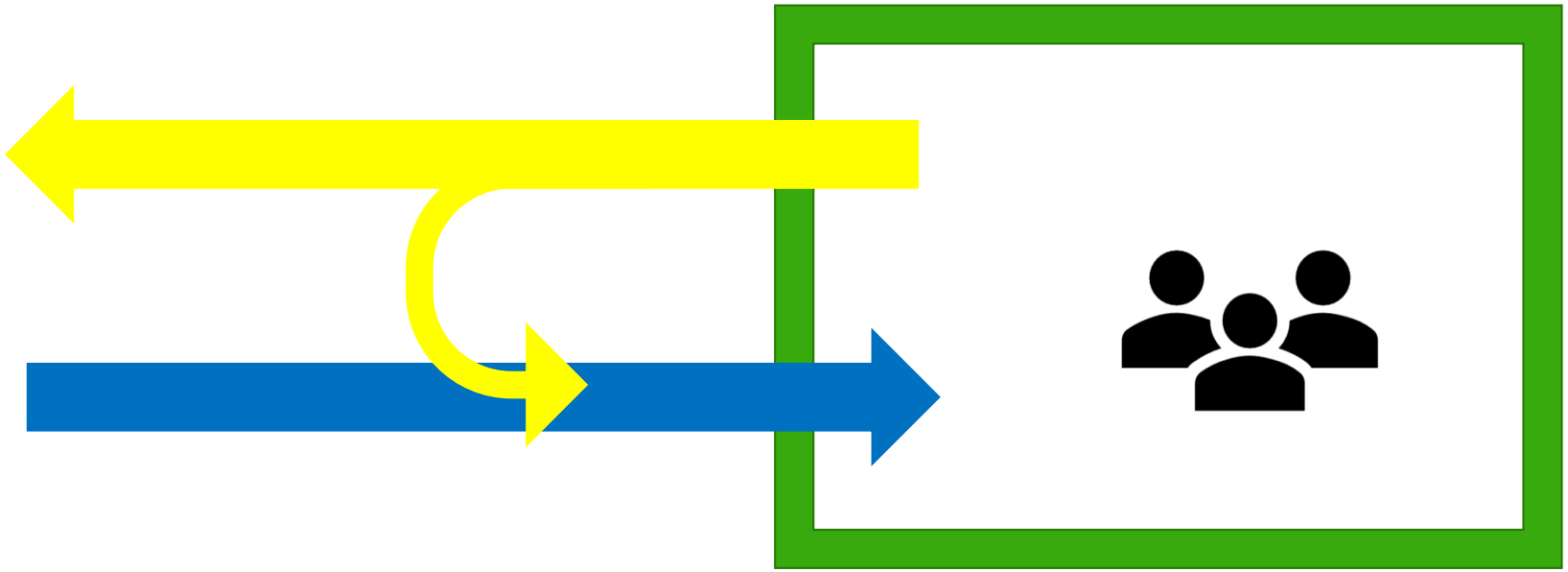
Ventilatsiooniseadmete sisemised lekked

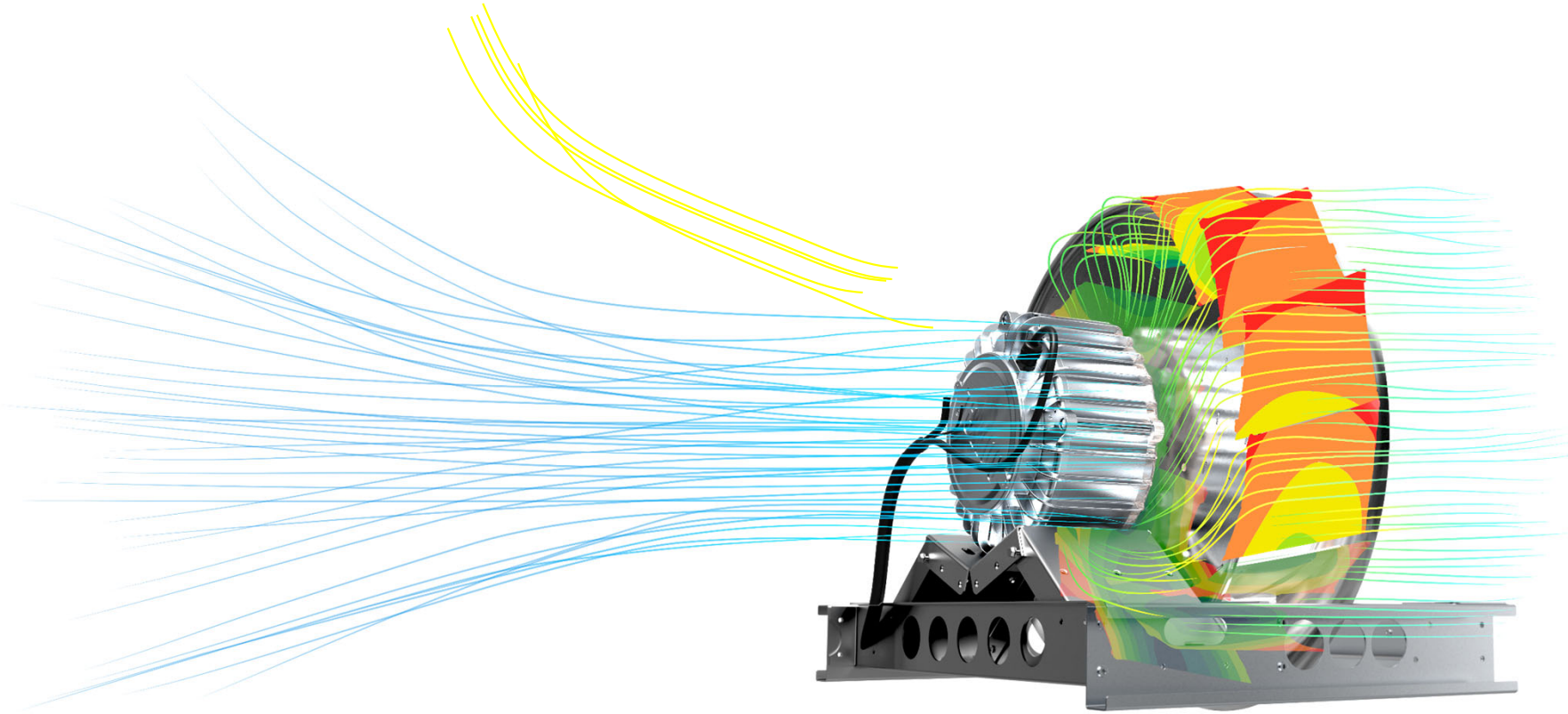
Ingrid Salk
Airexa OÜ
24.03.2022

Õhu kvaliteet



Leke võib kahjustada õhu kvaliteeti

Energiatarve



Võib lekke tõttu suureneda

Swegon

World Health Organization

REHVA
Federation of European Heating, Ventilation and Air Conditioning Associations

EUROVENT
EUROPEAN INDUSTRY ASSOCIATION

ASHRAE
Shaping Tomorrow's Built Environment Today

Ventilatsioon

- siseõhu asendamine puhta välisõhuga –

on üks olulisemaid strateegiaid viiruse leviku tõkestamisel.

World Health Organization

Swegon

“Puhtakspuhumissektori ja korralikult hooldatud tihenditega rootorsoojusvahetite puhul on lekkemäär väga madal ja ristsaastumine on minimaalne”

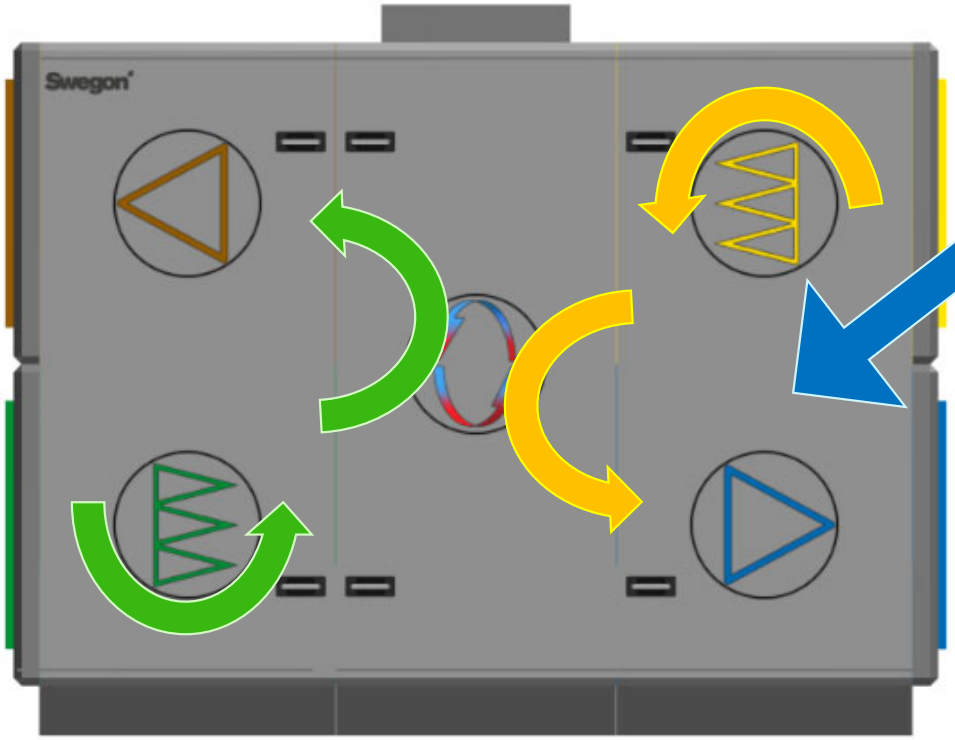
Kui soojustagastusega seadmes avastatakse kriitilised lekked (>3%), hinnake HVAC spetsialistiga konsulteerides võimalust paigaldada MERV 14/F8 filter vastavalt süsteemi võimekusele.

Suurenenud filtri efektiivsus põhjustab üldiselt suuremat rõhulangust läbi filtri. Enne filtrite vahetamist veenduge, et HVAC-süsteemid saaksid filtrite uuendamisega hakkama ilma negatiivse mõjuta rõhuerinevustele ja/või õhuvoolukiirustele

Lekkekohad

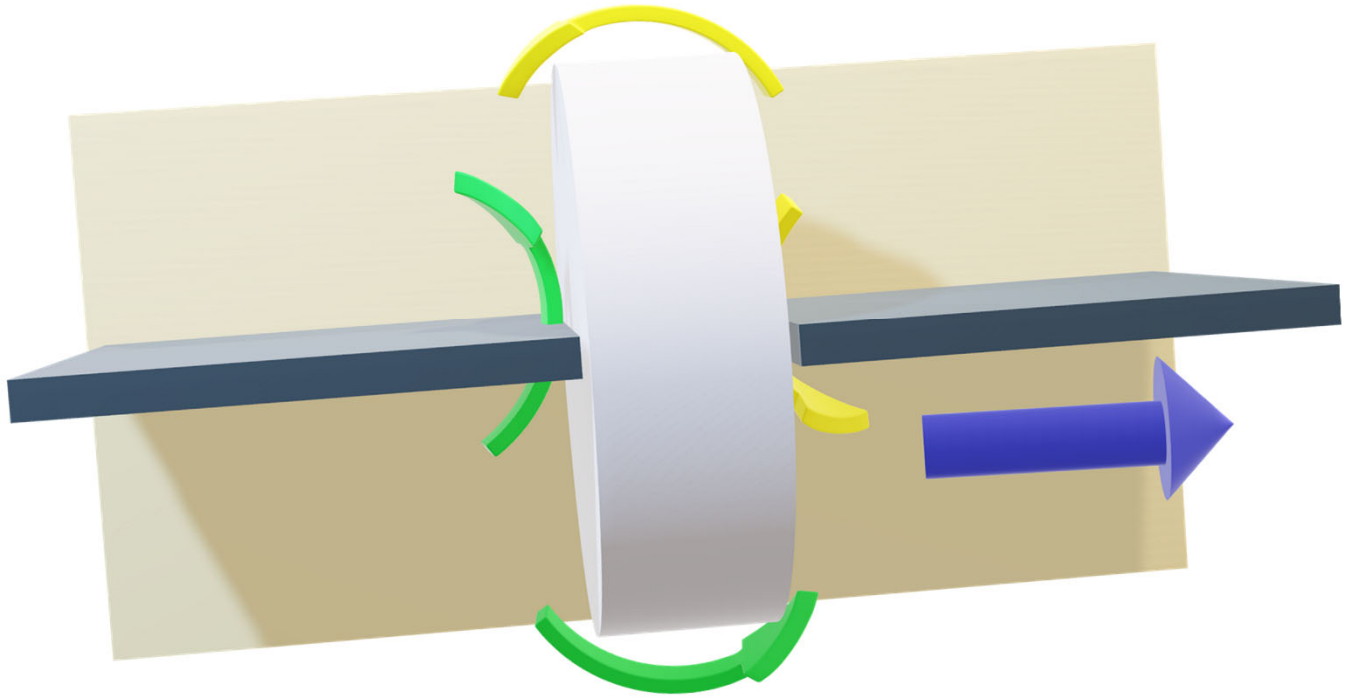
Swegon

Filtri leke
EN 1886
Õhu kvaliteet



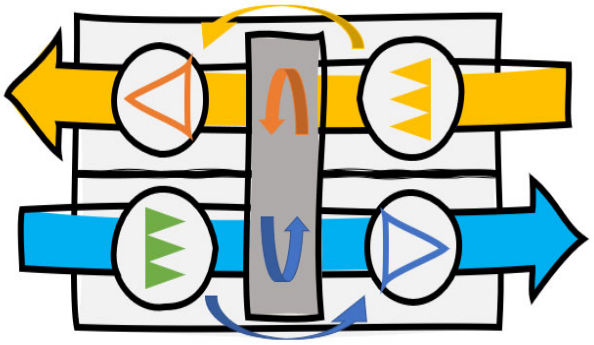
Väline leke
EN 1886
Energia
Õhu kvaliteet

Sisemine leke
OACF ja EATR
EN 16798-3 ning EN 308



Four leakage modes

1



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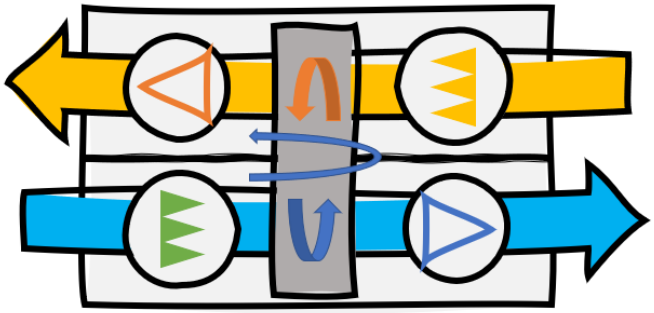

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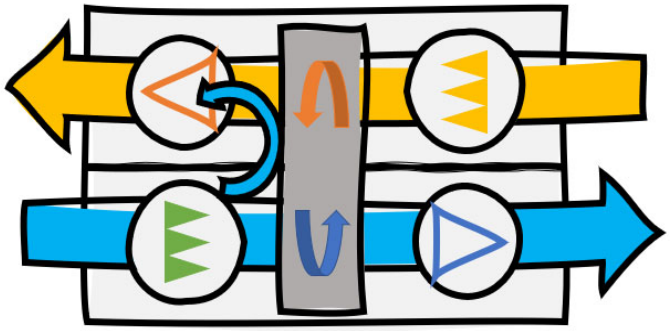

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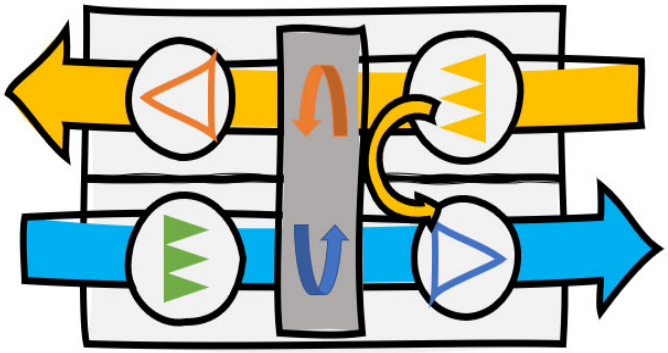
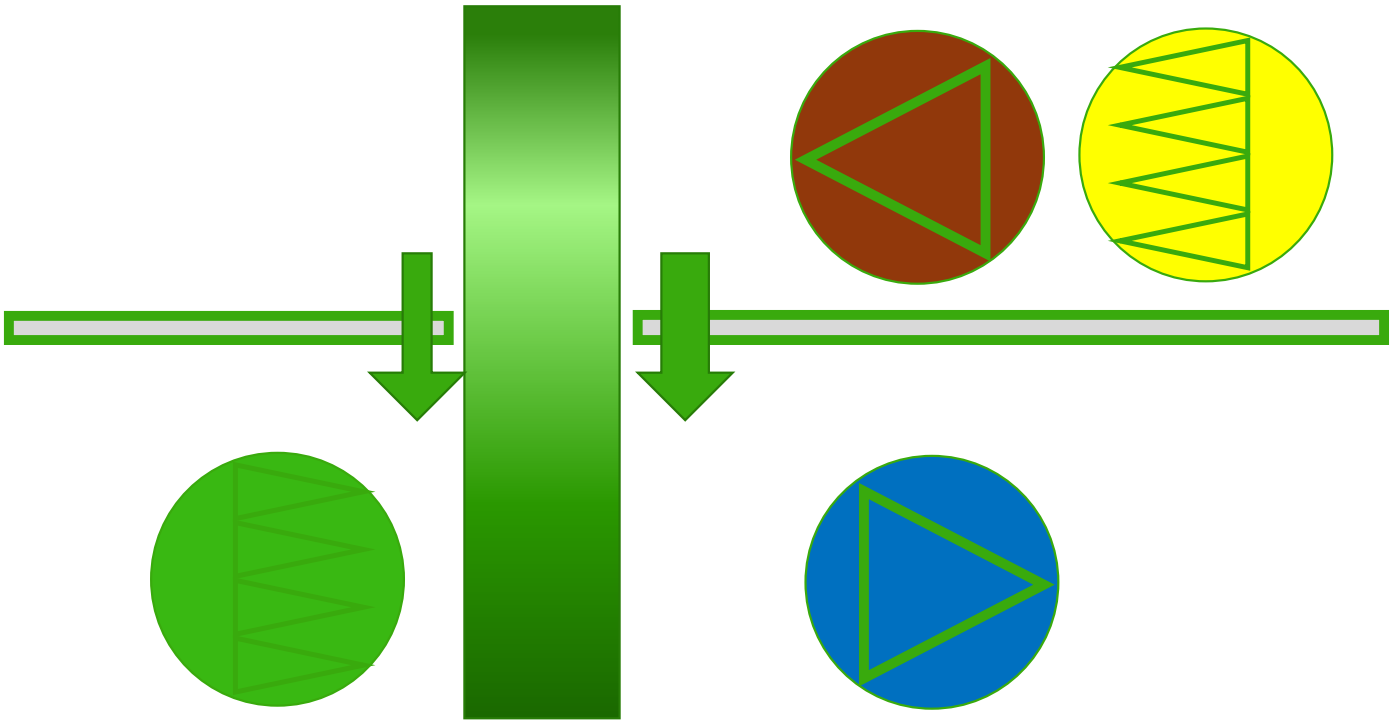
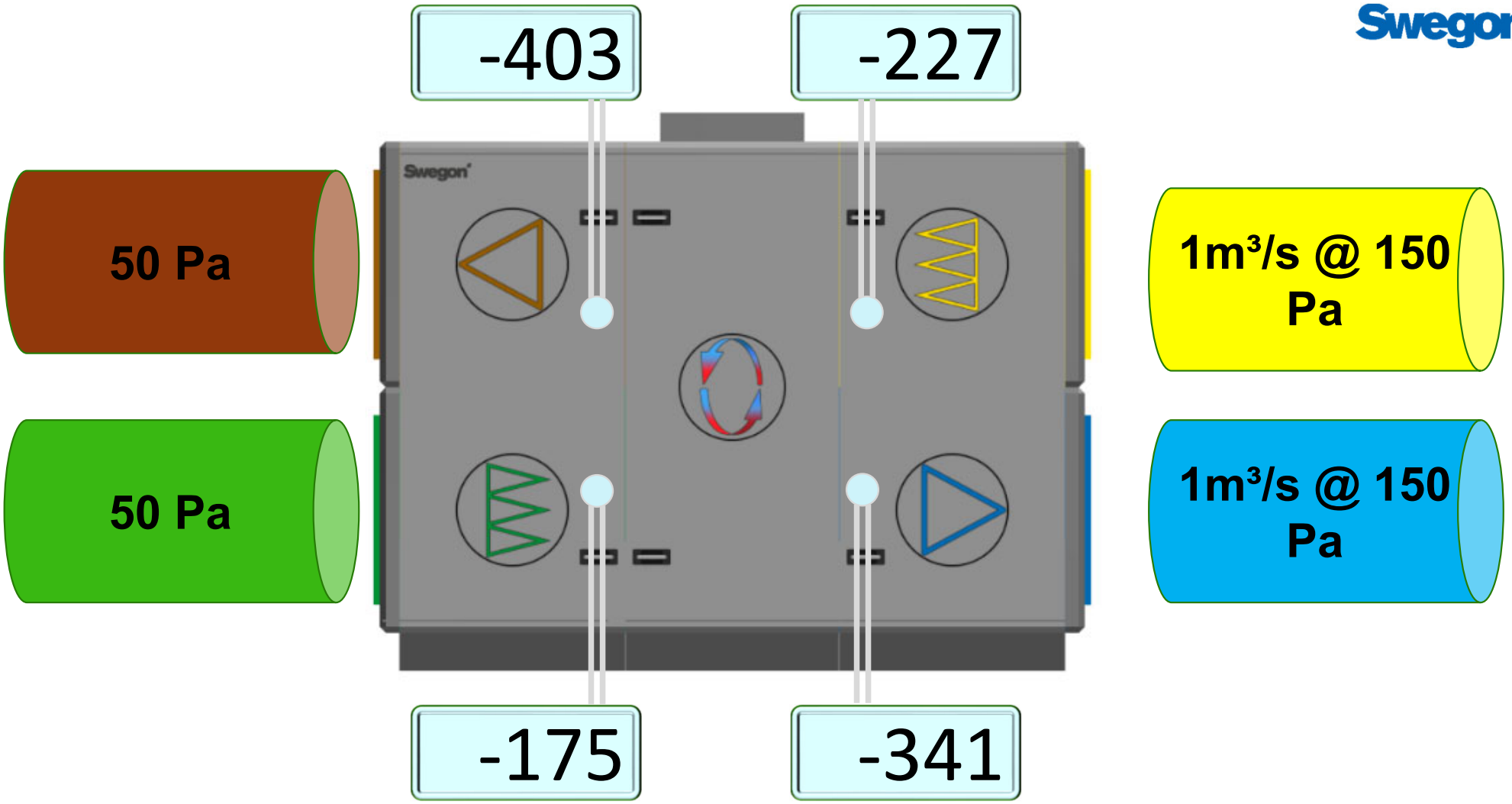
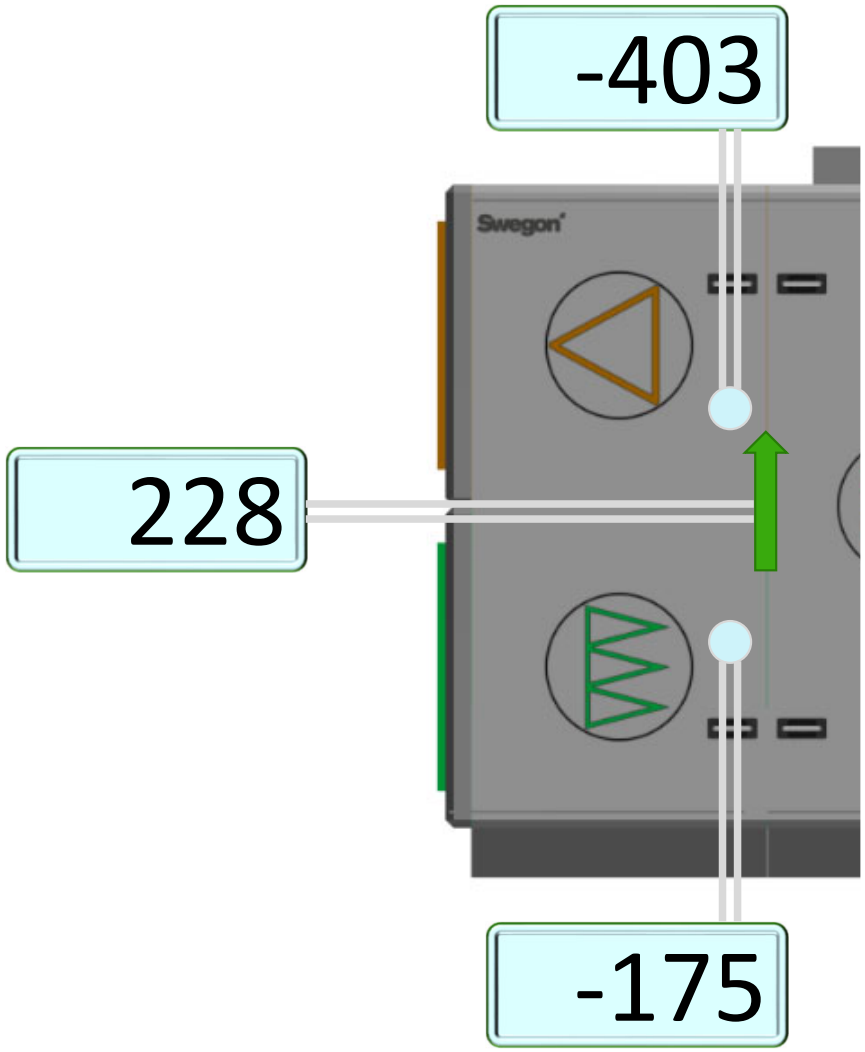
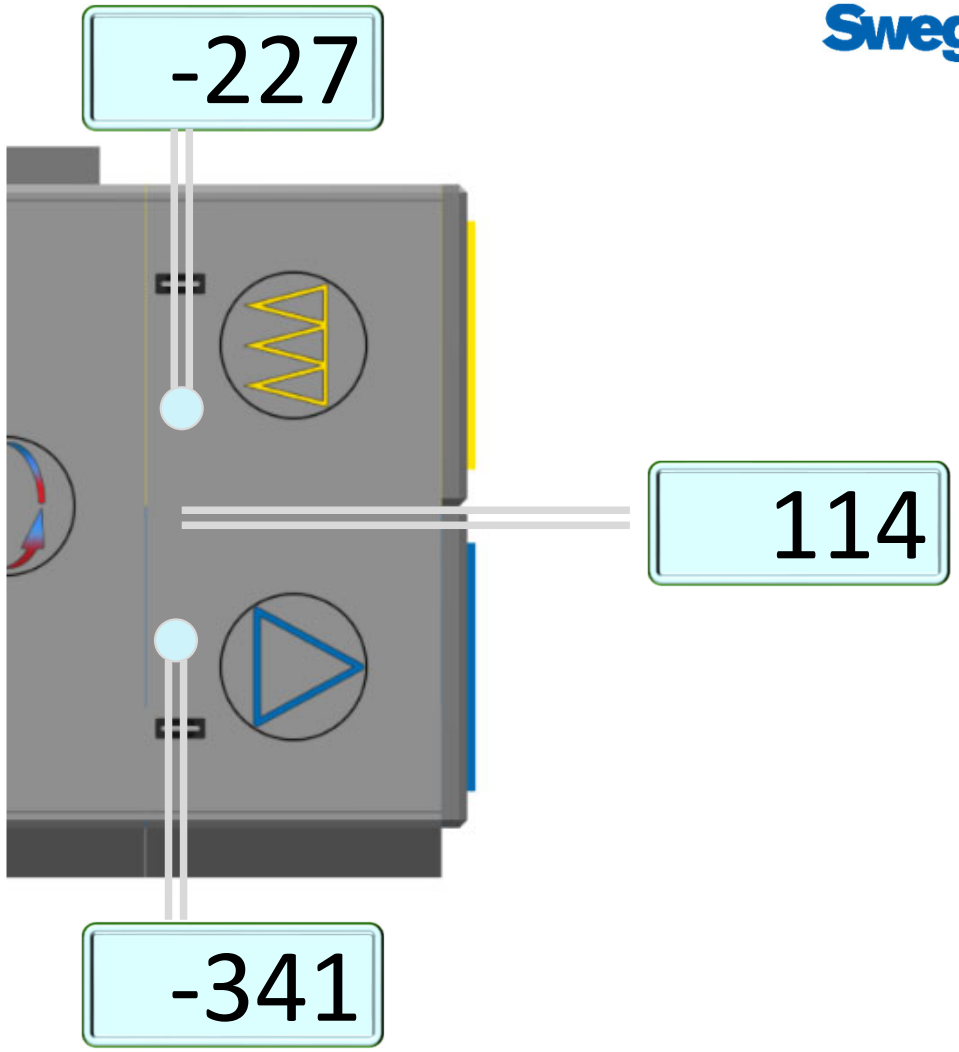


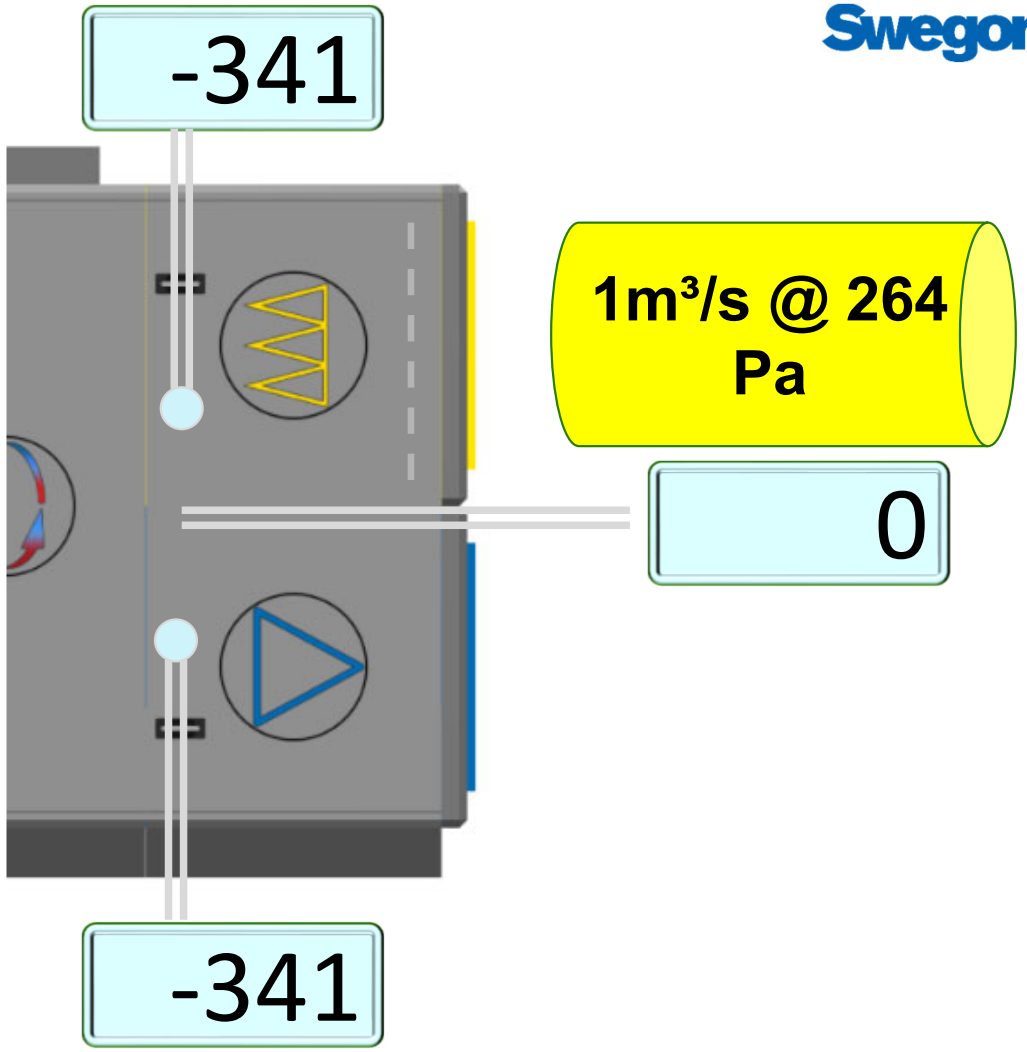



-403
-227
50 Pa
1m³/s @ 150 Pa
50 Pa
1m³/s @ 150 Pa
-175
-341

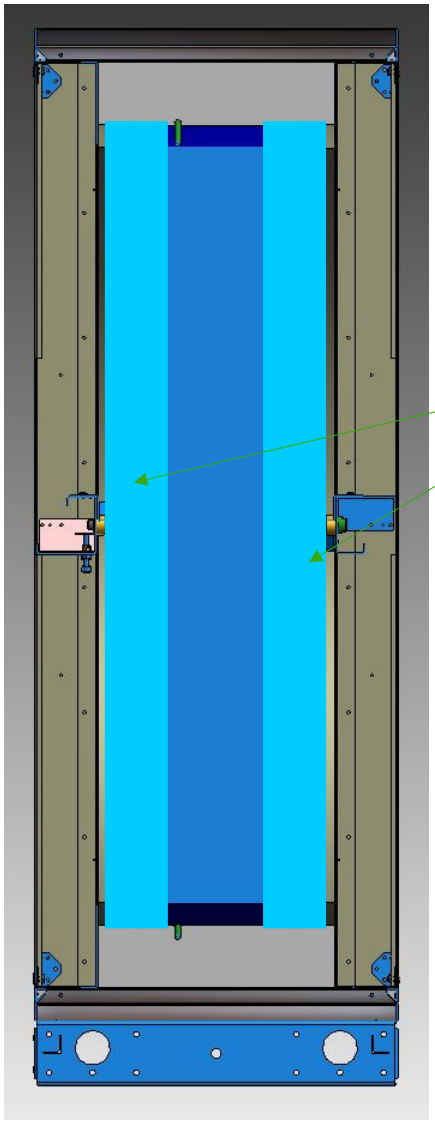


lekkeõhuhulk selles
näites 20 l/s

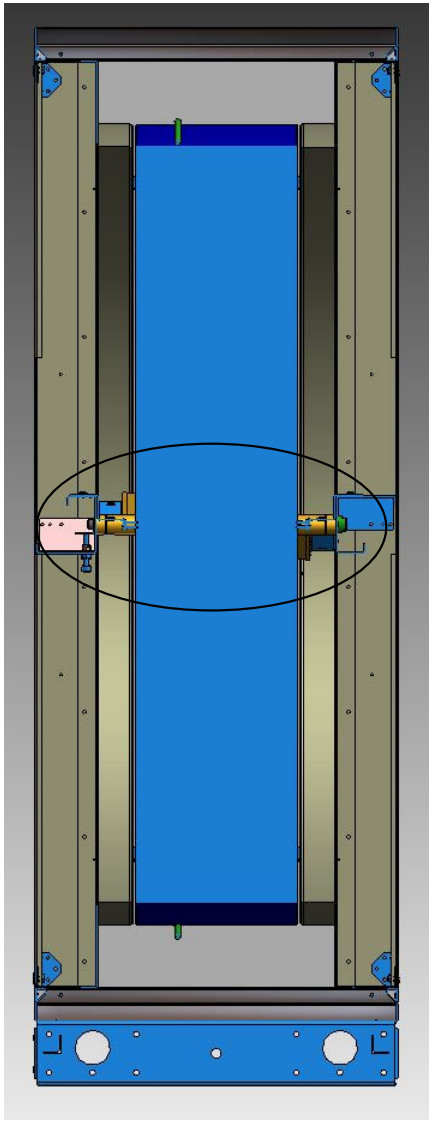

-227
114
-341

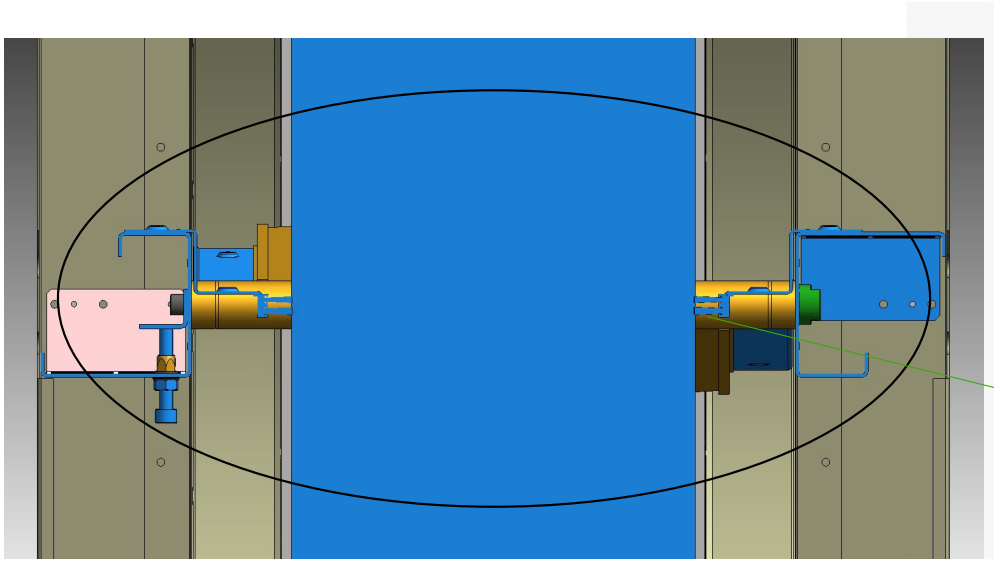

-341
1m³/s @ 264 Pa
0
-341

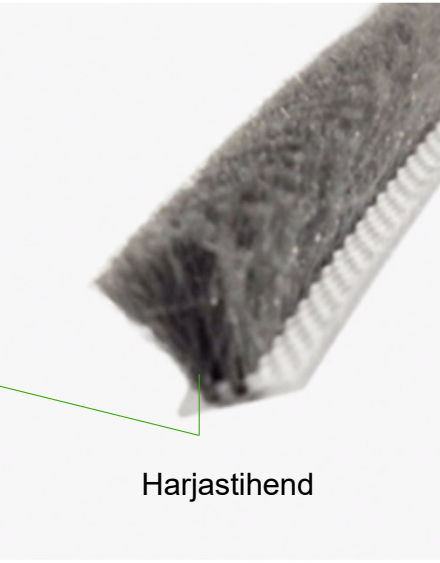
GOLD rootori tihend



Ääretihendid
mõlemas küljes

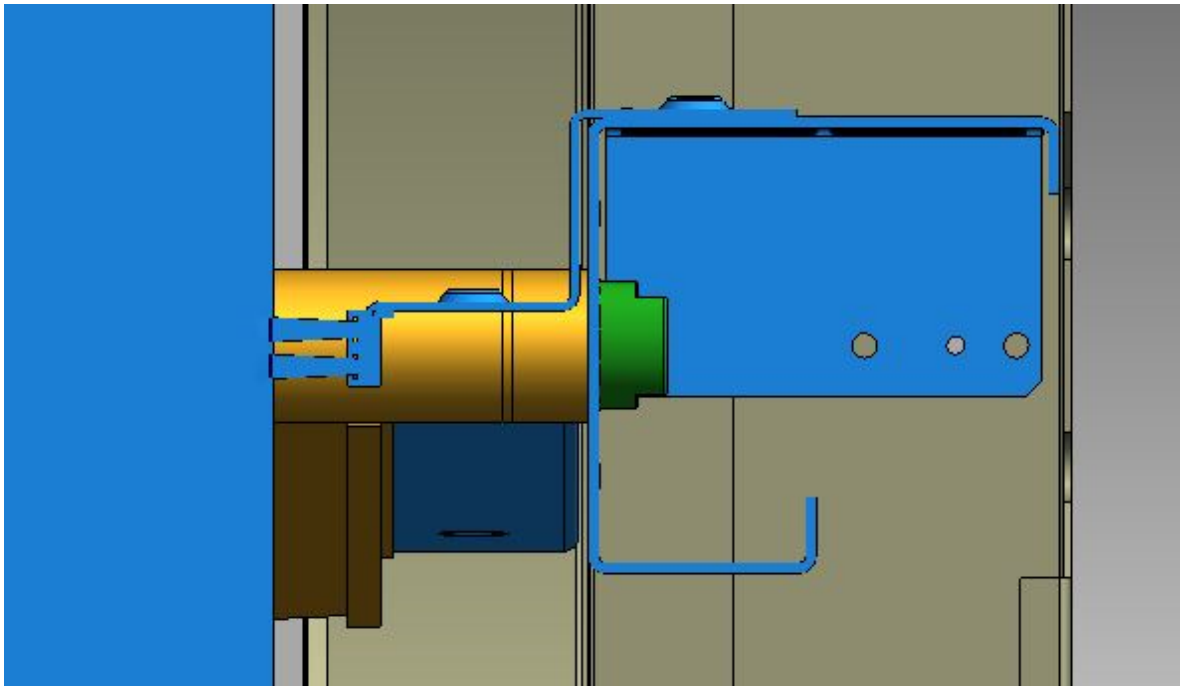






Rootori ristlõige, millel on näha harjastihendid

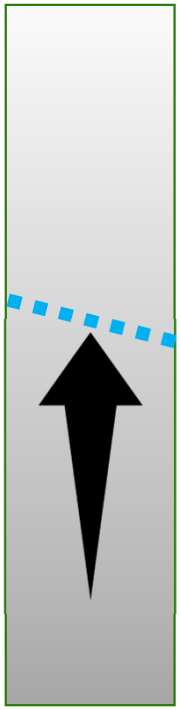
Mõlemale küljele on paigaldatud kaks harjas tihendit

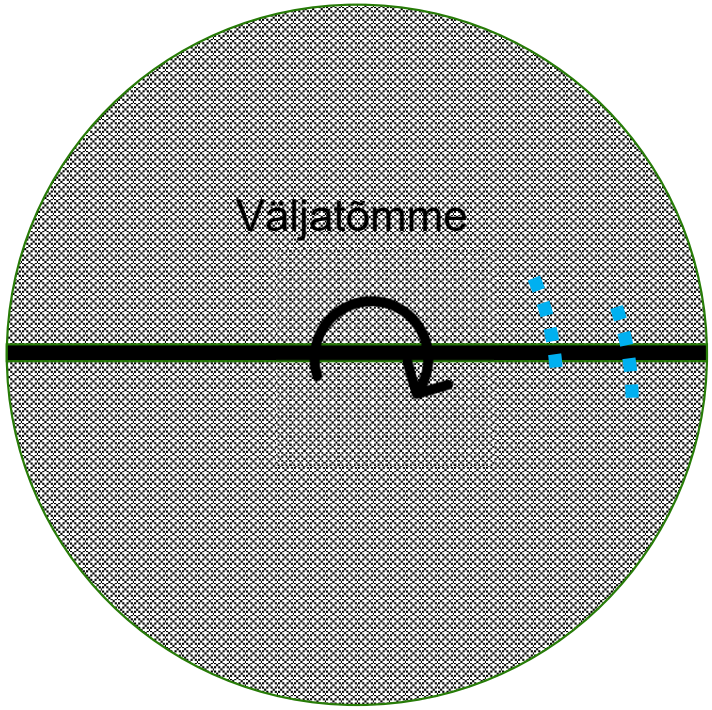


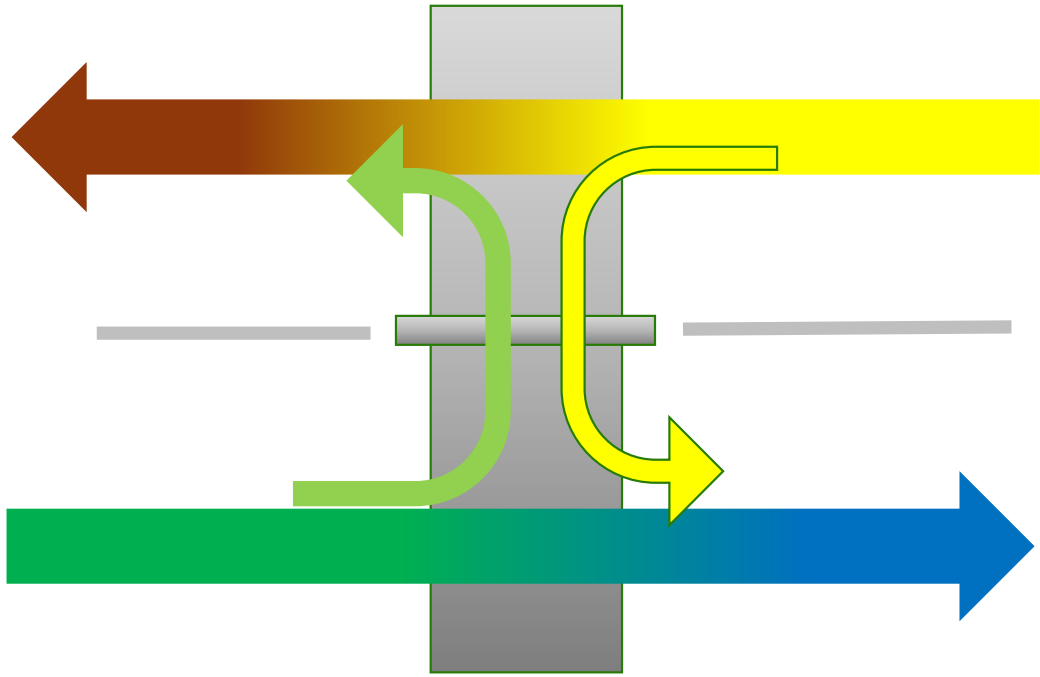


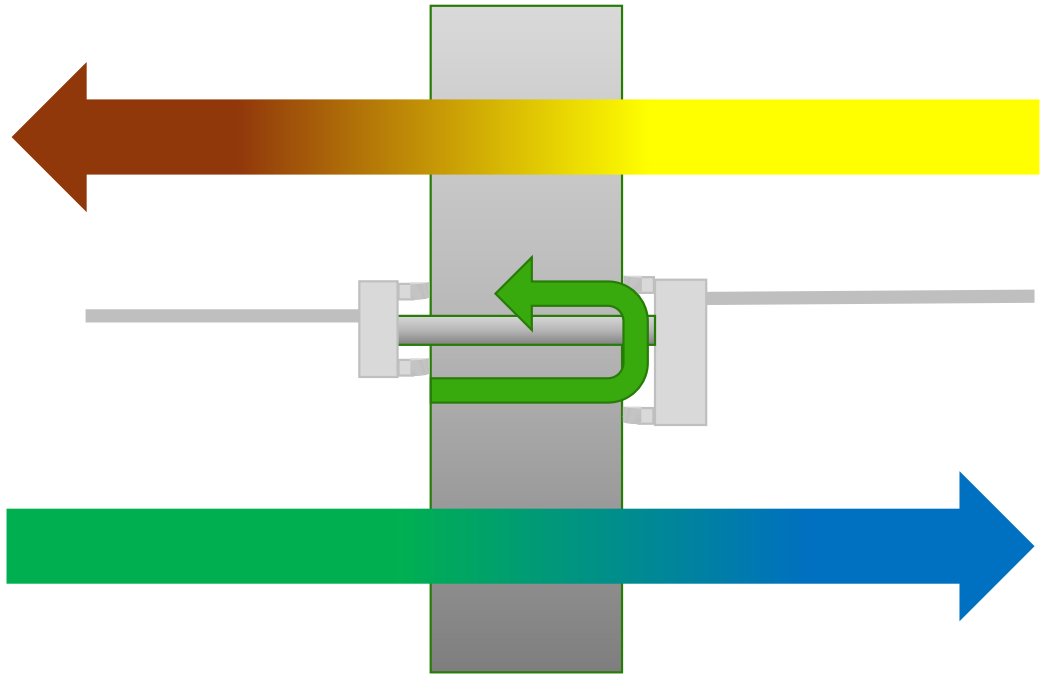
Kuni 50% väiksem lekkevõimalus

Puhtaks puhumissektor



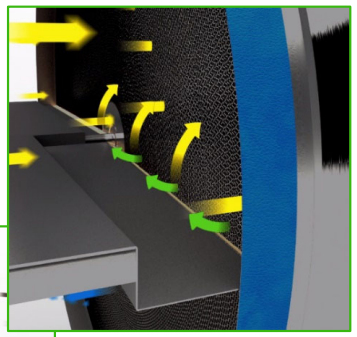

Väljatõmme



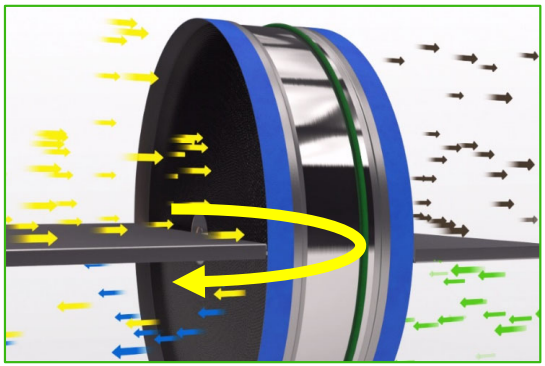


GOLD RX Puhtakspuhumise sektsioon

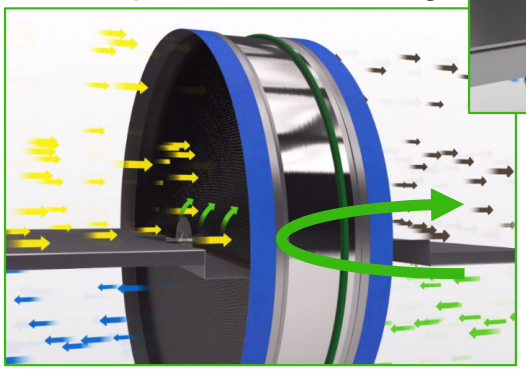
- Puhtakspuhumissektsioon eraldab sissepuhke ja väljatõmbeõhu

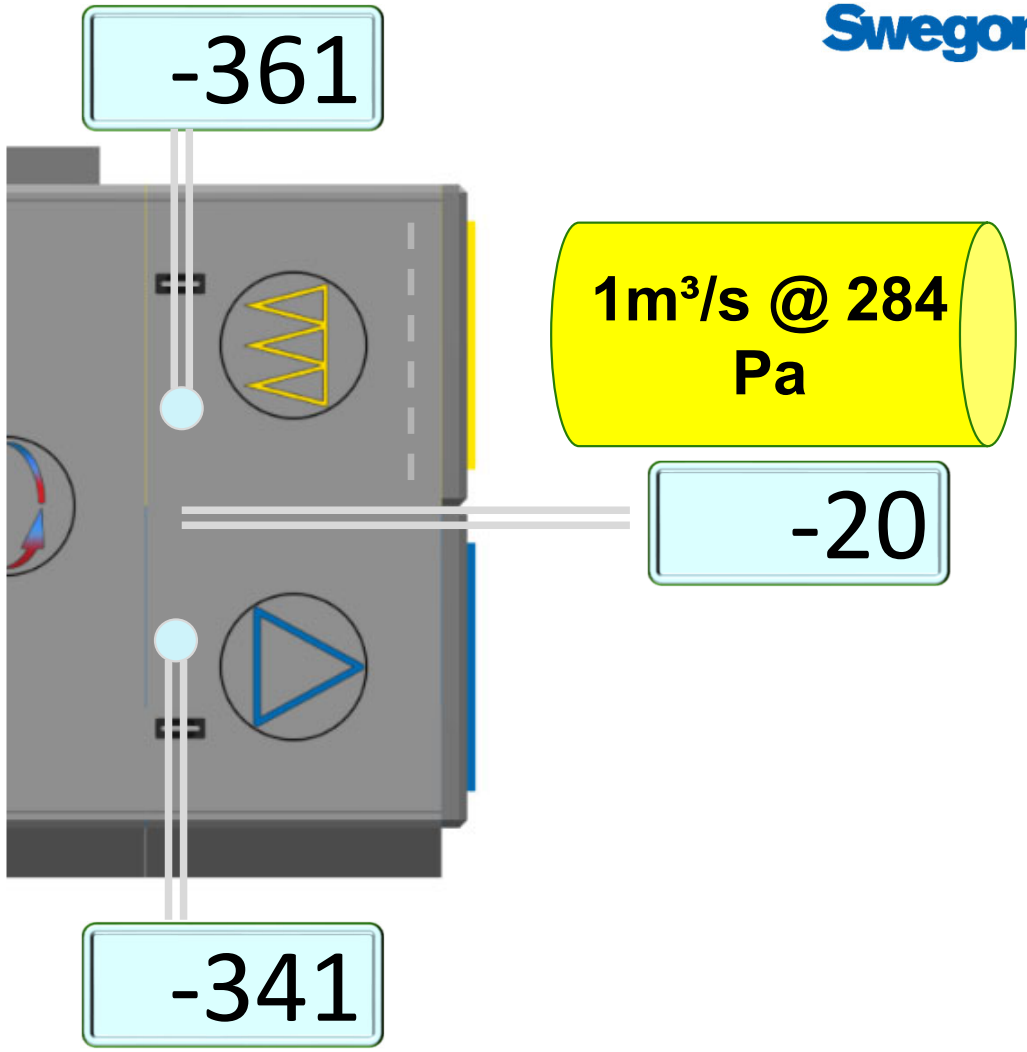


Ilma puhtakspuhumissektsioonita



Puhtakspuhumissektsiooniga




-361
1m³/s @ 284 Pa
-20
-341

CIT Energy Management AB
A Chalmers Industriteknik Company

Swegon

1130 / LE

Test Report

Carry-over test of three SWEGON rotary heat recovery sections

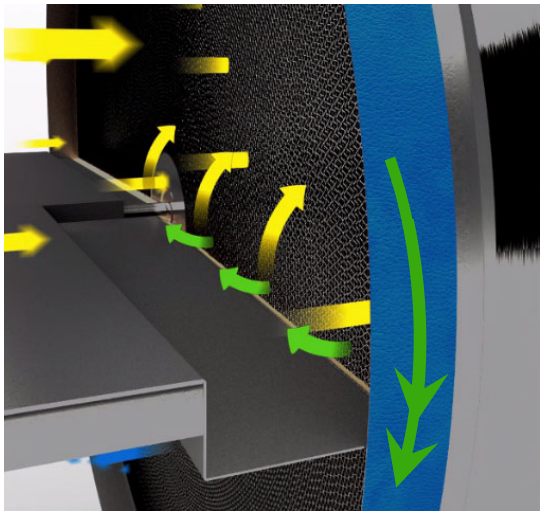
Puhtakspuhumissektoriga varustatud rootorite katsed märgistusgaasiga näitavad, et leke on väiksem kui 0,5%.

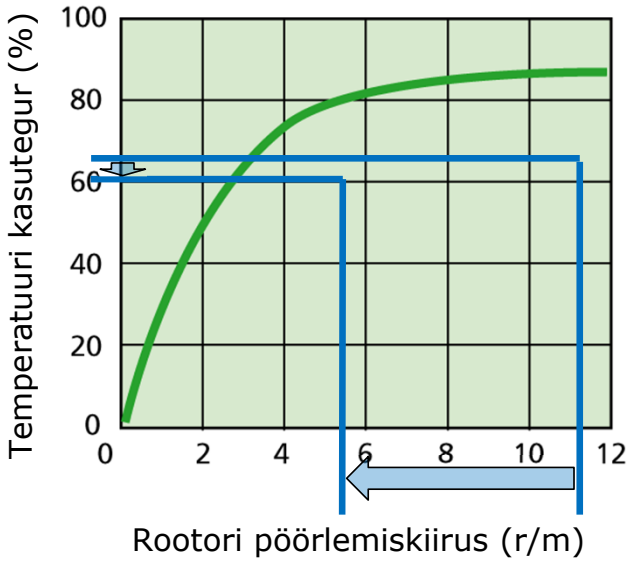
Seega 1000 l/s sissepuhkeõhu hulgaga seadmel kandub maksimaalselt 5 l/s väljatõmbe õhust sissepuhkeõhule, eeldusel, et seade on õigesti paigaldatud ja seadistatud.

Funktsioon Carry over control

GOLD RX Carry over control funktsioon

- Carry-Over Control regullerib rootori pöörlemiskiirust
  - Garanteeritud õhu puhtuse kontroll
  - Minimaalne effektiivsuse vähendamine



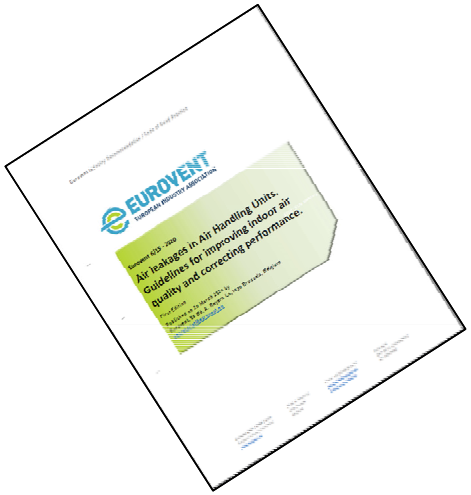


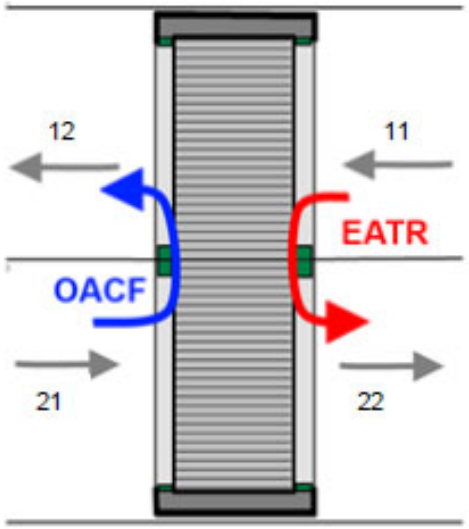
Standardites määratletud sisemised lekked

OACF ja EATR

EN 16798-3 defineerib kaks sisemist leket:

$$OACF = \frac{q_{m,21}}{q_{m,22}}$$





$$EATR = \frac{q_{m,22} - q_{m,22,net}}{q_{m,22}} = 1 - \frac{q_{m,22,net}}{q_{m,22}}$$

AHU Design
Technical specification

Swegon

Project: Untitled project
Unit name: - Design data

Date: 11/05/2020
21 / 1.0.20200326.1185802
Unit ID: AD-10000706960

	2x(490x592x370-8)		
	Velocity in the filter section	1.57	m/s
	Recommended design pressure drop	125	Pa
	Initial pressure drop	75	Pa
	Final pressure drop	175	Pa
1	**Rotary heat exchanger, GOLD012FRXP01**		
	Rotary heat exchanger of type RECOnomic		
	Standard aluminium		
	Speed controlled		
	Pressure drop, supply air	166	Pa
	Pressure drop, extract air	176	Pa
	Extra pressure drop in extract air side (damper) to ensure the right flow direction	66	Pa
	Purging flow including leakage	0.059	m³/s
	Outdoor Air Correction Factor, OACF	1.06	
	Exhaust Air Transfer Ratio, EATR	< 1.0	%
	Dry-bulb temperature efficiency of supply air(83.4% at the same airflow)	83.4	%
	Humidity efficiency, supply air, winter	28.1	%
	Humidity efficiency, supply air, summer	0.0	%
	Annual energy efficiency, dry conditions	96.4	%
	Annual temperature efficiency according to Svensk Ventilation (Off. etc.)	83.4	%
	Annual energy efficiency according to Svensk Ventilation (Off. etc.)	99.8	%

Supply air side, winter	In	Out	

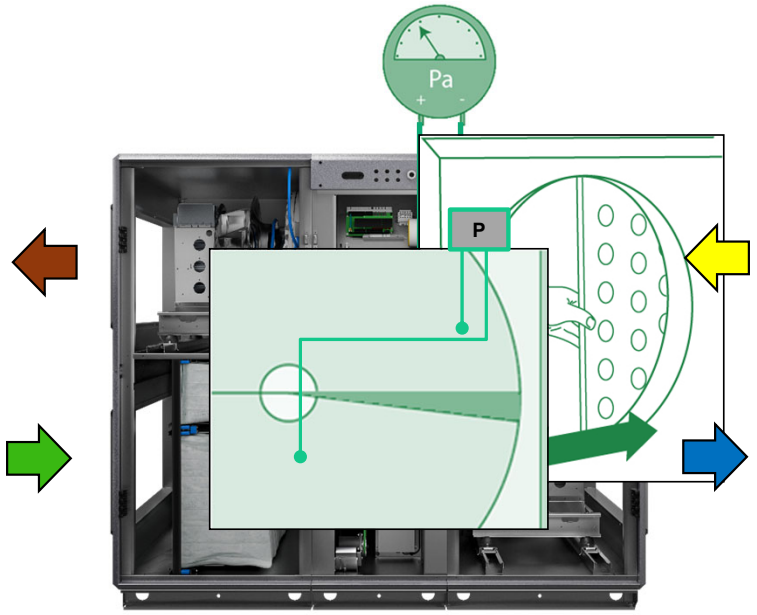
Swegon

GOLD RX – on kindlustatud väljatõmbeõhu lekke minimeerimiseks sissepuhkeõhku

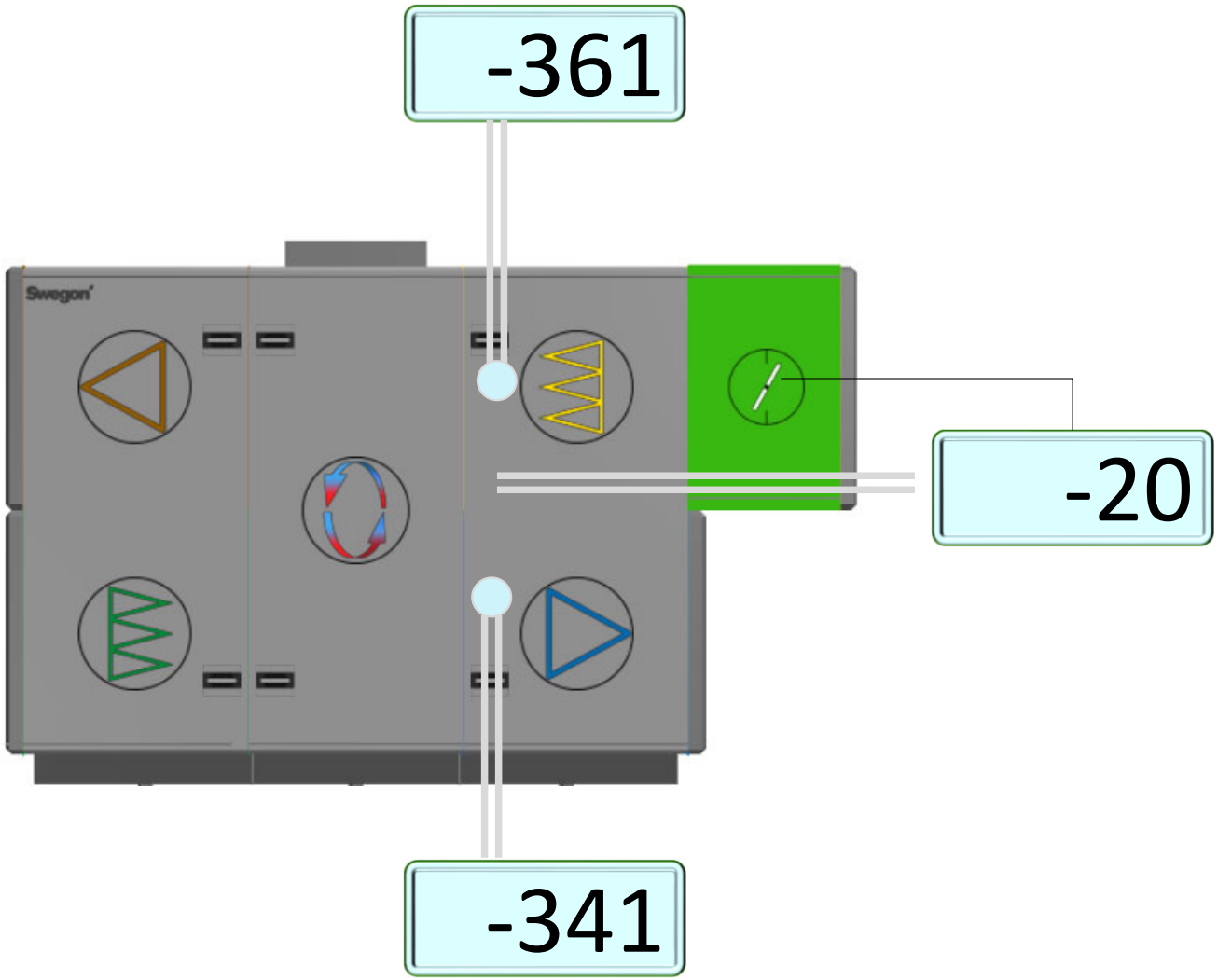
- Rõhu mõõtmine
- Häälestusplaadi kasutamine
- Puhtakspuhumissektor
- Carry-over control funktsioon
- Garanteeritud õhuhulgad

→ Usaldusväärne ka VAV/DCV süsteemides

→ Äärmiselt väike sisemine leke, ainult 0.45 %

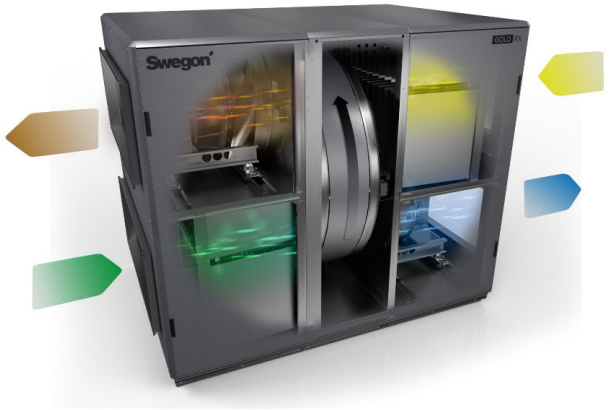


Fikseeritud või muutuv väljatõmbeõhu rõhk?

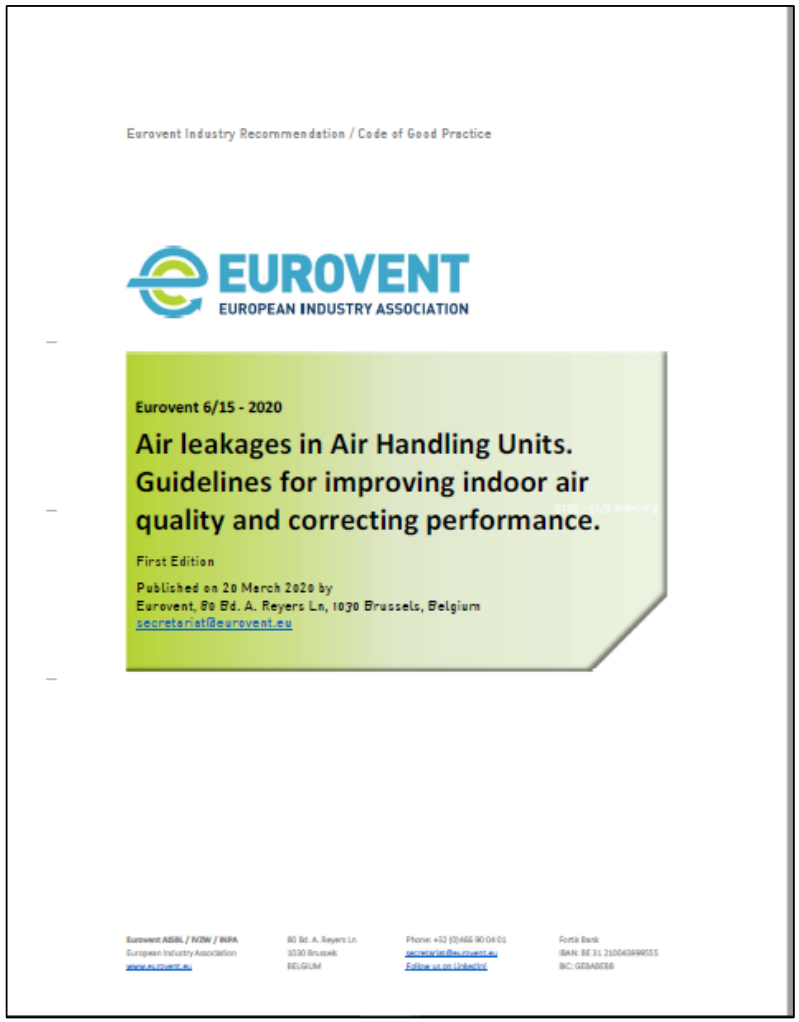


1m³/s @ 284 Pa

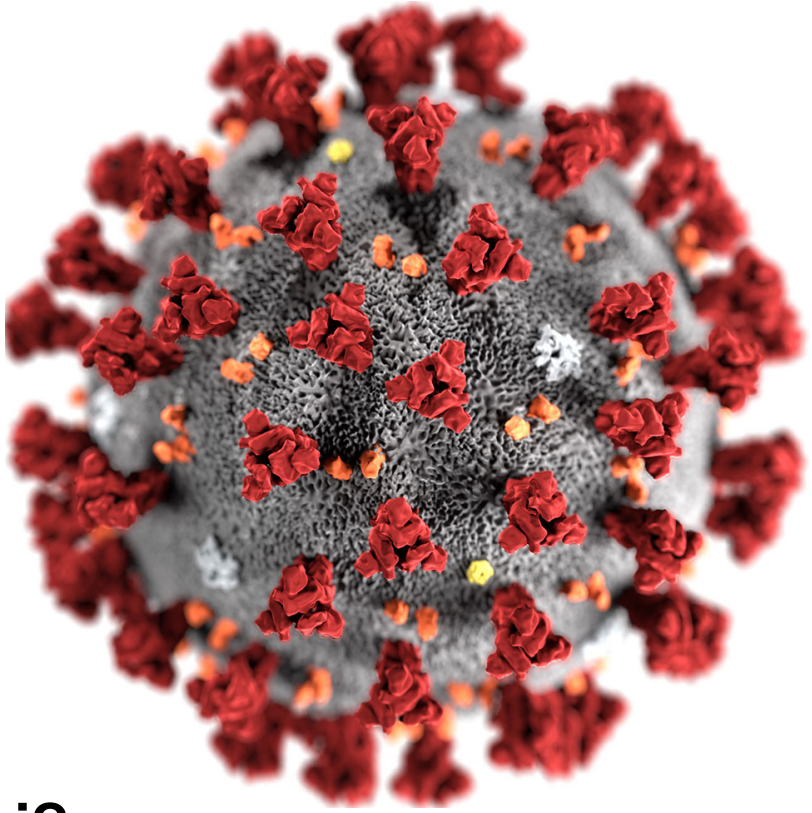
Rootoritega ventilatsiooniseadmed on effektiivsed ja kompaktsed aga neil esinevad mõned lekke kohad. Need lekkekohad on teada ja neid lekkeid saab juhtida tagades seadmete korrektse paigalduse, häälestuse ja kasutuse.







Eurovent guideline 6/15 – 2020



Kas sorptsioonirootori kattematerjal kannab viirust edasi?

Tänan tähelepanu eest!