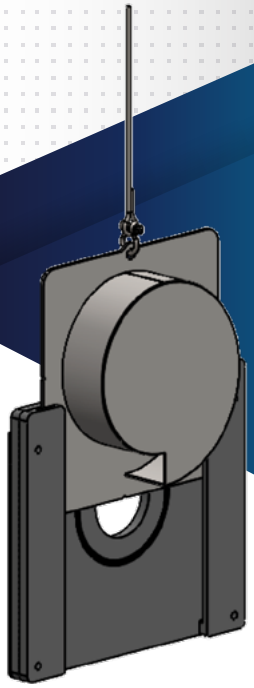
NORHAM



VORTEX LIMITER

VALVES & REGULATORS

Vortex-effect flow limiters

- **High performance:** passage section more than 3 times larger than a nozzle.
- **Reliable:** flow curves validated on a test bench.
- **Low maintenance:** no moving parts.
- Flow rates **between 1 to 10L per second.**

NORHAM

afaq ISO 9001 Qualité AFNOR CERTIFICATION N° 1997 | 8004.7

Z.A DRUISIEUX - 130 RUE DES SAULES, 26260 SAINT DONAT SUR L'HERBASSE - FRANCE
TEL: 33 (0) 4 75 45 00 00 - norham@norham.fr // www.norham.fr

VORTEX LIMITER

VALVES & REGULATORS

CONTENTS

INTRODUCTION 4

AREA OF USE 4
HOW IT WORKS 4
VALIDATION 5

PRODUCT CHOICE 6

THE RANGE 7

FIXED LIMITERS 8
REMOVABLE LIMITERS 10
ACCESSORIES FOR LIMITERS 11
OPTIONS 12

INSTALLATION INSTRUCTIONS 13

OTHER NORHAM SOLUTIONS 14

VORTEX LIMITER

VALVES & REGULATORS

INTRODUCTION

AREA OF USE

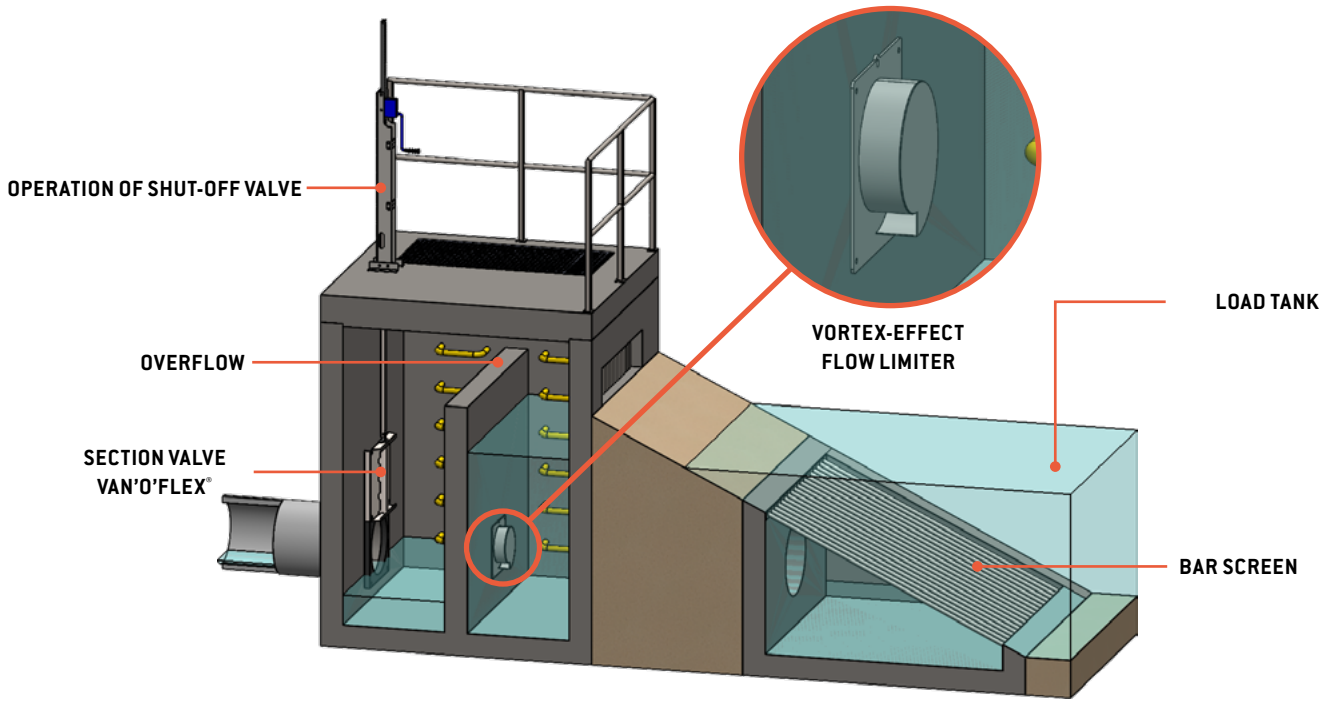
The **VORTEX EFFECT FLOW LIMITER** or **VORTEX LIMITER** is positioned at the outlet of the control structure, on the retention side. It limits the outflow according to the maximum head of water upstream.

Its passage section is at least three times larger than a nozzle hole. The **VORTEX EFFECT LIMITER** therefore reduces the risk of clogging at the tank outlet. As the flow limiter has no moving mechanism, maintenance is minimal.

The **VORTEX LIMITER** is available in two configurations:

- A fixed version, installed directly on the concrete wall;
- A removable version, mounted on slides, which can be removed from the surface using a sling.

REPRESENTATION OF A REGULATION STRUCTURE

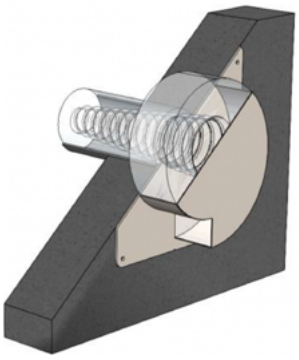


OPERATION

The **VORTEX LIMITER** requires an increase in an upstream load to operate. The formation of the vortex, that is to say the whirlpool, occurs when the limiter is fully submerged.

Due to hydrostatic pressure, the water begins to swirl in the limiter chamber. The speed of the water, combined with the volute shape of the limiter, causes the effluent to flow around the periphery of the outlet tube. An air cone forms at the centre of the limiter.

It is this air cone that enables the flow limitation while maintaining a large passage section: more than three times larger than a nozzle.



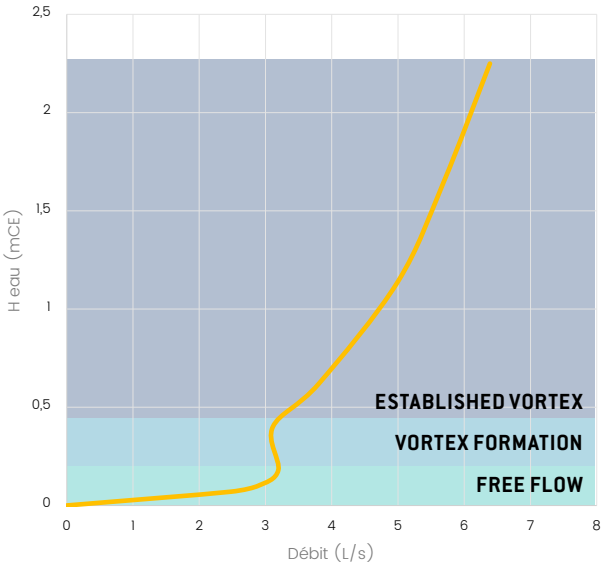
Dimensions in mm. Non-contractual images.

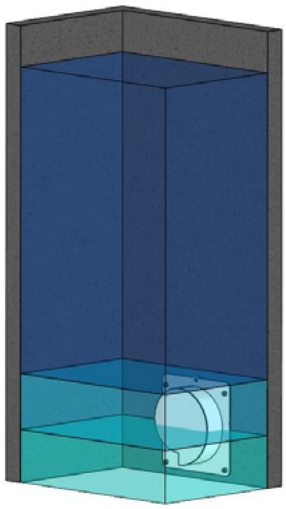
PHASES OF THE FLOW-RATE LINE CHART

The flow rate line chart is divided into three phases that depend on the water level:

- **The free flow phase:** The water is at the outlet hole level. The flow rate is not limited.
- **The vortex formation phase:** The water level rises above the outlet hole until it reaches the top of the limiter. Thanks to the increasing pressure and the specific shape of the limiter, the water gains speed. An air cone appears and the vortex forms until it stabilises.
- **The established vortex phase:** Once the limiter is fully submerged, the flow rate is limited by the vortex effect.

The flow rate follows the same chart line as the water level falls.

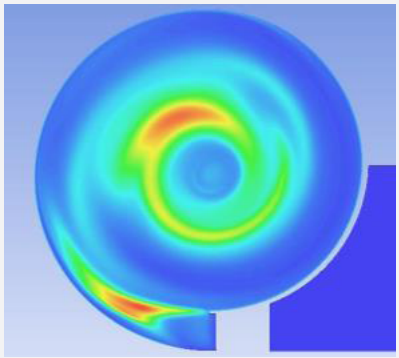




VALIDATION

Our line charts are derived from numerical models which have been experimentally validated on test benches.

EXAMPLE: NUMERICAL MODELLING



Fluid velocity during the established vortex phase.

EXAMPLE: VALIDATION ON TEST BENCH

Validation of outflow as a function of water height using a data acquisition system. A limiter is installed in the tank. The formation of the air cone is visible at the outlet (vortex effect).

VORTEX LIMITER

VALVES & REGULATORS

PRODUCT CHOICE

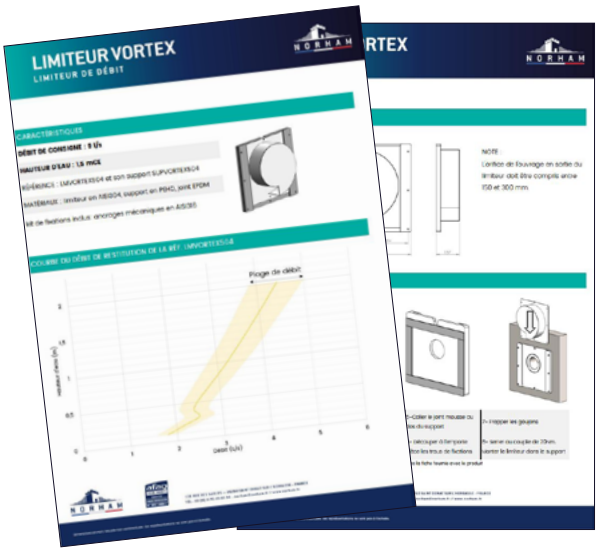
For all requests to our sales department, please provide the following details:

- the **water height**,
- the **flow rate**
- the **type of limiter** (fixed or removable).

A customised document with the flow rate line chart will be sent to you with our price offer.

	H.WATER (M)						Ø MAX [1]
PRODUCTS	0.5 m	1 m	1.5 m	2 m	2.5 m	3 m	
LMVORTEX220	0.5 to 1.0 l/s	0.8 to 1.2 l/s	1.0 to 1.4 l/s	1.2 to 1.6 l/s	1.3 to 1.8 l/s	1.4 to 2.0 l/s	130
LMVORTEX244	1.0 to 1.3 l/s	1.2 to 1.7 l/s	1.4 to 2.0 l/s	1.6 to 2.3 l/s	1.8 to 2.6 l/s	2.0 to 2.9 l/s	150
LMVORTEX258	1.3 to 1.7 l/s	1.7 to 2.2 l/s	2.0 to 2.7 l/s	2.3 to 3.1 l/s	2.6 to 3.5 l/s	2.9 to 3.7 l/s	160
LMVORTEX276	1.7 to 2.1 l/s	2.2 to 2.9 l/s	2.7 to 3.5 l/s	3.1 to 4.1 l/s	3.5 to 4.6 l/s	3.7 to 4.9 l/s	170
LMVORTEX294	2.1 to 2.8 l/s	2.9 to 3.6 l/s	3.5 to 4.5 l/s	4.1 to 5.2 l/s	4.6 to 5.7 l/s	4.9 to 6.2 l/s	185
LMVORTEX334	2.8 to 3.6 l/s	3.6 to 4.7 l/s	4.5 to 5.7 l/s	5.2 to 6.5 l/s	5.7 to 7.2 l/s	6.2 to 7.8 l/s	215
LMVORTEX364	3.6 to 4.2 l/s	4.7 to 5.6 l/s	5.7 to 6.7 l/s	6.5 to 7.6 l/s	7.2 to 8.4 l/s	7.8 to 8.9 l/s	240
LMVORTEX394	4.2 to 5.0 l/s	5.6 to 6.7 l/s	6.7 to 8.0 l/s	7.6 to 9.0 l/s	8.4 to 9.9 l/s	8.9 to 10.5 l/s	260
LMVORTEX452	Contact us.						300
LMVORTEX482							330
LMVORTEX504							350

(1) Max. Ø of hole in limiter's wall

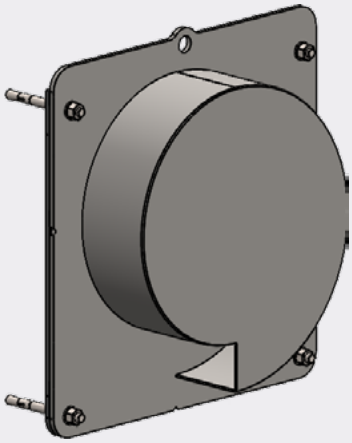
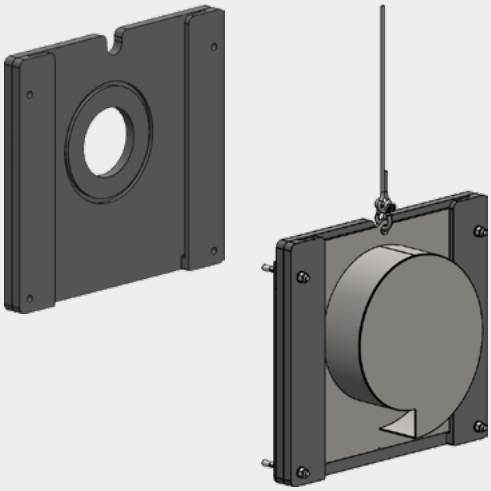


Dimensions in mm. Non-contractual images.

VORTEX LIMITER

VALVES & REGULATORS

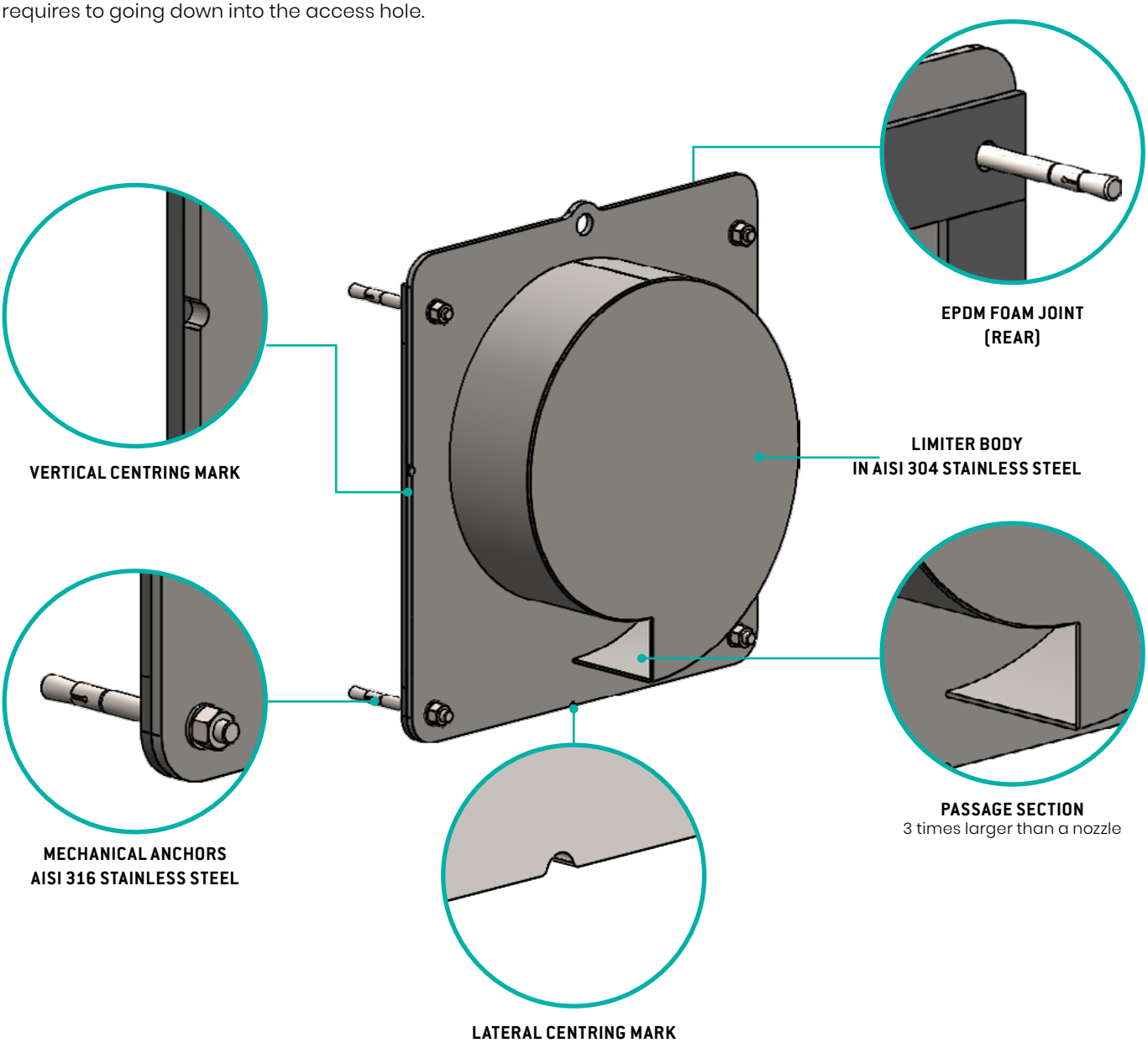
THE RANGE

	FIXED LIMITER	REMOVABLE LIMITER
IMAGE		
RANGE	LMVORTEX	LMVORTEX_SUP + LMVORTEX
FLOW RATE	1 to 10L per second	
MATERIAL	AISI 304 stainless steel body	AISI 304 stainless steel body and HDPE support
PAGE	6	8

FIXED LIMITER

AREA OF USE

The **FIXED LIMITER** is installed directly on the concrete wall. It is not removable. Access to the limiter for maintenance requires to going down into the access hole.



OPTION

- **Adaptor flange** for circular manhole(1).

(1) The multi-hole ADAPTATION FLANGE provides a suitable and optimal solution when a flat surface part has to be installed in a circular manhole. See p. 12.

MATERIAL

- **Body:** AISI 304 stainless steel;
- **Fasteners:** AISI 304 stainless steel;
- **Foam joint:** EPDM.

Dimensions in mm. Non-contractual images.

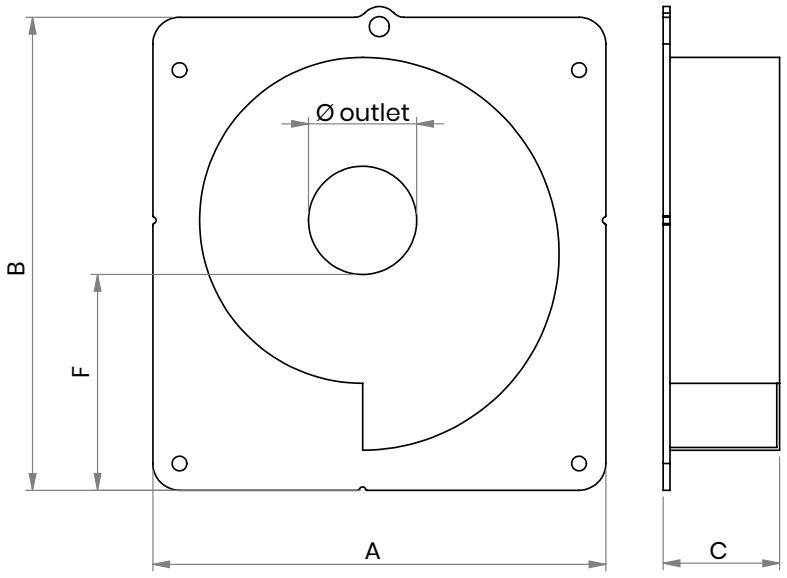
VORTEX LIMITER

VALVES & REGULATORS

FIXED LIMITER PRODUCT REFERENCES

REF.	A	B	C	F	Ø MIN [1]	Ø MAX [1]
LMVORTEX220	277	280	63	130	50	130
LMVORTEX244	299	304	71	140	60	150
LMVORTEX258	310	318	76	146	70	160
LMVORTEX276	324	336	80	155	80	170
LMVORTEX294	339	354	87	162	90	185
LMVORTEX334	374	394	95	182	100	215
LMVORTEX364	402	424	104	196	110	240
LMVORTEX394	449	469	115	222	115	260
LMVORTEX452	500	527	128	250	125	300
LMVORTEX482	527	557	132	264	140	330
LMVORTEX504	547	579	142	273	150	350

(1) Ø min. and Ø max.of the hole in limiter's wall.

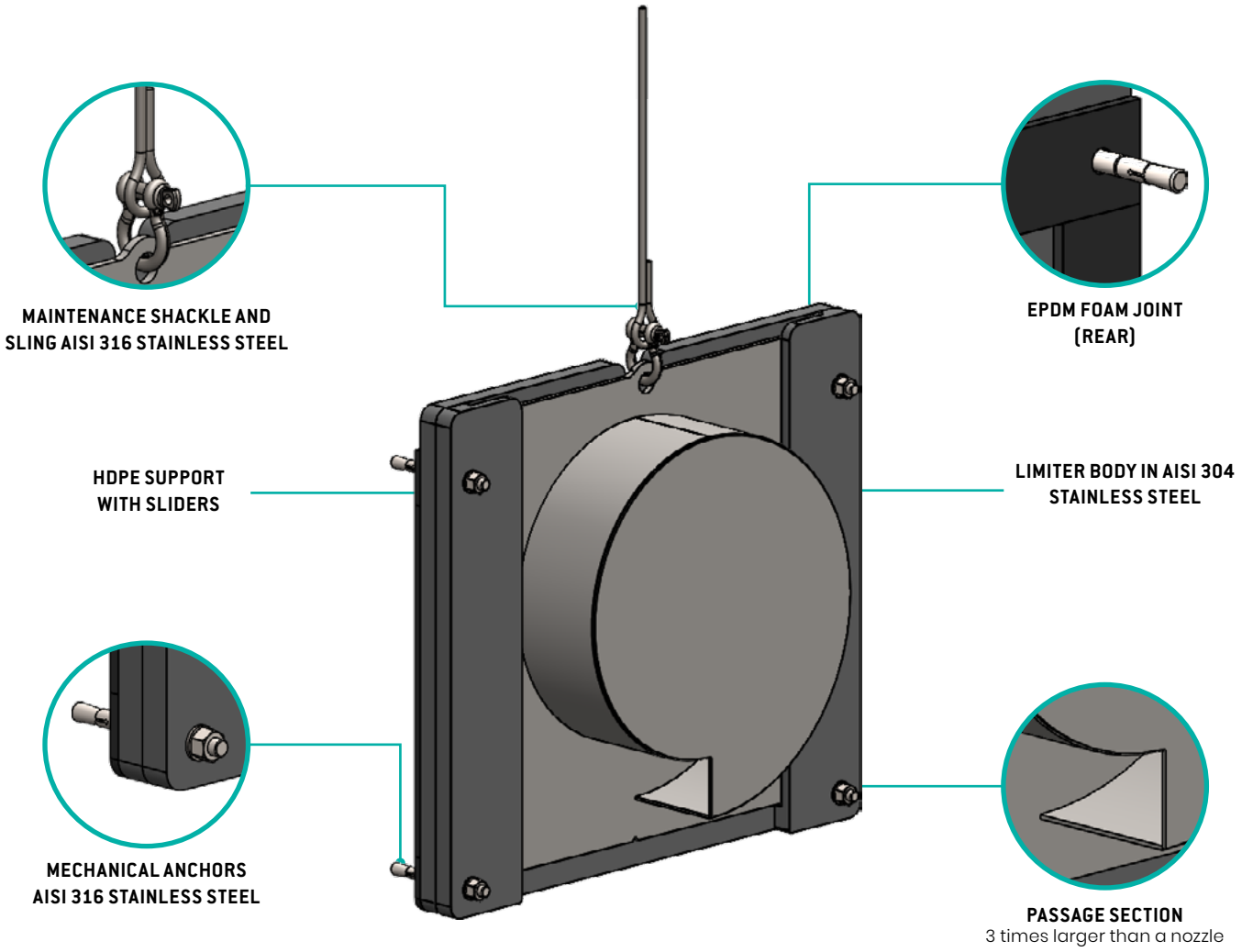


Water height and flow rate in l/s have to be specified.

REMOVABLE LIMITER

AREA OF USE

The **REMOVABLE LIMITER** consists of a stainless steel body mounted on an HDPE support with two sliders. It can be fitted with a 3m or 6m sling to allow the flow limiter to be removed from the top of the access hole. This simplifies maintenance operations, as the limiter body can be cleaned from the surface. What's more, once the body has been removed, the flow is no longer limited, as the passageway is unobstructed.



OPTION

- **Adaptor flange** for circular manhole(1).

(1) The multi-hole ADAPTATION FLANGE provides a suitable and optimal solution when a flat surface part has to be installed in a circular manhole. See p. 12.

MATERIAL

- **Body of the limiter:** AISI 304 stainless steel;
- **Support:** HDPE;
- **Fasteners:** AISI 304 stainless steel;
- **Foam joint:** EPDM.

Dimensions in mm. Non-contractual images.

VORTEX LIMITER

VALVES & REGULATORS

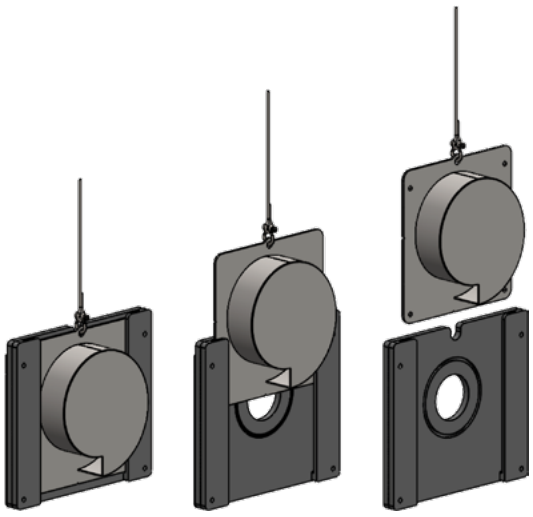
To have a removable limiter, you need 3 items:

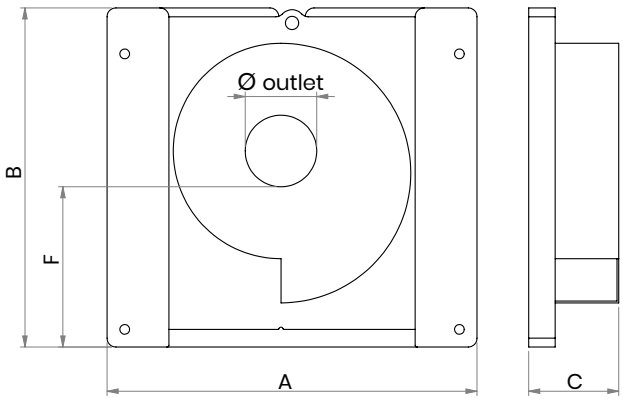
- the limiter body (see illustration p. 10);
- the corresponding support (see illustration p. 10)
- the handling cable (see below: Accessories for limiters)

REMOVABLE LIMITER PRODUCT REFERENCES

REF.		A	B	C	F	Ø MIN (1)	Ø MAX (1)
SUPPORT	BODY						
LMVORTEX220_SUP	LMVORTEX220	357	310	124	145	50	130
LMVORTEX244_SUP	LMVORTEX244	379	334	138	155	60	150
LMVORTEX258_SUP	LMVORTEX258	390	348	148	161	70	160
LMVORTEX276_SUP	LMVORTEX276	404	366	160	170	80	170
LMVORTEX294_SUP	LMVORTEX294	419	384	172	177	90	185
LMVORTEX334_SUP	LMVORTEX334	454	424	172	197	100	215
LMVORTEX364_SUP	LMVORTEX364	482	454	190	211	110	240
LIMVORTEX394_SUP	LMVORTEX394	529	510	223	247	115	260
LMVORTEX452_SUP	LMVORTEX452	580	567	233	275	125	300
LMVORTEX482_SUP	LMVORTEX482	607	597	253	289	140	330
LMVORTEX504_SUP	LMVORTEX504	627	619	264	298	150	350

(1) Ø min. and Ø max.of the hole in limiter's wall.

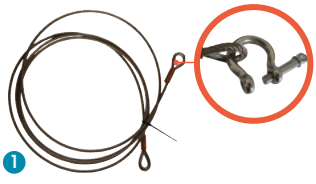




Water height and flow rate in l/s must be specified.

ACCESSORIES FOR LIMITERS

REF.	DESCRIPTION
1 CABLE3M-316	Handling cable 3 m, AISI 316 stainless steel, Ø 5 mm, 2 cable loops
CABLE6M-316	Handling cable 6 m, AISI 316 stainless steel, Ø 5 mm, 2 cable loops

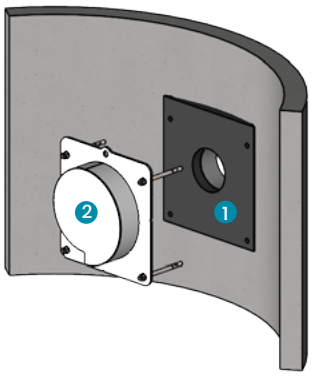


OPTIONS

ADAPTOR FLANGES FOR LIMITERS

Body in HDPE, EPDM seal and screws in AISI 316 stainless steel.
Adaptor flanges for **FIXED LIMITERS**.

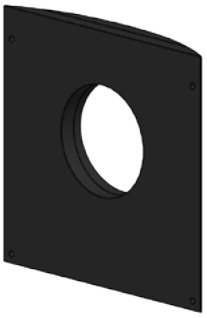
REF.	ACCESS HOLE Ø
AR_V_VF_220	600 to 1500
AR_V_VF_244	600 to 1500
AR_V_VF_258	600 to 1500
AR_V_VF_276	600 to 1500
AR_V_VF_294	800 to 1500
AR_V_VF_334	800 to 1500
AR_V_VF_364	800 to 1500



1 Adaptor flange
2 FIXED LIMITER

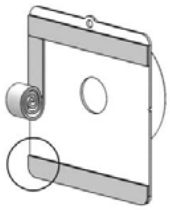
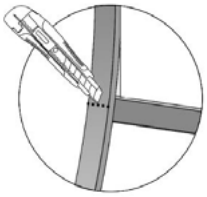
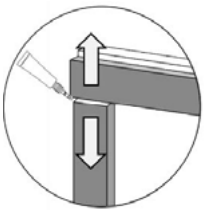
Adaptor flanges for **REMOVABLE LIMITERS**.

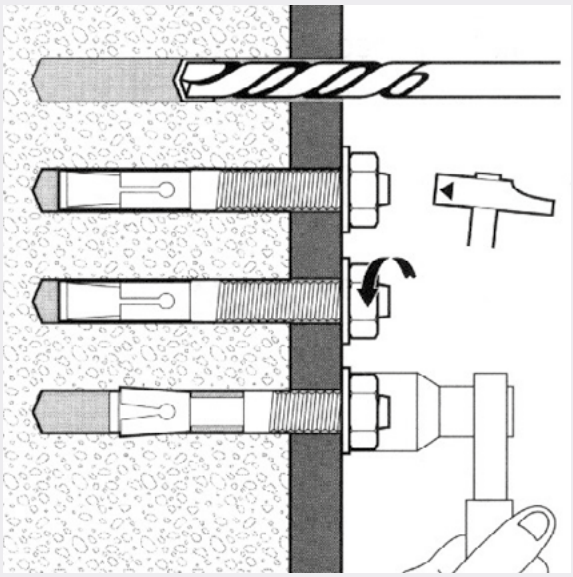
REF.	ACCESS HOLE Ø
AR_V_VA_220	600 to 1500
AR_V_VA_244	600 to 1500
AR_V_VA_258	600 to 1500
AR_V_VA_276	600 to 1500
AR_V_VA_294	800 to 1500
AR_V_VA_334	800 to 1500
AR_V_VA_364	1000 to 1500



BARE PART, WITHOUT LIMITER

INSTALLATION INSTRUCTIONS

STEP 1	Make sure the concrete wall is smooth, clean and flat.
STEP 2	Place the limiter on the wall, centre it and mark the positions of the fixing points.
STEP 3	Remove the limiter and drill ø 8 mm holes to a minimum depth of 60 mm.
STEP 4	 Glue the foam joint, starting with the horizontal strips.   Glue the joints using Cyano glue.  Cut out the fastening holes using a punch.
STEP 5	Insert the dowels into the holes. Hammer them in if necessary.
STEP 6	Tighten evenly with a torque spanner **to a torque of 18Nm.**



An installation and maintenance instruction sheet is supplied with each VORTEX LIMITER.

OTHER NORHAM SOLUTIONS

ECO-FLAP®	MULTITUBE
	
Preventive anti-backflow solution for domestic networks	Anti-return check valves for wastewater and rainwater.
DOWNLOAD THE DOCUMENTATION	DOWNLOAD THE DOCUMENTATION

Dimensions in mm. Non-contractual images.

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