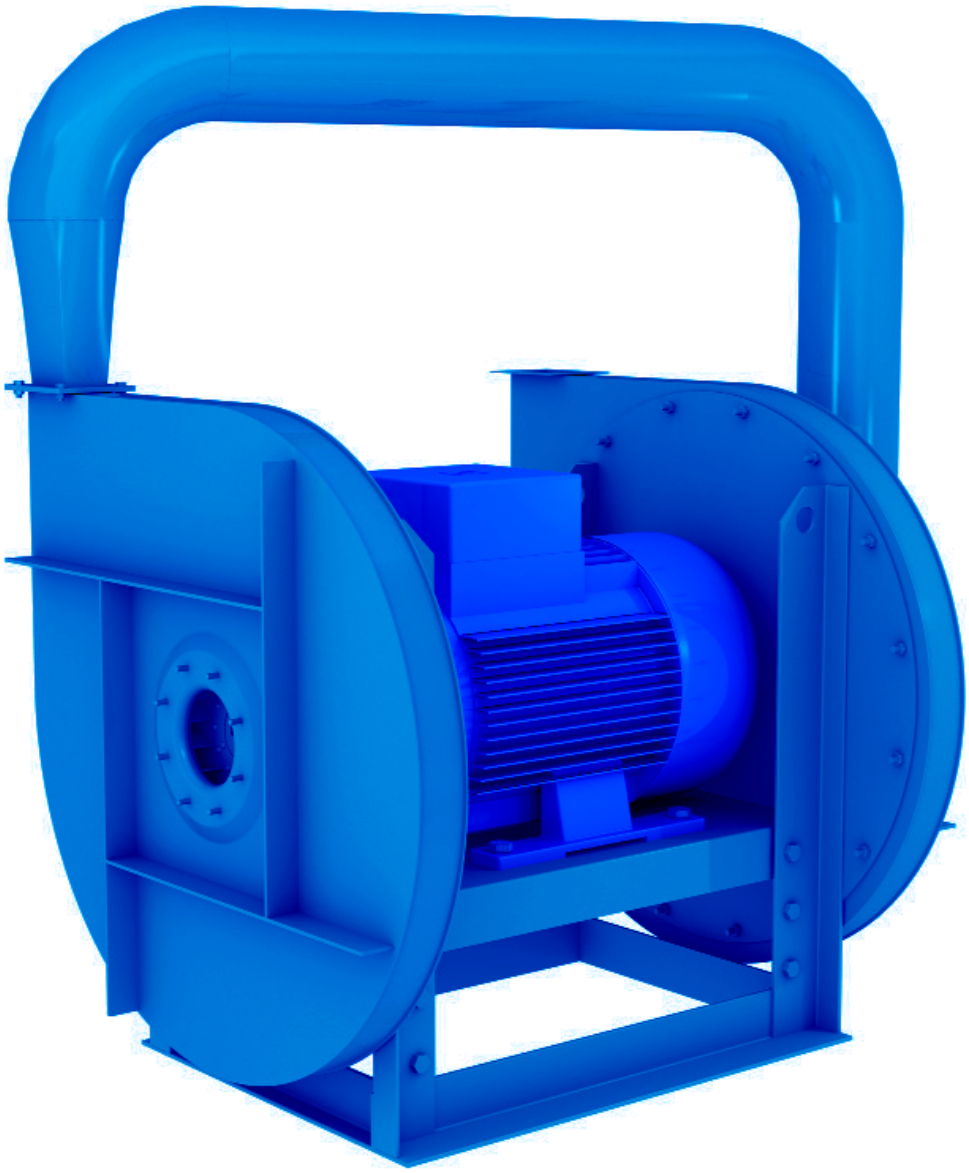
HIGH PRESSURE BLOWERS
CENTRIFUGAL AND AXIAL FANS
AIR FILTERS
AIR HANDLING UNITS
TUNNEL ENGINEERING

SAVIO S.r.l.

VENTILATORI CENTRIFUGHI
CENTRIFUGAL FANS
VENTILATEURS CENTRIFUGES
ZENTRIFUGAL VENTILATOREN



Serie SRED – SRFD – SRGD

INDICE

SUMMARY

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INHALTSANGABE

GENERAL PRINCIPLES OF THE FAN DESIGN

1) PARAMETERS

The main parameters, characteristic to a fan, are four in number:

Capacity (V) Pressure (p) Efficiency (η) Speed of rotation (n° min.$^{-1}$)

1.1) Capacity:

The capacity is the quantity of fluid moved by the fan, in volume, within a unit of time, and it is usually expressed in m^3/h, $m^3/min.$, m^3/sec.

1.2) Pressure:

The total pressure (pt) is the sum of the static pressure (pst), i.e. the energy required to withstand opposite frictions from the system, and the dynamic pressure (pd) or kinetic energy imparted to the moving fluid (pt = pst + pd).
The dynamic pressure depends on both fluid speed (v) and specific gravity (y).

$$pd = \frac{1}{2} \bullet y \bullet v^2$$

Where: pd = dynamic pressure (Pa); y = specific gravity of the fluid (Kg/m^3); v = fluid speed at the fan opening worked by the system (m/sec)

$$v = \frac{V}{A}$$

Where: V = capacity (m^3/sec); A = gauge of the opening worked by the system (m^2); v = fluid speed at the fan opening worked by the system (m/sec)

1.3) Efficiency:

The efficiency is the ratio between the energy yielded by the fan and the energy input to the fan driving motor.

$$\eta = \frac{V \bullet pt}{1{,}02 \bullet P}$$

Where: η = efficiency = (%); V capacity (m^3/sec); P = absorbed power (kW); pt = total pressure (daPa)

1.4) Speed of rotation:

The speed of rotation is the number of revolutions the fan impeller has to run in order to meet the performance requirements.
As the number of revolutions varies (n), while the fluid specific gravity keeps steady (y), the following variations take place:

The capacity (V) is directly proportional to the speed of rotation, therefore :

$$V_1 = V \bullet \frac{n_1}{n}$$

Where: n = speed of rotation; V = capacity; V_1 = new capacity obtained upon varying of the speed of rot.; n_1 = new speed of rotation

The total pressure (pt) varies as a function of the squared ratio of the speeds of rotation; therefore:

$$pt_1 = pt \bullet \left[\frac{n_1}{n}\right]^2$$

Where: n = speed of rotation; pt = total pressure; pt_1 = new total pressure obtained upon varying of the speed of rot.; n_1 = new speed of rotation

The absorbed power (P) varies as a function of the cubed ratio of the speeds of rotation therefore:

$$P_1 = P \bullet \left[\frac{n_1}{n}\right]^3$$

Where: n = speed of rotation; P = abs. power; P_1 = new electrical input obtained upon varying of the speed of rot.; n_1 = new speed of rotation

2) SIZING

The characteristics expressed in the following tables are referred to operation with fluid (air) at +15°C temperature and 760 mm Hg barometric pressure (specific gravity = 1.226 kg/m^3) .
The noise data are referred to a measurement taken in free field, at 1.5 m distance, with fan running at the maximum rate of efficiency.
The above-mentioned values undertake the following tolerance: ± 5% capacity - +3 dB(A) noise.
When the conveyed fluid conditions differ from the above-mentioned ones, the following should be considered, that the temperature and the barometric pressure are directly affecting the specific gravity of the fluid .
As the specific gravity varies, the volume flowrate (V) keeps on constant, and the pressure (pt) and power (P) vary directly as a function of the ratio of the specific gravities.

$$pt_1 = \frac{y_1}{y} \bullet pt \qquad P_1 = \frac{y_1}{y} \bullet P$$

Where: pt = total pressure; pt_1 = new total pressure obtained upon varying the specific gravity; P = absorbed power; P_1 = new abs. power obtained upon varying the specific gravity; y = fluid spec. gravity; y_1 = new specific gravity of the fluid

The specific gravity (y) may be calculated with the following formula:

$$y = \frac{Pb \bullet 13{,}59}{29{,}27 \bullet (273+t)}$$

Where: 273= absolute zero; t= fluid temp. (°C); y = air specific gravity at t °C (Kg/m^3); Pb = barometric pressure (mm Hg); 13,59 = mercury specific gravity at 0° C (kg/dm^3)

For ease of calculation, the air weight at various temperatures and heights a.s.l. have been included in the table below:

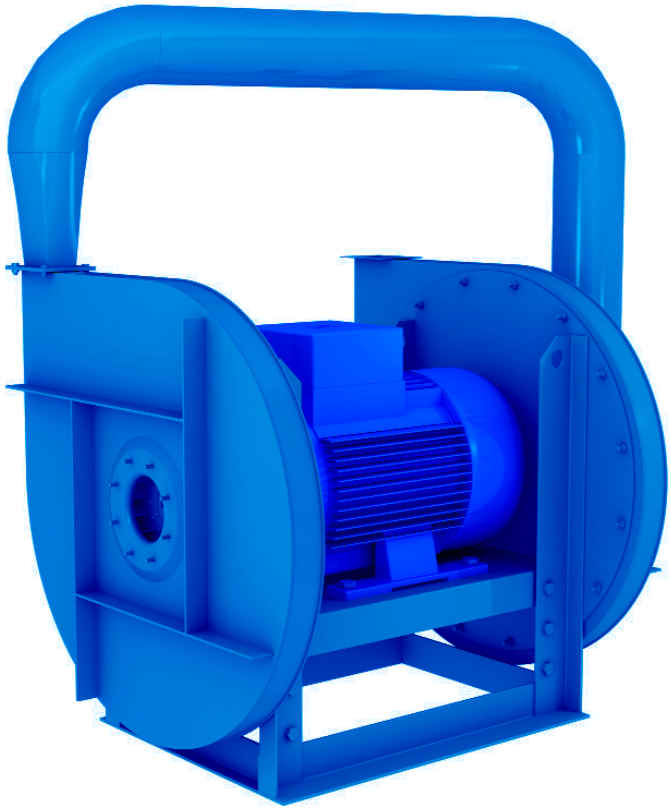
Height above sea level in meters	Temperature																				
	-40°C	-20°C	0°C	10°C	15°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C	100°C	120°C	150°C	200°C	250°C	300°C	350°C	400°C
0	1,514	1,395	1,293	1,247	1,226	1,204	1,165	1,127	1,092	1,060	1,029	1,000	0,972	0,946	0,898	0,834	0,746	0,675	0,616	0,566	0,524
500	1,435	1,321	1,225	1,181	1,161	1,141	1,103	1,068	1,035	1,004	0,975	0,947	0,921	0,896	0,851	0,790	0,707	0,639	0,583	0,537	0,497
1000	1,355	1,248	1,156	1,116	1,096	1,078	1,042	1,009	0,977	0,948	0,920	0,894	0,870	0,846	0,803	0,746	0,667	0,604	0,551	0,507	0,469
1500	1,275	1,175	1,088	1,050	1,032	1,014	0,981	0,949	0,920	0,892	0,866	0,842	0,819	0,797	0,756	0,702	0,628	0,568	0,519	0,477	0,442
2000	1,196	1,101	1,020	0,984	0,967	0,951	0,919	0,890	0,862	0,837	0,812	0,789	0,767	0,747	0,709	0,659	0,589	0,533	0,486	0,447	0,414
2500	1,116	1,028	0,952	0,919	0,903	0,887	0,858	0,831	0,805	0,781	0,758	0,737	0,716	0,697	0,662	0,615	0,550	0,497	0,454	0,417	0,386

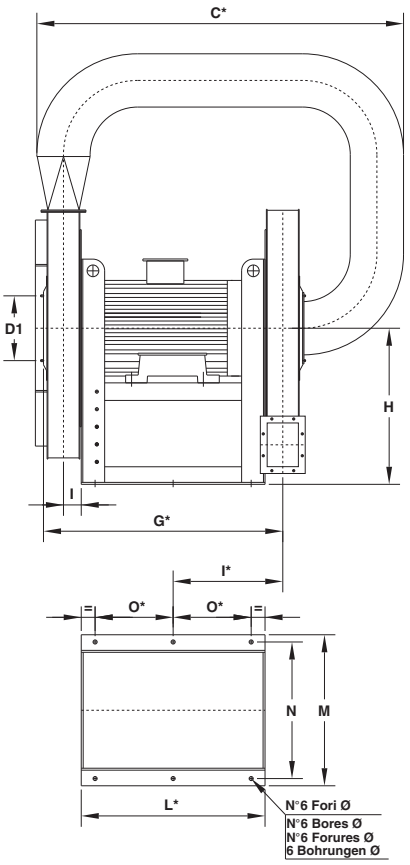
CARATTERISTICHE TECNICHE
Serie di ventilatori a doppio stadio con accoppiamento diretto per alte pressioni (portate tra 10 e 400 m^3/minuto e pressioni tra 150 e 5000 daPa), idonee per il trasporto fumi e polveri, in miscela con l'aria fino alla temperatura massima di +80°C.
Questa serie di ventilatori è caratterizzata da un elevato rendimento. Vengono utilizzati per i trasporti pneumatici, nei mulini, nei pastifici, nelle industrie siderurgiche, chimiche, metallurgiche dove siano richieste medie e piccole portate con altissime pressioni.
COSTRUZIONE
Coclea in acciaio di forte spessore con girante in acciaio saldato a pale rovesce.

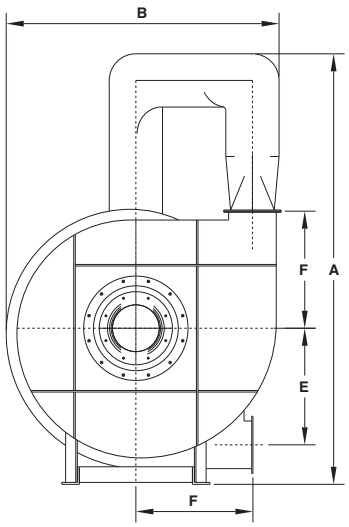
TECHNICAL FEATURES
Set of doubles stage direct-coupling fans for high pressure flow rates (from 10 through 400 m^3/min and from 150 through 5000 daPa), suitable for conveyance of fumes and dust, mixed with air, having +80° C max. temperature.
This series of fans is characterised by high output. They are used for conveying air in mills, bakeries, iron and steel, chemical, metallurgic industries where small flow rates with high pressure are needed.
CONSTRUCTION FEATURES
Strong thickness steel fan casing with welded steel impeller and inverted blades.

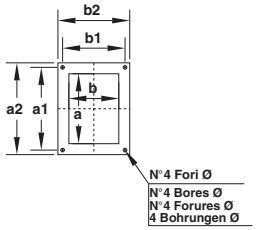
CARACTERISTIQUES TECHNIQUES
Série de ventilateurs à deux stages à accouplement direct pour pressions hautes (débits compris entre 10 et 400 m^3/min et pressions entre 150 et 5000 daPa), adaptés au transport des fumées et des poussières mélangées à l'air, jusqu'à une température maximale de +80°C.
Cette série de ventilateurs sont caractérisées par un rendement élève. Ils viennent utilisés pour les transports pneumatiques, moulins, industries sidérurgique, chimiques, métallurgique, où sont demandés des petits débits avec hautes pression.
CONSTRUCTION
Virole en acier en fort épaisseur avec turbine en acier soudée à pales renversées.

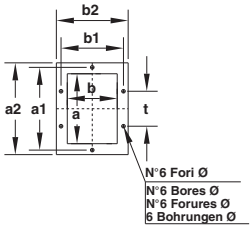
TECHNISCHE MERKMALE
Serie Ventilatoren von 2-stufigen Ventilatoren mit direkter Kupplung für hohe Drücke (Fördermengen zwischen 10 und 400 m^3/min und Drücke zwischen 150 und 5000 daPa), geeignet zum Transport von Rauch und Staub gemischt mit Luft bis zu einer Höchsttemperatur von +80°C.
Diese Serie Ventilatoren zeichnet sich durch hohe Leistungen aus.
Sie finden ihren Einsatz bei den pneumatischen Transporten, in den Mühlen und Teigwarenfabriken, der Hüttenindustrie, sowie der chemischen und metallurgischen Industrie, wo kleine Fördermengen mit hohen Drücken verlangt werden.
BAUAUSFÜHRUNG
Förderschnecke aus bemessenem Stahl mit Laufrad aus geschweißtem Stahl und nach rückwärts Ventilator flügeln

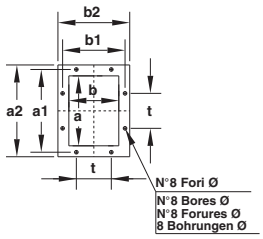


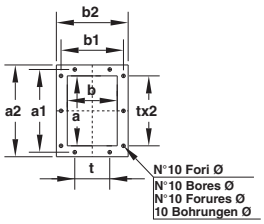












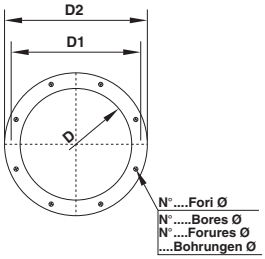
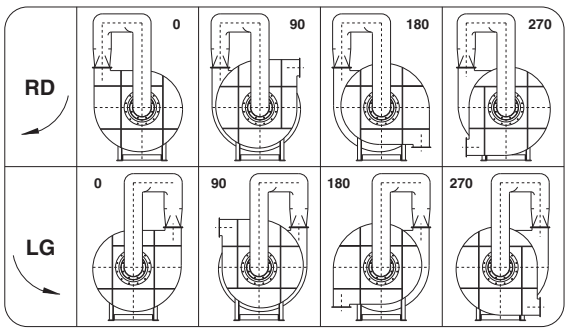


Tabella orientamenti
Table of discharge positions

Tableau d'orientation
Tabelle der Gehäusestellungen



Tipo-Type-Typ-Tipo		Ventilatore Fan Ventilateur Ventilator							Basamento Base Chassis Sockel						Flangia aspirante Inlet flange Bride a l'aspiration Flansch saugseitig					Flangia premente Outlet flange Bride en refoulement Flansch drückseitig									Peso Weight Poids Gewicht	PD^2 GD^2
Ventilatore Fan Ventilateur Ventilator	Motore Motor Moteur Motor	A	B	C*	E	F	G*	H	I*	L*	M	N	O*	Ø	D	D_1	D_2	N°	Ø	a	b	a_1	b_1	a_2	b_2	t	N°	Ø	kg	kgm^2
SRED 631/A	132 SB2	1350	775	950	330	355	580	425	265	440	355	315	180	12	164	200	235	8	11,5	100	71	125	100	160	131	-	4	9	180	4,6
SRED 712/A	132 MB2	1450	860	990	380	400	580	475		480			200		164	200	235	8	11,5	100	71	125	100	160	131	-	4	9	265	6,4
SRED 711/A	160 MR2			1090			710		330	610	410	360	225	14															300	8
SRED 801/A	160 L2	1550	950	1140	430	450	785	530	370	650	460	400	250		164	200	235	8	11,5	100	71	125	100	160	131	-	4	9	390	12,6
SRED 901/A	180 M2	1750	1150	1350	530	550	825	630	385	670	530	470	250	17	184	219	255	8	11,5	112	80	140	112	172	140	112	4	11	510	20
SRED 1003/A	200 LR2	2280	1400	1850	600	630	980	710	450	760	650	580	280	19	228	265	299	8	11,5	180	125	219	167	250	195	112	6	11	750	30
SRED 1002/A	200 L2																												770	32
SRED 1001/A	225 M2			1760			1000		460	780																			810	35
SRED 1001/B	250 M2			1900			1070		491	835	680	600	315	22															880	
SRED 1122/A	280 S2	2100	1500	1750	630	670	1280	800	590	1020	750	680	355		255	292	325	8	11,5	200	140	241	182	270	210	112	8	11	1400	50
SRFD 631/A	160 MR2	1580	960	1200	420	425	810	560	370	610	410	360	225	14	205	241	275	8	11,5	160	112	200	153	230	182	112	6	11	305	6
SRFD 631/B	160 M2																												320	
SRFD 712/A	160 M2	1700	1100	1330	470	475	830	630	375	610	460	400	225	14	228	265	299	8	11,5	180	125	219	167	250	195	112	6	11	410	10
SRFD 712/B	160 L2			1370			870		395	650			250																425	
SRFD 711/A	160 L2																												430	11,5
SRFD 711/B	180 M2			1385			885		405	670				17															455	
SRFD 802/A	180 M2	1850	1250	1400	530	530	900	710	415	670	530	470	250	17	255	292	325	8	11,5	200	140	241	182	270	210	112	8	11	575	17
SRFD 802/B	200 LR2			1490			990		460	760			280	19															625	
SRFD 801/A	200 LR2																												635	19
SRFD 801/B	200 L2																												645	
SRFD 902/A	225 M2	2100	1450	1620	600	600	1060	800	490	790	650	580	315	19	285	332	366	8	11,5	224	160	265	200	294	230	112	8	11	840	28
SRFD 902/B	250 M2			1700			1140		530	870			355	22															900	
SRFD 901/A	250 M2																												920	36
SRFD 901/B	280 S2			1850			1290		600	1020	700	630	400																1000	
SRFD 1002/A	280 S2	2400	1600	1950	670	670	1330	900	610	1020	700	630	400	22	320	366	401	8	11,5	250	180	292	219	320	250	112	10	11	1210	48
SRFD 1002/B	280 M2																												1240	
SRFD 1002/C	315 S2						1340		615	1030	800	730		24															1390	
SRFD 1001/A	280 M2						1330		610	1020	700	630																	1250	
SRFD 1001/B	315 S2						1340		615	1030	800	730																	1400	60
SRFD 1001/C	315 M2																												1430	
SRFD 1122/A	315 MG2	2400	1700	2100	742	750	1340	900	615	1030	850	780	400	24	360	405	441	8	11,5	315	224	366	273	395	304	125	10	11	1550	74
SRFD 1122/B	315 MK2			2200			1440		660	1130			450																1650	
SRGD 902/A	315 S2	2150	1500	1950	552	600	1450	800	650	1050	800	730	400	24	360	405	441	8	11,5	315	224	366	273	395	304	125	10	11	1300	30
SRGD 902/B	315 M2																												1330	
SRGD 901/A	315 M2																												1350	38
SRGD 901/B	315 MG2																												1420	
SRGD 1002/A	315 MK2	2450	1700	2200	700	750	1565	900	710	1150	900	830	450	24	405	448	486	12	11,5	355	250	405	300	435	330	125	10	11	1700	52
SRGD 1002/B	355 LB2			2500			1865		860	1450			560																2300	
SRGD 1002/C	355 LA2																												2400	64
SRGD 1001/A	355 LB2																												2350	
SRGD 1001/B	355 LA2																												2450	
SRGD 1001/C	355 LG2																												2750	

Tabella non impegnativa
The above date are unbinding
Tableay sans engagement
Maße unverbindlich

* **Dimensioni soggette a variazione in funzione della marca del motore**
Dimensions subject to variation according to the motor brand
Dimensions pouvant etre modifiees suivant la marque du moteur
Abmessungen sind abhänging vom Motorfabrikat

Peso ventilatore in kg (completo di motore)
Fan weight in kg (including motor)
Poids du ventilateur en kg (complet avec moteurs)
Ventilator Gewicht in kg (mit Motor)

Tipo / Type / Typ / Tipo						V = m³/min																												
Ventilatore Fan Ventilateur Ventilator	Motore Motor Moteur Motor	*KW ass.	KW inst.	n. min⁻¹	Lp dB/A	10	12	14	16	18	20	25	30	35	40	45	50	56	63	71	80	90	100	112	125	140	160	180	200	225	250	280	315	355	400
						Pt = kgf/m²																													
SRED 631/A	132 SB2	6,8	7,5	2900	81	1650	1600	1530	1450																									
SRED 712/A	132 MB2	8,2	9	2900	83	2100	2010	1950	1850	1750																								
SRED 711/A	160 MR2	10	11	2900	84	2400	2380	2300	2200	2150	2050																							
SRED 801/A	160 L2	17	18,5	2900	87		2780	2700	2600	2510	2420	2200																						
SRED 901/A	180 M2	20	22	2950	89			3100	3120	3140	3160	3180																						
SRED 1003/A	200 LR2	27	30	2950	92				3030	3060	3080	3090	3100	3100	3100																			
SRED 1002/A	200 L2	34	37	2950	93					3440	3460	3480	3490	3500	3510	3510																		
SRED 1001/A	225 M2	41	45	2950	94						4000	4050	4060	4060	4050																			
SRED 1001/B	250 M2	50	55	2950	95						4000	4050	4060	4060	4050	4030	4000	3940																
SRED 1122/A	280 S2	68	75	2950	97							4600	4650	4700	4750	4760	4760	4750	4700	4600														
SRFD 631/A	160 MR2	10	11	2900	82					1600	1590	1550	1500																					
SRFD 631/B	160 M2	13,5	15	2900	82					1600	1590	1550	1500	1450	1400																			
SRFD 712/A	160 M2	13,5	15	2900	84						1840	1830	1800	1760																				
SRFD 712/B	160 L2	17	18,5	2900	84						1840	1830	1800	1760	1710	1670	1610																	
SRFD 711/A	160 L2	17	18,5	2950	85							2050	2040	2000	1960																			
SRFD 711/B	180 M2	21	22	2950	86							2050	2040	2000	1960	1930	1880	1830																
SRFD 802/A	180 M2	21	22	2950	89								2380	2370	2320																			
SRFD 802/B	200 LR2	28	30	2950	90								2380	2370	2320	2270	2220	2170	2110															
SRFD 801/A	200 LR2	28	30	2950	91									2650	2620	2600	2580	2560																
SRFD 801/B	200 L2	35	37	2950	91									2650	2620	2600	2580	2560	2500	2400														
SRFD 902/A	225 M2	42	45	2950	94											3100	3080	3050	3000	2950														
SRFD 902/B	250 M2	51	55	2950	95											3100	3080	3050	3000	2950	2860	2790												
SRFD 901/A	250 M2	51	55	2950	96												3400	3390	3380	3370														
SRFD 901/B	280 S2	70	75	2950	97												3400	3390	3380	3370	3320	3250	3180	3090										
SRFD 1002/A	280 S2	70	75	2950	97														4000	3980	3950	3900												
SRFD 1002/B	280 M2	84	90	2950	97														4000	3980	3950	3900	3800	3700										
SRFD 1002/C	315 S2	100	110	2950	98														4000	3980	3950	3900	3800	3700	3600	3420								
SRFD 1001/A	280 M2	85	90	2950	99															4380	4370	4330												
SRFD 1001/B	315 S2	100	110	2950	99															4380	4370	4330	4300	4220	4100									
SRFD 1001/C	315 M2	125	132	2950	100															4380	4370	4330	4300	4220	4100	3980	3800							
SRFD 1122/A	315 MG2	150	160	2950	101																	5000	5000	5000	4980	4960								
SRFD 1122/B	315 MK2	185	200	2950	102																	5000	5000	5000	4980	4960	4940	4920	4850					
SRGD 902/A	315 S2	100	110	2950	96																				3500	3400	3300	3150						
SRGD 902/B	315 M2	125	132	2950	96																				3500	3400	3300	3150	3000	2800	2600			
SRGD 901/A	315 M2	125	132	2950	97																					3750	3650	3520	3400					
SRGD 901/B	315 MG2	150	160	2950	98																					3750	3650	3520	3400	3220	3000	2750		
SRGD 1002/A	315 MK2	185	200	2950	99																						4500	4400	4300	4180				
SRGD 1002/B	355 LB2	215	250	2950	100																						4500	4400	4300	4180	4000	3800		
SRGD 1002/C	355 LA2	235	250	2950	101																						4500	4400	4300	4180	4000	3800	3550	3220
SRGD 1001/A	355 LB2	215	225	2950	101																								4650	4600	4460			
SRGD 1001/B	355 LA2	235	250	2950	102																								4650	4600	4460	4300	4100	
SRGD 1001/C	355 LG2	280	300	2950	102																								4650	4600	4460	4300	4100	3750	3400

Pa (Pascal) = kgf/m² x 9,807

Tolleranza sulla portata ± 5 %
Capacity tolerance ± 5 %
Tolèrance sur le débit ± 5 %
Fördertoleranz ± 5 %

* KW assorbiti ventilatore alla massima portata
KW absorbed by fan at maximum capacity
KW absorbès per le ventilateurs au debit maximum
Aufgenommene KW vom Ventilator bei der Höchsten Fördermenge

Tolleranza sulla rumorosità ± 3 dB
Toleranz Schallpegel ± 3 dB

Noise level tolerance ± 3 dB
Tolérance sur niveau sonore ± 3 dB