | | | | | | | | | | | | | | | | | | |
| O-rings | Vitron A / PFA covered Vitron A or Kalrez on application | | | | | | | | | | PFA covered Vitron A / Kalrez on application | | | | | | | | | |
| Bearings | steel ball bearings / stainless steel ball bearings on application | | | | | | | | | | AISI 316 needle bearings | | | | | | | | | |
| Body pressure rating [kPa (bar)] | 2000 (20) | | | 1050 (10.5) | | | 2500 (25) | | | 2000 (20) | | | 2500 (25) | | | 2000 (20) | | | | |
| with steel covers | 2500 (25) | | | 2000 (20) | | | not applicable | | | | | | | | | | | | | |
| Available flanges | | | | | | | | | | | | | | | | | | | | |
| DIN PN [bar] | PN 10, 16, 25; raised face or with groove acc. DIN 2512N | | | | | | | | | | | | | | | | | | | |
| ANSI | 150, 300 RF ³ | | | | | | | | | | | | | | | | | | | |
| JIS [K] | 5, 10, 16, 20 | | | | | | | | | | | | | | | | | | | |
| Liquid temperature range standard | -10 °C to 120 °C for other temperatures consult factory | | | | | | | | | | | | | | | | | | | |
| Weight without counter [kg] | 13 | 16 | 24 | 78 | 108 | 13 | 16 | 24 | 78 | 108 | 13 | 16 | 24 | 78 | 108 | | | | | |

Notes: ¹ standard factory calibration. ² calibration on request. ³ for 300 lbs flanges on 100 mm models consult factory.

Flow ranges

To select the appropriate meter size for your process the graphs must be used. The data in these graphs only refer to standard flowmeters used on Newtonian liquids. Consult VAF Instruments for viscosities higher than shown in the graphs. Lower minimum capacities are possible dependent on liquid viscosity and required measuring accuracy.

Flowrate - pressure drop viscosity relation

These graphs show the pressure drop across the flowmeter as a function of the flowrate and the viscosity of the liquid. The sloping lines are lines of equal viscosity. The curve at the top of the graphs represents the maximum allowable pressure drop.

HiFlow®

| Basic model number | J5150 | J5200 | J5250 | J5300 | J1150 | J1200 | J3150 | J3200 |
|---|---|----------------|--------|--------|-----------------------|-------|---------------------|-------|
| Connection size, DN [mm] | 150 | 200 | 250 | 300 | 150 | 200 | 150 | 200 |
| Capacity [l/min] | see graphs | | | | | | | |
| Maximum, 8 hrs/day discontinuous | 4.600 | 8.000 | 12.500 | 16.000 | 4.600 | 8.000 | 4.600 | 8.000 |
| Maximum, continuous | 3.450 | 6.000 | 9.500 | 12.000 | 3.450 | 6.000 | 3.450 | 6.000 |
| Minimum, range 1:10 ¹ | 460 | 800 | 1.250 | 1.600 | 460 | 800 | 460 | 800 |
| Minimum, range 1:20 ² | 230 | 400 | 625 | 800 | 230 | 400 | 230 | 400 |
| Displaced volume per revolution [litre] | 11,9 | 29,3 | 58,6 | | 11,9 | 29,3 | 11,9 | 29,3 |
| Measuring accuracy | | | | | | | | |
| Range 1:10 ¹ better than | ± 0,1 % | | | | | | | |
| Range 1:20 ² better than | ± 0,3 % | | | | | | | |
| Repeatability | better than ± 0,05 % | | | | | | | |
| Required starting pressure [kPa (bar)] | 3 (0,03) | | | | | | | |
| Materials | | | | | | | | |
| Body | ductile iron | | | | AISI 316 | | | |
| Rotor | cast iron | | | | | | AISI 316 | |
| Covers | ductile iron | | | | carbon steel | | AISI 316 | |
| Vanes | carbon | | | | | | | |
| O-rings | Viton A, PFA covered Viton A | | | | | | PFA covered Viton A | |
| Bearings | steel | | | | | | stainless steel | |
| Body pressure rating, [kPa (bar)] | 1050 (10,5) | 1250 (12,5) | | | Design on application | | | |
| Available flanges | | | | | | | | |
| DIN PN [bar] | 10, 16; optional with groove acc. DIN 2512N | | | | | | | |
| ANSI | 150 RF | | | | | | | |
| JIS [K] | 5, 10 | | | | | | | |
| Liquid temperature range standard | -10 °C to 120 °C for other temperatures consult factory | | | | | | | |
| Weight without counter [kg] | 215 | 585 | 1000 | 1100 | 230 | 605 | 320 | 500 |

¹ Standard factory calibration. ² Calibration on request.

Technical specification

Note

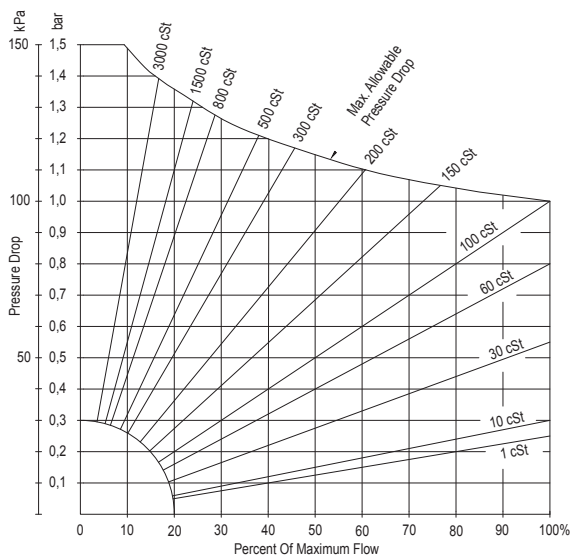
For liquids with viscosities below 0,5 mPa.s with poor lubricating properties, or flowmeters that are running continuously it is also advisable to reduce the maximum flow, to prevent excessive wear of the vanes. A general rule is to reduce the maximum capacity to 75% of the value specified in the table.

Lower minimum capacities are possible dependent on liquid viscosity and required measuring accuracy.

Consult VAF Instruments on application.

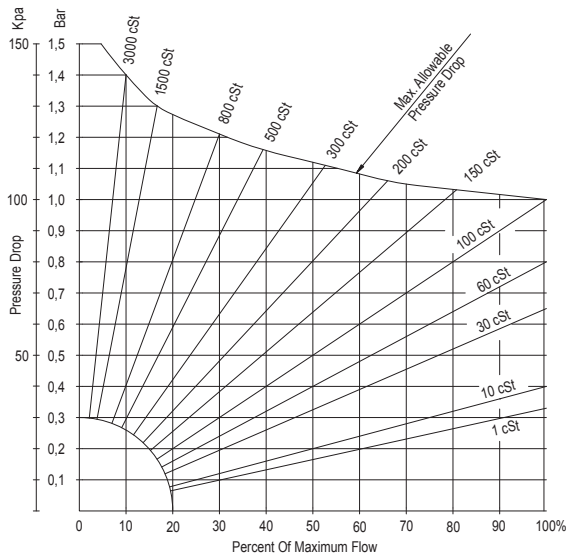
Note: 1 cSt = 1 mPa.s if specific gravity is 1,0

MidFlow®

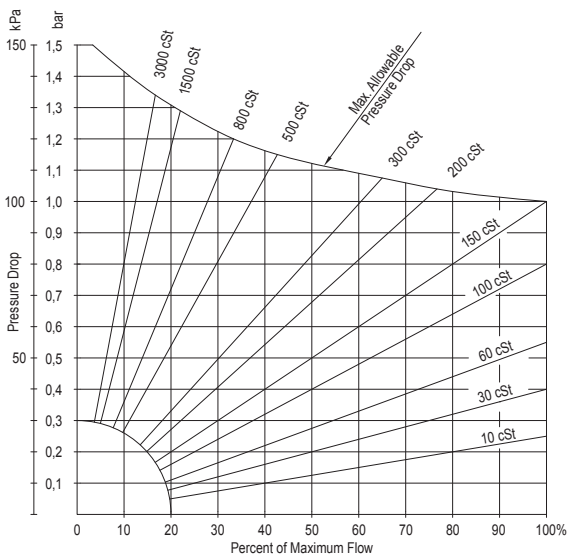


Meter size DN 25 mm: 100% = 160 l/min

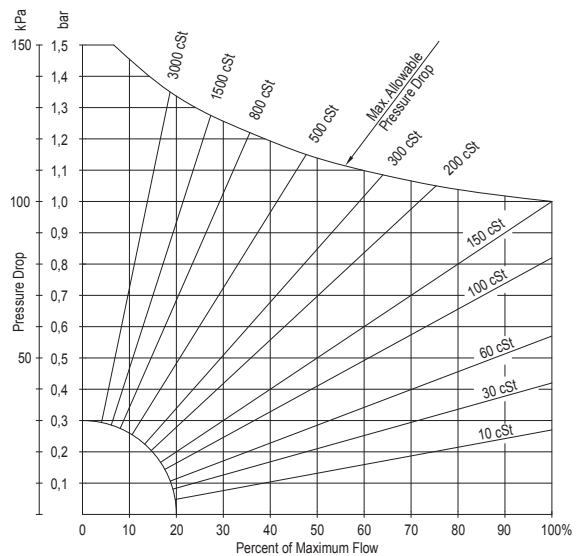
Meter size DN 40 mm: 100% = 250 l/min



Meter size DN 50 mm: 100% = 500 l/min

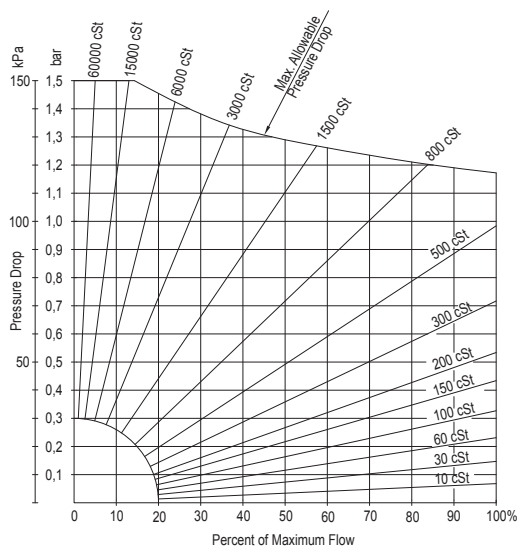


Meter size DN 80 mm: 100% = 1900 l/min

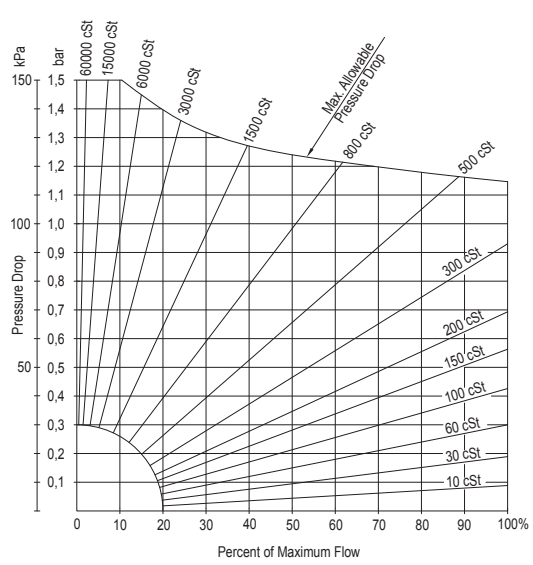


Meter size DN 100 mm: 100% = 2750 l/min

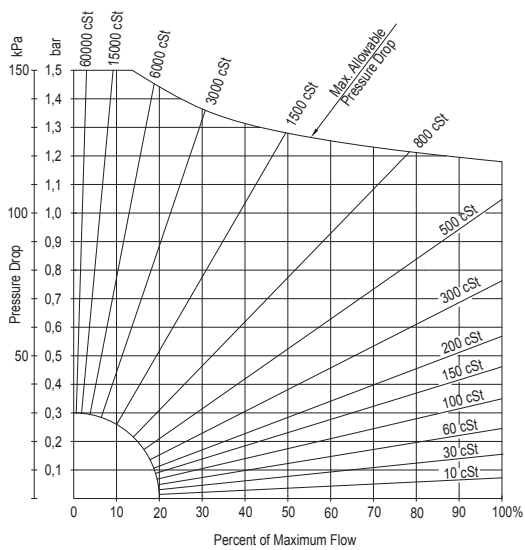
HiFlow®



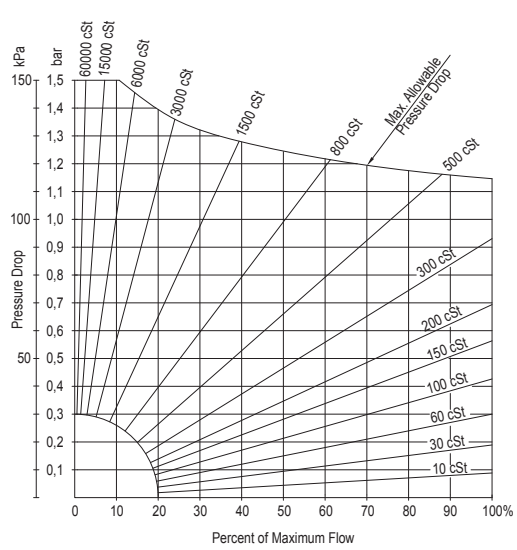
Meter size DN 150 mm: 100% = 4600 l/min



Meter size DN 200 mm: 100% = 8000 l/min



Meter size DN 250 mm: 100% = 12500 l/min



Meter size DN 300 mm: 100% = 16000 l/min

Options & accessories

Counters, pulse transmitters and accessories

VAF MidFlow®/HiFlow® meters can be fitted with various combinations of counters and pulse transmitters. All can be calibrated to read in litres, cubic meters or gallons. The following meter mounted counters and pulse transmitters are available:



Key resettable totaliser

For simple totalising jobs. Direction of reading from the top of the flowmeter. An inductive pulse transmitter can be installed in the counter adapter as optional extra.



Resettable flowmeter register

For registering delivered or transferred quantities per job and in total. Optionally available with extension between meter body and counter. Combinations with pulse transmitters are possible.



Batch counter

Electrical or pneumatic 2-stage knockoff. Optionally available with extension between meter body and counter. Combinations with pulse transmitters are possible.



Incremental pulse encoder

Dual channel optical pulse transmitter (EEX d IIB T6). Directly connected to flowmetershaft.



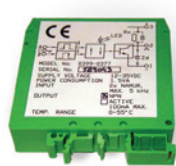
Ticket printer

Records and prints liquid deliveries and transactions. For use with reset and preset counters. Accumulative or zero start models available.



Calibration adapter

With pulse transmitters for remote flow monitoring and control. Pulse generators used are inductive proximity switches acc. NAMUR DIN 19234.



Pulse discriminator

(DIN rail mounting) to prevent pulse signal errors caused by pipeline vibrations and flow pulsations, or where other unsteady flow conditions would prevent smooth rotation of the meter. For use with 2 inductive pulse transmitters.

General

- Liquid filter/air vent;
- Appropriate liquid filtering is essential for protection of the flowmeter;
- Cooling rings for protection of the counting mechanism against operating temperatures above 120°C;
- Material certificate acc. EN 10204 3.1;
- Custody transfer accuracy certification;
- Special adaptations for accurate measurement of liquids with very high or very low viscosities, e.g. molasses or LPG;
- Helium leak-test when volatile liquids must be measured;
- Heating covers;
- Counter extension between counter and meter body for easier reading on loading platforms etc. Extension length up to 3 metres;
- Automatic temperature compensation;
- Internal flushing bores. Prevent deposits when crystallising liquids must be measured;
- Stainless steel encapsuled magnet coupling between meter body and counter adapter. Prevents corrosion by aggressive process liquids.

Electronic signal processing instrumentation

VAF Instruments offers a complete range of microprocessor controlled, analogue and digital instruments for indicating, totalising, registering and controlling liquid flows. Electronic instruments are available as modular plug-in units or in housings for wall or flush panel mounting. Output options for a number of instruments provide interfaces to chart recorders, printers, alarms and distributed control networks. VAF's engineers will be pleased to assist you in working out customized flow control systems in accordance with your requirements. At the present time our basic series of electronic flow signal processing instrumentation comprises:

- Flow computers;
- Multifunction flow controllers;
- Flow totalisers with optional temperature compensation;
- Batch controllers;
- Ratio controllers;
- Pulse amplifiers/pulse discriminators;
- Power supplies;
- Scalers;
- Frequency-to-current converters.



Applications

Some of the many applications are:

- Fuel consumption measurement of combustion engines and oil burners;
- Blending of additives in the process industry;
- Fuel oil bunkering and blending;
- Addition of catalysts to chemical reactors;
- Dyeing yarn, leather, plastics, etc.;
- Coating of sheet materials;
- Injection of oils and fats in the foodstuffs and animal feed industries;
- Flow control of dosing pumps;
- Dosing of additives in cement concrete preparation;
- Measurement of liquid movement in hydraulic systems;
- Accurate measurement of viscous liquids at low flowrates;
- Dosing of liquids in the paint, tobacco and beverage industries.



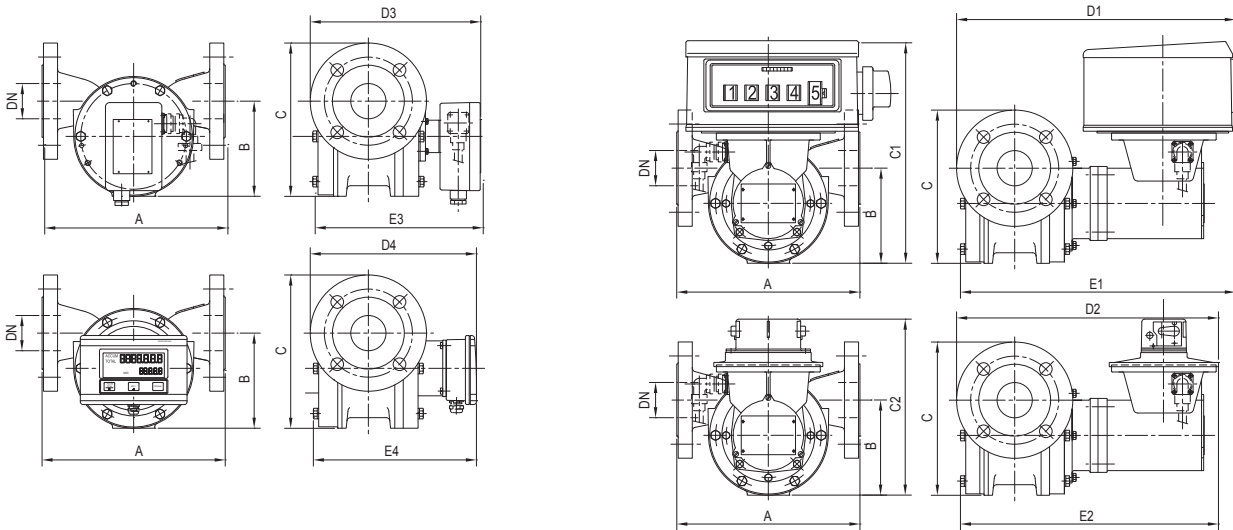
Dimensions

All dimensions apply to flowmeters with DIN PN 10/16/25 flanges.

Dimensions of flowmeters with other pressure rating are available on application.

All dimensions are in millimetres.

MidFlow®



Models JZ025 to JZ100

| Basic model number | J1025 | J5025 | J3025 | J1040 | J5040 | J3040 | J1050 | J5050 | J3050 | J1080 | J5080 | J3080 | J1100 | J5100 | J3100 |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|
| Connection size | DN 25 | | | DN 40 | | | DN 50 | | | DN 80 | | | DN 100 | | |
| A | 240 | | | 240 | | | 260 | | | 400 | | | 450 | | |
| B | 110 | | | 110 | | | 135 | | | 243 | | | 285 | | |
| C | 168 | | | 185 | | | 218 | | | 343 | 345 | 343 | 395 | 397 | 395 |
| C1 | 300 | | | 300 | | | 315 | | | 373 | | | 400 | | |
| D1 | 350 | 354 | 368 | 372 | 397 | 395 | 403 | 477 | 470 | 494 | 511 | 504 | 550 | | |
| E1 | 348 | 365 | 348 | 365 | 393 | 389 | 413 | 520 | 502 | 563 | 570 | 552 | 638 | | |
| C2 | 235 | | | 235 | | | 250 | | | 308 | | | 335 | | |
| D2 | 326 | 330 | 343 | 347 | 372 | 370 | 378 | 452 | 445 | 469 | 487 | 480 | 526 | | |
| E2 | 324 | 340 | 324 | 340 | 369 | 365 | 389 | 496 | 478 | 538 | 546 | 528 | 613 | | |
| D3 | 240 | 244 | 258 | 262 | 287 | 285 | 293 | 367 | 360 | 384 | 401 | 394 | 440 | | |
| E3 | 238 | 255 | 238 | 255 | 283 | 279 | 303 | 410 | 392 | 453 | 460 | 442 | 528 | | |
| D4 | 217 | 221 | 235 | 239 | 264 | 262 | 270 | 344 | 337 | 361 | 378 | 371 | 417 | | |
| E4 | 215 | 232 | 215 | 232 | 260 | 256 | 280 | 387 | 369 | 430 | 437 | 419 | 505 | | |

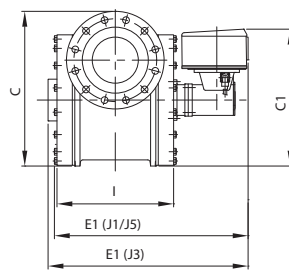
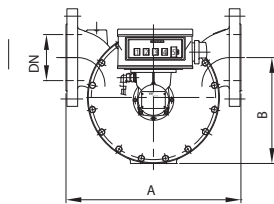
Dimensions

Flange dimensions apply to flowmeters with DIN PN 10 flanges.

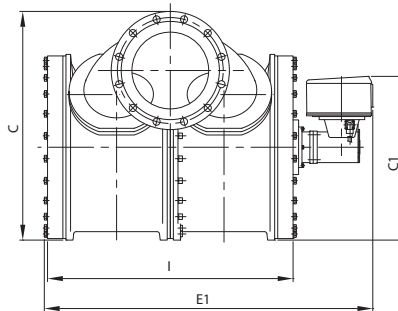
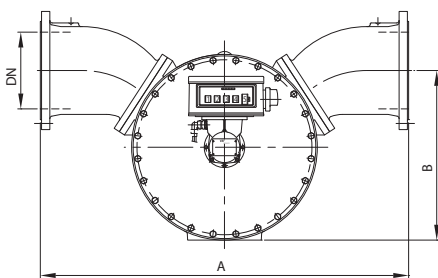
Dimensions of flowmeters with other pressure ratings are available on application.

All dimensions are in millimeters.

HiFlow®



Model no. JZ150 and JZ200



Model no. J5250 and J5300

| Basic model number | J5150 | J5200 | J5250 | J5300 |
|--------------------|--------|--------|--------|--------|
| Connection size | DN 150 | DN 200 | DN 250 | DN 300 |
| A | 550 | 900 | 1200 | 1200 |
| B | 345 | 528 | 553 | 578 |
| C | 487 | 708 | 751 | 801 |
| E | 599 | 689 | 1057 | 1057 |
| I | 360 | 450 | 800 | 800 |

Quotation & ordering information

For proper selection of the suitable MidFlow®/HiFlow® meter the following data should be determined:

| | | | |
|--|--|--|--------------------------------------|
| Liquid data: | | | |
| 1. Process liquid (trade name or chemical composition): | | | |
| 2. Flowrate [l/min] minimum: | | continuous: | |
| 3. Operating pressure range [bar]: | | allowable pressure drop [bar]: | |
| 4. Operating temperature range [°C] process liquid: | | ambient: | |
| 5. Viscosity at operating conditions: [cSt] | | | |
| Flowmeter data: | | | |
| 6. Basic model number: | | | |
| 7. Diameter liquid piping: | | | |
| 8. Wetted parts material: | | <input type="radio"/> ductile iron | <input type="radio"/> carbon steel |
| | | <input type="radio"/> AISI 316 | |
| 9. Connection flanges: | | <input type="radio"/> DIN PN [bar]: | <input type="radio"/> ANSI RF [lbs]: |
| | | <input type="radio"/> JIS [K]: | |
| 10. Direction to flow: | | <input type="radio"/> left to right | <input type="radio"/> right to left |
| | | <input type="radio"/> top to bottom | <input type="radio"/> bottom to top |
| 11. Local counter: | | <input type="radio"/> no built-on counter (continue with step 12) | |
| | | <input type="radio"/> key-resettable totaliser | |
| | | <input type="radio"/> resettable flowmeter register | |
| | | batch counter: <input type="radio"/> electrical <input type="radio"/> pneumatic | |
| | | knock-off: <input type="radio"/> 1 stage knock-off <input type="radio"/> 2 stage knock-off | |
| | | <input type="radio"/> ticket printer (on resettable flowmeter register or batch counter) | |
| 12. Pulse transmitter: | | <input type="radio"/> number of low speed inductive pulse transmitter(s): ; preferred pulses/litre: | |
| | | <input type="radio"/> number of high speed inductive pulse transmitter(s): ; preferred pulses/litre: | |
| | | <input type="radio"/> pulse discriminator, (DIN rail mounting) using 2 inductive pulse transmitters | |
| | | <input type="radio"/> incremental pulse encoder | |
| 13. Liquid filter: | | <input type="radio"/> required <input type="radio"/> not required | |
| 14. Special certification: | | <input type="radio"/> inspection by customer <input type="radio"/> standard factory calibration | |
| | | <input type="radio"/> inspection by classification authority: | |
| | | <input type="radio"/> factory test and material certificate acc. EN 10204 3.1 | |
| | | <input type="radio"/> MID <input type="radio"/> other: | |
| 15. Tagging: | | <input type="radio"/> paper tag <input type="radio"/> stn. stl. tag fixed to flowmeter | |
| 16. Other options & accessories: | | | |

Name:

Place and date:

For further information see relevant Product Bulletins or www.vaf.nl

Represented by

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