

COMPACT FLOWMETER, DeltaK

KEY DATA

- Orifice design based on ISO 5167-1 & ISO 5167-2, ASME.MFC.3M or ISO/TR 15377 standards
- Recommended for gas, liquid or steam
- Pipe diameter : from 25 mm to 600 mm - beyond, contact us
- Reynolds number from 80 to 10^8 (depending on the primary element)
- Accuracy : from 0,5% of the max flowrate
- Repeatability of measurement : 0,1%



compact version with integrated 5-way manifold and differential pressure transmitter



BENEFITS



- ▶ Pre-assembled complete set: primary element with integrated and factory-tested pressure taps, integrated manifold; ready to be installed between simple flanges
 - ▶ Plug and play system: possibility to mount a pre-set differential pressure transmitter directly on the manifold
 - ▶ Leakage-free system: integrated and 100% factory-tested pressure taps
- ▶ Cost-effective measurement system : low installation cost and maintenance-free
 - ▶ Very long life-time product, no drift over time
- ▶ Different types of orifices available depending on applications (conditioning)



The compact flowmeter offers a "leak-free" guarantee thanks to the pressure taps which are connected, welded to the primary element and the manifold and which are 100% factory-tested. The differential pressure transmitter is directly mounted on the manifold.

With no additional external connecting tubes, the tightness of the assembly is ensured.

STANDARDS

- ISO 5167-1 & ISO 5167-2
- ASME.MFC.3M
- ISO/TR 15377
- Pressure Equipment Directive PED 2014/68/UE

TECHNICAL CHARACTERISTICS

- Fluid temperature⁽¹⁾: cryogenic up to the transmitter temperature limit
- Fluid type: gas, liquid or steam
- Orifice materials⁽²⁾ : stainless steel, monel, hastelloy, inconel, duplex, super duplex, titanium, tantalum...
- Maximum operating pressure: limited by the flange rating
- Accuracy: from 0,5% of the max flowrate

DESCRIPTION

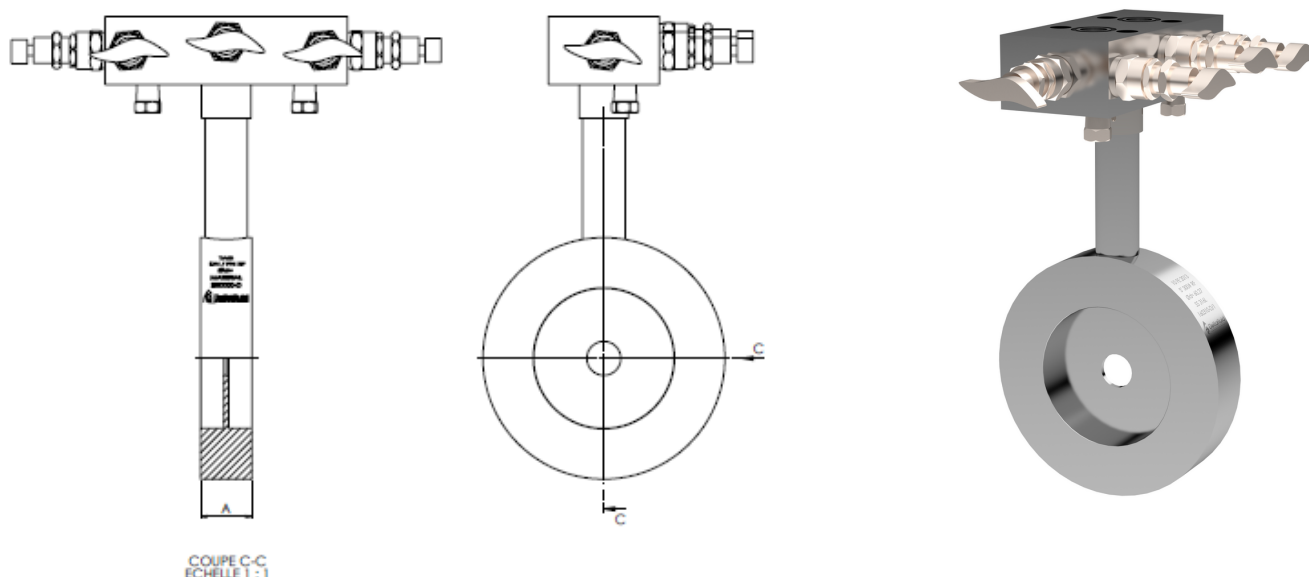
- Primary measuring element : sharp-edge, conical entrance, quarter circle, eccentric, segmental or conditioning orifice.
- Composition : compact monoblock measuring set including the primary element, the 3 or 5-way manifold, compact integrated pressure taps, and the differential pressure transmitter as an option - multivariable transmitter and temperature sensor to be added if temperature and pressure correction are needed (see page 5)
- Mounting between simple flanges

(1) Temperature restriction depending on the transmitter temperature resistance because it can't be remote-mounted

(2) For an aggressive fluid, possibility to apply a specific coating to the material in contact with the fluid to increase product lifetime

DRAWINGS

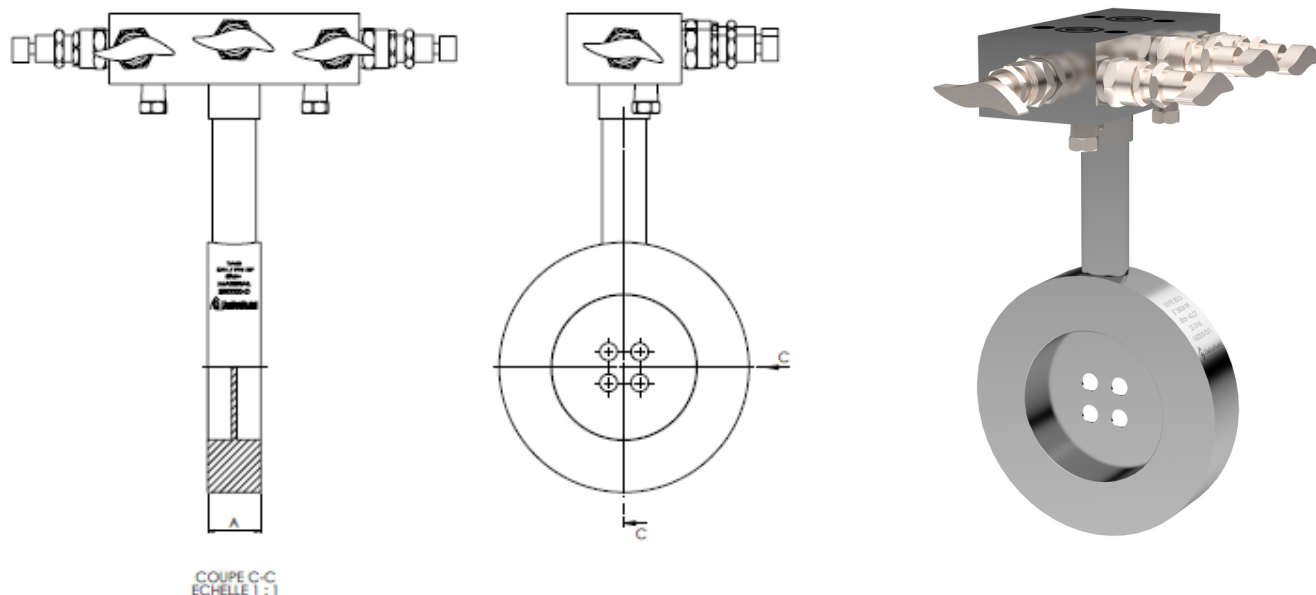
- Compact flowmeter with a 5-way manifold - simple orifice



A, monoblock compact thickness: 30 mm up to ND300, 35 mm beyond

RTJ and large male/female and tongue/groove face monoblock thicknesses⁽³⁾ are not standardized and are calculated according to your application; they are given during the technical study.

- Compact with a 5-way manifold - conditioning orifices



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(3) see page 8 the face type detail

COMPARISON OF ORIFICE PLATE VS COMPACT FLOWMETER ASSEMBLY

■ Traditional mounting of an orifice plate

- Proven technology
- Flexible mounting configurations
- On-site installation
- On-site test
- Mounting between orifice flanges

Pieces to install :

- Orifice plate
- Connecting tubes
- Mounting accessories
- Valves
- Mounting bracket

■ Compact flowmeter

An optimal measurement solution:

- Ready to be installed flowmeter
- Compact and integrated pressure taps
- 100% factory-tested: no leakage risk
- Limited installation, commissioning, maintenance costs
- Factory-preset transmitter
- Mounting between simple flanges

PRESSURE AND TEMPERATURE COMPENSATION



A compressible fluid such as gas or steam has a density which varies according to its pressure and its temperature. Whereas liquid can be considered as an incompressible fluid.

Thus, for gas and steam, in order to obtain the most accurate mass flow possible at operating conditions, the advice is to use a multi-variable transmitter.

This specific transmitter measures the fluid static and differential pressure and is coupled to a temperature sensor to achieve pressure and temperature compensation of the measured flowrate. The compensated flowrate is thus close to the actual flowrate.

■ traditional mounting with compensation

■ Compact flowmeter with integrated temperature sensor

Pieces to install :

- Orifice plate
- Thermowell & temperature sensor
- Temperature transmitter
- Static pressure transmitter
- Wiring
- Connecting tubes
- Manifold
- Differential pressure transmitter
- Mounting accessories
- Valves
- Mounting bracket

An optimal measurement solution for gas:

- Complete flowmeter ready to be installed, 100% factory-tested (leakage-free test)
- Solution with integrated pressure and temperature compensation for optimal calculation of mass flowrate
- Improved accuracy and performance compared to an uncompensated flowmeter

STRAIGHT LENGTHS

Required straight lengths between **conditioning orifice plate** (or orifices in the compact monoblock) and fittings - 2D upstream / 2D downstream

Required straight lengths between single hole orifice plate (or single orifice in the compact monoblock) and fittings - without flow conditioner

Values expressed as multiple of pipe internal diameter, D

UPSTREAM SIDE OF ORIFICE PLATE

Downstream side of orifice plate

d/D	Single 90° bend or two 90° bends in any plane S>30S	Two 90° bends in the same plane 30D≥S≥10D	Two 90° bends in the same plane 10D>S	Two 90° bends in perpendicular planes 30D≥S≥5D	Two 90° bends in perpendicular planes 5D>S	Single 90° tee with or without extension	Single 45° bend or two 45° bends in the same plane S≥22D	Concentric reducer 2D to D over a length of 1,5D to 3D	Concentric expander 0,5D to D over a length of D to 2D	Full bore ball valve or gate valve fully open	Abrupt symmetric reduction	Thermometer pocket or well of diameter ≤ 0,03D	Fittings (columns 2 to 11) and densitometer pocket													
	1	2	3	4	5	6	7	8	9	10	11	12	13													
<0,2	6	3	10	10	19	18	34	17	3	7	5	6	12	6	30	15	5	3	4	2						
0,40	16	3	10	10	44	18	50	25	9	3	30	9	5	12	8	12	6	30	15	5	3	6	3			
0,50	22	9	18	10	22	10	44	18	75	34	19	9	30	18	8	5	20	9	12	6	30	15	5	3	6	3
0,60	42	13	30	18	42	18	44	18	65	25	29	18	30	18	9	5	26	11	24	7	30	15	5	3	7	3,5
0,67	44	20	44	18	44	20	44	20	60	18	36	18	44	18	12	6	28	14	18	9	30	15	5	3	7	3,5
0,75	44	20	44	18	44	22	44	20	75	18	44	18	44	18	13	8	36	18	24	12	30	15	5	3	8	4

Nota :

The minimum straight lengths required are the lengths between various fittings located upstream or downstream of the orifice plate and the orifice plate itself.

Straight lengths shall be measured from the downstream end of the curved / conical portion of the nearest bend or tee or reducer or expander to the upstream face of the orifice plate.

In the columns, left values give lengths corresponding to zero additional uncertainty (see ISO 5167-1 standard)

Right values give lengths corresponding to 0,5% additional uncertainty (see ISO 5167-1 standard). Empty cells when no available data.

S is the distance between two fittings..

ACCESSORIES

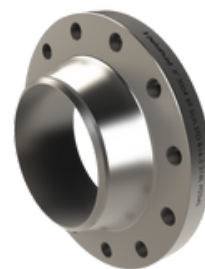
For flow measurement, we offer a full range of accessories for assembly with compact flowmeters :

■ Transmitter



Differential pressure transmitter, multivariable transmitter

■ Flanges



Flanges with flat gasket face, raised face, large male/female face, tongue/groove face, RTJ-F face

■ Temperature sensor & thermowell



■ Fittings



■ Flow straightener or conditioner



FURTHER INFORMATION

■ All information on the mounting of compact flowmeters (and their accessories) such as :

- pressure taps orientation
- mounting of the differential pressure transmitter
- flange tightening

can be found on the IOM notice "User guide - installation, operation and maintenance manual" ref DTF-SMQ-P3-IOM-017 provided on request upon delivery of components.

ITEM CODES

- Compact flowmeter DeltaK : DCManifold-ND-rating-Face type-Material (+sensor)⁽⁴⁾
 Conditioning Compact flowmeter DeltaK : DC4TManifold-ND-rating-Face type-Material (+sensor)⁽⁴⁾

DC / DC4T	Manifold	ND	NP/rating	Face type	Material
Nominal diameter - ASME OU	3-way: 3V 5-way: 5V	1/2" to 24"	150# to 2500#	RF RTJ-F SEM SEF DEM DEF	316L Others
Nominal diameter - ISO		DN15 to 600	PN2,5 to 400		

- Compact flowmeter examples:
 - DC3V-2-300-RF-316
 - DC4T5V-3-600-RF-316+sensor

(4) the mention "+sensor" indicates the presence of a temperature sensor for compensation of the measured flow (which implies the need of a multivariable transmitter) - see page 5



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