



FO Turbo-Lux 3 orifice plate flowmeter with FM- and VdS Approval

Operating Instructions

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1 Safety Instructions

1.1 Intended use

The orifice plate flowmeter FO Turbo-Lux 3 is used to measure the volume of water in closed conduits. It is suitable for any point of installation, mounting position and flow direction (in compliance of the directional arrow).

The main application is in test pipes for water supply of stationary water extinguishing systems.

The necessary approvals of the FM Approvals and VdS Schadenverhütung GmbH are available.

Warning!



The operator of these measuring devices is solely responsible for the suitability, intended use and corrosion resistance of the selected materials. It must be particularly ensured that the materials selected for the wetted parts of the flowmeter are suitable for the process media to be measured.

The manufacturer is not liable for any damage resulting from improper or unintended use of these devices.

The device may only be used in the operating manual specified pressure and temperature limits.

1.2 Certifications

- FM Approvals Class: 1046
- VdS Approval 2344, 21009-29
- Pressure equipment directive 97/23/EC

1.3 Safety instructions from the manufacturer

Disclaimer

The manufacturer is not liable for damages of any kind caused by the use of the device, including, but not limited to direct, indirect, incidental, punitive and consequential damages.

For every product purchased from the manufacturer warranty applies, according to the relevant product documentation and our Terms and Conditions.

The manufacturer reserves the right to revise the content of the documents, including this disclaimer, without notice, and is not liable in any way for possible consequences of such changes.

Product liability and warranty

The responsibility that the instruments are suitable for the particular application rests solely with the operator. The MECON GmbH assumes no liability for the consequences of misuse, modifications or repairs that were carried out by the customer without prior consultation.

In the case of a complaint, the offending parts must be returned to MECON GmbH, unless otherwise agreed.

General information

To prevent injury to the user or damage to the unit, it is necessary that you read the information in this manual carefully before operating the unit. This manual is intended both for the correct installation, operation and maintenance of the equipment. Special designs for special applications and custom models are not covered by this documentation.

2 Installation and mode of operation

2.1 Installation instructions

**Information!**

All instruments are carefully checked for proper function before shipment. Check immediately on receipt, the outer packing carefully for damage or signs of improper handling.

Report damage to the carrier and your local sale staff. In such cases, a description of the defect, the type and the serial number of the device is indicated.

**Information!**

Unpack the unit carefully to avoid damage.

**Information!**

Check the completeness of the delivery against the packing list. Check the rating plate, if the delivered flow meter according to your order.

2.2 Installation

Installation of the orifice plate

Before and after the orifice plate a straight calming section is provided as a function of the nominal diameter (D). When using valves and fittings before the orifice plate, an inlet path of min. 10 x D is always required.

For the standard version an inflow path of min. 10 x D and an outflow zone of min. 5 x D is required (please see page 11). The connected pipes have to be of the same size as the orifice plate.

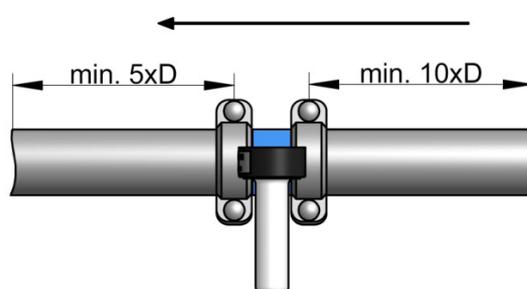


Fig. 1 Inlet path and outflow zone

For some flow ranges a special version for shortened inlet path of 5 x D and shortened outflow zone of min. 2 x D is available (please see page 12). Before installation following conditions have to be observed:

- A straight inlet path of 5 X D is required. A longer inlet path is not allowed.
- The inlet path has to be connected directly to a one quarter pipe.

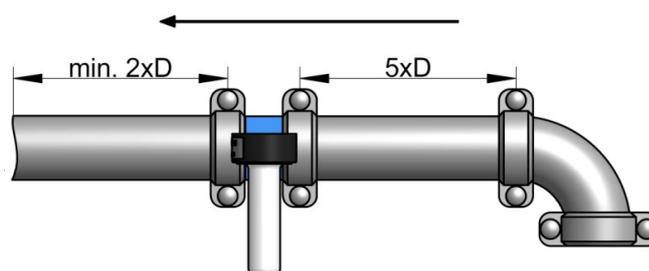


Fig. 2 Shortened inlet path and outflow zone

The installation can be in any line routing - horizontal to vertical - place (Fig. 3). However, it is important to ensure that the flow direction of the arrow marked on the device and corresponds to the differential pressure sampling tube (Fig. 6/7, pos. 7) is in the horizontal position. For attachment of the bypass meter, sufficient clearance must be provided. Important for the compliance of the measuring tolerance is the central mounting of the pipeline. The center offset must not exceed 0.5 mm.

Mounting the bypass meter

The bypass meter is only compatible with the delivered orifice plate. Before loosening the cap (Fig. 6/7, pos. 10), the pipeline must be emptied to prevent the escape of liquids. The meter is plugged and screwed with a nut (Fig. 6, pos. 9). It must always be mounted vertically so that the float (Fig. 6, pos. 4) can move freely in the tube. About foreign bodies that have come behind the filter must be removed. The tightening of the nut or the cap should be done by hand as possible. The threads must - for example be slippery - by fat. To avoid air strikes, the tube should be slowly filled with water.

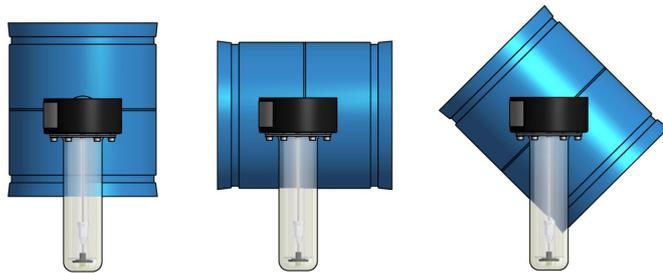


Fig. 3 Examples of installation

2.3 Mode of operation

The orifice plate flowmeter FO Turbo-Lux 3 consists of an orifice plate (Fig. 6/7, pos 1) for stationary installation and a portable bypass meter (Fig. 6, pos. 2). The bypass meter contains a conical glass tube (Fig. 6, pos. 3) with float (Fig. 6, pos. 4). The water flows vertically from top to bottom through the flow tube at the upper end of a side panel (Fig. 6, pos. 5) is arranged.

A filter (Fig. 6, pos. 13) at the inlet largely prevents the ingress of foreign bodies. Inlet and outlet port for the bypass to be measured are arranged concentrically, so that an easy to combine with the stationary primary element.

2.4 Maintenance

If the filter is blocked by deposits (Fig. 6, pos. 13) the flowmeter must be returned to the manufacturer to be cleaned and tested. Ensure that the O-ring (Fig. 6, pos. 8) and the M 30 x 1,5 thread of the orifice plate are lubricated with grease.

2.5 Storage

Store the emptied device in a dry and dust-free place. Keep away from direct and permanent sun and heat. Keep away from direct Avoid external load to the device.

The storage temperature range is – 20... + 60 °C.

3 Start-up

Read the exact value when a consistent flow has been attained and the float has reached a stable position. The pipeline must always be filled.

Read the value at the greatest diameter of the float:

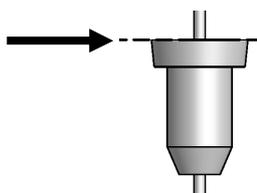


Fig. 4 Float

For the bypass meter it is important that when starting up the pump, the shut-off-/control valve of the bypass orifice is opened min. 30% to avoid hydraulic shocks or pressure surges that could damage the bypass meter.

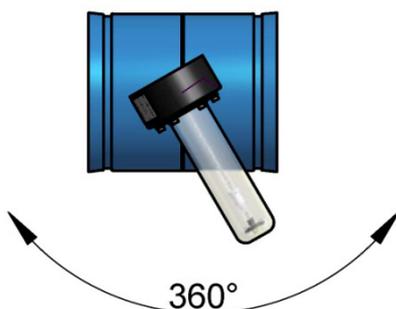


Fig. 5 Rotation bypass meter

When the bypass meter is commissioned or set into operation, bubbles of air will initially accumulate at the top part, which must be removed. For this purpose, the union nut (Fig. 6, pos. 9) must be somewhat loosened during operation and the device must be rotated by 360°, so that the air bubbles can escape. Then the bypass meter has to be positioned vertically and the union nut has to be tightened once again.

Attention: Before pressure test in pipes, the bypass meter has to be disassembled and the connection of the orifice plate has to be screwed pressure-tight with the cap.

Read the exact value

On the scale the flow is printed in lpm (liters per minute), USGPM (U.S. gallons per minute) and as percentage (100% = rated power of the pump) for each nominal size and range.

The following table provides more information about the scale display.

Size	Pump rating USGPM	Flow range USGPM	USGPM		Flow range lpm	lpm	
			Step	Graduation		Step	Graduation
2"/ DN 50	50	20 - 100	10	5	75 - 375	50	5
2½"/ DN 65	100	40 - 200	20	4	150 - 375	100	5
3"/ DN 80	150	60 - 300	50	5	220 - 1100	200	4
3"/ DN 80	200	80 - 400	50	5	300 - 1500	200	4
4"/ DN 100	250	100 - 500	50	5	380 - 1900	200	4
4"/ DN 100	300	120 - 600	100	5	460 - 2300	200	4
4"/ DN 100	400	160 - 800	100	5	600 - 3000	500	5
4"/ DN 100	450	180 - 900	100	5	680 - 3400	500	5
6"/ DN 150	500	200 - 1000	100	5	760 - 3800	500	5
6"/ DN 150	750	300 - 1500	200	4	1130 - 5650	1000	5
6"/ DN 150	1000	400 - 2000	200	4	1500 - 7500	1000	5
6"/ DN 150	1250	500 - 2500	500	5	1900 - 9500	1000	5
8"/ DN 200	1500	600 - 3000	500	5	2200 - 11000	2000	4
8"/ DN 200	2000	800 - 4000	500	5	3000 - 15000	2000	4
8"/ DN 200	2500	1000 - 5000	1000	5	3800 - 19000	2000	4
8"/ DN 200	3000	1200 - 6000	1000	5	4500 - 22500	2000	4

Schedule 1 Scale gradation

After device usage

After the measurement, the bypass meter is unscrewed, emptied and put back into the packaging. However, make sure in advance that the pipeline is empty and without pressure. The open orifice plate must be sealed pressure-tight with the cap again.

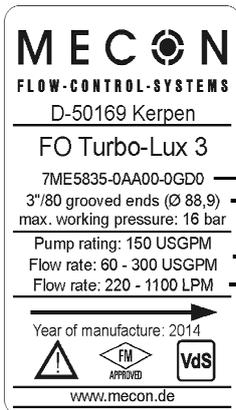
4 Device Description

4.1 Scope of delivery



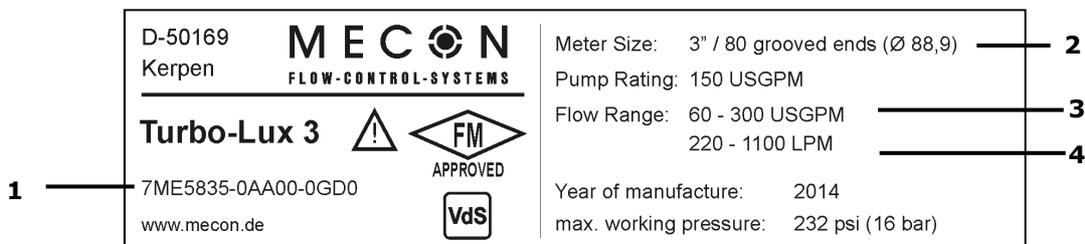
- ① Orifice plate flowmeter FO Turbo-Lux 3
- ② Operating Instruction
- ③ Certificate (option)

4.2 Nameplate



- 1. Description code/ Order code
- 2. Nominal size and process connection
- 3. Flow range USGPM
- 4. Flow range LPM

Nameplate orifice plate



Nameplate bypass meter

5 Description Code

Standard version for inlet path 10 x D and outflow zone 5 x D

The description code consists of the following elements:

7ME5835 - 0AA00 - **0 /**

① ② ③

① Calibration certificate for bypass flowmeter

0 Without calibration certificate

1 With calibration certificate

② Nominal size/Pump rating

	Nominal size grooved ends	Pump- rating		Flow range		Approvals	
		USGPM	USGPM	lpm		FM	VdS
EB	2"/ DN 50 (Ø60,3)	50	20 - 100	75 - 375		X	X
FC	2½"/ DN 65 (Ø76,1)	100	40 - 200	150 - 750		*	X
GD	3"/ DN 80 (Ø88,9)	150	60 - 300	220 - 1100		X	X
GE	3"/ DN 80 (Ø88,9)	200	80 - 400	300 - 1500		X	X
HF	4"/ DN 100 (Ø114,3)	250	100 - 500	380 - 1900		X	X
HG	4"/ DN 100 (Ø114,3)	300	120 - 600	460 - 2300		X	X
HH	4"/ DN 100 (Ø114,3)	400	160 - 800	600 - 3000		X	X
HJ	4"/ DN 100 (Ø114,3)	450	180 - 900	680 - 3400		X	X
XK	6"/ DN 150 (Ø165,1)	500	200 - 1000	760 - 3800		-	X
XL	6"/ DN 150 (Ø165,1)	750	300 - 1500	1130 - 5650		-	X
XM	6"/ DN 150 (Ø165,1)	1000	400 - 2000	1500 - 7500		-	X
XN	6"/ DN 150 (Ø165,1)	1250	500 - 2500	1900 - 9500		-	X
KK	6"/ DN 150 (Ø168,3)	500	200 - 1000	760 - 3800		*	X
KL	6"/ DN 150 (Ø168,3)	750	300 - 1500	1130 - 5650		X	X
KM	6"/ DN 150 (Ø168,3)	1000	400 - 2000	1500 - 7500		X	X
KN	6"/ DN 150 (Ø168,3)	1250	500 - 2500	1900 - 9500		X	X
LP	8"/ DN 200 (Ø219,1)	1500	600 - 3000	2200 - 11000		X	X
LQ	8"/ DN 200 (Ø219,1)	2000	800 - 4000	3000 - 15000		X	X
LR	8"/ DN 200 (Ø219,1)	2500	1000 - 5000	3800 - 19000		X	X
LS	8"/ DN 200 (Ø219,1)	3000	1200 - 6000	4500 - 22500		X	**

③ Optional version for sizes 6"/ DN 150 and 8"/ DN 200

S Housing tube made in Stainless steel

*Approval in process

** VdS-limited flow range

Special version for inlet path 5 x D and outflow zone 2 x D

The description code consists of the following elements:

7ME5835 - 0AA00 - **1** /

① ② ③

① Calibration certificate for bypass flowmeter

- | | |
|----------|---------------------------------|
| 0 | Without calibration certificate |
| 1 | With calibration certificate |

② Nominal size/Pump rating

	Nominal size grooved ends	Pump- rating USGPM	Flow range		Approvals	
			USGPM	lpm	FM	VdS
EB	2" / DN 50 (Ø60,3)	50	20 - 100	75 - 375	X	X
FC	2½" / DN 65 (Ø76,1)	100	40 - 200	150 - 750	*	X
GD	3" / DN 80 (Ø88,9)	150	60 - 300	220 - 1100	X	X
GE	3" / DN 80 (Ø88,9)	200	80 - 400	300 - 1500	X	X
HF	4" / DN 100 (Ø114,3)	250	100 - 500	380 - 1900	X	X
HG	4" / DN 100 (Ø114,3)	300	120 - 600	460 - 2300	X	X
HH	4" / DN 100 (Ø114,3)	400	160 - 800	600 - 3000	X	X
HJ	4" / DN 100 (Ø114,3)	450	180 - 900	680 - 3400	X	X
XK	6" / DN 150 (Ø165,1)	500	200 - 1000	760 - 3800	-	X
XL	6" / DN 150 (Ø165,1)	750	300 - 1500	1130 - 5650	-	X
XM	6" / DN 150 (Ø165,1)	1000	400 - 2000	1500 - 7500	-	X
KK	6" / DN 150 (Ø168,3)	500	200 - 1000	760 - 3800	*	X
KL	6" / DN 150 (Ø168,3)	750	300 - 1500	1130 - 5650	X	X
KM	6" / DN 150 (Ø168,3)	1000	400 - 2000	1500 - 7500	X	X
LP	8" / DN 200 (Ø219,1)	1500	600 - 3000	2200 - 11000	X	X
LQ	8" / DN 200 (Ø219,1)	2000	800 - 4000	3000 - 15000	X	X

③ Optional version for sizes 6" / DN 150 and 8" / DN 200

- | | | | | | | |
|----------|--------------------------------------|--|--|--|---|---|
| S | Housing tube made of stainless steel | | | | * | X |
|----------|--------------------------------------|--|--|--|---|---|

*Approval in process

6 Technical Data

Measuring principle	Orifice plate flowmeter with variable flowmeter as indication
Input	
Nominal Size	2"/ DN 50 grooved ends (Ø60,3) 2½"/ DN 65 grooved ends (Ø76,1) 3"/ DN 80 grooved ends (Ø88,9) 4"/ DN 100 grooved ends (Ø114,3) 6"/ DN 150 grooved ends (Ø165,1) 6"/ DN 150 grooved ends (Ø168,3) 8"/ DN 200 grooved ends (Ø219,1)
Pressure limit	PN16
Measuring accuracy	±2 % of full-scale value (FM) ±2.5 % of full-scale value (VdS)
Application conditions	
Temperature limit	+4°C - 50°C (39°F - 122°F)
Medium:	Water
Design / material	
- Orifice plate	
2"/ DN 50 - 4"/ DN 100	Housing tube in Stainless steel with turned grooved connection
6"/ DN 150 - 8"/ DN 200	Housing tube in Coated steel/optional in Stainless steel with rolled grooved connection
- Differential pressure sampling tube	Brass
- Float	Stainless steel
- Bypass orifice	Stainless steel
- Filter	Stainless steel
- Seal	Perbunan
certifications	
classification by Pressure Equipment Directive (97/23/EC)	For liquids of fluid group 2, complies with requirements of article 3, paragraph 3 (sound engineering practice (SEP)) FM Approval 0003044464 VdS Approval G415006

The version with rolled grooved ends may only be used in combination with FM/VdS-approved pipe couplings manufactured by Minimax, Modgal, Victaulic (except pipe couplings of the type "Style 77") and Jinan Meide casting couplings type 1G.

7 Dimension and weights

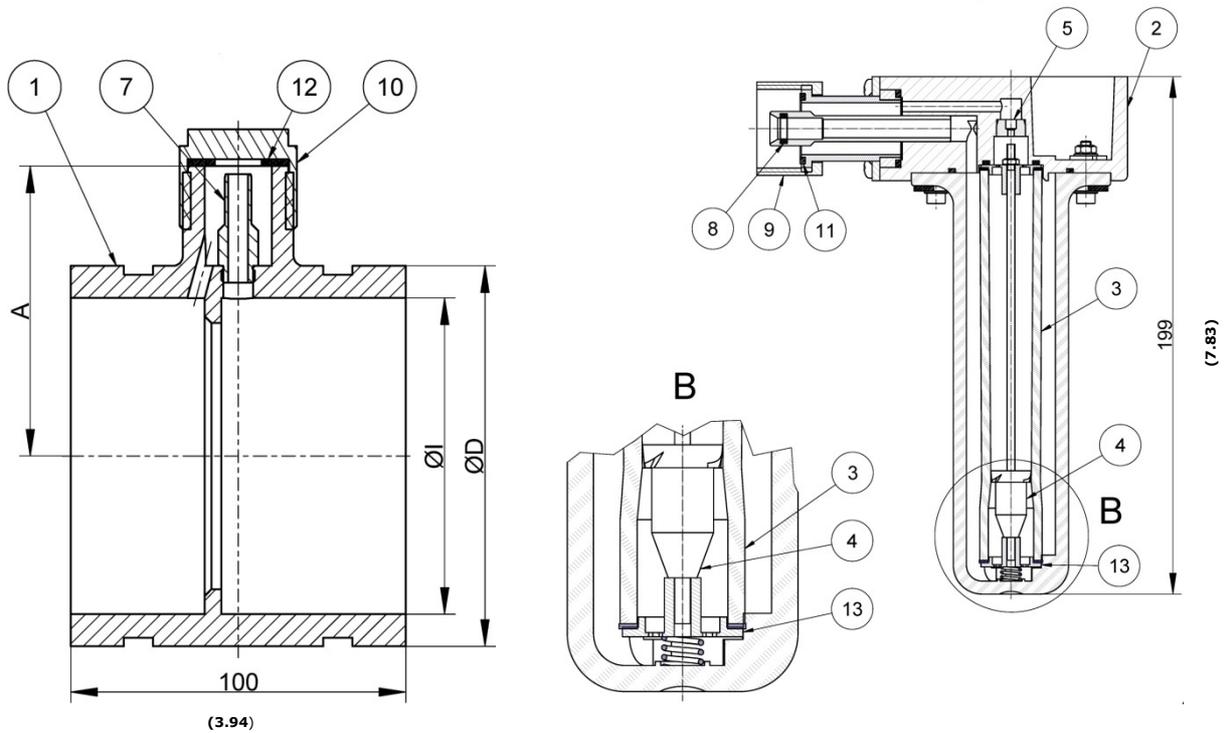


Fig. 6 FO Turbo-Lux 3 orifice plate, Drawing and dimensions 2"/ DN 50 – 4"/ 100 in mm (inch)

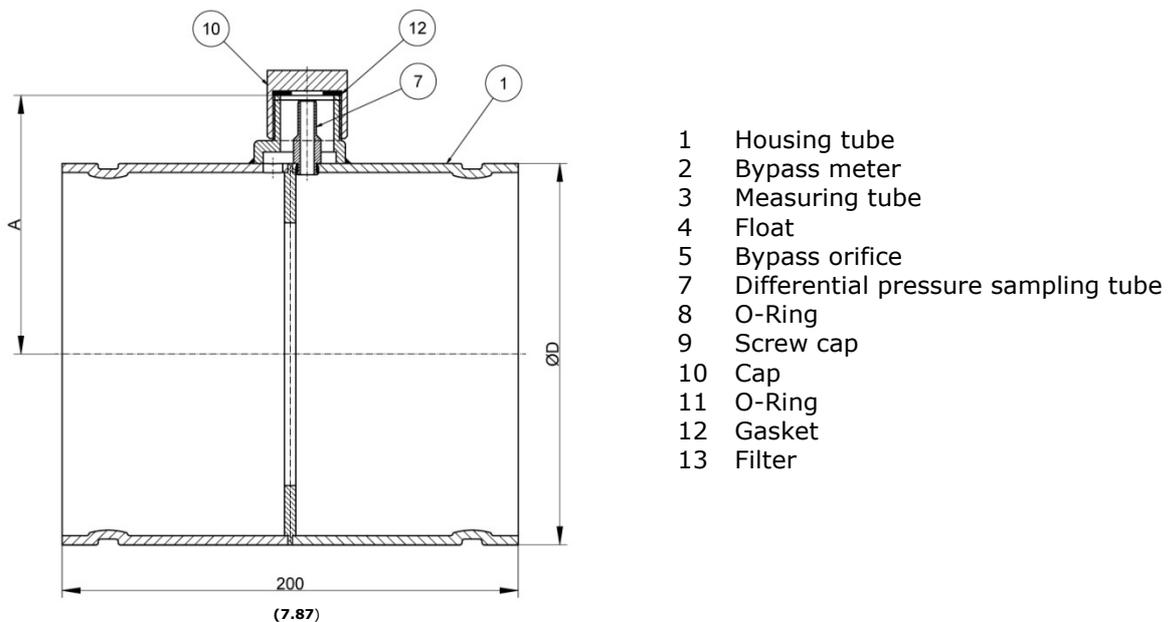


Fig. 7 FO Turbo-Lux 3 orifice plate, Drawing and dimensions 6"/ DN 150 – 8"/ DN 200 in mm (inch)

meter size	dimensions			weight incl. packing kg (lbs)
	A mm (inch)	ØD mm (inch)	ØI mm (inch)	
2"/ DN 50	60 (2.362)	60,3 (2.374)	53 (2.087)	2,0 (4.409)
2½"/ DN 65	68 (2.677)	76,1 (2.996)	66 (2.598)	2,1 (4.630)
3"/ DN 80	75 (2.952)	88,9 (3.499)	80 (3.150)	2,3 (5.071)
4"/ DN 100	87 (3.425)	114,3 (4.499)	100 (3.937)	3,2 (7.055)
6"/ DN 150	113 (4.449)	165,1 (6.496)	155 (6.102)	4,9(10.803)
6"/ DN 150	114 (4.488)	168,3 (6.626)	160 (6.299)	4,9 (10.803)
8"/ DN 200	140 (5.511)	219,1 (8.626)	210 (8.268)	6,4 (14.110)

Schedule 2 Dimension and weights

meter size	ØD mm (inch)	min. thickness mm (inch)	max. thickness mm (inch)
2"/ DN 50	60,3 (2.374)	2,6 (0.102)	3,6 (0.142)
2½"/ DN 65	76,1 (2.996)	2,6 0.102)	2,9 (0.114)
3"/ DN 80	88,9 (3.499)	2,9 (0.114)	4,0 (0.157)
4"/ DN 100	114,3 (4.499)	3,2 (0.126)	4,5 (0.177)
6"/ DN 150	165,1 (6.496)	4,0 (0.157)	5,0 (0.197)
6"/ DN 150	168,3 (6.626)	4,0 0.157)	4,5 (0.177)
8"/ DN 200	219,1 (8.626)	4,5 (0177)	4,5 (0.177)

Schedule 3 Dimensions tube of inlet path and outflow zone

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