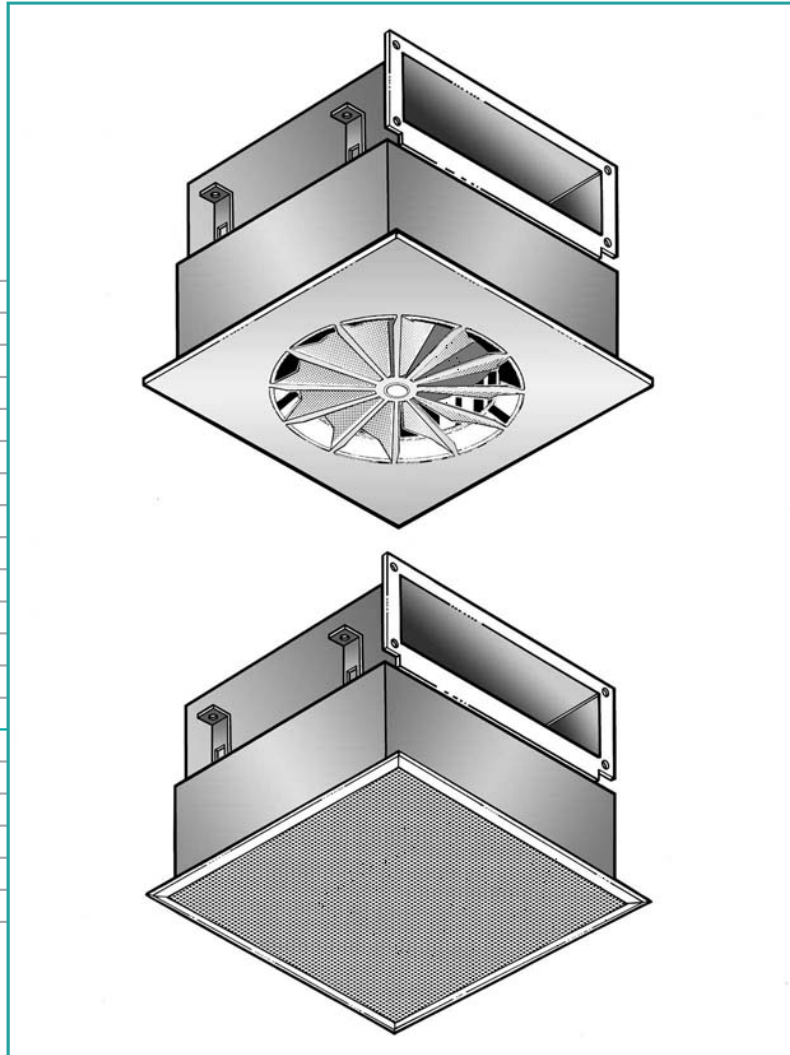


Technical Selection



**Puridrall and Puri-inlet,
air outlets for clean rooms
with split housing**

Preliminary remarks

Cleanroom classes 6 to 8 to DIN EN ISO 14644-1 (VDI 2083) or 1 000 to 100 000 to US Federal Standard 209 as well as C and D to EG-GMP are obtained using turbulent mixing-air flow. This is a mode of ventilation in which clean supply air entering the room is mixed - as intensively as possible - with the indoor air. The key effect on the degree of cleanliness is the dilution of air pollutants emitted in the room. The more even the dilution, the higher the degree of cleanliness reached.

This calls for air outlets that achieve intensive admixture of supply air and indoor air due to their induction effect. For this, KRANTZ KOMPONENTEN uses its own tried and tested twist outlets. Supply air discharge is horizontal and radial. The strong induction effect of the air jets causes a turbulent, diffuse mixing-air flow with constant, low indoor air velocity. This reliably prevents zones of higher particle concentration.

The Puridrall is made up of a twist outlet and HEPA filter cell built into a joint housing (filter housing) and the connection housing.

To filter return air directly at the collection point in clean rooms KRANTZ KOMPONENTEN provides the Puri-inlet. This has the same shape and quality as the Puridrall. Instead of a twist outlet element, the Puri-inlet has a perforated plate for return air intake.

The cleanroom air outlet described here is a variant of the Puri air outlets that have been available for many years (see publication DS 4087). It has a split housing: The lower segment (filter housing) accommodates the filter cell and the air outlet element. The filter cell is replaced from below after dismantling the air outlet element.

The upper housing segment (connection housing) is available with 3 different air connections:

- lateral, rectangular (standard)
- lateral, circular
- above, circular

The air connection chosen is easy to revert into the other options if required, when converting production facilities, for example. The complete filter unit with air outlet in the lower housing segment can further be used.

Applications

Both air outlets can be used in all areas of industry, research and medicine, where air cleanliness to the above-mentioned cleanliness classes is required (see chart on page 9).

Puridrall and Puri-inlet are well suited for refitting existing HVAC systems in clean rooms.

Construction design

Puridrall

Puridrall is available in 7 sizes, for a volume flow rate range of 20 to 450 l/s (75 to 1600 m³/h). Its essential components are the housing **1a** and **1b** with built-in HEPA filter cell **2** and twist outlet **3**.

Attractive slim ceiling twist outlets are used for all Puridrall sizes.

The twist outlet is detachable downwards. After releasing the contact pressure fixture **4** the filter cell **2** can be easily removed.

The sealing frame **5** for the filter cell is available with a test groove **5a** (DIN 1946, Part 4) for dry sealing. The tightness test is conducted from below at an easily accessible point **6** with the twist outlet removed.

Puri-inlet

The construction design is the same as for Puridrall but a perforated plate is used instead of the twist outlet element.

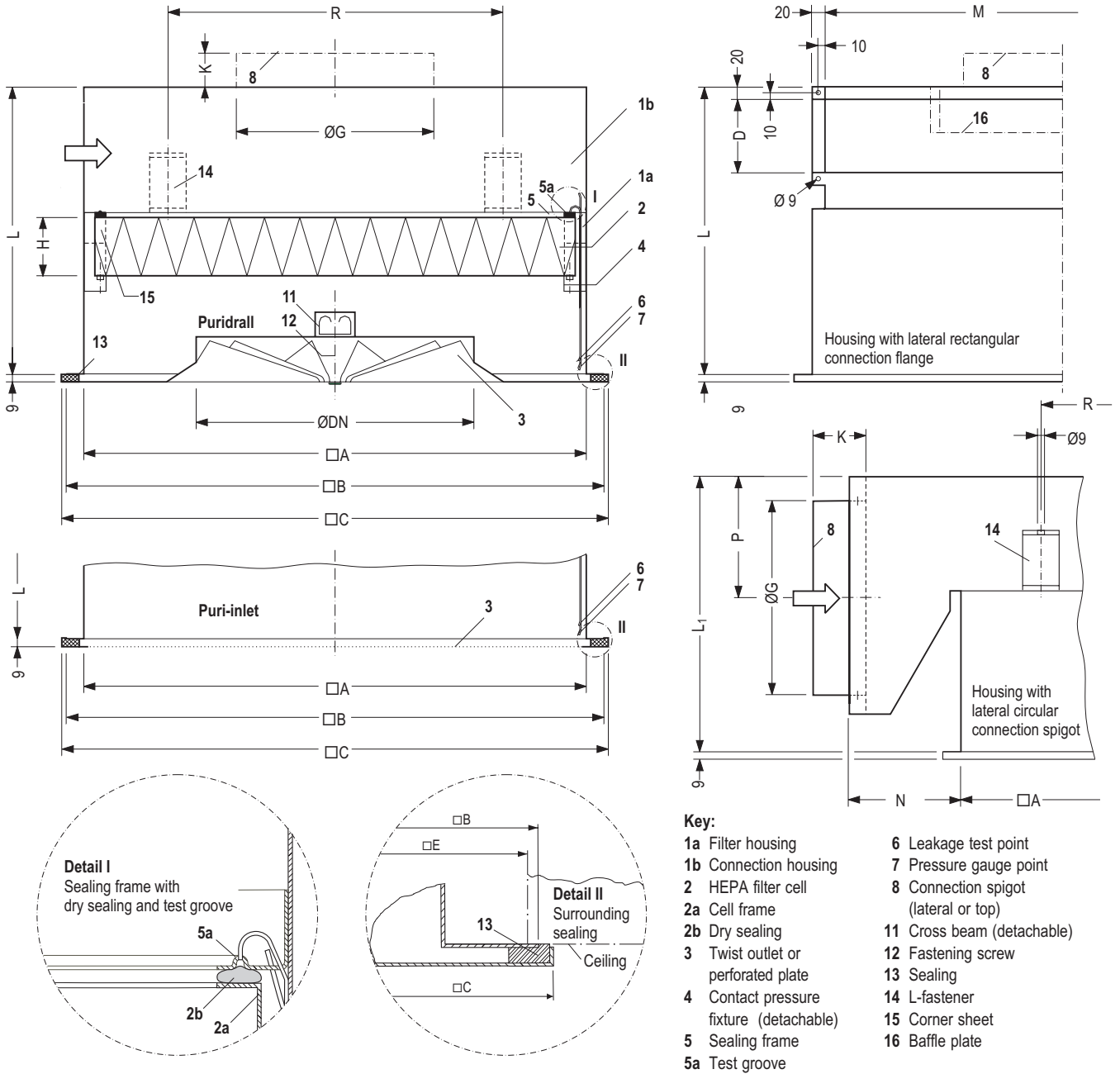
Materials and types

Filter housing and sealing frame made of galvanized sheet metal, coated on both sides with disinfectant-proof epoxy polyester resin, colour to RAL 7035 (light grey). Connection housing made of galvanized sheet metal - with two-side coating on request as described above.

Contact pressure fixture, holder for crossbeam and test pipes for tight fit and filter pressure made of stainless steel.

Twist outlet and perforated plate made of galvanized sheet metal, coating with disinfectant-proof epoxy polyester resin, colour to RAL 9010 (pure white) or as required. Class H13 or H14 HEPA filter cell (to DIN EN 1822-1), filter cell frame made of aluminium.

All parts are made of rustproof material or protected from corrosion, and are disinfectant-resistant.

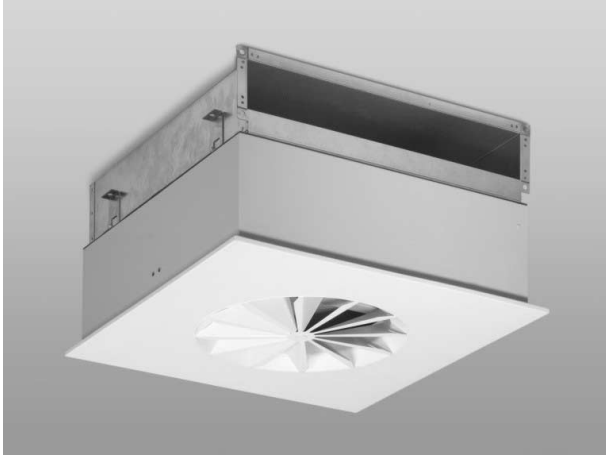


- Key:**
- 1a Filter housing
 - 1b Connection housing
 - 2 HEPA filter cell
 - 2a Cell frame
 - 2b Dry sealing
 - 3 Twist outlet or perforated plate
 - 4 Contact pressure fixture (detachable)
 - 5 Sealing frame
 - 5a Test groove
 - 6 Leakage test point
 - 7 Pressure gauge point
 - 8 Connection spigot (lateral or top)
 - 11 Cross beam (detachable)
 - 12 Fastening screw
 - 13 Sealing
 - 14 L-fastener
 - 15 Corner sheet
 - 16 Baffle plate

Housing size	Twist outlet size (Type RA-N) ⁵⁾	Filter cell L x B x H ⁴⁾ mm	Volume flow rate								Pressure loss ¹⁾			Dimensions													Total weight approx. kg		
			\dot{V}_{max} l/s	\dot{V}_{max} m ³ /h	\dot{V}_{min} l/s	\dot{V}_{min} m ³ /h	\dot{V}_{nenn} l/s	\dot{V}_{nenn} m ³ /h	u_{nenn} m/s	Δp_{nenn} Pa	$\Delta p_{t,nenn}$ Pa	Filter cell ²⁾		Total ³⁾		□A	□B	□C	D	□E	L	L ₁	Ø-G	K	M	N		P	R
												mm	mm	mm	mm														
Puridrall	PDV - 1	DN 180	457 x 457 x 66	55	200	20	75	40	150	0.20	68	93	482	532	542	80	510	322	363	199	40	452	125	151	272	18			
	PDV - 2	DN 250	457 x 457 x 66	110	400	38	140	95	340	0.45	160	180	482	532	542	80	510	322	363	199	40	452	125	151	272	18			
	PDV - 3	DN 315	457 x 457 x 66	125	450	55	200	95	340	0.45	160	175	482	532	542	80	510	322	363	199	40	452	125	151	272	18			
	PDV - 4	DN 315	545 x 545 x 66	165	600	55	200	135	480	0.45	160	190	570	610	620	80	590	322	363	224	40	540	125	151	372	24			
	PDV - 5	DN 355	610 x 610 x 66	195	700	85	300	170	605	0.45	155	170	635	685	695	80	663	322	363	249	60	605	125	151	435	27			
	PDV - 6	DN 400	610 x 610 x 90	250	900	110	400	225	805	0.60	155	170	635	685	695	80	663	322	398	279	60	605	125	167	435	28			
	PDV - 7	DN 500	610 x 610 x 110	445	1600	195	700	335	1205	0.90	155	175	635	685	695	160	663	477	518	399	80	605	200	227	435	37			
Puri-inlet	PEV - 1	—	457 x 457 x 66	55	200	—	—	40	150	0.20	68	72	482	532	542	80	510	322	363	199	40	452	125	151	272	17.5			
	PEV - 2	—	457 x 457 x 66	125	450	—	—	95	340	0.45	160	180	482	532	542	80	510	322	363	199	40	452	125	151	272	17.5			
	PEV - 4	—	545 x 545 x 66	165	600	—	—	135	480	0.45	160	170	570	610	620	80	590	322	363	224	40	540	125	151	372	23.5			
	PEV - 5	—	610 x 610 x 90	280	1000	—	—	225	805	0.60	155	165	635	685	695	80	663	322	363	249	60	605	125	151	435	26			
	PEV - 7	—	610 x 610 x 110	555	2000	—	—	335	1205	0.90	155	170	635	685	695	160	663	477	518	399	80	605	200	227	435	36			

1) Initial pressure loss Δp -start (class H14 filter cell uncontaminated) at nominal volume flow rate \dot{V}_{nom}
 2) Recommendation: Filter replacement at Δp -end = 2 x Δp -start from chart on page 8, depending on selected volume flow rate
 3) Puridrall or Puri-inlet with filter cell
 4) Height H and pressure loss Δp_{nom} apply for our standard filter cells. Other heights and pressure losses apply for other filter cell makes and for filter cells with fluid sealing.

5) Other outlet types available on request



Puridrall with rectangular connection flange, lateral



Puri-inlet with perforated plate for return air intake



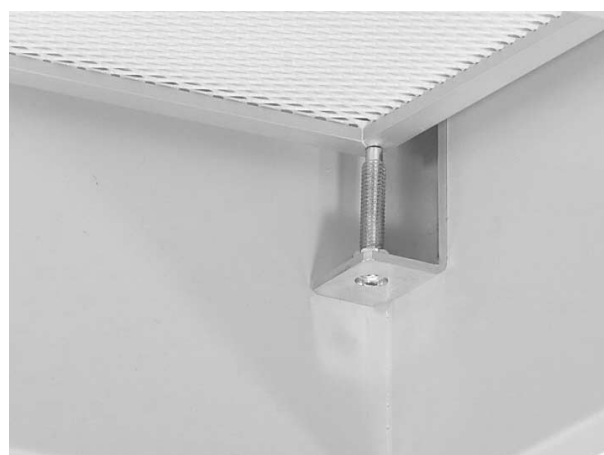
Puridrall with circular connection spigot, lateral



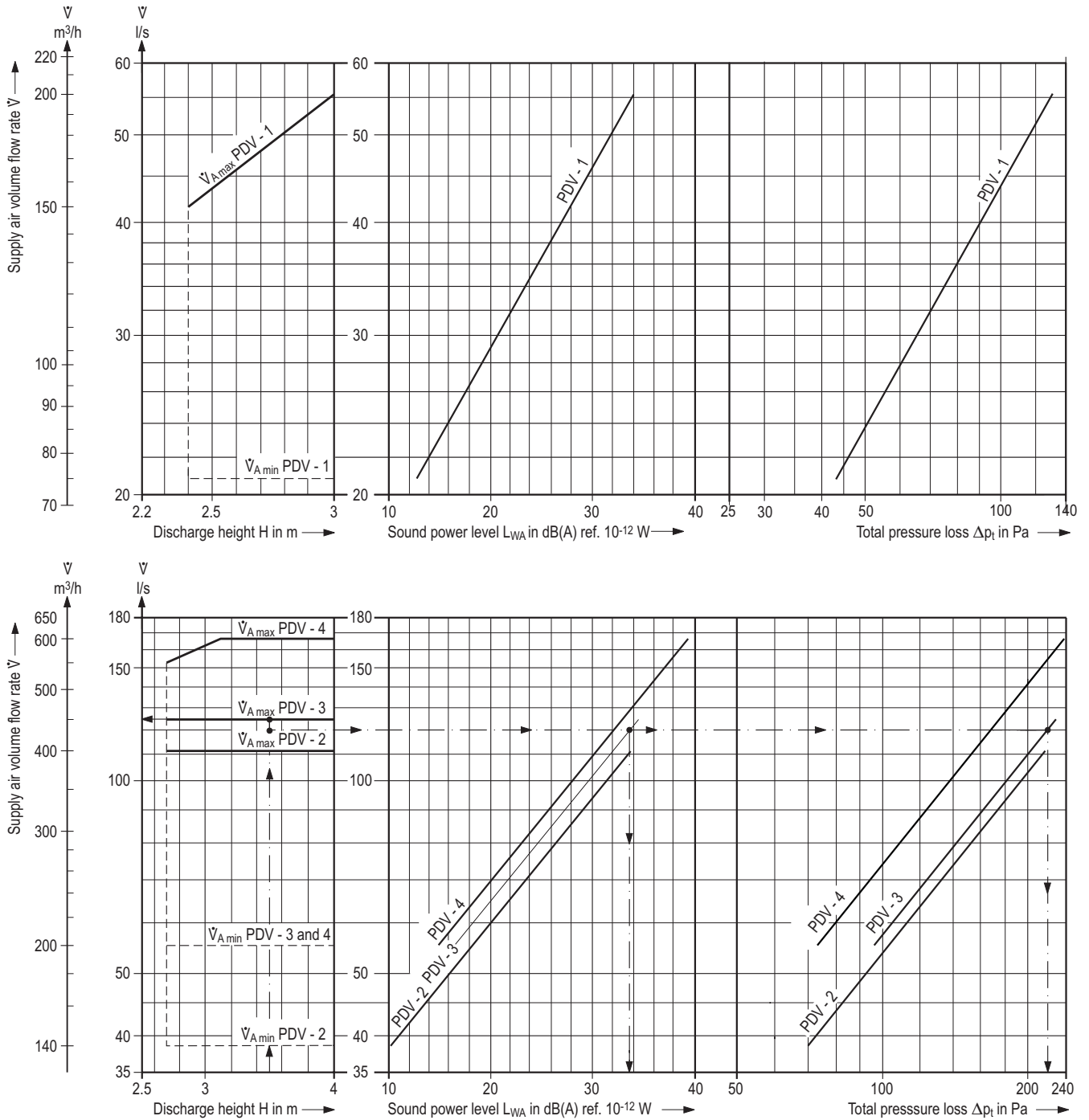
Housing for Puridrall and Puri-inlet, with dismantled outlet / inlet



Puridrall with circular connection spigot, on top



Contact pressure fixture and filter cell as built in (detail)



Layout example for Puridrall PDV-3:

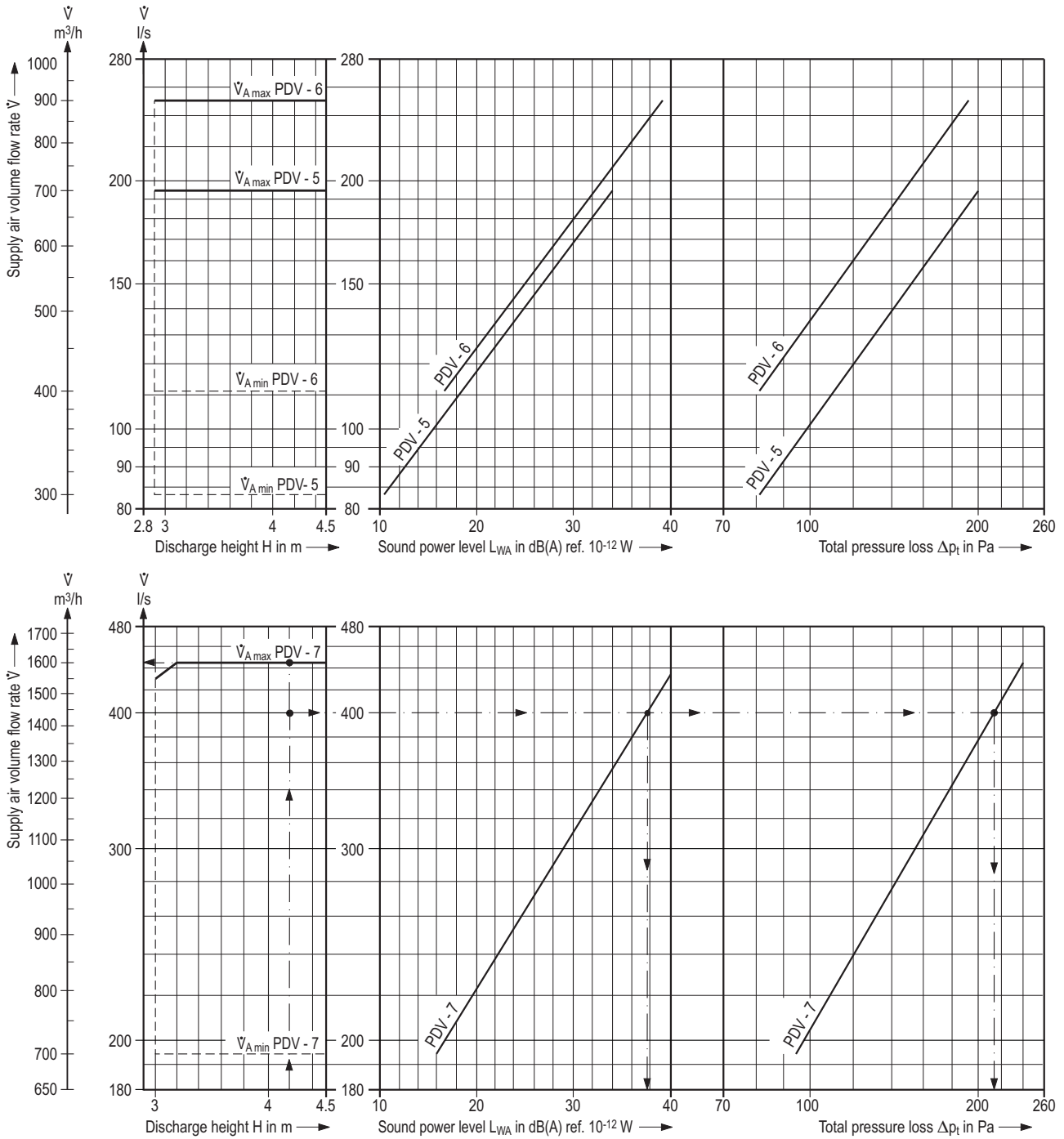
- 1 Supply air volume flow rate $\dot{V} = 5\,000$ l/s
- 2 Discharge height $H = 3.5$ m
- 3 Room area $A = 245$ m²
- 4 Specific volume flow rate $\dot{V}_{Sp} = 20.4$ l/(s · m²) (① : ③)
- 5 Max. perm. sound power level $L_{WA} = 35$ dB(A) ref. 10⁻¹² W

From chart:

- 6 $\dot{V}_{Amax} = 125$ l/s
- 7 \dot{V}_A selected = 120 l/s and hence
- 8 $Z = 42$ units from (① : ⑦)
- 9 $L_{WA} \approx 33$ dB(A) ref. 10⁻¹² W
- 10 $\Delta p_t \approx 220$ Pa
- 11 $t_{min} \approx 2.4$ m (Chart page 7)

Key:

- \dot{V} = Total supply air volume flow rate
- \dot{V}_{Amax} = Max. volume flow rate per Puridrall depending on discharge height (outlet to floor)
- $\dot{V}_{A sel.}$ = Selected volume flow rate per outlet
- H = Discharge height
- Δp_t = Total pressure loss of Puridrall with uncontaminated filter cell
- t_{min} = Minimum Puridrall spacing
- \dot{V}_{Sp} = Specific air volume flow rate per m² of room area



Layout example for Puridral PDV-7:

- 1 Supply air volume flow rate $\dot{V} = 9\,700 \text{ l/s}$
- 2 Discharge height $H = 4.2 \text{ m}$
- 3 Room area $A = 415 \text{ m}^2$
- 4 Specific volume flow rate $\dot{V}_{Sp} = 23.4 \text{ l/(s} \cdot \text{m}^2) \text{ (① : ③)}$
- 5 Max. perm. sound power level $L_{WA} = 40 \text{ dB(A) ref. } 10^{-12} \text{ W}$

From chart:

- 6 $\dot{V}_{Amax} = 444 \text{ l/s}$
- 7 $\dot{V}_{A \text{ selected}} = 400 \text{ l/s}$ and hence
- 8 $Z = 24$ units from (① : ⑦)
- 9 $L_{WA} \approx 38 \text{ dB(A) ref. } 10^{-12} \text{ W}$
- 10 $\Delta p_t \approx 215 \text{ Pa}$
- 11 $t_{min} \approx 4.15 \text{ m}$ (Chart page 7)

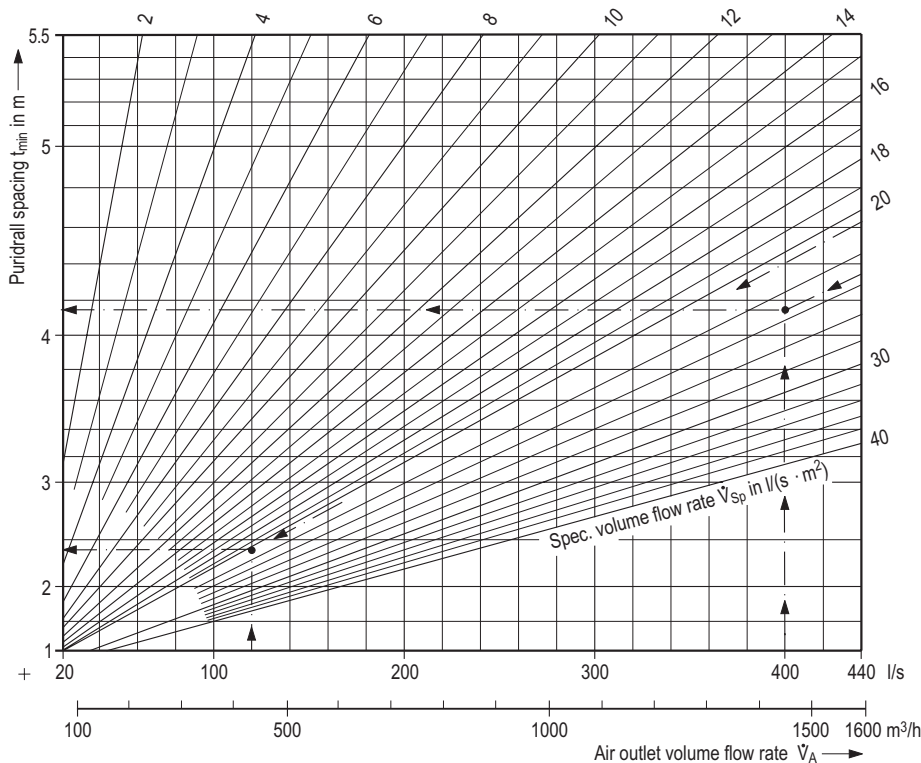
Key:

- \dot{V} = Total supply air volume flow rate
- \dot{V}_{Amax} = Max. volume flow rate per Puridral depending on discharge height (outlet to floor)
- $\dot{V}_{A \text{ sel.}}$ = Selected volume flow rate per outlet
- H = Discharge height
- Δp_t = Total pressure loss of Puridral with uncontaminated filter cell
- t_{min} = Minimum Puridral spacing
- \dot{V}_{Sp} = Specific air volume flow rate per m^2 of room area

Total pressure loss and sound power level for Puridrall

Puridrall housing size	Outlet volume flow rate		Total pressure loss Δp_t Pa	L_{WA} dB(A)	Sound power level L_W in dB ref. 10^{-12} W						
	\dot{V} l/s	\dot{V} m ³ /h			Octave band centre frequency in Hz						
					63	125	250	500	1000	2000	4000
PDV - 1	22	80	47	14	17	21	16	14	—	—	—
	33	120	73	23	26	30	25	23	16	—	—
	44	160	100	29	32	36	31	29	22	16	—
	55	200	128	34	37	41	36	34	27	21	—
PDV - 2	55	200	105	18	27	28	20	14	—	—	—
	70	250	135	23	32	33	25	19	14	—	—
	85	300	160	27	36	37	29	23	18	17	16
	110	400	220	34	43	44	36	30	25	24	23
PDV - 3	85	300	153	26	36	37	24	18	19	15	15
	97	350	180	29	40	40	28	22	23	18	19
	110	400	210	32	43	43	31	25	26	21	22
	125	450	232	34	45	46	33	27	28	24	24
PDV - 4	85	300	112	24	29	32	22	17	16	17	17
	110	400	155	31	35	38	28	23	23	23	23
	140	500	195	35	40	43	33	28	28	28	28
	165	600	238	39	44	47	37	32	31	32	32
PDV - 5	110	400	110	18	31	31	19	—	—	—	—
	140	500	140	25	38	37	25	18	—	—	—
	165	600	170	30	43	42	30	23	17	—	—
	195	700	200	34	47	47	35	28	21	18	16
PDV - 6	165	600	125	28	35	35	30	25	23	17	—
	195	700	148	32	39	39	34	29	27	21	—
	220	800	170	36	43	43	38	33	31	25	17
	250	900	190	39	46	46	41	36	34	28	20
PDV - 7	280	1000	141	27	35	36	31	25	18	—	—
	335	1200	174	32	40	41	36	30	23	—	—
	390	1400	208	37	45	46	41	35	28	19	—
	445	1600	240	41	49	50	45	39	32	23	17

Minimum Puridrall spacing



1. Example Puridrall PDV-3 (see page 5)

Air outlet volume flow rate $\dot{V}_A = 120$ l/s
 Specific volume flow rate $\dot{V}_{Sp} = 20.4$ l/(s · m²)¹⁾
 Min. Puridrall spacing $t_{min} \approx 2.4$ m²⁾

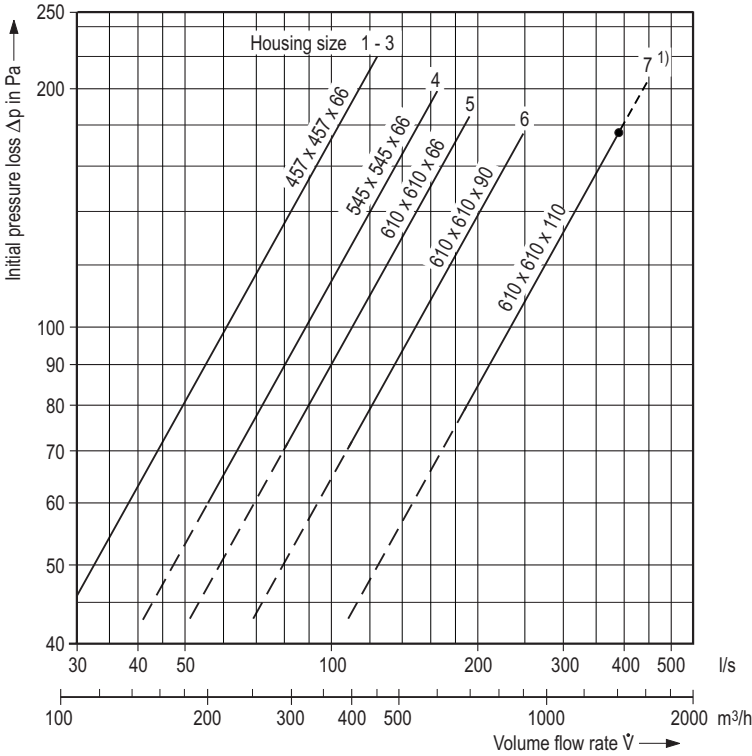
2. Example Puridrall PDV-7 (see page 6)

Air outlet volume flow rate $\dot{V}_A = 400$ l/s
 Specific volume flow rate $\dot{V}_{Sp} = 23.4$ l/(s · m²)¹⁾
 Min. Puridrall spacing $t_{min} \approx 4.15$ m²⁾

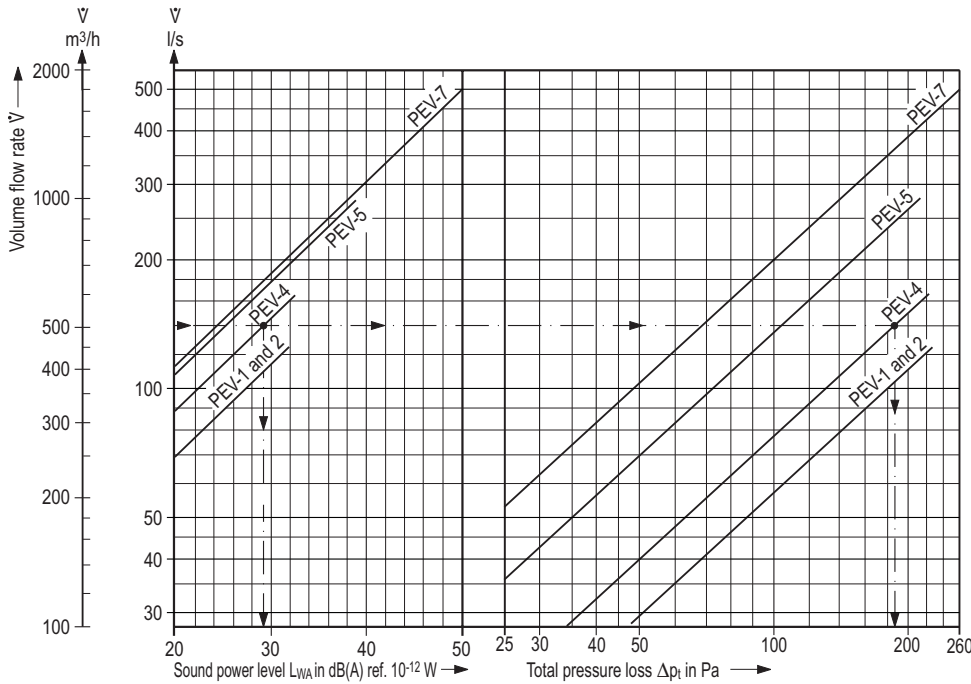
1) Related to floor area

2) When the Puridrall outlets are unevenly spaced the t_{min} selected can be max. 25% smaller

Pressure loss of class H14 ¹⁾ HEPA filter



1) Housing size 7: Volume flow rate > 1400 m³/h corresponds to class H13



Layout example for Puri-inlet:

- 1 Return air volume flow rate $\dot{V} = 6945$ l/s
- 2 Max. permitted sound power level $L_{WA} = 35$ dB(A) ref. 10^{-12} W

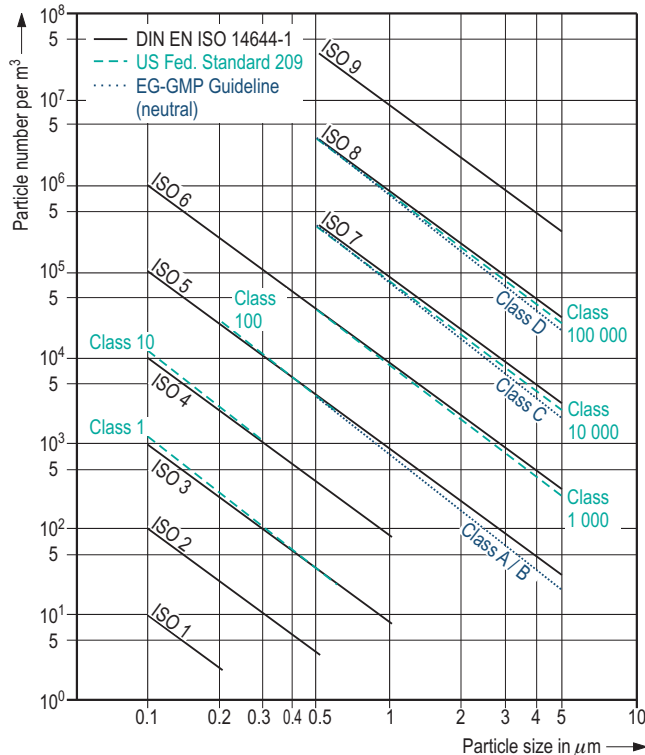
From chart:

- 3 Selected Puri-inlet = PEV-4
- 4 Volume flow rate per inlet = 140 l/s
- 5 Number of Puri-inlet = 50 units from (1) : (4)
- 6 Sound power level $L_{WA} \approx 29$ dB(A) ref. 10^{-12} W
- 7 Pressure loss $\Delta p_t = 185$ Pa

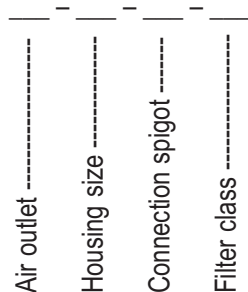
Total pressure loss and sound power level for Puri-inlet

Puri-inlet housing size	Volume flow rate		Total pressure loss Δp_t Pa	L_{WA} dB(A)	Sound power level L_W in dB ref. 10^{-12} W						
	\dot{V} l/s	\dot{V} m³/h			Octave band centre frequency in Hz						
					63	125	250	500	1000	2000	4000
PEV - 1	28	100	45	16	20	26	16	--	--	--	--
	40	150	73	24	28	34	24	21	17	--	--
	55	200	95	30	34	40	30	27	23	17	--
PEV - 2	55	200	95	16	20	26	16	--	--	--	--
	85	300	150	24	28	34	24	21	17	--	--
	125	450	230	32	36	42	32	29	25	19	--
PEV - 4	110	400	145	25	29	35	25	22	18	--	--
	140	500	180	29	33	39	29	26	22	16	--
	165	600	220	33	37	43	33	30	26	20	--
PEV - 5	165	600	123	29	37	41	33	23	20	--	--
	220	800	165	35	43	47	39	29	26	20	--
	280	1000	205	39	47	51	43	33	30	24	15
PEV - 7	280	1000	140	39	48	52	43	32	28	24	15
	415	1500	210	47	56	60	51	40	36	32	23
	555	2000	280	52	61	65	56	45	41	37	28

Cleanliness classes to DIN EN ISO 14644-1, US Federal Standard 209 and EG-GMP Guideline



Type code



Air outlet:

PDV = Puridrall variant; PEV = Puri-inlet variant

Housing size:

1 to 7

Connection:

ES = rectangular, lateral
RS = circular, lateral
RO = circular, on top

Filter class to DIN EN 1822-1: H13 or H14

Example:

Puridrall, housing size PDV - 4, with lateral rectangular connection flange, filter class H14:
Type PDV - 4 - ES - H14

Puri-inlet, housing size PEV - 5, with lateral circular connection spigot, filter class H13:
Type PEV - 5 - RS - H13

Features

- For cleanliness classes 6 to 8 to DIN EN ISO 14644-1 (VDI 2083) or 1 000 to 100 000 to US Federal Standard 209 as well as C and D to EG-GMP
- With split housing; complete filter facility and air outlet elements in the lower housing segment (filter housing), air connection at the upper housing segment (connection housing)
- As **Puridrall** for air supply with twist outlet (Type RA-N) for horizontal, radial air discharge and for generating high-induction, turbulent mixing-air flow
- Even dilution of pollutants emitted in room
- As **Puri-inlet** for air filtering directly at the collection point, with perforated plate for air intake
- Filter housing (lower segment) airtight to DIN 25414; max. leakage volume flow rate well below 0.003% of nominal volume flow rate at a pressure differential of 2000 Pa
- HEPA filter cell, type tested to DIN EN 1822-1, filter class H13 or H14 (optional)
- Filter cell frame with dry sealing
- Filter sealing frame for dry sealing with connection for pressure differential measurement, particle sampling and leakage testing to DIN 1946, Part 4
- Compact construction with easy accessibility for disinfection and maintenance work
- Low pressure loss and low sound power level
- Air connection either lateral, rectangular or circular, or on top, circular
- All parts rustproof or protected against corrosion
- Well suited for refitting existing HVAC systems in clean rooms

Tender text

..... units

Puridrall, air outlet for clean rooms with twist outlet for turbulent mixing air flow and pronounced induction effect between supply air and indoor air, easily detachable from room,

suitable for clean rooms of classes 6 to 8 to DIN EN ISO 14644-1 or 1 000 to 100 000 to US Federal Standard 209 as well as C and D to EG-GMP,

Puri-inlet, air inlet for filtration of return air from clean rooms directly at the collection point, with perforated plate air inlet for air intake,

filter housing air-tight to DIN 25414, including sealing frame for dry sealing with surrounding test groove for tightness test to DIN 1946, Part 4,

contact pressure fixture for filter cell, replacement filter cell from below.

Air connection with

- rectangular connection flange, lateral,
- circular connection spigot, lateral, on top,

Measurement point for pressure differential as well as particle sampling on the untreated air side.

HEPA filter cell with cell frame, including dry sealing.

Technical data:

Volume flow rate: l/s (m³/h)

Filter class: H13
 H14¹⁾

Perm. sound power level: dB(A) ref. 10⁻¹² W

Total pressure loss with uncontaminated filter cell Pa

Materials:

Filter housing, sealing frame and twist outlet: Galvanized sheet metal

Surface protection: Epoxy polyester resin coating, disinfectant-proof

Connection housing: Galvanized sheet metal

Surface protection: Epoxy polyester resin coating, disinfectant-proof

Contact pressure fixture: Stainless steel

Filter cell frame: Aluminium

Colour

– housing: painted to RAL 7035 (light grey)

– square visible surface incl. air outlet: painted to RAL 9010 (pure white) or RAL

Dimensions:

Housing LxWxH: mm x mm x mm

Filter cell LxWxH: mm x mm x mm

Weight with filter cell: kg

Make: KRANTZ KOMPONENTEN

Type: _ - _ - _ - _ - _

1) Available for sizes 1-6 and size up to 1400 m³/h; size 7 > 1400 m³/h corresponds to class H13

Subject to technical alterations!