Non Return Damper, Type RK-E20

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Self acting non return dampers will close at reverse airflows in HVAC systems and will lock ducts or air handling units automatically.

They are installed e. g. often on the positive pressure side of parallel arranged ventilators and will prevent reverse airflows at a stop of one ventilator. When the ventilators are running the lamellae are open due to the airflow energy.

Non return dampers are optimal if the pressure drop should be low with open lamellae and the leakage should be very small in closed position.

Krantz is producing non return dampers since many years and these have been installed in HVAC systems with good success. Based on practical experience and many laboratory tests Krantz non return dampers have been optimized. The result is a non return damper with a very low pressure drop and especially small leakage rates.

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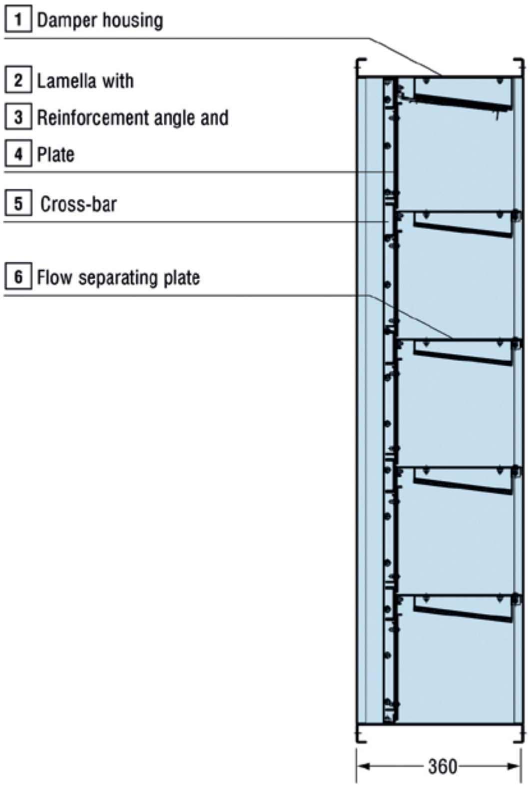
Design

The robust damper housing made from optional stainless or galvanized steel 1 can contain up to seven lamellae 2. Non return dampers with more than one lamella additionally have crossbars 5 made from U-profile, welded to the damper housing. These cross-bars are serving as fixing for the lamellae and as supporting surface for the sealing.

The lamellae are made from ageing resistant reinforced elastic material with a nonbreakable inlet. A solid reinforcement and stabilization of the damper blade sealing is done by aluminium reinforcement angles 3 on incoming flow side of the damper and aluminium plates 4 on the back side.

The elastic lamellae are heat resistable up to 90 °C. For higher requirements lamellae with higher heat resistance are available as an option (additional price).

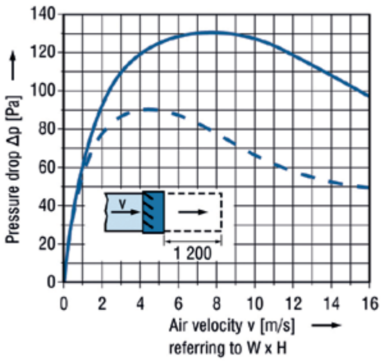
The flow-separating plates 6 at back side of damper housing 1 are creating single ducts behind each lamella to avoid transmission of impulse between partial air flows.



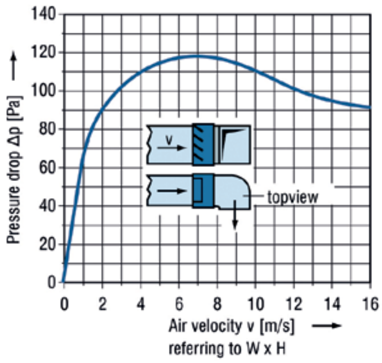
Pressure drop at different installations

The non return damper can be installed in different positions. The pressure drop will be influenced strongly by the installation situation as airflow on both sides of the dampers will be different. The following diagrams are showing nine common installation situations for non return dampers. The values apply for the pictured situation, that means non return damper and e.g. duct in front or after the damper.

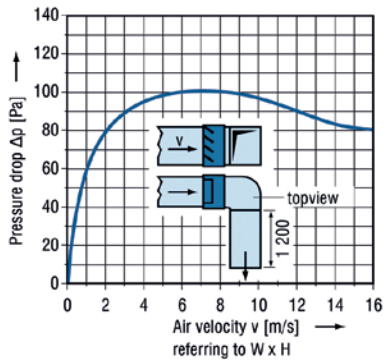
The values in the diagrams do not consider the dynamic pressure drop at the end of the system!



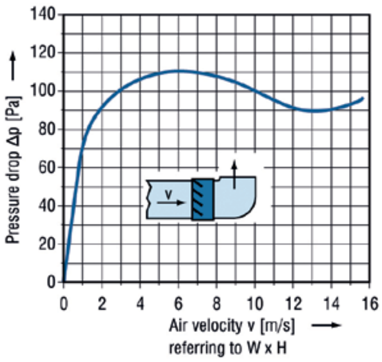
Diagr. 1: Non return damper on horizontal duct, free airflow after the damper [——] or with additional duct 1,200 mm [– –]



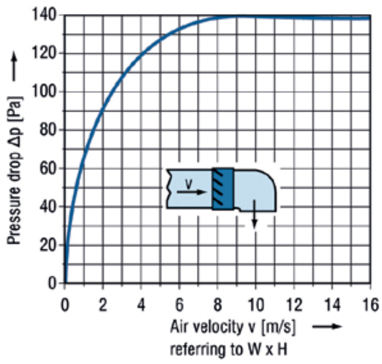
Diagr. 2: Non return damper on horizontal duct, with additional bending after the damper leading horizontal 90° to one side



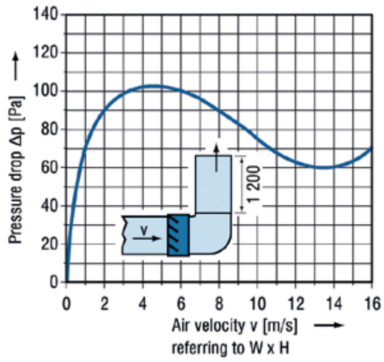
Diagr. 3: Non return damper on horizontal duct, with additional bending after the damper leading horizontal 90° to one side and duct 1,200 mm



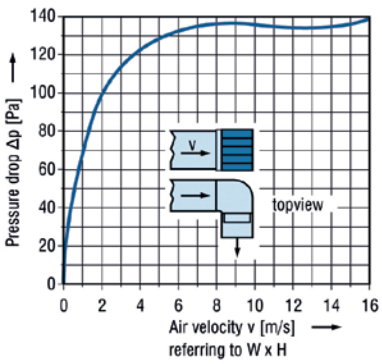
Diagr. 4: Non return damper on horizontal duct, with additional bending after the damper leading vertical to the top



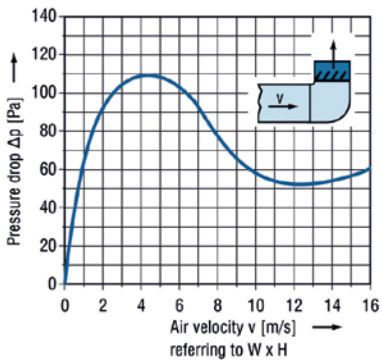
Diagr. 5: Non return damper on horizontal duct, with additional bending after the damper leading vertical to the bottom



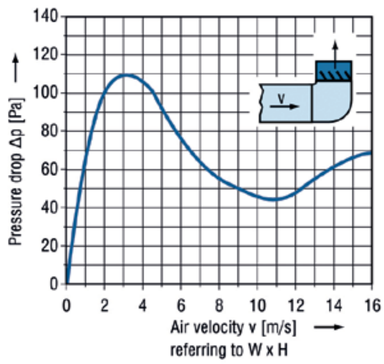
Diagr. 6: Non return damper on horizontal duct, with additional bending after the damper leading vertical to the top and duct 1,200 mm



Diagr. 7: Non return damper on horizontal duct, with additional bending in front the damper leading horizontal 90° to one side



Diagr. 8: Non return damper on vertical duct, with additional bending in front the damper leading horizontal 90° to the top (installation situation A)



Diagr. 9: Non return damper on vertical duct, with additional bending in front the damper leading horizontal 90° to the top (installation situation B)

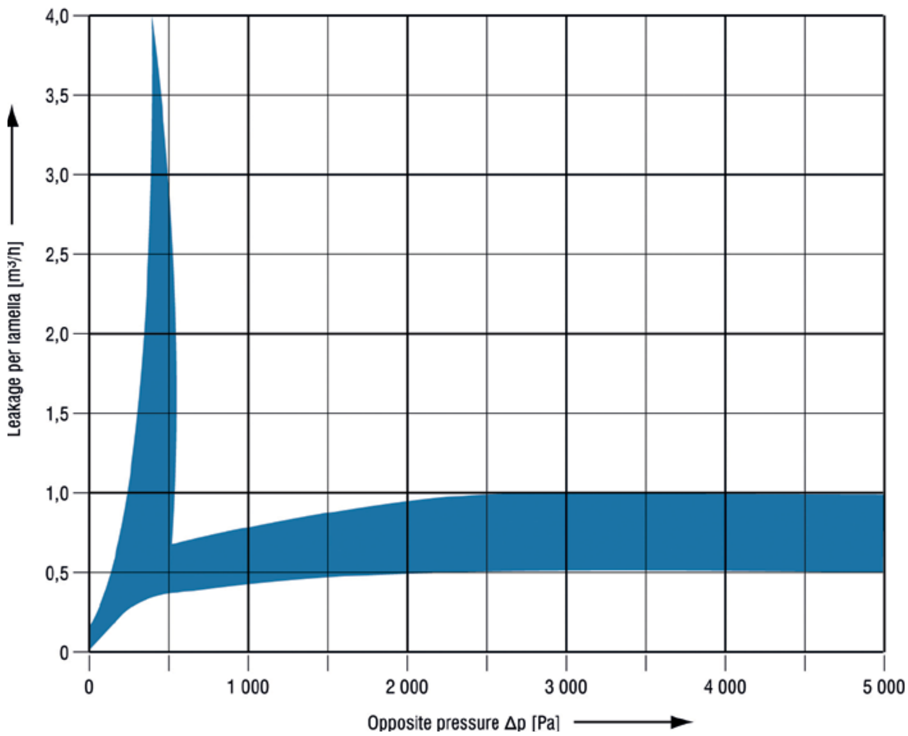
Leakage

The leakage rate of the non return damper was determined by numerous laboratory tests. The leakage rate will be expressed as “leakage air flow per lamella” and is shown in the diagram. Considering manufacturing tolerances the leakage rate varies with a range of variation from a minimum to a maximum value. The diagram applies for all damper sizes.

The value of leakage is not depending from the length and the height of the lamellae. Therefore the total leakage rate for different damper sizes can be determined quickly.

The diagram shows that the leakage rate is increasing with increasing opposite pressure in the beginning. When the lamellae are pressed against the sealing plates leakage rate decreases extremely to a rather constant value. The biggest leakage rate appears at opposite pressures from 200 to 500 Pa. At pressures above 500 Pa the leakage rate per lamella is less than 1 m³/h.

The maximum opposite pressure of the non return damper should not exceed 5,000 Pa. For higher requirements and opposite pressure of up to 45,000 Pa reinforced non return dampers are available as option on request.



Leakage of non return damper type RK-E20 in closed situation depending on opposite pressure

Design example		
Damper:	W = 1 000 mm, H = 1 000 mm	
Built-in situation:	– Non return damper on horizontal duct, – with additional bending after the damper – leading horizontal 90° to one side	
Air velocity v:	10 m/s	(relating to W x H)
Opposite pressure:	1 000 Pa	
No. of lamellae:	4 pcs	(see table page 6)
Pressure loss Δp:	110 Pa	(from diagram 2, page 5)
Leakage rate per lamella:	max. 0.8 m³/h	(from leakage diagram, see above)
Total leakage:	max. 3.2 m³/h	(no. of lamellae x leakage rate per lamella)

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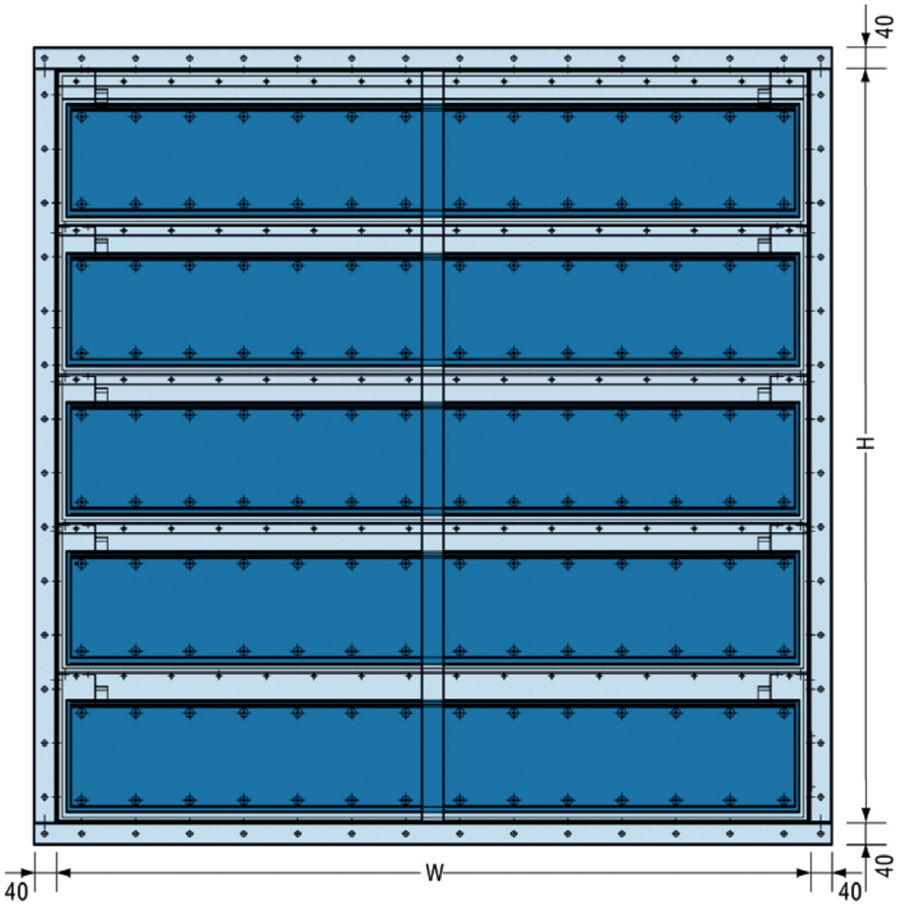
Sizes



Sizes of damper housing																			
W	200	250	300	315	350	400	–	500	560	600	630	800	900	1 000	–	1 250	1 400	1 600	–
H	200	–	300	315	350	400	450	500	560	–	630	800	–	1 000	1 120	1 250	1 400	1 600	2 000
No. of lamellae	1	–	1	1	2	2	2	2	2	–	2	3	–	4	4	5	5	6	7

All combinations of W and H dimensions are possible. All dimensions in mm. The companion flanges are not drilled on delivery.

Text for tender

Non Return Damper, Type RK-E20

For shutting off air ducts at reverse flow.

Robust construction to withstand pressure 10 % higher than admissible operation pressure without impact on function.

All weldings are made according to DIN 25 496, item 6.2(4), that means using stabilised steel at austenitic material, e. g. material 1.4541 (AISI / SAE 321 or B.S. 321 S12) and using reassured steel at ferretic material.

All media touched parts are welded continuously and without gaps to ensure an easy decontamination.

The special design of the damper prevents the lamellae from fluttering.

The tightness requirements according to DIN 25 496 will be fulfilled.

Design

- Robust and maintenance-free construction
- Damper housing in screwed construction-with C-profiles
- Arrangement of flow-separating plates at escape side of damper to create single ducts behind each lamella to avoid transmission of impulse between partial air flows
- Lamellae made of silicone
- Reinforcing angle on incoming flow side and plate on back side of lamella to reinforce and stabilize sealing surface of lamella. Design of reinforcing angle as tear-off edge of air flow to guarantee a stable position of opened lamella

Material

Damper housing and separating plates:
- galvanized steel or
- stainless steel 1.4541 (AISI / SAE 321 or B.S. 321 S12)

Reinforcing angle and back plate:
- Aluminium

Lamellae:
- Silicone

Technical data

Fabricate:	Krantz
Type:	RK-E20
Adm. operation temperature:	90 °C
Dimension (W/H):	see table page 6
Total depth of damper:	360 mm
Adm. leakage rate of damper housing acc. DIN 25 496 (outer tightness):	10 l/(h m²) at 1 bar, 20 °C and Δp = 2 000 Pa
Adm. leakage rate of damper housing acc. DIN 25 496 (inner tightness):	2 % of nominal air flow at 1 bar, 20 °C and Δp = 2 000 Pa

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