

Explosion Isolation Flap Valve CARZ-N - protective system



PATENTED PRODUCT

Patent protected product:

- EP patent: EP 3 343 077
- USA: US 10 315 059
- China: 201711349554.2

Explosion Isolation Flap Valve type CARZ-N is designed as an explosion pressure resistance equipment, which is able to prevent the transmission of dangerous effects from an explosion pressure wave and flame front to upstream areas. Certified according to EN 16447.

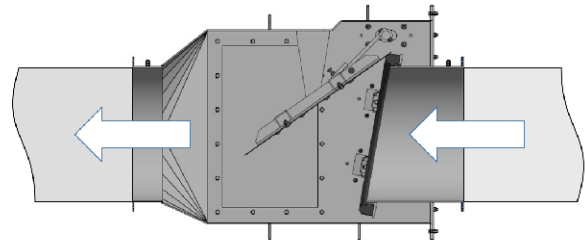
Description

Welded construction in RAL 5009 blue painted steel plate.

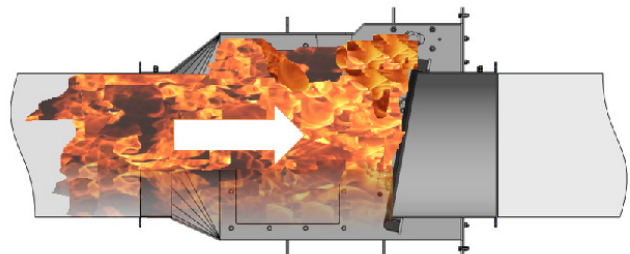
Function

During airflow generated by main fan, the Flap plate is open. In case of an explosion in the downstream equipment (e.g. dust collector) a pressure wave will force the Flap plate to close and lock in position. Large opening angle ensures low pressure drop. When Flap plate is closed it makes an effective barrier against approaching flame front. This prevents the explosion from being transmitted to upstream work areas, protecting workers, machinery and the facility.

Suction direction



Explosion direction



Marking, external zone 21

   II D St1
II D St2
II 1/2 D Ex h IIIC T75°C Da/Db



Ex h IIIC T75°C Da/Db

The marking is based on product certification:

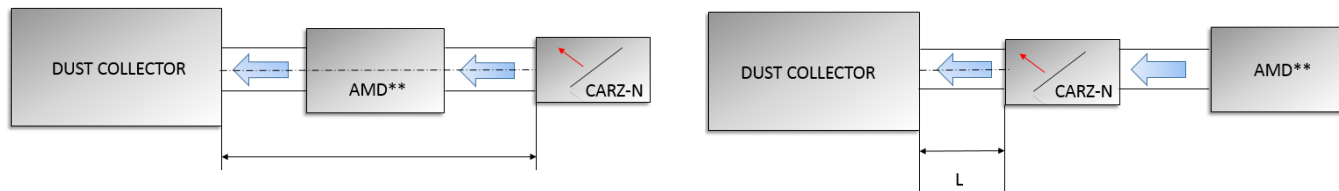
- **FTZU 16 ATEX 0192X** by N.B. No. 1026 and Quality System approval by N.B.
- **IECEx FTZU 17.0015X** - Product certification according to International Certification System IECEx.

Special installation requirements

PULL configuration



PUSH configuration



**AMD=Air moving device or fan

Parameter	Dust type	Size 315 mm	Size 350 - 450 mm	Size 500 - 1000 mm
L min	Organic	5 m (16.4 ft) for PULL & PUSH	5,5 m (18 ft) for PULL 5 m (16.4 ft) for PUSH	5,5 m (18 ft) for PULL 5 m (16.4 ft) for PUSH
	Metallic	5,3 m (17.4 ft) only for PULL	5,5 m (18 ft) only for PULL	N/A
L max	Organic	10,2 m (33.5 ft) for PULL 10 m (32.8 ft) for PUSH	10 m (32.8 ft) for PULL & PUSH	10 m (32.8 ft) for PULL & PUSH
	Metallic	10,3 m (33.8 ft) only for PULL	10,5 m (34.5 ft) only for PULL	N/A
Max. flow velocity	30 m · s ⁻¹ (5,906 fpm)			
Max. number of bends (between CARZ-N and protected vessel)	straight duct with max. 2 bends 90 dgr			

Specifications

Combustible dust properties	PULL						
	Size 315 - 400 mm	Size 350 - 400 mm	Size 450 mm		Size 500 - 630 mm		Size 710 - 1000 mm
Kst	200 < Kst ≤ 300 bar · m · s ⁻¹ for organic dust 200 < Kst ≤ 260 bar · m · s ⁻¹ for metallic	Kst ≤ 200 bar · m · s ⁻¹ for metallic and organic dust	200 < Kst ≤ 300 bar · m · s ⁻¹ for organic dust 200 < Kst ≤ 260 bar · m · s ⁻¹ for metallic dust	Kst ≤ 200 bar · m · s ⁻¹ for organic and metallic dust	200 < Kst ≤ 300 bar · m · s ⁻¹ for organic dust	Kst ≤ 200 bar · m · s ⁻¹ for organic dust	Kst ≤ 200 bar · m · s ⁻¹ for organic dust
MESG*	≥ 1,3 mm						≥ 1,8 mm
Explosion class	St2	St1	St2	St1	St2	St1	St1

* Maximum Experimental Safe Gap

Combustible dust properties	PUSH		
	Size 315 mm	Size 350 - 630 mm	Size 710 - 1000 mm
Kst (organic dust)	Kst ≤ 300 bar · m · s ⁻¹	Kst ≤ 200 bar · m · s ⁻¹	Kst ≤ 200 bar · m · s ⁻¹
MESG*	≥ 1,3 mm	≥ 1,3 mm	≥ 1,8 mm
Explosion class	St2	St1	St1

* Maximum Experimental Safe Gap

MESG (mm) is calculated from MIE (mJ) and MIT (°C) using the following equation (Eckhoff, 2003)**:

$$MESG = 1,01 \times (MIE \times (MIT + 273) / 273)^{0,157}$$

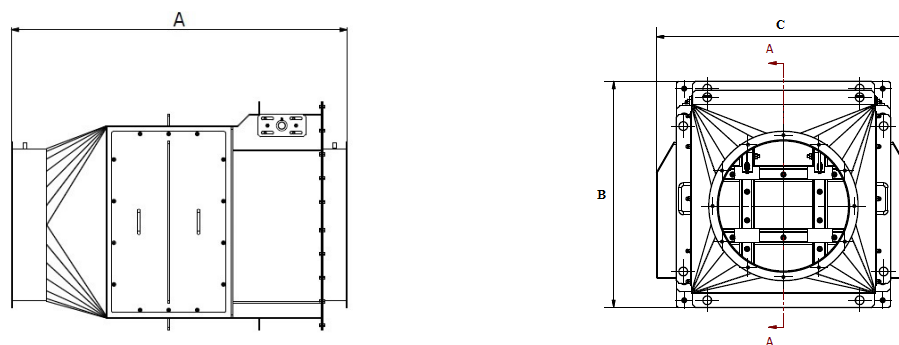
** Reference to EN 16447:2014, chapter 5.2.3

Parameters for PULL	Size 315 mm	Size 350 - 450 mm	Size 500 - 630 mm	Size 710 - 1000 mm
Operating temperature range	-20°C to +60°C			
Ambient Temperature				
Max. reduced explosion pressure in vessel - $p_{red, max}$	St1: 50 kPa St2: 50 kPa	St1: 50 kPa St2: 40 kPa	St1: 50 kPa St2: 40 kPa	St1: 35 kPa
Max. dust concentrations in duct	St1: < LEL* for metallic dust St2: Any for metallic and organic dust	St1: Any for organic dust St1: < LEL* for metallic dust St2: <LEL*		St1: Any for organic
Min. Vessel size	0,46 m ³	0,9 m ³	1,6 m ³	3,2 m ³
Explosion shock resistant pressure in CARZ-N	1 bar			0,7 bar
Inclination of the CARZ-N	Horizontally			
Protection method of connected vessel	Explosion vents or Explosion doors (not self-closing type)			

*Lower Explosion Limit = MEC Minimum Explosion Concentration

Parameters for PUSH	Size 315 mm	Size 350 - 630 mm	Size 710 - 1000 mm
Operating temperature range	-20°C to +60°C		
Ambient Temperature			
Max. reduced explosion pressure in vessel - $p_{red, max}$	50 kPa	50 kPa	40 kPa
Max. dust concentrations in duct	Any for organic	Any for organic	Any for organic
Min. Vessel size	0,46 m ³	1,6 m ³	3,2 m ³
Explosion shock resistant pressure in CARZ-N	1 bar		0,7 bar
Inclination of the CARZ-N	Horizontally		
Protection method of connected vessel	Non-reclosing vent devices, reclosing vent devices or suppression		

Dimensions



Flap valve size ØD	Dimensions [mm]			Weight [kg]	Maximum Equipment category*	Part number		
	A	B	C			FL	NW	QF
315 mm	1095	643	857	140	2	73008407	73008408	73008413
350 mm	1105	685	895	145	2	73008409	73008410	73008414
400 mm	1115	715	948	157	2	73008411	73008412	73008415
450 mm	1109	1118	973	175	2	73007816	73007817	N/A
500 mm	1193	1168	1012	200	2	73007839	73007840	N/A
560 mm	1294	1228	1040	224	2	73007845	73007846	N/A
630 mm	1409	1298	1129	260	2	73007851	73007852	N/A
710 mm	1489	1124	1270	380	2	73008055	73008056	N/A
800 mm	1554	1214	1354	431	2	73008058	73008059	N/A
900 mm	1636	1320	1451	490	2	73008060	73008061	N/A
1000 mm	1805	1410	1540	566	2	73008062	73008063	N/A

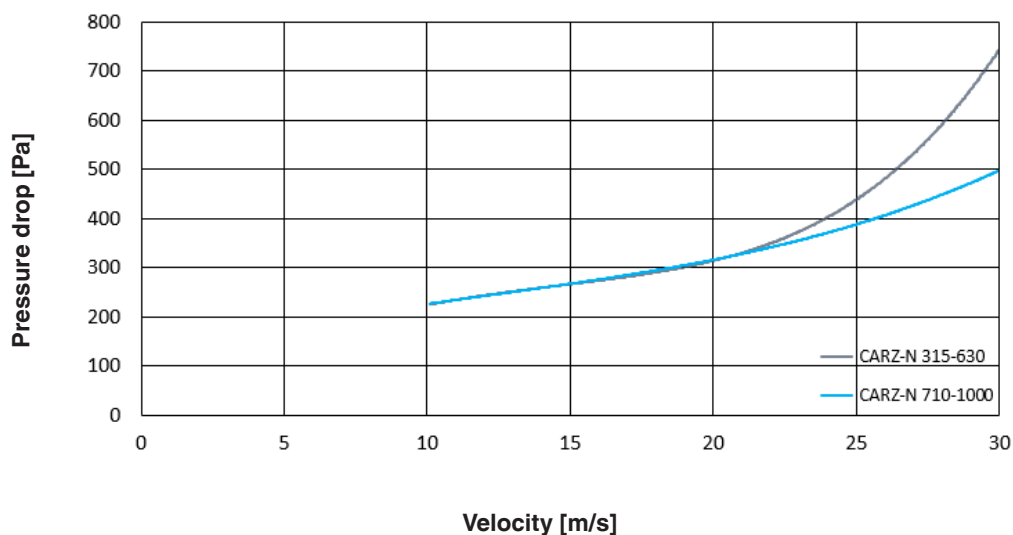
* Sizes 450-1000 for category 3 with IEC EX certificate on special request.

NOTE. Category 3 - normal level of protection zone 2 or 22, category 2 - high level of protection zone 1,2 or 21,22 according to 2014/34/EU.

FL - bolted flange,
 QF - flange for *Quick Fittings* type ducting system,
 NW - bolted flange according to standard DIN 24154-R2.

Chart of pressure drop vs. velocity

CARZ-N 315 -1000 mm: Static Pressure



Accessories

Manufacturer offers accessories that must be ordered separately:

- Flap lock indicator II 2 D-Ex tb IIIC T85°C Db, IP66/67 - part number: **73007978**.
- Flap lock indicator not for an external explosive atmosphere - part number: **73007979**.

Contact Nederman for other configurations with dust build-up sensor for NFPA 69 compliance.