FAST
TRATTAMENTO DELL'ARIA

Trattamento dell'aria

AIR HANDLING UNITS
FM Series

EUROVENT
CERTIFIED PERFORMANCE
AHU N. 04-04-051

0406-6180631-rev.1

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ICIM
ISO 9001 - Cert. n° 0882/0
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SELECTION MANUAL

GB

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1. Introduction

The air handling units **FM** (**F**ast **M**oduli) series represent the synthesis of experiences, studies and experimentations in the particular field of the “aeraulic” equipments.
The target is to give to the costumer a highly industrialized product, with all the consequent advantages in quality and reliability.
FM series units are able to satisfy all the particular needs of the climatization plant.
The new air handling units structure presents a new softer and ergonomic line made of aluminium profiles with both externally and internally rounded edges.
It is so possible to avoid internal dust heaps, typical of the sharp edges, with better quality and healthier treated air making also easier all the unit cleaning procedures.
In the air handling market FM series units represent the best choice, always supported by FAST technical and commercial departements.

The FM series, more than the nice look, includes the following characteristic elements:

- self supporting structure with aluminium framework and pentaposts in fiberglass reinforced nylon;
- unique panelling with real thickness of 50 mm, manufactured with the most qualified materials (galvanized sheets, galvanized prepainted sheets, peraluman, AISI 304 stainless steel for the skins and injected poliurethane and rockwool for the insulation);
- innovative system for air humidification with particular care of the air salubrity, to avoid developing of moulds and bacteria, and paying attention to the waste of water (IDROSENSORE);
- all the components are inside the casing and therefore the airflow is completely separated from the external atmospheric elements that could penalize the functionality and the performances of the air handling units;
- a wide range of accessories and executions are provided to give to the client an immediate view and check of all the operating conditions of the air handling unit.

FM series conforms EN1886 directive concerning mechanical strength, air leakages, thermal performances and acoustic insulation. The exact coupling between frame and panels allows UNI EN 1886 B class leakages, TÜV laboratories certified.

The declared performances are confirmed by EUROVENT certification (identification number AHU - 04 - 04 - 051).


CERTIFICATION PROGRAMME FOR
AIR HANDLING UNITS
EUROVENT
CERTIFIED PERFORMANCE
FAST S.p.A.
AIR HANDLING UNIT RANGE FM
AHU – 04 – 04 - 051

In the following chapters are represented the specific characteristics and performances; for anything not indicated, additional literature can be provided with the full availibility of our technical office.

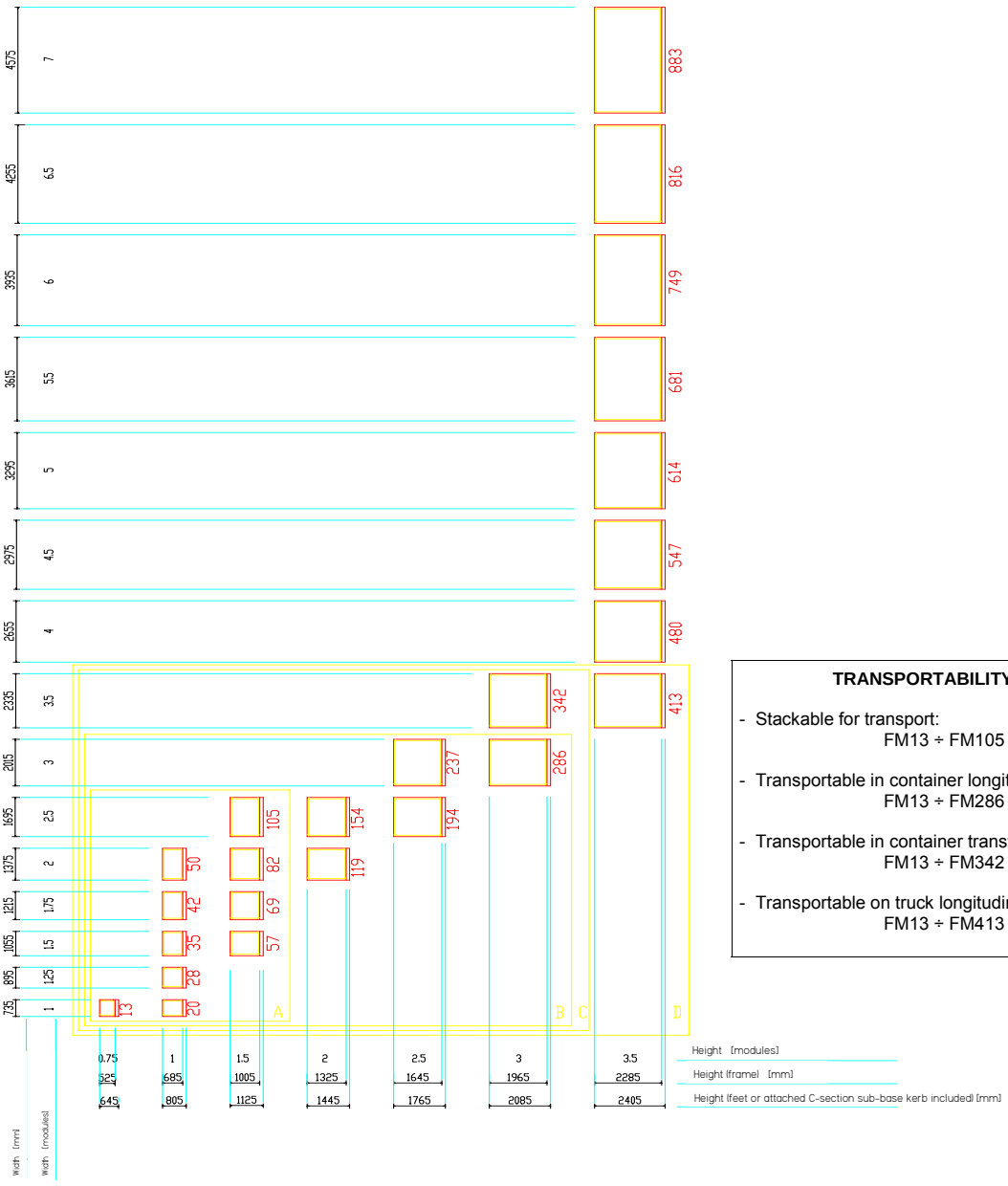
1.1 MODULARITY

Sizing of **FM** air handling units is based on a modular approach that permits the maximum standardisation of components while offering comprehensive coverage of the range of possible capacities.
The selection of the the size shall be done in conformity to the air face velocity at coils (max 3 m/s for cooling coils and max 4 m/s for heating coils).

The front dimensions and the lengths of the AHUs are modular according to a basic dimension of 160 mm (1/4 module), 320 mm (1/2 module) and 640 mm (1 module).
Each module is 640 mm. The smallest dimension envisaged is a quarter module, i.e. 160 mm.
Widths start from a single module up to a maximum of 7 modules.
Heights are from a minimum of 0.75 modules to a maximum of 3.5 modules.

1.2 SIZES

The 24 frames in the programme are shown in a front view in the following diagram.
On this sketch it the dimensions for transport are also indicated considering a maximum dimension of 2400 mm (width of truck). For AHUs with bigger length, it is necessary to split the unit in more sections.

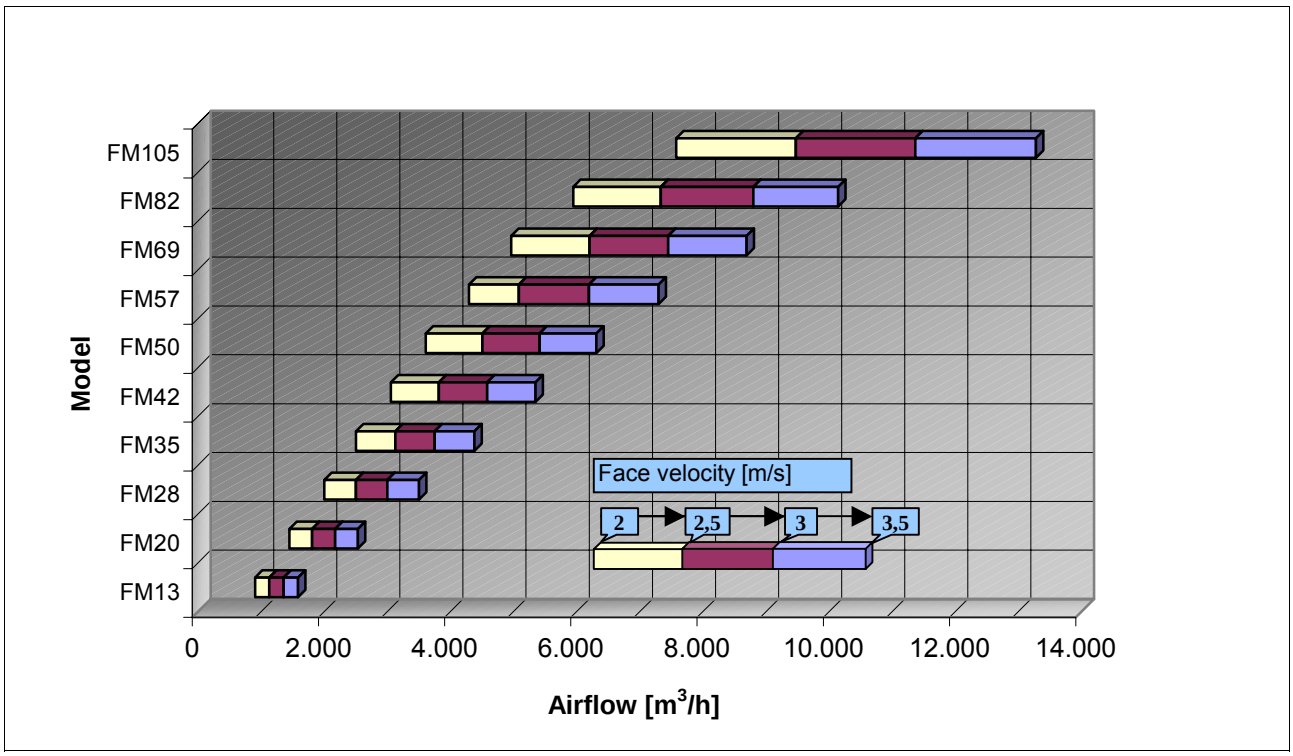


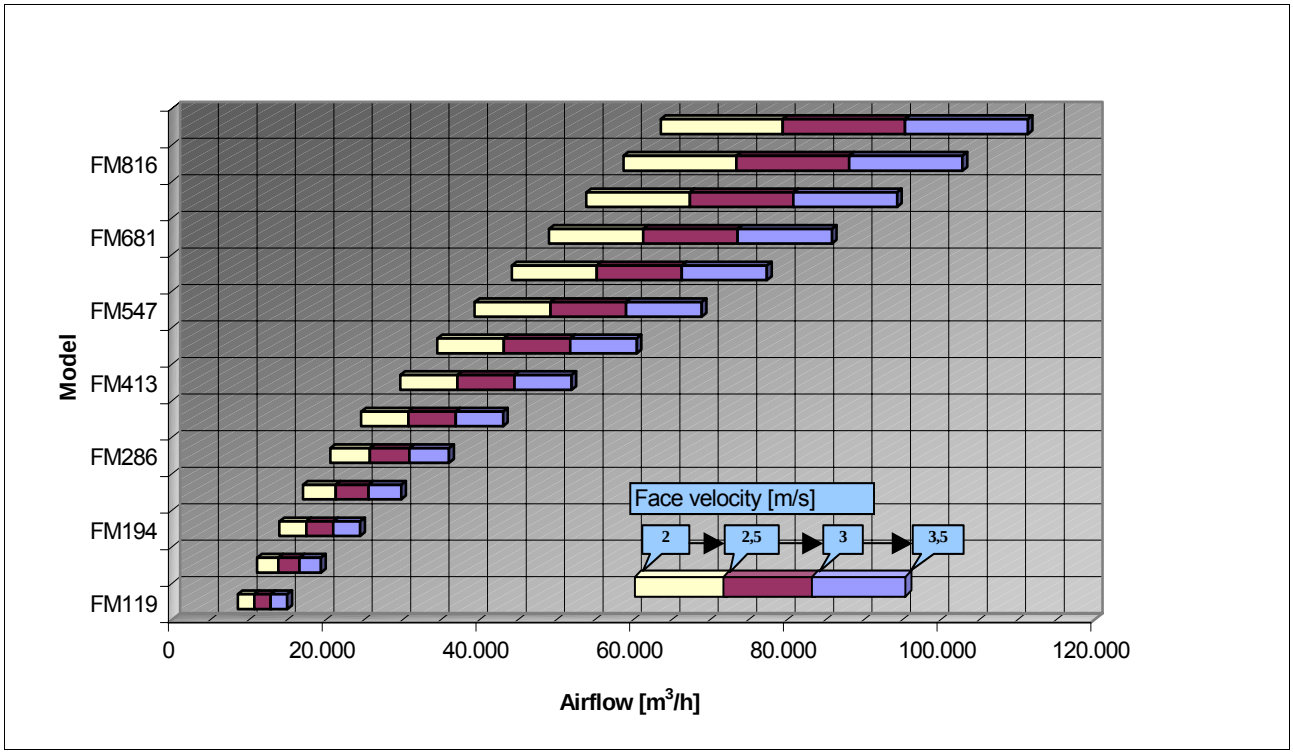
TRANSPORTABILITY

- Stackable for transport:
  FM13 ÷ FM105
- Transportable in container longitudinally:
  FM13 ÷ FM286
- Transportable in container transversally:
  FM13 ÷ FM342
- Transportable on truck longitudinally:
  FM13 ÷ FM413

1.3 CAPACITIES

Capacities are shown in the following diagrams, expressed in m^3/h corresponding to face velocities of 2 - 2.5 - 3 - 3.5 m/s
For sizing the unit, it is necessary to identify the treatment and then select the size according to the technical limits for the air velocity (conditioning and humidification F.V. ≤ 3 m/s, thermoventilation F.V. ≤ 4 m/s).





The table below shows:

- System frame size: FM code;
- Nominal height of system in modules (h_m);
- Nominal width of system in modules (w_m);
- Overall height of system including feet (h);
- Overall width of system (w);
- Internal height (h_i);
- Internal width (w_i);
- Face area of coils (S);
- Capacity of system in m^3/s corresponding to face velocity on coils of 2, 2.5, 3 and 3.5 m/s;
- Capacity of system in m^3/h corresponding to face velocity on coils of 2, 2.5, 3 and 3.5 m/s;

FM	Modules		Overall Dim.		Internal Dim.		Coil area	Air flow [m^3/s]				Air flow [m^3/h]			
	h_m	w_m	h	w	h_i	w_i	S	Face velocity [m/s]				Face velocity [m/s]			
	[mod]	*[mod]*	*[mm]*	*[mm]*	*[mm]*	*[mm]*	*[m^2]*	*2*	*2,5*	*3*	*3,5*	*2*	*2,5*	*3*	*3,5*
13	0,75	1	645	735	410	620	0,126	0,25	0,32	0,38	0,44	900	1.150	1.370	1.590
20	1	1	805	735	570	620	0,202	0,4	0,5	0,6	0,71	1.440	1.800	2.160	2.560
28	1	1,25	805	895	570	780	0,278	0,56	0,7	0,84	0,97	2.020	2.520	3.030	3.490
35	1	1,5	805	1055	570	940	0,348	0,7	0,87	1,04	1,22	2.520	3.130	3.740	4.390
42	1	1,75	805	1215	570	1100	0,425	0,85	1,06	1,27	1,49	3.060	3.820	4.570	5.370
50	1	2	805	1375	570	1260	0,502	1	1,25	1,5	1,76	3.600	4.500	5.400	6.340
57	1,5	1,5	1125	1055	890	940	0,566	1,13	1,41	1,7	1,98	4.070	5.080	6.120	7.130
69	1,5	1,75	1125	1215	890	1100	0,69	1,38	1,73	2,07	2,42	4.970	6.230	7.450	8.710
82	1,5	2	1125	1375	890	1260	0,815	1,63	2,04	2,45	2,85	5.870	7.340	8.820	10.260
105	1,5	2,5	1125	1695	890	1580	1,053	2,11	2,63	3,16	3,69	7.600	9.470	11.380	13.290
119	2	2	1445	1375	1210	1260	1,191	2,38	2,98	3,57	4,17	8.570	10.730	12.850	15.010
154	2	2,5	1445	1695	1210	1580	1,539	3,08	3,85	4,62	5,39	11.090	13.860	16.630	19.400
194	2,5	2,5	1765	1695	1530	1580	1,944	3,89	4,86	5,83	6,8	14.000	17.500	20.990	24.480
237	2,5	3	1765	2015	1530	1900	2,369	4,74	5,92	7,11	8,29	17.070	21.300	25.600	29.840
286	3	3	2085	2015	1850	1900	2,862	5,72	7,16	8,59	10,02	20.590	25.780	30.920	36.070
342	3	3,5	2085	2335	1850	2220	3,419	6,84	8,55	10,26	11,97	24.620	30.780	36.940	43.090
413	3,5	3,5	2405	2335	2170	2220	4,127	8,25	10,32	12,38	14,44	29.700	37.150	44.570	51.980
480	3,5	4	2405	2655	2170	2540	4,799	9,6	12	14,4	16,79	34.560	43.200	51.840	60.440
547	3,5	4,5	2405	2975	2170	2860	5,471	10,94	13,68	16,41	19,15	39.390	49.250	59.080	68.940
614	3,5	5	2405	3295	2170	3180	6,143	12,29	15,36	18,43	21,5	44.250	55.300	66.350	77.400
681	3,5	5,5	2405	3615	2170	3500	6,815	13,63	17,04	20,44	23,85	49.070	61.340	73.580	85.860
749	3,5	6	2405	3935	2170	3820	7,487	14,97	18,72	22,46	26,2	53.890	67.400	80.860	94.320
816	3,5	6,5	2405	4255	2170	4140	8,159	16,32	20,4	24,48	28,55	58.750	73.440	88.130	102.780
883	3,5	7	2405	4575	2170	4460	8,831	17,66	22,08	26,49	30,91	63.580	79.500	95.370	111.280

2. Technical characteristic

2.1 CASING

2.1.1 EUROVENT CERTIFICATION

The code EN 1886 classifies the following characteristics of the AHUs

- Mechanical strength of casing
- Casing air leakage
- Filter bypass leakage
- Thermal performance of casing
- Acoustic insulation of casing

The design of the casing is very effective with regard to the above mentioned characteristics.

The declared characteristics are certified by the EUROVENT program by the TÜV laboratories.

Classified characteristic	Table	Class	Value specified in EN 1886
Casing strenght	1	2A	Max. relative deflection: 4 mm/m
- 400 Pa casing air leakage	2	B	Max. leakage rate: 0.44 l/sm^2
+ 700 Pa casing air leakage	3	B	Max. leakage rate: 0.63 l/sm^2
Filter by-pass leakage	4	F9	Tot. leahage K: 0.5 %
Thermal transmittance U	5	T3	1 < U ≤ 1.4 W/Km^2
Thermal brindging std execution	6	TB3	0.45 < k_b ≤ 0.45

Centre band frequency	Hz	125	250	500	1000	2000	4000	8000
Noise brakedown	dB	11	12	13	13	15	33	38

2.1.2 PANELS

The enclosure comprises a structural frame with cladding panels.
Panel thickness is 50 mm.
The panels are secured by means of locking profiles which are slotted into the frame: this system ensures uniform pressure on the panel/frame seals and hence improved airtightness.
The panels are supplied in the four following forms as per price list:

Type	Exterior panel	Insulation	Interior panel
PZP	Galvanised and prepainted steel	Injected polyurethane	Galvanised steel
	Thickness 0,6 mm	Density 42 kg/m^3	Thickness 0,6 mm
AAP	Peraluman	Injected polyurethane	Peraluman
	Thickness 0,8 mm	Density 42 kg/m^3	Thickness 0,8 mm
XXP	INOX Aisi 304 steel	Injected polyurethane	INOX Aisi 304 steel
	Thickness 0,6 mm	Density 42 kg/m^3	Thickness 0,6 mm
PXP	Galvanised and prepainted steel	Injected polyurethane	INOX Aisi 304 steel
	Thickness 0,6 mm	Density 42 kg/m^3	Thickness 0,6 mm
XZP	INOX Aisi 304 steel	Injected polyurethane	Galvanised steel
	Thickness 0,6 mm	Density 42 kg/m^3	Thickness 0,6 mm
AXP	Peraluman	Injected polyurethane	INOX Aisi 304 steel
	Thickness 0,8 mm	Density 42 kg/m^3	Thickness 0,6 mm

Type	Exterior panel	Insulation	Interior panel
PZL	Galvanised and prepainted steel	Rock wool	Galvanised steel
	Thickness 1,2 mm	Density 40 kg/m^3	Thickness 0,6 mm
AAL	Peraluman	Rock wool	Peraluman
	Thickness 1,2 mm	Density 40 kg/m^3	Thickness 0,6 mm
XXL	INOX Aisi 304 steel	Rock wool	INOX Aisi 304 steel
	Thickness 1,2 mm	Density 40 kg/m^3	Thickness 0,6 mm
PXL	Galvanised and prepainted steel	Rock wool	INOX Aisi 304 steel
	Thickness 1,2 mm	Density 40 kg/m^3	Thickness 0,6 mm
XZL	INOX Aisi 304 steel	Rock wool	Galvanised steel
	Thickness 1,2 mm	Density 40 kg/m^3	Thickness 0,6 mm
AXL	Peraluman	Rock wool	INOX Aisi 304 steel
	Thickness 1,2 mm	Density 40 kg/m^3	Thickness 0,6 mm

Special panels may be supplied on request (please contact Technical Office).

Prepainted sheet steel specifications:
Hot galvanised sheet steel (EN 10142 EN 10147) prepainted on HDG support with polyester resin (antislip), with protective plastic film to avoid damages to the panel surface in the workshop and on site.

- Dry film thickness μ m 25 (ECCA T-1)
- Gloss (mirror gloss incidence angle 60°) 40 (EN 13523-2)
- Pencil hardness (scale Koh-i-noor) Grade "F" (ECCA T-1)
- Bending (without cracking) 3.0 T (ECCA T-7)
- Bending 1.5 T (ECCA T-7)
- Degree of reticolation MEK 100 d.c. (AICC n°23)
- Salt spray fog 500 h blister max 8, max 3 mm (ECCA T-8)
- Umidity 1000 h blister max 8 (ASTM 714)
- Artificial aging Q.U.V:B 400 h (EN 13523-10)

The interior surface of the panels is treated to facilitate anchorage of the injected polyurethane foam.

Peraluman sheet specifications:
Alloy 5754 P-AlMg3 sheet with protective plastic film to save panel integrity during the assembly and the installation of the unit on site.

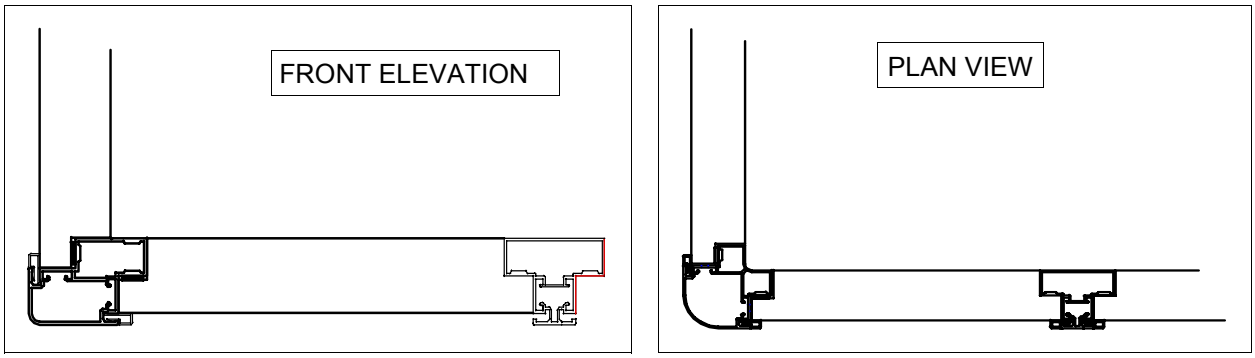
Stainless steel specification:
AISI 304 sheet steel with protective plastic film as above described. This material is particulary resistant to the most aggressive athmospheres and is suitable, with no alterations for all types of washing and sanithizing, for specific purposes in hospital plants, food, chemical and pharmaceutical industry.

The perfect match between panel edges and frame provides a completely smooth surface on the enclosure interior with consequent benefits in terms of reduced dust deposits and easier cleaning.
The panels are so sized that there are no horizontal seams on the sides, thus improving overall rigidity.
The inspection doors are mounted on a steel spindle and two hinges made of fibre reinforced nylon. The doors are fastened with 2 or 3 handles made of the same material. The number of handles depends on the height of the system.

2.1.3 FRAME

The frame is built of UNI 6060 extruded aluminium alloy profiles connected by fibreglass reinforced nylon corner pieces and self-tapping screws. The extruded profiles used for the AHUs frame are completely closed and therefore the thermal bridges are reduced to a minimum and the by-passes along the internal components are completely eliminated. For heavy operating conditions (very low temperatures for the treated air in units located in technical rooms with high relative humidity), the frame can be supplied also with thermal brake pentaposts: this execution can be provided also for the “cool” side of the AHU only.

The shape of the profiles and panels is visible in the following diagram, showing:
- front elevation: basic profile with base panel and intermediate upright;
- plan view: sectional views of vertical corner profile and intermediate upright with base profile seen from above.



2.1.4 BASE

For units with external lenght or width up to 1375 mm, 4 feet at the corners are provided (in case of humidifying sections, a full C-sections sub-base kerb is provided).
For larger dimensions, a full C-section sub-base kerb in steel profile 120 mm high is provided.
For the sections with washer, a 400 mm high tray is provided as basement.

2.1.5 ROOF

If requested a canopy can be supplied in 12/10 gauge sheet steel, galvanised and prepainted, with the same characteristics as those specified above for panel cladding sheets. The canopy roof eaves project 50 mm beyond the enclosure on all four sides.

2.2 AIR INLETS

The dampers are fully in aluminium with aerofoil blade. On request can the dampers can be supplied with sealing gaskets on both the edge of the blade and the side panels of the frame. In the first execution the leakage is less than 5% at a differential pressure of 1000 Pa; in the second execution the leakage is less than 1%.

When the dampers are external to the casing, they are fixed to the framework of the AHU.
When the dampers are internal to the casing, they are fixed to the panel.

2.2.1 FACE DAMPERS

The following types of front damper can be supplied:

Damper position	**Dimensions**	**Installation**
front	full size	external
front	partial	external or internal
upper	partial	external or internal
lower	partial	internal
rh side	partial	external
lh side	partial	external

If the damper is not required, the unit can be supplied with a flange or a blank panel in which an opening of the required dimensions can be made.

2.2.2 MIXING BOXES

Possible configurations for 2-way mixing sections:

Damper position	**Damper installation**
Front and Upper	External or internal
Front and Lower	Internal
Upper and Rh Side	External
Upper and Lh Side	External
Front and Rh Side	External
Front and Lh Side	External
Side + Side	External
Front + Front	External

If the damper is not required, the unit can be supplied with a flange or a blank panel in which an opening of the required dimensions can be made.

2.2.3 THREE - WAY MIXING BOXES

Configurations for **3 - way mixing sections** are as follows:

- two upper dampers and one internal recirculation damper;
- two front dampers and one horizontal internal recirculation damper (for stacked systems);
- two lateral internal dampers and one internal recirculation damper.

If the damper is not required, the unit can be supplied with a flange or a blank panel in which an opening of the required dimensions can be made.

2.3 FILTRATION

The selection of the filter is decisive to obtain a good quality of the treated air and hygienic conditions of the air distribution system.
In the following pages we describe the characteristics of the different filter types and tables for the selection, but the correct selection of the filters, according to the specific requirements, is up to the designer of the plant. Furthermore, for

an efficient maintenance of the filters, it is important to provide accessories like differential manometers and pressostats for a remote indication of the actual condition of the filter cells.

The following filter selection chart is provided for demonstration purposes.

Classification according to EN 779			
Initial colourimetric efficiency (E_A)		E_A < 20 %	E_A >= 20 %
Characteristic		Weight efficiency A_m (%)	Coulorimetric efficiency E_m (%)
Filter group	Filter class	Class limits	
Big powder (G)	G 1	A_m < 65	-
	G 2	65 <= A_m < 80	-
	G 3	80 <= A_m < 90	-
	G 4	A_m >= 65	-
Fine powder (F)	F 5	-	40 <= E_m < 60
	F 6	-	60 <= E_m < 80
	F 7	-	80 <= E_m < 90
	F 8	-	90 <= E_m < 95
	F 9	-	E_m >= 95

Classification HEPA and ULPA filters according to EN 1822		
Filter class	Overall efficiency value	Local efficiency value
	Efficiency (%)	Efficiency (%)
H 10	85	-
H 11	95	-
H 12	99,5	-
H 13	99,95	99,75
H 14	99,995	99,975
U 15	99,9995	99,9975
U 16	99,99995	99,99975
U 17	99,999995	99,9999

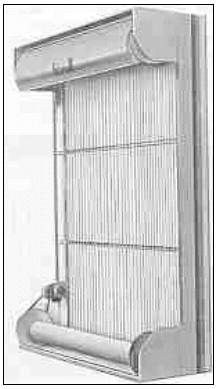
2.3.1 CELL PREFILTERS

The prefilters with cells on rails for side withdrawal are the most used type in the air handling units for the practicalness, the reclaimness and the easy finding on the spare parts market.
The cells can have synthetic or metallic media according to the use and in conformity to the required efficiency. All the cells are 50 mm deep corrugated 1:1.
The cells can be easily reclaimed with immersion in soapy water with common domestic soaps and after rinse can be reused. The metallic filters, used for air with oil or grase content, must be washed with propewr solvents and dried with compressed air.
Quantity and dimensions are indicated in the following table.

FM	Cells 592x592	Cells 490x592	Cells 287x592	Face area [m^2]	Velocity (at 3 m/s at coil) [m/s]
13			1	0,17	2,22
20		1		0,29	2,08
28		1		0,29	2,88
35		1		0,29	3,6
42			2	0,34	3,75
50		2		0,58	2,59
57	1		2	0,69	2,46
69	1	1	1	0,81	2,56
82	2		2	1,04	2,35
105	2		3	1,21	2,61
119	4			1,40	2,55
154	4		2	1,74	2,65

FM	Cells 592x592	Cells 490x592	Cells 287x592	Face area [m^2]	Velocity (at 3 m/s at coil) [m/s]
13	4		4	2,08	2,8
20	6		3	2,61	2,72
28	9			3,15	2,72
35	9		3	3,66	2,8
42	9		6	4,17	2,97
50	12		4	4,89	2,95
57	12		7	5,39	3,04
69	15		5	6,11	3,02
82	15		8	6,62	3,09
105	18		6	7,33	3,06
119	18		9	8,35	2,93
154	21		7	8,55	3,1

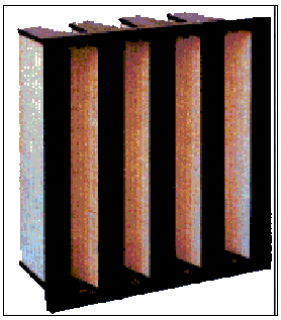
2.3.2 ROLL FILTERS



The roll filters are used as an alternative to the cell filters when the interval between the substitution of the filters must be as long as possible. The efficiency of the medium is similar to the cell filters but the roll filters have the big advantage to renew itself automatically according to the signal of a differential pressostat, rolling up the dirty part of the filter medium and placing in the airflow the clean part.
The duration of the filter, that can't be reclaimed, strictly depends on the quantity of powder in the air but guarantees anyway long maintenance intervals with alarm signal which can be sent also to a remote control panel.
The roll filter is supplied complete with electric switchboard and pressostat.
Quantity and dimensions are indicated in the following table.

FM	no rolls	Rotation	H filter [mm]	L roll 1 [mm]	L roll 2 [mm]	Face area [m^2]	Velocity (at 3 m/s at coil) [m/s]
13 - 50	**NOT AVAILABLE**						
57	1	Horizontal	1200	830	-	0,438	3,87
69	1	Horizontal	1200	830	-	0,438	4,73
82	1	Horizontal	1200	830	-	0,438	5,58
105	1	Horizontal	1500	830	-	0,657	4,81
119	1	Vertical	1200	1230	-	0,678	5,27
154	1	Vertical	1200	1530	-	0,585	5,38
194	1	Vertical	1500	1530	-	1,287	4,53
237	1	Vertical	1500	1830	-	1,557	4,56
286	1	Vertical	1800	1830	-	2,076	4,14
342	1	Vertical	1800	2130	-	2,436	4,21
413	1	Vertical	2100	2130	-	3,045	4,07
480	2	Vertical	2100	1230	1230	3,39	4,25
547	2	Vertical	2100	1530	1230	3,84	4,27
614	2	Vertical	2100	1530	1530	4,29	4,30
681	2	Vertical	2100	1830	1530	4,74	4,31
749	2	Vertical	2100	1830	1830	5,19	4,33
816	2	Vertical	2100	2130	1830	5,64	4,34
883	2	Vertical	2100	2130	2130	6,09	4,35

2.3.3 BAG FILTERS

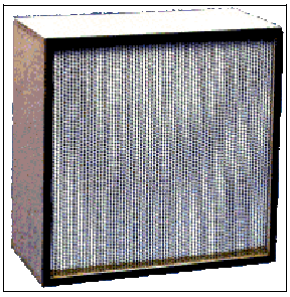


The high efficiency filters are available as bag filters and as rigid bag filters according to the project requirements. F7 and F8 classes are available for different efficiencies. They should always be fitted togheter with pre-filters, cell or roll type, to improve their duration and can be followed by filters with higer efficiency up to absolute filters.
The bag filters are seated in a proper frame with neoprene gasket to prevent by-pass of non filterd air; The bags are held in position by means of metallic clips. The extraction is possible in the inspection room before the filter bank sized to allow an easy access to the maintenance personnel.
Special executions for specific uses (i.e. hospitals, pharmaceutical industry, chemical industry etc) and particular requirements can be studied by our technical office.
Quantity and dimensions are indicated in the following table.

FM	Cells 592x592	Cells 490x592	Cells 287x592	Face Area [m^2]	Velocity (at 3 m/s at coil) [m/s]
13			1	0,17	2,22
20		1		0,29	2,08
28		1		0,29	2,88
35		1		0,29	3,60
42		1		0,29	4,39
50		2		0,58	2,59
57		1	2	0,63	2,69
69		1	2	0,63	3,29
82		2	2	0,92	2,66
105		2	3	1,09	2,90
119	2	2		1,28	2,79
154	2	2	1	1,45	3,18

FM	Cells 592x592	Cells 490x592	Cells 287x592	Face Area [m^2]	Velocity (at 3 m/s at coil) [m/s]
13	4		4	2,08	2,80
20	6		3	2,61	2,72
28	9			3,15	2,72
35	9		3	3,66	2,80
42	9		6	4,17	2,97
50	12		4	4,89	2,95
57	12		7	5,39	3,04
69	15		5	6,11	3,02
82	15		8	6,62	3,09
105	18		6	7,33	3,06
119	18		9	8,35	2,93
154	21		7	8,55	3,10

2.3.4 ABSOLUTE FILTERS

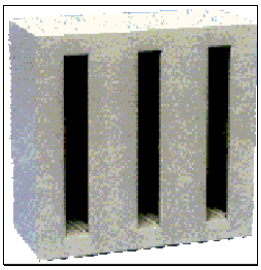


The absolute filters are generally used where it is necessary to guarantee a limited number of particles per m^3 and aseptic conditions.
The most common applications are related to AHU for hospitals (operating theaters and similar), for electronic and chemical industry (clean rooms).
These filters must be placed after the supply fan (in the positive pressure side of the AHU) and must be preceded by lower efficiency filters (i.e. medium efficiency prefilters and high efficiency filters).
It is advisable to provide, as accessory, a differential manomreter and/or pressostat that indicates the fouling of the filter to program the substitution of the filter cells.
Particular care is given to the design of the seating devices for the cells to avoid air by-pass and to make easier the maintenance.
Quantity and dimensions are indicated in the following table.

FM	Cells	Cells	Cells	Cells	Face area [m^2]	Velocity (at 3 m/s at coil) [m/s]
	592x592	490x592	287x592	287x287		
13			1		0,17	2,22
20		1			0,29	2,08
28		1			0,29	2,88
35		1		1	0,29	3,60
42		1		1	0,29	4,39
50		2			0,58	2,59
57		1	2		0,63	2,69
69		1	2		0,63	3,29
82		2	2		0,92	2,66
105		2	3		1,09	2,90
119	2	2			1,28	2,79
154	2	2	1	1	1,45	3,18

FM	Cells	Cells	Cells	Cells	Face area [m^2]	Velocity (at 3 m/s at coil) [m/s]
	592x592	490x592	287x592	287x287		
194	4		4	1	2,08	2,80
237	6		3		2,61	2,72
286	9				3,15	2,72
342	9		3		3,66	2,80
413	9		6	1	4,17	2,97
480	12		4		4,89	2,95
547	12		7	1	5,39	3,04
614	15		5		6,11	3,02
681	15		8	1	6,62	3,09
749	18		6		7,33	3,06
816	18		9	1	7,84	2,93
883	21		7		8,55	3,10

2.3.5 ACTIVATED CARCOAL FILTERS



The activated carcoal filters are used for the adsorption of odours and toxic substances from the airflow both for the supply air and the exhaust air from polluted rooms (i.e. human odours, odours from kitchens, some components of smoke, idrocarbon vapours diluted in the air etc.).
These filtering systems must be be preceded by lower efficiency filters (i.e. medium efficiency prefilters and high efficiency filters) to improve the duration and assure the best efficiency during their life.
The filters are perfectly accessible for maintenance; both non-reclaimable cells and rechargeble cartridges can be supplied.
Quantity and dimensions are indicated in the following table.

FM	Cells	Cells	Cells	Face area. [m^2]	Velocity (at 3 m/s at coil) [m/s]
	592x592	490x592	287x592		
13			1	0,17	2,22
20		1		0,29	2,08
28		1		0,29	2,88
35		1		0,29	3,60
42		1		0,29	4,39
50		2		0,58	2,59
57		1	2	0,63	2,69
69		1	2	0,63	3,29
82		2	2	0,92	2,66
105		2	3	1,09	2,90
119	2	2		1,28	2,79
154	2	2	1	1,45	3,18

FM	Cells	Cells	Cells	Face area. [m^2]	Velocity (at 3 m/s at coil) [m/s]
	592x592	490x592	287x592		
194	4		4	2,08	2,80
237	6		3	2,61	2,72
286	9			3,15	2,72
342	9		3	3,66	2,80
413	9		6	4,17	2,97
480	12		4	4,89	2,95
547	12		7	5,39	3,04
614	15		5	6,11	3,02
681	15		8	6,62	3,09
749	18		6	7,33	3,06
816	18		9	7,84	2,93
883	21		7	8,55	3,10

2.3.6 ELECTROSTATIC FILTERS

The electrostatic filters are used when elevate filtrating performances are requested, even on very small particles, together with limited pressure drops.
The system uses polarised electrodes, positively loaded and fed with roughly 10.000V tension and metallic plates loaded in the opposite way. The creation of an intense electrostatic field generates positive ions which capture the polluting particles present in the air.
The advantages deriving from the use of electrostatic filters are the reduced need for maintenance, the low energy consumption and the possibility of using them up to very high operating temperatures.
For further information please contact the Technical Department.

2.3.7 GERMICYDA LAMPS

Are generally used in series with very high efficiency filters and their use is advisable when bacteria and germs, always present in the air, must be controlled in the airflow to the rooms to be served and in the exhaust air from rooms with possible contaminations.
The lamps, their power and the layout have been defined by our technical office for most common applications; for special purposes particular solutions can be studied.
The sections are complete with lamps, wiring and terminal box for the mains supply and control.

Our technical office can study also different filtering devices for particular industrial applications, very low air temperatures or sand presence (inertia filters).

2.4 HEAT EXCHANGERS

The finned coil heat exchangers are the most important elements in the air handling units, since in the coils themselves we have the heat exchange between the primary fluid (hot water, chilled water, evaporating or condensating refrigerant) and the secondary fluid, the air to be handled.
The coils must be sized according to the treatment required to the AHU and according to the materials required for the specific evironmental conditions, following the requests of the plant designer.
The coils are selected in conformity to the range and the types provided for each AHU size. For different executions, our technical office can realize particular projects.

Standard designs:
- P6030 Copper-aluminium

Non-standard designs:
- Copper-copper;
- Prepainted Copper-aluminium;
- Copper-tin coated copper;
- Fe-Al

Type:
- water;
- superheated water;
- steam;
- direct expansion.

Access:
Side removal (disassembled together with condensate collection tray for the cooling coils).
Condensate trays:
Made of peraluman stainless steel with 1" G side drain connection (on panel). Condensate collection trays are installed one for each coil, so installations with a cooling coil followed by a humidification coil have two trays, joined by a peraluman water shield.
Rows: Standard coils are available with 1,2,3,4,5,6,7,8 rows and various circuits as shown in the following table.
Consult us for non-standard row number, circuit or fin spacing.

2.4.1 WATER COILS

Characteristics (model P6030)

FM	Single zone				Heating for dual duct sections			
	Face area [m^2]	Height [mm]	Lenght [mm]	Tubes/Rows [n°]	Face area [m^2]	Height [mm]	Lenght [mm]	Tubes/Rows [n°]
13	0,126	300	420	5	0,076	180	420	3
20	0,202	480	420	8	0,126	300	420	5
28	0,278	480	580	8	0,174	300	580	5
35	0,348	480	725	8	0,218	300	725	5
42	0,425	480	885	8	0,266	300	885	5
50	0,502	480	1045	8	0,314	300	1045	5
57	0,566	780	725	13	0,348	480	725	8
69	0,690	780	885	13	0,425	480	885	8
82	0,815	780	1045	13	0,502	480	1045	8
105	1,053	780	1350	13	0,648	480	1350	8
119	1,191	1140	1045	19	0,752	720	1045	12
154	1,539	1140	1350	19	0,972	720	1350	12
194	1,944	1440	1350	24	1,053	780	1350	13
237	2,369	1440	1645	24	1,283	780	1645	13
286	2,862	1740	1645	29	1,579	960	1645	16
342	3,419	1740	1965	29	1,886	960	1965	16
413	4,127	2100	1965	35	2,240	1140	1965	19
480	4,799	2100	2285	35	2,605	1140	2285	19
547	5,471	2100	2605	35	2,970	1140	2605	19
614	6,143	2100	2925	35	3,335	1140	2925	19
681	6,815	2100	3245	35	3,699	1140	3245	19
749	7,487	2100	3565	35	4,064	1140	3565	19
816	8,159	2100	3885	35	4,429	1140	3885	19
883	8,831	2100	4205	35	4,794	1140	4205	19

Header diameter for single-zone, P6030 water coils

FM	Diam. (R1,2)	Diam. (R2,2)	Diam. (R3,2)	Diam. (R4,1)	Diam. (R4,2)	Diam. (R6,1)	Diam. (R6,2)	Diam. (R8,1)	Diam. (R8,2)
13	1/2"	1/2"	1"	1"	1"	1"	1"	1"	1"
20	1/2"	1"	1"	1"	1"	1"	1"	1"	1"
28	1/2"	1"	1"	1"	1"	1"	1"	1"	1"
35	1/2"	1"	1"	1"	1"	1"	1"	1"	1"
42	1"	1"	1"	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2
50	1"	1"	1"	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2
57	1"	1"	1"	1"	1"	1" 1/2	1" 1/2	1" 1/2	1" 1/2
69	1"	1"	1"	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2
82	1"	1"	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2	2" 1/2	2" 1/2
105	1"	1"	1" 1/2	1" 1/2	1" 1/2	1" 1/2	1" 1/2	2" 1/2	2" 1/2
119	1"	1" 1/2	2"	2"	2"	2"	2"	2" 1/2	2" 1/2
154	1"	1" 1/2	2"	2"	2"	2" 1/2	2" 1/2	2" 1/2	2" 1/2
194	1" 1/2	1" 1/2	2"	2" 1/2	2" 1/2	2" 1/2	2" 1/2	3"	3"
237	1" 1/2	1" 1/2	2"	2" 1/2	2" 1/2	2" 1/2	2" 1/2	3"	3"
286	1" 1/2	2" 1/2	2"	2" 1/2	2" 1/2	3"	3"	4"	4"
342	1" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2	3"	3"	4"	4"
413	2"	2" 1/2	2" 1/2	3"	3"	3"	3"	4"	4"
480	2"	2" 1/2	2" 1/2	3"	3"	4"	4"	4"	4"
547	2"	2" 1/2	2" 1/2	3"	3"	4"	4"	4"	4"
614	2"	2" 1/2	2" 1/2	3"	3"	4"	4"	4"	4"
681	2"	2" 1/2	2" 1/2	3"	3"	4"	4"	4"	4"
749	2"	2" 1/2	2" 1/2	3"	3"	4"	4"	4"	4"
816	2"	2" 1/2	2" 1/2	3"	3"	4"	4"	4"	4"
883	2"	2" 1/2	2" 1/2	3"	3"	4"	4"	4"	4"

Header diameter for multizone heating, P6030 water coils

FM	Diam. (R1,3)	Diam. (R2,3)	Diam. (R3,3)	Diam. (R4,3)
13	1"	1"	1"	1"
20	1"	1"	1"	1"
28	1"	1"	1"	1"
35	1"	1"	1"	1"
42	1"	1"	1"	1"
50	1"	1"	1"	1"
57	1"	1"	1"	1"
69	1"	1"	1"	1"
82	1"	1"	1"	1"
105	1"	1"	1"	1"
119	1"	1"	1"	1" 1/2
154	1"	1"	1"	1" 1/2

FM	Diam. (R1,3)	Diam. (R2,3)	Diam. (R3,3)	Diam. (R4,3)
194	1"	1"	1" 1/2	2"
237	1"	1"	1" 1/2	2"
286	1"	1"	1" 1/2	2"
342	1"	1"	1" 1/2	2"
413	1"	1" 1/2	1" 1/2	2"
480	1"	1" 1/2	1" 1/2	2"
547	1"	1" 1/2	1" 1/2	2"
614	1"	1" 1/2	1" 1/2	2"
681	1"	1" 1/2	1" 1/2	2"
749	1"	1" 1/2	1" 1/2	2"
816	1"	1" 1/2	1" 1/2	2"
883	1"	1" 1/2	1" 1/2	2"

2.4.2 DIRECT EXPANSION COIL

Characteristics

FM	Geometry	Face area [m²]	Height [mm]	Lenght [mm]	Tubes/rows [n°]	Circuit							
						R 3.1	R 3.2	R 4.1	R 4.2	R 6.1	R 6.2	R 8.1	R 8.2
13	P2519	0,126	300	420	12	3	6	3	6	4	6	6	12
20	P2519	0,189	450	420	18	3	6	6	9	6	9	6	9
28	P2519	0,261	450	580	18	3	6	6	9	6	9	9	12
35	P2519	0,326	450	725	18	6	9	6	9	9	18	9	12
42	P2519	0,398	450	885	18	6	9	6	9	9	18	12	18
50	P2519	0,470	450	1045	18	6	9	6	9	9	18	12	18
57	P2519	0,544	750	725	30	7	9	10	15	15	18	15	20
69	P2519	0,664	750	885	30	7	9	10	15	15	18	15	20
82	P2519	0,784	750	1045	30	9	15	15	20	18	30	20	30
105	P2519	1,013	750	1350	30	9	15	15	20	22	30	24	30
119	P2519	1,176	1125	1045	45	13	22	22	30	22	45	30	36
154	P2519	1,519	1125	1350	45	13	22	22	30	27	45	36	45
194	P2519	1,958	1450	1350	58	22	29	29	58	29	58	58	77
237	P2519	2,385	1450	1645	58	29	43	29	58	43	58	58	77
286	P2519	2,879	1750	1645	70	35	52	35	70	52	70	70	140
342	P2519	3,439	1750	1965	70	35	52	46	70	70	105	70	140
413	P6030	4,127	2100	1965	35	10	17	14	35	21	35	28	35
480	P6030	4,799	2100	2285	35	17	26	17	35	21	35	35	70
547	P6030	5,471	2100	2605	35	17	26	23	35	35	52	35	70
614	P6030	6,143	2100	2925	35	17	26	23	35	35	52	35	70
681	P6030	6,815	2100	3245	35	26	52	23	35	35	52	46	70
749	P6030	7,487	2100	3565	35	26	52	23	35	35	52	46	70
816	P6030	8,159	2100	3885	35	26	52	35	70	35	105	46	70
883	P6030	8,831	2100	4205	35	26	52	35	70	35	105	46	70

2.4.3 ELECTRIC COIL

The electric coils are often used for small heating loads in the small and medium size AHUs, mainly for summertime re-heating when it is not possible or convenient to start the traditional system for hot water production. The electric coils are used also as anti-frost device to protect filters or water coils.
The electric coils are manufactured with armoured steel finned tubes and fed at 400 V
They are equipped with limit thermostat with automatic reset ad safety thermostat with manual reset.
Capacitis and n° of elements in the following tables.

FM	1° Step			2° Step			3° Step			4° Step		
	Elements	Heating cap.	Dt	Elements	Heating cap.	Dt	Elements	Heating cap.	Dt	Elements	Heating cap.	Dt
	[n°]	W	°C	[n°]	W	°C	[n°]	W	°C	[n°]	W	°C
13	3	2100	6	6	4200	11	9	6300	17	12	8400	22
20	3	2100	3	9	6300	10	12	8400	14	18	12600	21
28	3	3000	4	9	9000	11	12	12000	14	18	18000	21
35	3	3600	3	9	10800	10	12	14400	14	18	21600	21
42	3	3900	3	9	11700	9	12	15600	12	18	23400	18
50	3	4500	3	9	13500	9	15	22500	15	21	31500	21
57	6	7200	4	15	18000	11	21	25200	15	27	32400	19
69	6	7800	4	18	23400	11	24	31200	15	33	42900	21
82	6	9000	4	18	27000	11	24	36000	15	33	49500	20
105	6	10800	3	18	32400	10	27	48600	15	36	64800	20
119	9	13500	4	27	40500	11	36	54000	15	45	67500	19
154	9	18000	4	27	54000	12	36	72000	15	45	90000	19
194	12	24000	4	30	60000	10	45	90000	15	60	120000	20

The Dt refer to the nominal flowrate (corresponding to a face velocity of 2.5 m/s at coils).

2.5 HUMIDIFIERS

The humidification is a very important treatment to obtain an optimum indoor air quality. The humidifiyng system described below shall be selected in conformity to their use and to the available fluid.
It is obvious that the fact that moulds and bacteria find a favourable ambient on humid surfaces and in stagnant water must be taken in account: therefore FAST provides drainable pans and small pump traps to limit the quantity of water in the system.
The wet decks are of the anti-mould type and can be also equipped with humidity sensor to stop the waterflow as soon as the evaporating deck is wet, limiting the water consumption and maintaining the drain pan almost dry.
The steam system with centralized steam production are particularly indicated for small flows and for applications where the healthiness of the air is very important (i.e. hospitals).

2.5.1 WET DECK HUMIDIFIERS

The following constructive types may be provided for:
a. paper wet deck thick 100 mm and city water;
b. paper wet deck thick 200 mm and city water;
c. paper wet deck thick 100 mm and recirculating pump;
d. paper wet deck thick 200 mm and recirculating pump;
e. PVC wet deck thick 100 mm and recirculating pump;
f. PVC wet deck thick 200 mm and recirculating pump;
g. paper wet deck thick 100 mm and city water with flow control with humidity sensor at wet deck and solenoid valve;
h. paper wet deck thick 200 mm and city water with flow control with humidity sensor at wet deck and solenoid valve;

2.5.2 STEAM HUMIDIFIERS

The following constructive types may be provided for:
a. steam manifold only;
b. with steam producer.

2.5.3 AIR WASHER

The system is made up by two opposed ramps, on which nebulizing nozzles are placed, included in a waterproof peraluman (standard) or stainless steel chamber internal to the casing of the air-handling unit. The system is complete with connections and pump and/or support pan (400 mm high) with drain hole, overflow hole, filter, floating valve, drop eliminators before and after the ramps. It is possible also to provide a model with 2 nozzle ramps and one recirculation pump, or 23 nozzle ramps and 2 recirculation pumps.

2.5.4 WATER COMPRESSED AIR HUMIDIFIERS

The system is made up of special atomised nozzles, fed with water and compressed air in separate lines. An accurate installation and the respect of the minimum distances with the following components in the air flow allow a nebulization of the water in extremely small droplets, thus avoiding the risk of condensation. In this way very elevate performances are obtained and, thanks to the automatic cleaning of the nebulizing heads, low maintenance costs.
The system is supplied complete with all necessary components mounted for the correct functioning (ramp, self-cleaning nozzles, pipes and feeding cabinet with modulating control).

2.5.5 ULTRASOUND HUMIDIFIERS

The humidification system with ultrasounds provides for the use of a high-frequency piezoelectric transducer which, vibrating at extremely high frequency generates the cavitation of the water with its subsequent nebulization. The main advantages of the adoption of this system are: high efficiency, low energetic consumption, reduced water consumption, long duration, easiness of installation and safety of usage.
For further information please contact the Technical Department.

2.5.6 DRAIN PAN

- For water compressed air humidifiers and steam humidifiers: peraluman or stainless internal drain pan (h=50 mm) with 1” G drain;
- For wet deck humidifiers (type a. or b. par. 2.5.1): peraluman or stainless steel internal drain pan (h=50 mm) and fiberglass reinforced polypropilene pump trap with 1” GJ drain and 1” GJ supply;
- For wet deck humidifiers (type g. or h. par. 2.5.1): peraluman or stainless steel internal drain pan (h=50 mm) and fiberglass reinforced polypropilene trap with 1” GJ drain and supply with solenoid valve;
- For wet deck humidifiers (type c., d., e., f. par. 2.5.1): peraluman internal drain pan (h=50 mm) and fiberglass reinforced polypropilene pump trap with 1” GJ drain and supply with ball valve;
- For air washer: stainless steel water basin (h=400 mm).

For sizes FM13, FM20, FM28 the pump trap is manufactured in peraluman.

2.6 DROPLET ELIMINATORS

The droplet eliminators, carefully designed to obtain the maximum efficiency in eliminating the water droplets generated in the treatments of cooling with dehumidification and of air humidification, is provided as optional component or as mandatory.
Droplet eliminators are supplied with “Z” profile galvanised sheet steel baffles as standard.
Droplet eliminators are always accessible laterally for removal installation.
Droplet eliminators are obligatory in the following cases:

- cooling coils: air velocity more than 2.6 m/s;
- spray pack humidifiers: air velocity more than 2.6 m/s;
- vapour and water - compressed air humidifiers;
- air washers (with inlet flow rectifier).

Materials:

- galvanized steel (standard);
- peraluman construction;
- 304 AISI steel construction;
- poly-propylene construction (air washer).

2.7 FAN SECTION

2.7.1 FAN

The fan are the most important components in the air handling units since the fan-motor assembly is the only moving part and therefore subject to possible probems of wear, noise, manitenance, safety. A correct selection for size and models together with a careful selection of the supplier assures an optimum performance for the AHU’s life.
FAST provides for each size of AHU different fan sizes and models to better match the plant requirements in terms of efficiency, noise level and operating flexibility.
Series: all fan units conform to series DIN 323 R20 (square outlet) of the following types:

- forward curved blades
- backward inclined blades
- backward inclined air foil blades

Sizes: fan sizes are selected on the basis of required capacity and pressure head. The sizes are shown in the following table for each size of air handling unit, with reference to the outside diameter of the blower wheel in mm.

Orientation: possible fan orientations are shown in the following table.
An even final number means right hand orientation; an odd final number refers to left hand orientation.
Orientation must be selected on the basis of the position of the delivery duct.
The choice of the orientation depends on the real plant configuration and shall consider more than the inspection side of the AHU also the layout of the supply ducts to minimize the pressure drop at the AHU-duct junction.

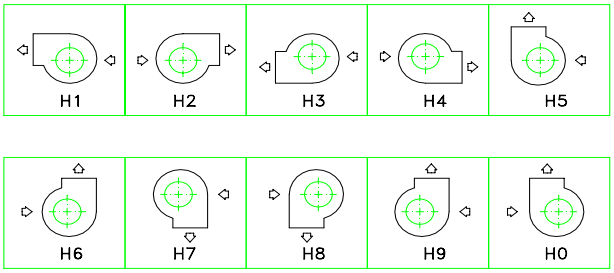
FM	Fan sizes																	
13	180																	
20		200	225															
28		200	225	250														
35			225	250	280													
42			225	250	280													
50				250	280													
57					280	315	355	400										
69						315	355	400										
82						315	355	400										
105							355	400										
119								400	450	500	560							
154									450	500	560							
194										500	560	630	710					
237											560	630	710					
286											560	630	710	800				
342												630	710	800	900			
413												630	710	800	900			
480													710	800				
547													710	800	900			
614														800	900	1000		
681		sizes not available with backward curved aerofoil blades													900	1000		
749															900	1000		
816															900	1000		
883															900	1000		

Anti-vibration mounts: standard versions have rubber (60°Sh) anti-vibration mounts and anti-vibration seals on the outlet port. From fan size 450 up, the system can be optionally supplied with spring supports (minimum efficiency 80%). In this case the dimensions may be subject to modification, with reference to the indicated ones (please contact our Technical Department).

The ventilating sections are supplied as standard with:

- safety guard behind inspection door replacing enclosure panel;
- earth wire between motor cradle and main frame.

FAN ORIENTATION



2.7.2 MOTORS

Motors are three-phase asynchronous with squirrel cage rotor, totally enclosed design with air-over cooling. Electrical characteristics of the motors conform to IEC 60034-1, dimensional characteristics are to IEC 60072-1 and IEC 34-7 (IM B3 - IM1001).

Protection category: IP55
Stator winding class: F

Motors are single speed (2, 4, 6 poles depending on fan speed) or (optional) two speed with 4/6, 4/8 poles and single winding.
The fans can be optionally supplied with inveter.

2.7.3 DRIVES

The pulleys may be fixed or variable type, for a better calibration of the fan speed in the installation.
The transmission belts may be of the following types: SPA, SPB or SPC.
Pulleys for belt types SPA, SPB and SPC are supplied with “Taperlock” taper bushes and are statically and dynamically balanced.The belt tensioning device assures an easy maintenance.

2.8 SOUND ATTENUATORS

The noise is one of the contaminant of the air conditioning equipments. It is important to take care in reducing as much as possible the noise from the fans with an accurate selection of the type and size of the fan. If this is not sufficient it is possible to provide sound attenuators on the supply and/or the return of the fans.

Baffle length

- 560 mm
- 880 mm
- 1200 mm
- 1520 mm

Baffle thickness: 200 mm

Air passage width: min. 105 mm, max. 114 mm

Construction:
Rockwool with air contact surfaces protected with plastic film; enclosed in expanded galvanised steel mesh.

Sound attenuation at various frequencies is shown below:

	Breakdown [dB]							
Lenght [mm]	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
560	2	5	10	17	18	22	26	13
880	5	10	18	26	29	39	41	20
1200	7	14	24	35	39	48	48	28
1520	9	16	30	44	45	48	48	31

2.9 MULTIZONE / DUAL DUCT SECTIONS

The Multizone/Dual duct sections are generally used where the control of room temperature is obtained by mixing two airflows of different temperatures, also serving different zones of the building in independent way with the same AHU.
The multizone section, more than containing the heating and cooling coils fitted in parallel, is equipped with conjugate dampers one for each zone to be served.
The Dual duct section is similar to the multizone but does'nt include the cojugate dampers since the mixing of the two airstrams are obtained in terminal units near to the rooms.
For the selection of the multizone section it is necessary to know the quantity of zones, their flowrate and the position on the front section of the AHU.

2.10 HEAT RECOVERY UNITS

The heat recovery units are even more used where, for the indoor air quality or for particular industrial processes, it is necessary to use high volumes of fresh air rather than recirculated air.
The use of heat recovery units is more valid for large fresh air volumes and for high temperature difference between exhaust and fresh air.

Types:
- static cross flow with synthetic pleated filters and peraluman condensate collection tray;
- static cross flow with by-pass damper (to by-pass the recovery unit in free-cooling mode), synthetic pleated filters and peraluman condensate collection tray;
- cross flow static with recirculator damper (set of 3 dampers with recovery unit), with pleated synthetic media filters and peraluman condensate collection tray.

Other types can be supplied after consulting Technical Department:
- heat pipes;
- rotary (sensible or total recovery);
- with double coil.

Efficiency:
Three sizes of cross flow recovery systems with different efficiency are available for each air handling unit.

Installation:
horizontal axis;

Air handling unit configuration:
- in line;
- stacked intake and outlet sections (sizes FM13 to FM154 included).

2.11 EMPTY SECTIONS

The empty sections can be provided to allow a better flexibility in the design of the AHU for the insertion of particular components or for the access for maintenance at some components like coils.
The lengths and executions are indicated below.

Length:

- 320 mm
- 640 mm
- 960 mm

Design:

- basic;
- with peraluman condensate collection tray h=mm 50 and side drain;
- with inspection door.

2.12 ACCESSORY

A wide range of accessories is available; these accessories can be installed at FAST works and solve possible installation problems to the client.
The most common accessories are listed below but other accessories can be supplied on request.

Technical compartments

The technical compartments allow the fitting of valves, actuators, electric appliances for power and control, other accessories in a closed room. The technical compartments have a proper roof and give a good thermal insulation.
The empyty sections are made of a 30 mm aluminium frame and 25 mm double skin panels.
The available dimensions are:

- 1 module length (640 mm) to 3,5 modules length (2240 mm);
- 1 module depth (internal depth 610 mm) till size FM105;
- 1,5 modules depth (internal depth 930 mm) for bigger size;

Compartments are supplied without base panel to permit the transit of pipes supplying the coils and humidifier sections.

Accessories for inlet/outlet sections

- flange;
- blank panel (to be drilled by others);
- antivibration canvas at air inlets (with or without damper) with earthing cable;
- antivibration canvas at air outlets (with or without damper) with earthing cable;
- aluminium grid with antibird mesh (for internal dampers only);
- manual actuator on dampers;
- proportional actuator on dampers;
- proportional spring actuator on dampers;
- walkable grid for dampers at floor.

Accessories for fan sections

- fan inlet guide vane (for backward curved blade fans only);
- damper at fan outlet;
- gravity damper at fan outlet;
- microswitch at fan inspection door;
- flowmeter.

Accessori available for all sections:

- 24V light fixture with window (installer must provide 24V power line);
- pressure gauge (assembled and connected to test points);
- pressure switch (assembled and connected to pressure points);
- double sleeve 1/4” G instrument/sensor holder;
- reinforced floor with aluminium sheet.

3. Dimensions

To calculate total length of a unit add, to the total of the individual modules, the fixed dimension of 95 mm for each section (frame) into which the unit is divided.

Example:

Air handling unit FM 082 comprising:

- mixing section, front-upper-external damper L = 640 mm
- bag filter with prefilter L = 640 mm
- 4R heating coil L = 320 mm
- 8R cooling coil L = 640 mm
- fan section with 355 fan unit L = 1280 mm

Total (nominal): L = 3520 mm

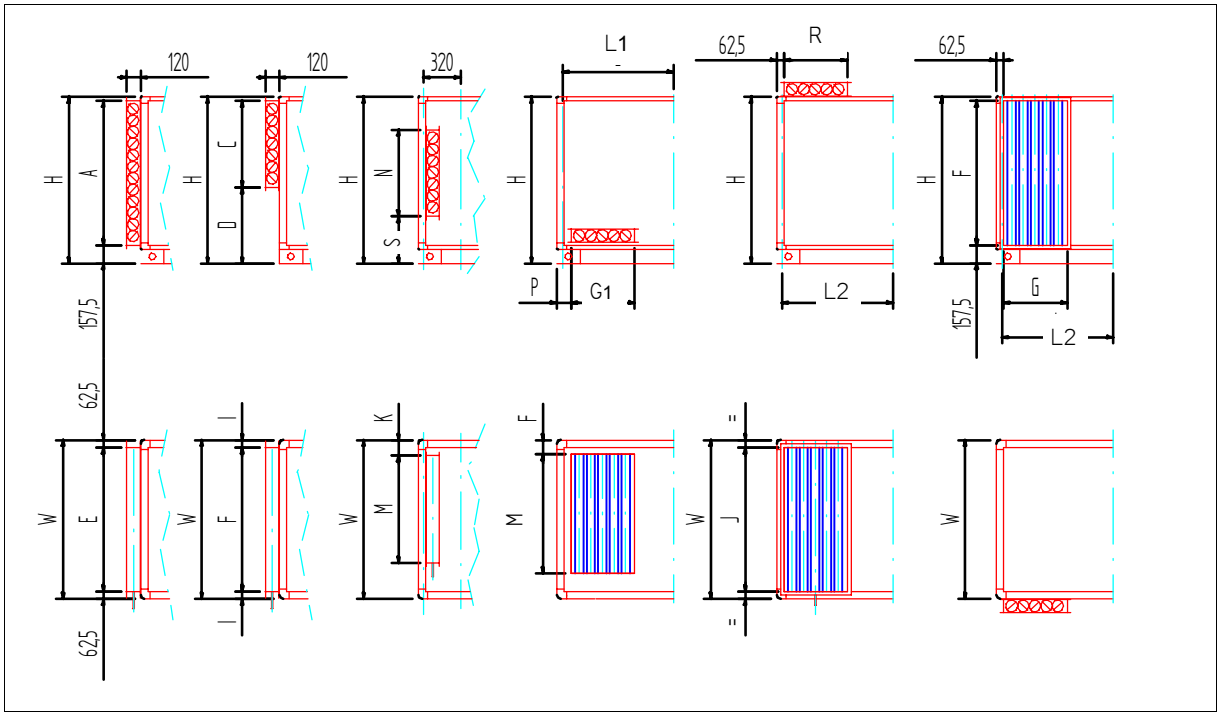
Effective length:
- packaged unit L = 3520 + 95 = 3615 mm
- 2-section unit L = 3520 + 95 x 2 = 3710 mm

For heat recovery sections, which are always independent, the tabulated value is the effective value.

Heights shown in the tables are effective, and inclusive of feet and 120 mm sub-base.

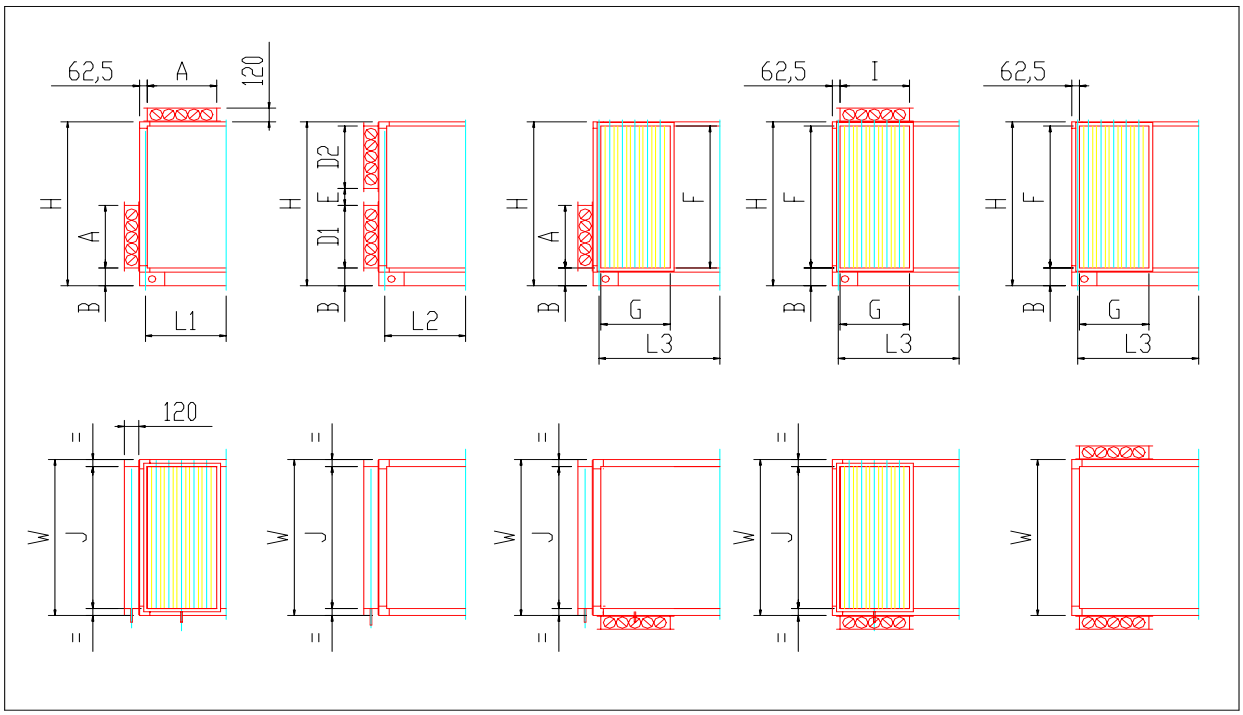
Tabulated widths (W) are the effective values. However, they do not include the clearance for handles (approx. 40 mm) or manifolds (approx. 50 mm).

3.1 Face dampers



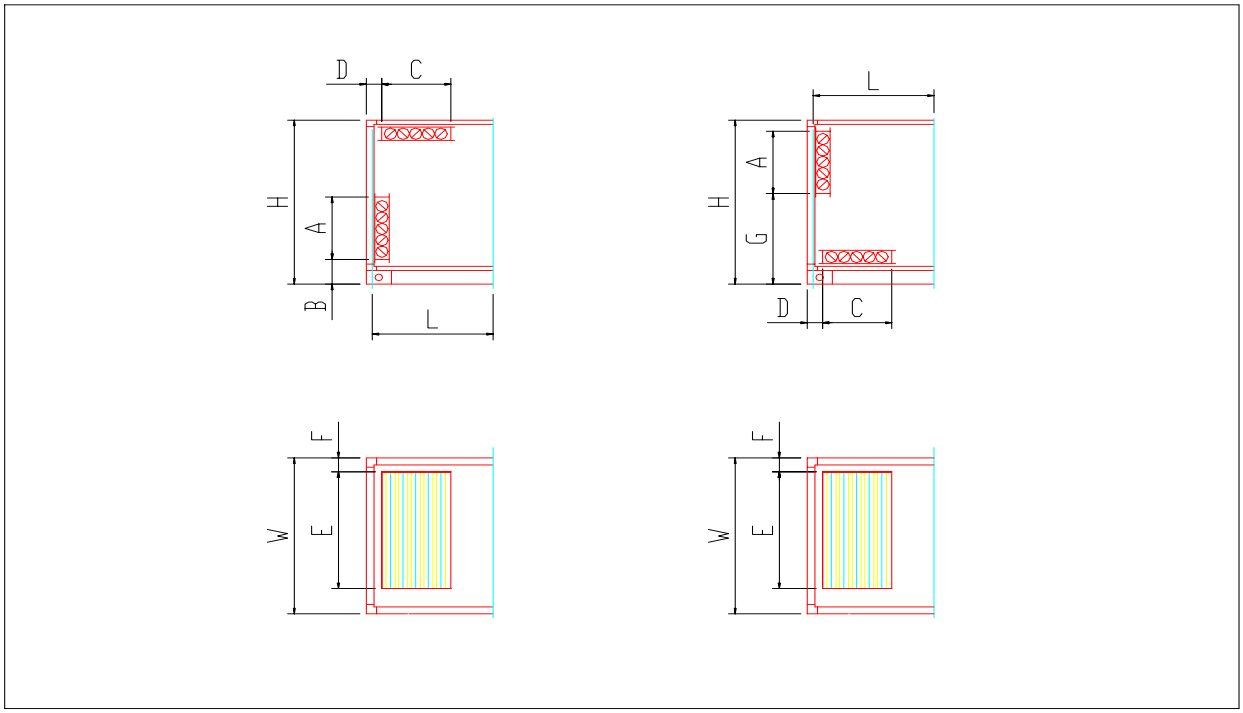
FM	W	H	L1	L2	A	C	D	E	G	F	I	K	M	N	P	G1	R	S
	mm	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*
13	735	645	640	320	450	300	308	450	300	610	62,5	123	450	300	218	300	300	233
20	735	805	640	320	610	300	468	450	300	610	62,5	123	450	450	218	300	300	238
28	895	805	640	320	610	300	468	610	300	770	62,5	123	610	450	218	300	300	238
35	1055	805	640	320	610	300	468	770	300	930	62,5	123	770	450	218	300	300	238
42	1215	805	640	640	610	300	468	930	610	1090	62,5	123	930	450	218	300	610	238
50	1375	805	640	640	610	300	468	1090	610	1250	62,5	123	1090	450	218	300	610	238
57	1055	1125	960	640	930	610	478	770	610	930	62,5	123	770	770	223	610	610	238
69	1215	1125	960	640	930	610	478	930	610	1090	62,5	123	930	770	223	610	610	238
82	1375	1125	960	640	930	610	478	1090	610	1250	62,5	123	1090	770	223	610	610	238
105	1695	1125	960	640	930	610	478	1410	610	1570	62,5	123	1410	770	223	610	610	238
119	1375	1445	960	640	1250	930	478	1090	610	1250	62,5	123	1090	1090	223	610	610	238
154	1695	1445	1280	960	1250	930	478	1250	930	1570	62,5	123	1250	1090	223	930	930	238
194	1695	1765	1280	960	1570	930	798	1250	930	1570	62,5	223	1250	1250	223	930	930	318
237	2015	1765	1280	960	1570	930	798	1570	930	1890	62,5	223	1570	1250	223	930	930	318
286	2015	2085	1280	1280	1890	1250	798	1570	1250	1890	62,5	223	1570	1570	223	930	1250	318
342	2335	2085	1280	1280	1890	1250	798	1890	1250	2210	62,5	223	1890	1570	223	930	1250	318
413	2335	2405	1280	1280	2210	1570	798	1890	1250	2210	62,5	223	1890	1890	223	930	1250	318
480	2655	2405	1280	1280	2210	1570	798	2210	1570	2530	62,5	223	2210	1890	223	930	1250	318
547	2975	2405	1280	1280	2210	2210	158	2530	1570	1890	543	223	2530	1890	223	930	1250	318
614	3295	2405	1280	1280	2210	2210	158	2850	1570	2210	543	223	2850	1890	223	930	1250	318
681	3615	2405	1280	1280	2210	2210	158	3170	1570	2530	543	223	3170	1890	223	930	1250	318
749	3935	2405	1280	1280	2210	2210	158	3490	1570	2850	543	223	3490	1890	223	930	1250	318
816	4255	2405	1280	1280	2210	2210	158	3810	1570	3170	543	223	3810	1890	223	930	1250	318
883	4575	2405	1280	1280	2210	2210	158	4130	1570	3490	543	223	4130	1890	223	930	1250	318

3.2 Mixing boxes with external dampers



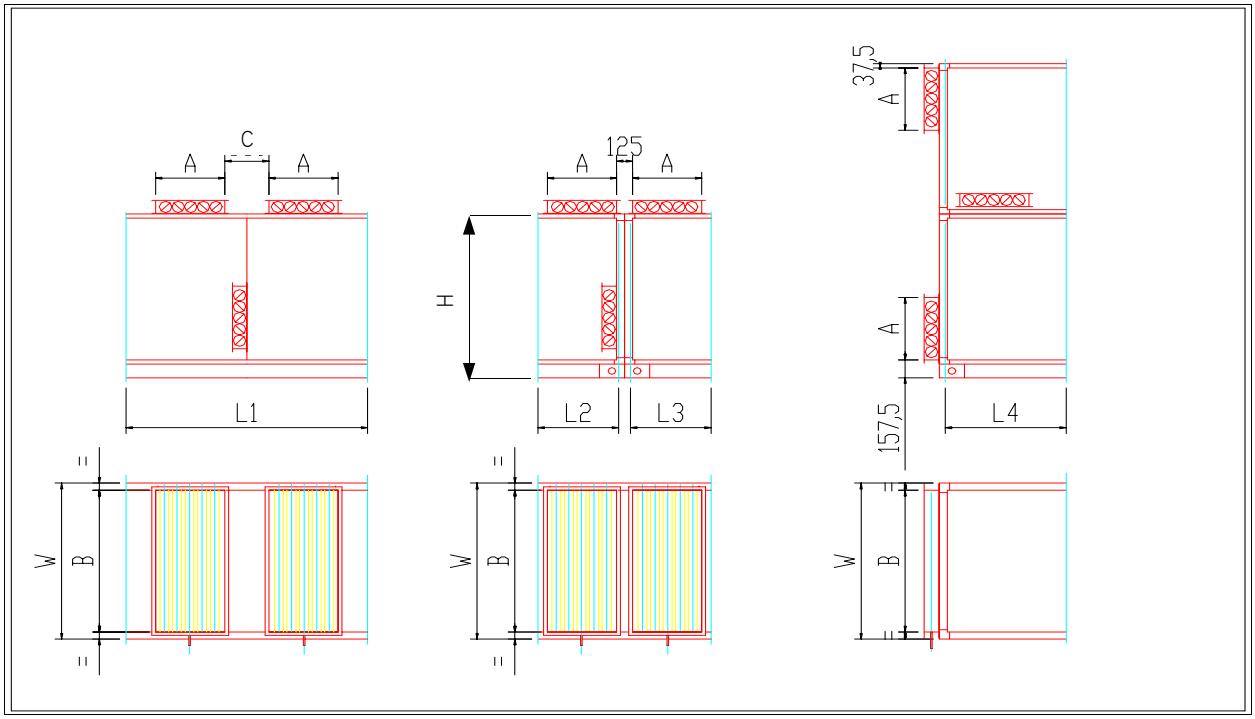
FM	W	H	L1	L2	L3	A	B	D1	D2	E	F	G	I	J
	mm	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*
13	735	645	320	640	320	300	157,5	200	200	50	450	300	300	610
20	735	805	320	640	320	300	157,5	300	250	60	610	300	300	610
28	895	805	320	640	320	300	157,5	300	250	60	610	300	300	770
35	1055	805	320	640	640	300	157,5	300	250	60	610	300	300	930
42	1215	805	320	640	640	300	157,5	300	250	60	610	610	300	1090
50	1375	805	320	640	640	300	157,5	300	250	60	610	610	300	1250
57	1055	1125	320	640	640	300	157,5	300	300	330	930	610	300	930
69	1215	1125	320	640	640	300	157,5	300	300	330	930	610	300	1090
82	1375	1125	320	640	640	300	157,5	300	300	330	930	610	300	1250
105	1695	1125	320	640	640	300	157,5	300	300	330	930	610	300	1570
119	1375	1445	640	640	640	610	157,5	450	450	350	1250	610	610	1250
154	1695	1445	640	640	960	610	157,5	450	450	350	1250	930	610	1570
194	1695	1765	640	640	640	610	157,5	610	610	350	1570	610	610	1570
237	2015	1765	640	640	960	610	157,5	610	610	350	1570	930	610	1890
286	2015	2085	960	640	960	930	157,5	770	770	350	1890	930	930	1890
342	2335	2085	960	640	1280	930	157,5	770	770	350	1890	1250	930	2210
413	2335	2405	960	640	960	930	157,5	930	930	350	2210	930	930	2210
480	2655	2405	960	640	1280	930	157,5	930	930	350	2210	1250	930	2530
547	2975	2405	960	640	1280	930	157,5	930	930	350	2210	1250	930	2850
614	3295	2405	960	640	1280	930	157,5	930	930	350	2210	1250	930	3170
681	3615	2405	960	640	1280	930	157,5	930	930	350	2210	1250	930	3490
749	3935	2405	960	640	1280	930	157,5	930	930	350	2210	1250	930	3810
816	4255	2405	960	640	1280	930	157,5	930	930	350	2210	1250	930	4130
883	4575	2405	960	640	1280	930	157,5	930	930	350	2210	1250	930	4450

3.3 Mixing boxes with internal dampers



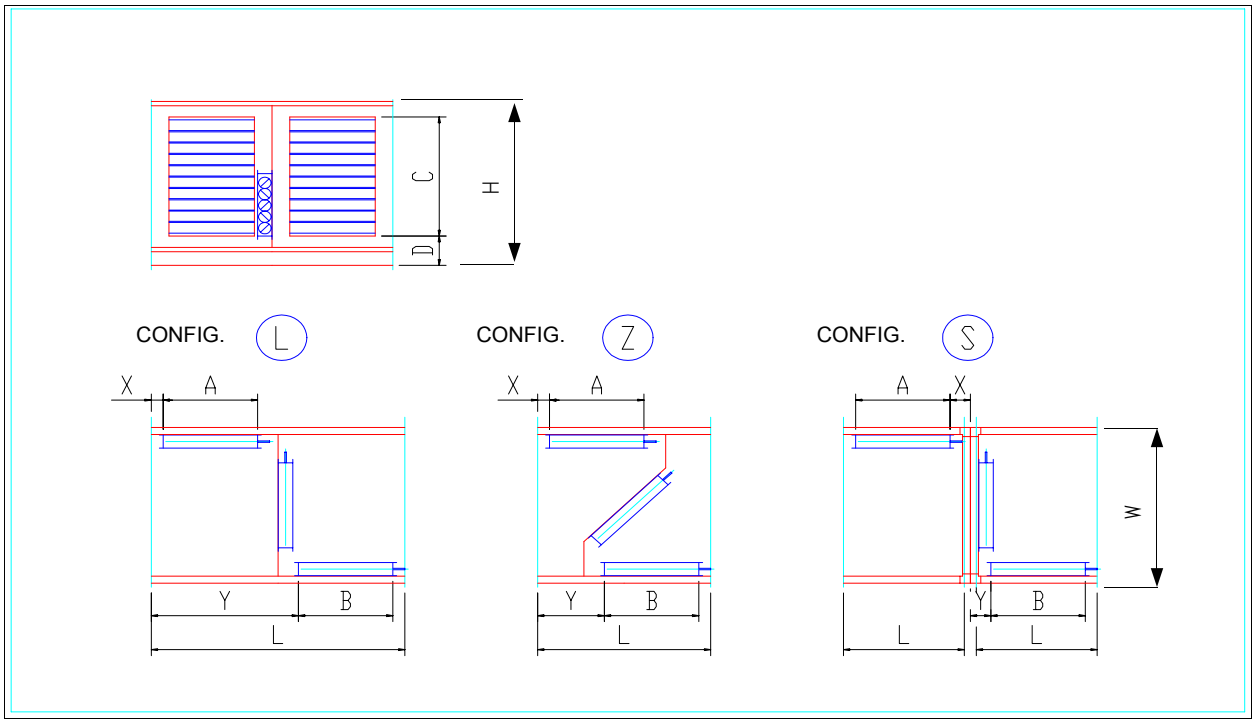
FM	W mm	H mm	L mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm
13	735	645	640	300	232,5	300	217,5	450	122,5	232,5
20	735	805	640	450	237,5	300	217,5	450	122,5	237,5
28	895	805	640	450	237,5	300	217,5	610	122,5	237,5
35	1055	805	640	450	237,5	300	217,5	770	122,5	237,5
42	1215	805	640	450	237,5	300	217,5	930	122,5	237,5
50	1375	805	640	450	237,5	300	217,5	1090	122,5	237,5
57	1055	1125	960	770	237,5	610	222,5	770	122,5	237,5
69	1215	1125	960	770	237,5	610	222,5	930	122,5	237,5
82	1375	1125	960	770	237,5	610	222,5	1090	122,5	237,5
105	1695	1125	960	770	237,5	610	222,5	1410	122,5	237,5
119	1375	1445	960	1090	237,5	610	222,5	1090	122,5	237,5
154	1695	1445	1280	1090	237,5	930	222,5	1250	122,5	237,5
194	1695	1765	1280	1250	317,5	930	222,5	1250	122,5	317,5
237	2015	1765	1280	1250	317,5	930	222,5	1570	122,5	317,5
286	2015	2085	1280	1570	317,5	930	222,5	1570	122,5	317,5
342	2335	2085	1280	1570	317,5	930	222,5	1890	122,5	317,5
413	2335	2405	1280	1890	317,5	930	222,5	1890	122,5	317,5
480	2655	2405	1280	1890	317,5	930	222,5	2210	222,5	317,5
547	2975	2405	1280	1890	317,5	930	222,5	2530	222,5	317,5
614	3295	2405	1280	1890	317,5	930	222,5	2850	222,5	317,5
681	3615	2405	1280	1890	317,5	930	222,5	3170	222,5	317,5
749	3935	2405	1280	1890	317,5	930	222,5	3490	222,5	317,5
816	4255	2405	1280	1890	317,5	930	222,5	3810	222,5	317,5
883	4575	2405	1280	1890	317,5	930	222,5	4130	222,5	317,5

3.4 3-way mixing boxes with exter nal dampers



FM	W *mm*	H *mm*	L1 *mm*	L2 *mm*	L3 *mm*	L4 *mm*	A *mm*	B *mm*	C *mm*
13	735	645	800	320	320	640	300	610	190
20	735	805	800	320	320	640	300	610	190
28	895	805	800	320	320	640	300	770	190
35	1055	805	800	320	320	640	300	930	190
42	1215	805	800	320	320	640	300	1090	190
50	1375	805	800	320	320	640	300	1250	190
57	1055	1125	1120	480	480	960	450	930	190
69	1215	1125	1120	480	480	960	450	1090	190
82	1375	1125	1120	480	480	960	450	1250	190
105	1695	1125	1120	480	480	960	450	1570	190
119	1375	1445	1440	640	640	960	610	1250	190
154	1695	1445	1600	640	640	960	610	1570	350
194	1695	1765	1920	800	800	1280	770	1570	350
237	2015	1765	1920	800	800	1280	770	1890	350
286	2015	2085	2240	960	960	1280	930	1890	350
342	2335	2085	2240	960	960	1280	930	2210	350
413	2335	2405	2240	960	960	1280	930	2210	350
480	2655	2405	2240	960	960	1280	930	2530	350
547	2975	2405	2240	960	960	1280	930	2850	350
614	3295	2405	2240	960	960	1280	930	3170	350
681	3615	2405	2240	960	960	1280	930	3490	350
749	3935	2405	2240	960	960	1280	930	3810	350
816	4255	2405	2240	960	960	1280	930	4130	350
883	4575	2405	2240	960	960	1280	930	4450	350

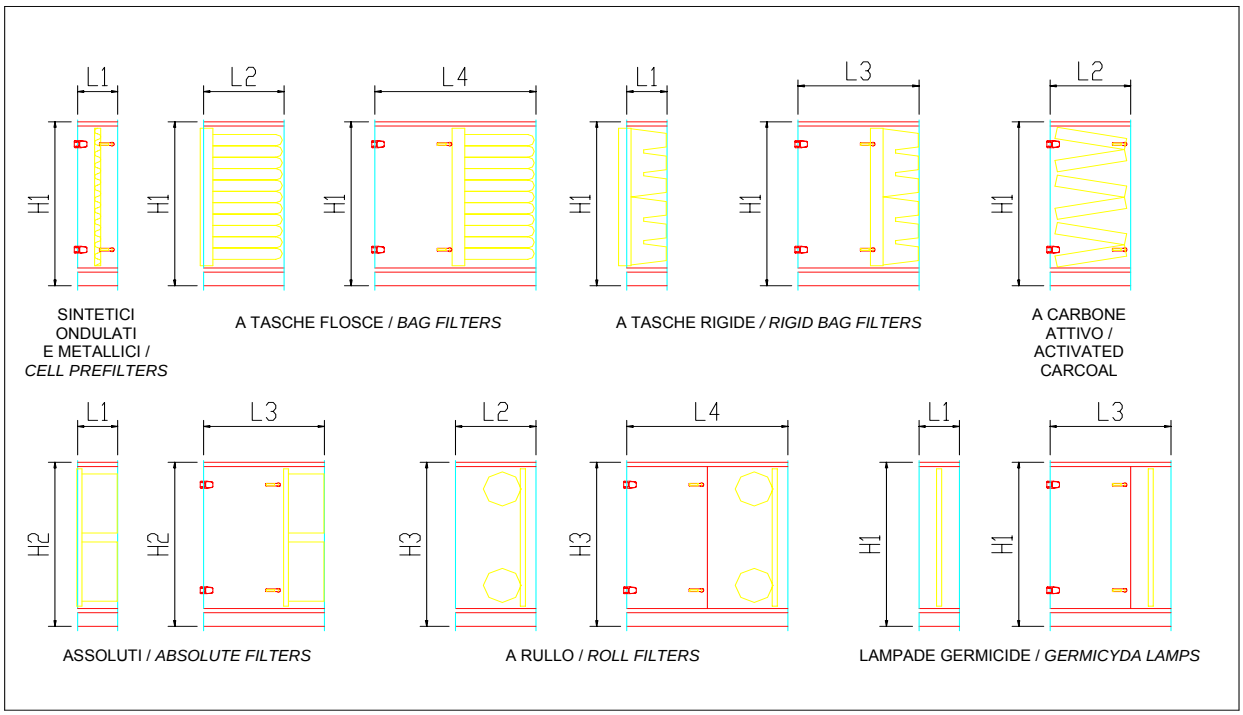
3.5 3-way mixing boxes with internal dampers



FM	W mm	H mm	C mm	D mm	Config. mm	L mm	A mm	B mm	X mm	Y mm
13	735	645	300	232,5	L	1280	450	450	75	755
20	735	805	450	237,5	L	1280	450	450	75	755
28	895	805	450	237,5	L	1600	450	770	75	755
35	1055	805	450	237,5	L	1600	450	770	75	755
42	1215	805	450	237,5	Z	1600	770	1090	75	435
50	1375	805	450	237,5	Z	1600	770	1090	75	435
57	1055	1125	770	237,5	Z	1280	770	770	75	435
69	1215	1125	770	237,5	Z	1600	770	1090	75	435
82	1375	1125	770	237,5	Z	1600	770	1090	75	435
105	1695	1125	770	237,5	Z	1920	1090	1410	75	435
119	1375	1445	1090	237,5	Z	1920	1090	1410	75	435
154	1695	1445	1090	237,5	Z	2240	1250	1730	75	435
194	1695	1765	1250	317,5	Z	1920	1250	1570	175	175
237	2015	1765	1250	317,5	Z	2240	1570	1890	175	175
286	2015	2085	1570	317,5	Z	2240	1570	1890	175	175
342	2335	2085	1570	317,5	Z	2560	1890	1890	175	175
413	2335	2405	1890	317,5	Z	2560	1890	1890	175	175
480	2655	2405	1890	317,5	S	2240	1890	1890	222,5	222,5
547	2975	2405	1890	317,5	S	2240	1890	1890	222,5	222,5
614	3295	2405	1890	317,5	S	2240	1890	1890	222,5	222,5
681	3615	2405								
749	3935	2405								
816	4255	2405								
883	4575	2405								

Contact FAST technical department

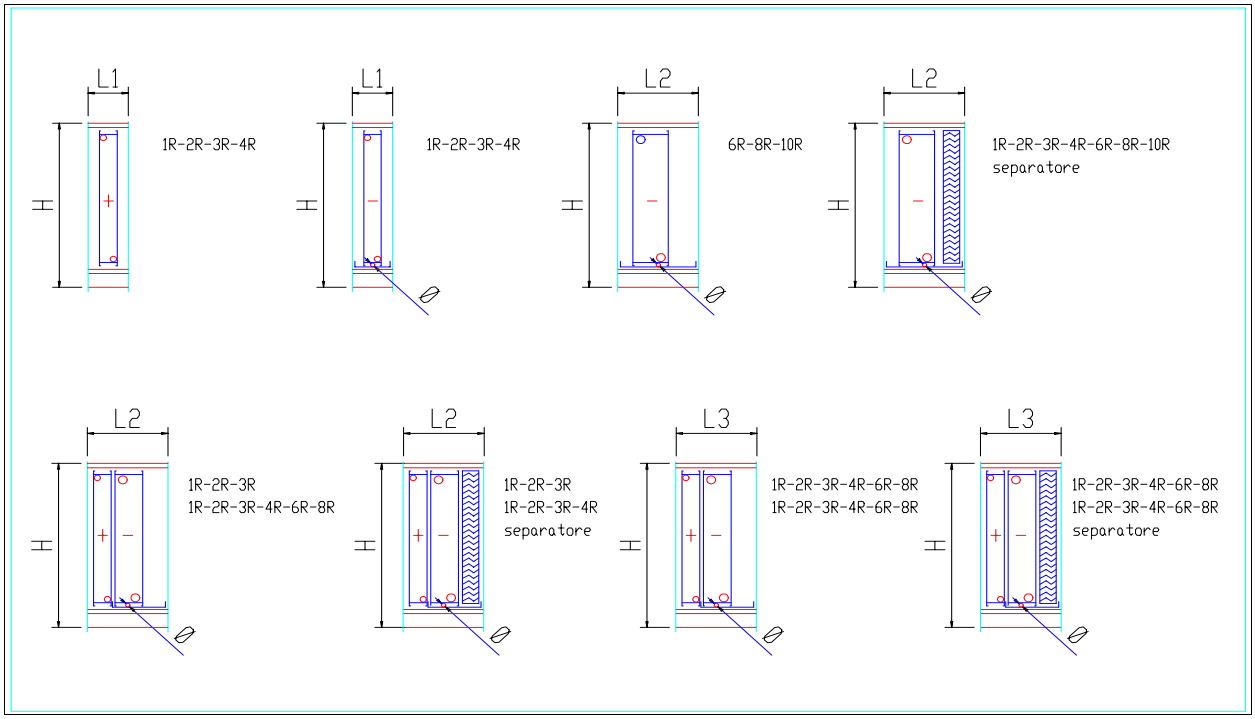
3.6 Filters



FM	H1 *mm*	H3 *mm*	H2 *mm*	L1 *mm*	L2 *mm*	L3 *mm*	L4 *mm*
13	645	-	1125	320	640	960	1280
20	805	-	1125	320	640	960	1280
28	805	-	1125	320	640	960	1280
35	805	-	1125	320	640	960	1280
42	805	-	1125	320	640	960	1280
50	805	-	1125	320	640	960	1280
57 (1)	1125	1125	1125	320	640	960	1280
69 (1)	1125	1125	1125	320	640	960	1280
82	1125	1125	1125	320	640	960	1280
105	1125	1125	1125	320	640	960	1280
119	1445	1445	1445	320	640	960	1280
154	1445	1445	1445	320	640	960	1280
194	1765	1765	1765	320	640	960	1280
237	1765	1765	1765	320	640	960	1280
286	2085	2085	2085	320	640	960	1280
342	2085	2085	2085	320	640	960	1280
413	2405	2405	2405	320	640	960	1280
480	2405	2405	2405	320	640	960	1280
547	2405	2405	2405	320	640	960	1280
614	2405	2405	2405	320	640	960	1280
681	2405	2405	2405	320	640	960	1280
749	2405	2405	2405	320	640	960	1280
816	2405	2405	2405	320	640	960	1280
883	2405	2405	2405	320	640	960	1280

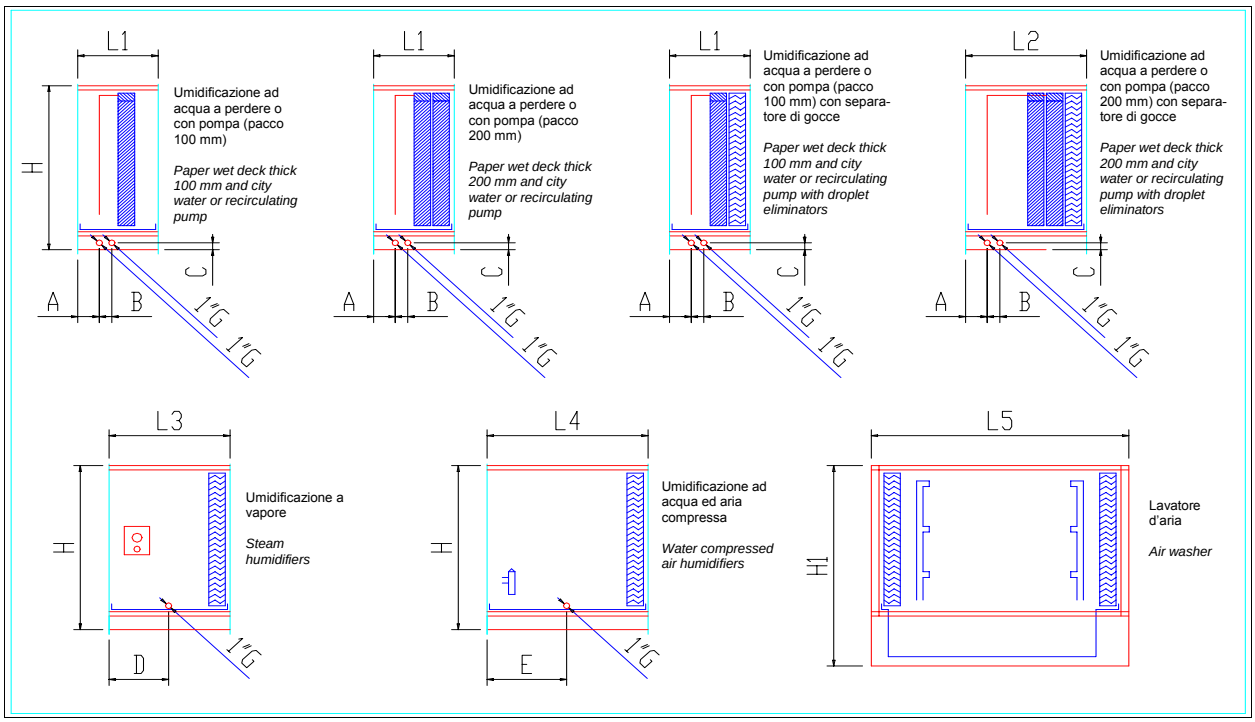
(1) Separate casing with same width as FM 82
(2) Roll filter with horizontal withdrawal up to size 105 inclu ded

3.7 Coils



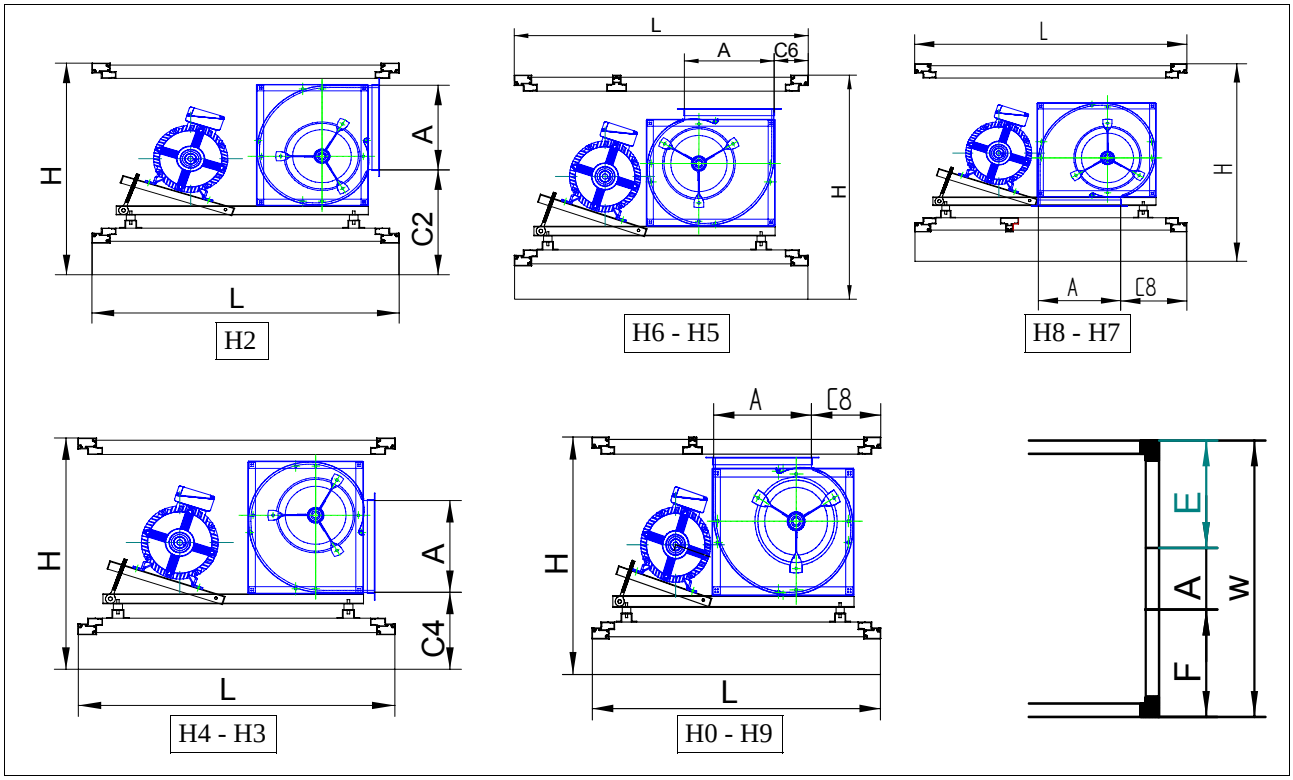
FM	H *mm*	L1 *mm*	L2 *mm*	L3 *mm*	Ø
13	645	320	640	960	1" G
20	805	320	640	960	1" G
28	805	320	640	960	1" G
35	805	320	640	960	1" G
42	805	320	640	960	1" G
50	805	320	640	960	1" G
57	1125	320	640	960	1" G
69	1125	320	640	960	1" G
82	1125	320	640	960	1" G
105	1125	320	640	960	1" G
119	1445	320	640	960	1" G
154	1445	320	640	960	1" G
194	1765	320	640	960	1" G
237	1765	320	640	960	1" G
286	2085	320	640	960	1" G
342	2085	320	640	960	1" G
413	2405	320	640	960	1" G
480	2405	320	640	960	1" G
547	2405	320	640	960	1" G
614	2405	320	640	960	1" G
681	2405	320	640	960	1" G
749	2405	320	640	960	1" G
816	2405	320	640	960	1" G
883	2405	320	640	960	1" G

3.8 Humidifiing sections



FM	H	H1	L1	L2	L3	L4	L5	A	B	C	D	E
	mm	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*
13	645	965	960	960	960	1280	2335	175	210	35	480	325
20	805	1125	960	960	960	1280	2335	175	210	35	480	325
28	805	1125	960	960	960	1280	2335	175	210	35	480	325
35	805	1125	640	960	960	1280	2335	145	70	35	480	325
42	805	1125	640	960	960	1280	2335	145	70	35	480	325
50	805	1125	640	960	960	1280	2335	145	70	35	480	325
57	1125	1445	640	960	960	1280	2335	145	70	35	480	325
69	1125	1445	640	960	960	1280	2335	145	70	35	480	325
82	1125	1445	640	960	960	1280	2335	145	70	35	480	325
105	1125	1445	640	960	960	1280	2335	145	70	35	480	325
119	1445	1765	640	960	960	1280	2335	145	70	35	480	325
154	1445	1765	640	960	960	1280	2335	145	70	35	480	325
194	1765	2085	640	960	960	1280	2335	145	70	35	480	325
237	1765	2085	640	960	960	1280	2335	145	70	35	480	325
286	2085	2405	640	960	960	1280	2335	145	70	35	480	325
342	2085	2405	640	960	960	1280	2335	145	70	35	480	325
413	2405	2405	640	960	960	1280	2335	145	70	35	480	325
480	2405	2405	640	960	960	1280	2335	145	70	35	480	325
547	2405	2405	640	960	960	1280	2335	145	70	35	480	325
614	2405	2405	640	960	960	1280	2335	145	70	35	480	325
681	2405	2405	640	960	960	1280	2335	145	70	35	480	325
749	2405	2405	640	960	960	1280	2335	145	70	35	480	325
816	2405	2405	640	960	960	1280	2335	145	70	35	480	325
883	2405	2405	640	960	960	1280	2335	145	70	35	480	325

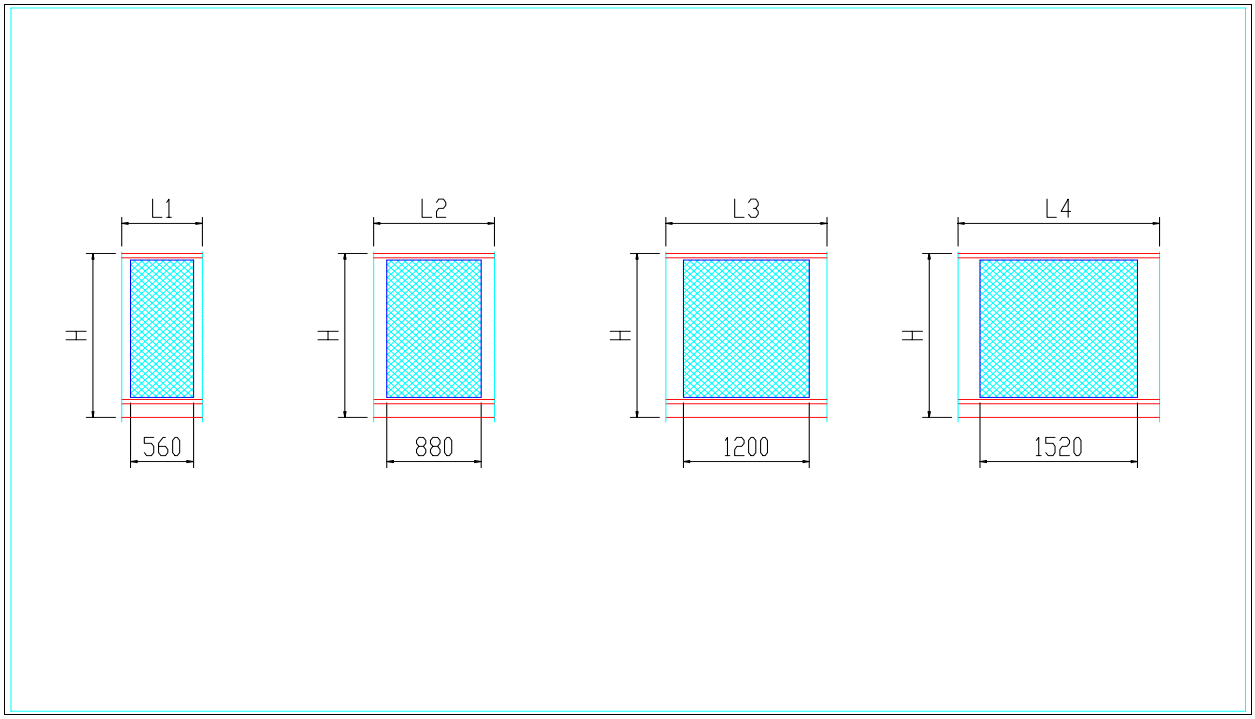
3.9 Fan sections



FM	Vent. *Fan*	W *mm*	H *mm*	L *mm*	A *mm*	C2 *mm*	C4 *mm*	C6 *mm*	C8 *mm*	E *mm*	F *mm*
13	180	735	645	800	209	332	224	129	237	263	263
20	200	735	805	960	236	380,5	270,5	192,5	306,5	249,5	249,5
	225	735	805	960	268	397,5	275,4	122,5	244,5	233,5	233,5
28	200	895	805	960	236	380,5	270,5	192,5	306,5	329,5	329,5
	225	895	805	960	268	397,5	275,5	122,5	244,5	313,5	313,5
	250	895	805	960	302	484	276	132,5	265,5	296,5	296,5
35	225	1055	805	960	268	397,5	275,5	122,5	244,5	393,5	393,5
	250	1055	805	960	302	484	276	132,5	265,5	376,5	376,5
	280	1055	805	960	341	356,5	212,5	117,5	261,5	357	357
42	225	1215	805	960	268	397,5	275,5	122,5	244,5	473,5	473,5
	250	1215	805	960	302	484	276	132,5	265,5	456,5	456,5
	280	1215	805	960	341	356,5	212,5	117,5	261,5	437	437
50	250	1375	805	960	302	484	276	132,5	265,5	536,5	536,5
	280	1375	805	960	341	356,5	212,5	117,5	261,5	517	517
57	280	1055	1125	960	341	356,5	212,5	117,5	261,5	357	357
	315	1055	1125	1120	384	449,5	279,5	132,5	302,5	335,5	335,5
	355	1055	1125	1120	433	485	292	135	327	311	311
	400	1055	1125	1280	487	528	306	133	355	284	284
69	315	1215	1125	1120	384	449,5	279,5	132,5	302,5	415,5	415,5
	355	1215	1125	1120	433	485	292	135	327	391	391
	400	1215	1125	1280	487	528	306	133	355	364	364
82	315	1375	1125	1120	384	449,5	279,5	132,5	302,5	495,5	495,5
	355	1375	1125	1120	433	485	292	135	327	471	471
	400	1375	1125	1280	487	528	306	133	355	444	444

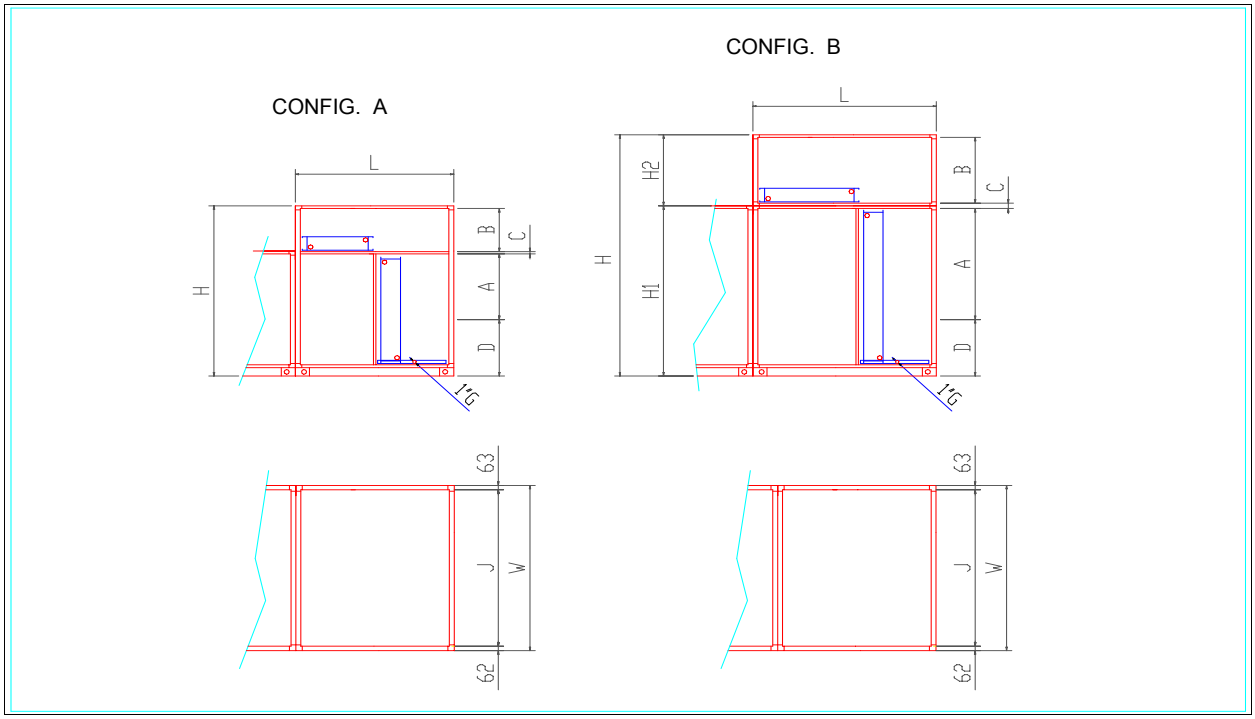
FM	Vent.	W	H	L	A	C2	C4	C6	C8	E	F
	Fan	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*
105	355	1695	1125	1120	433	485	292	135	327	631	631
	400	1695	1125	1280	487	528	306	133	355	604	604
	400	1375	1445	1280	487	528	306	133	355	444	444
119	450	1375	1445	1440	569	496,5	252	132,5	370,5	403	403
	500	1375	1445	1600	638	520,5	249,5	122,5	391,5	368,5	368,5
	560	1375	1445	1600	715	554,5	250,5	121	425	330	330
	450	1695	1445	1440	569	496,5	252	132,5	370,5	563	563
154	500	1695	1445	1600	638	520,5	249,5	122,5	391,5	528,5	528,5
	560	1695	1445	1600	715	554,5	250,5	121	425	490	490
	500	1695	1765	1600	638	520,5	249,5	122,5	391,5	528,5	528,5
194	560	1695	1765	1600	715	554,5	250,5	121	425	490	490
	630	1695	1765	1920	801	595,5	251,5	122,5	466	447	447
	710	1695	1765	2080	898	644,5	250,5	121,5	491,5	398,5	398,5
	560	2015	1765	1600	715	554,5	250,5	121	425	650	650
237	630	2015	1765	1920	801	595,5	251,5	122,5	466	607	607
	710	2015	1765	2080	898	644,5	250,5	121,5	491,5	558,5	558,5
	560	2015	2085	1600	715	554,5	250,5	121	425	650	650
286	630	2015	2085	1920	801	595,5	251,5	122,5	466	607	607
	710	2015	2085	2080	898	644,5	250,5	121,5	491,5	558,5	558,5
	800	2015	2085	2080	1007	895	451	185	566,5	504	504
	630	2335	2085	1920	801	595,5	251,5	122,5	466	767	767
342	710	2335	2085	2080	898	644,5	250,5	121,5	491,5	718,5	718,5
	800	2335	2085	2080	1007	895	451	185	566,5	664	664
	900	2335	2085	2560	1130	844,5	338,5	135,5	641,5	602,5	602,5
	630	2335	2405	1920	801	595,5	251,5	122,5	466	767	767
413	710	2335	2405	2080	898	644,5	250,5	121,5	491,5	718,5	718,5
	800	2335	2405	2080	1007	895	451	185	566,5	664	664
	900	2335	2405	2560	1130	844,5	338,5	135,5	641,5	602,5	602,5
	710	2655	2405	2080	898	644,5	250,5	121,5	491,5	878,5	878,5
480	800	2655	2405	2080	1007	895	451	185	566,5	824	824
	710	2975	2405	2080	898	644,5	250,5	121,5	491,5	1038,5	1038,5
547	800	2975	2405	2080	1007	895	451	185	566,5	984	984
	900	2975	2405	2240	1920	899,5	393,5	162,5	443,5	602,5	1242,5
	800	3295	2405	2080	1007	895	451	185	566,5	1144	1144
614	900	3295	2405	1920	1120	899,5	393,5	162,5	643,5	922,5	1242,5
	1000	3295	2405	2080	1267	924	394	239	829	694	1334
681	900	3615	2405	1920	1130	899,5	393,5	162,5	643,5	1242,5	1242,5
	1000	3615	2405	2080	1267	924	394	239	829	1014	1334
749	900	3935	2405	1920	1130	899,5	393,5	162,5	643,5	1402,5	1402,5
	1000	3935	2405	2080	1267	924	394	239	829	1174	1494
816	900	4255	2405	1920	1130	899,5	393,5	162,5	643,5	1562,5	1562,5
	1000	4255	2405	2080	1267	924	394	239	829	1494	1494
883	900	4575	2405	1920	1130	899,5	393,5	162,5	643,5	1722,5	1722,5
	1000	4575	2405	2080	1267	924	394	239	829	1654	1654

3.10 Sound attenuators



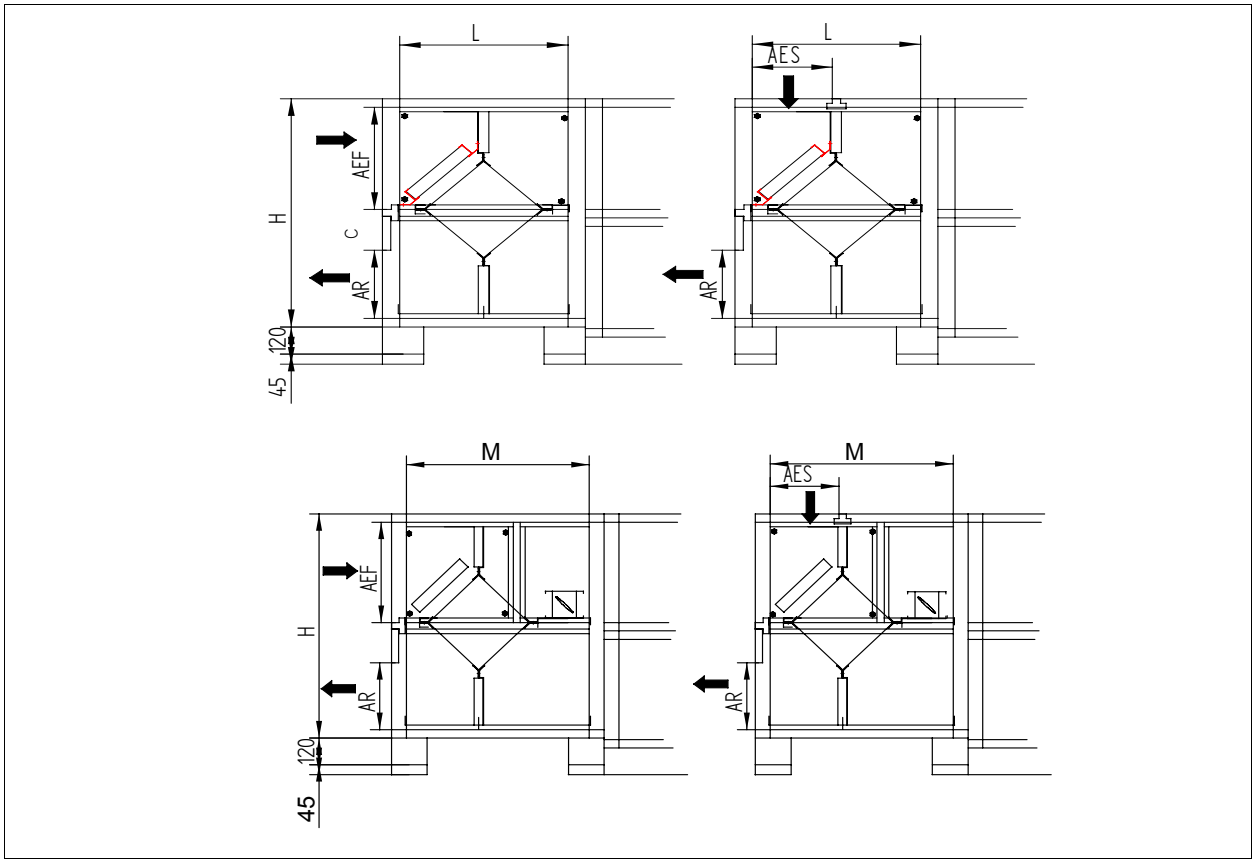
FM	H *mm*	L1 *mm*	L2 *mm*	L3 *mm*	L4 *mm*
13	645	640	960	1280	1600
20	805	640	960	1280	1600
28	805	640	960	1280	1600
35	805	640	960	1280	1600
42	805	640	960	1280	1600
50	805	640	960	1280	1600
57	1125	640	960	1280	1600
69	1125	640	960	1280	1600
82	1125	640	960	1280	1600
105	1125	640	960	1280	1600
119	1445	640	960	1280	1600
154	1445	640	960	1280	1600
194	1765	640	960	1280	1600
237	1765	640	960	1280	1600
286	2085	640	960	1280	1600
342	2085	640	960	1280	1600
413	2405	640	960	1280	1600
480	2405	640	960	1280	1600
547	2405	640	960	1280	1600
614	2405	640	960	1280	1600
681	2405	640	960	1280	1600
749	2405	640	960	1280	1600
816	2405	640	960	1280	1600
883	2405	640	960	1280	1600

3.11 Multizone / Dual duct sections

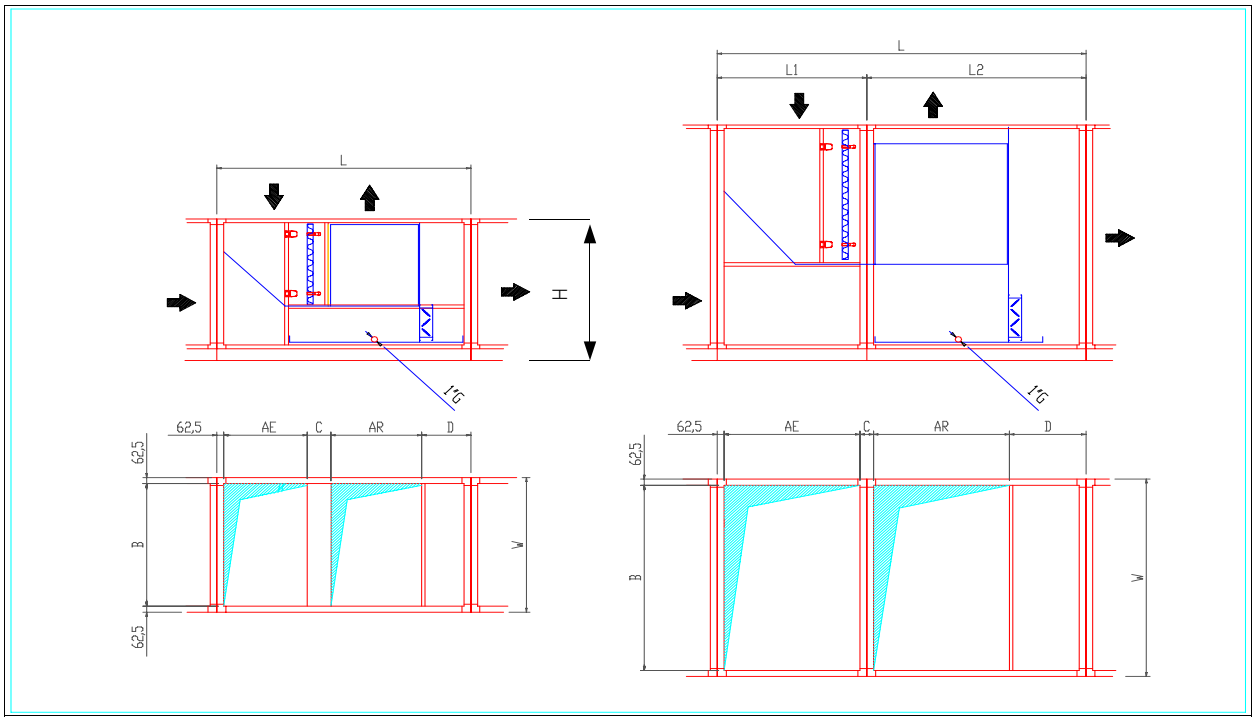


FM	W mm	L mm	Config.	H1 mm	H2 mm	H mm	J mm	A mm	B mm	C mm	D mm
13	735	1375	A	-	-	1125	610	290	290	30	317,5
20	735	1375	A	-	-	1125	610	450	290	30	317,5
28	895	1375	A	-	-	1125	770	450	290	30	317,5
35	1055	1375	A	-	-	1125	930	450	290	30	317,5
42	1215	1375	A	-	-	1125	1090	450	290	30	317,5
50	1375	1375	A	-	-	1125	1250	450	290	30	317,5
57	1055	1695	A	-	-	1765	930	610	610	30	477,5
69	1215	1695	A	-	-	1765	1090	610	610	30	477,5
82	1375	1695	A	-	-	1765	1250	610	610	30	477,5
105	1695	1695	A	-	-	1765	1570	610	610	30	477,5
119	1375	1695	A	-	-	2085	1250	930	610	30	477,5
154	1695	1695	A	-	-	2085	1570	930	610	30	477,5
194	1695	2015	A	-	-	2405	1570	930	610	30	797,5
237	2015	2015	A	-	-	2405	1890	930	610	30	797,5
286	2015	2015	B	2085	685	2770	1890	1250	610	75	797,5
342	2335	2015	B	2085	685	2770	2210	1250	610	75	797,5
413	2335	2335	B	2405	1005	3410	2210	1570	930	75	797,5
480	2655	2335	B	2405	1005	3410	2530	1570	930	75	797,5
547	2975	2335	B	2405	1005	3410	2850	1570	930	75	797,5
614	3295	2335	B	2405	1005	3410	3170	1570	930	75	797,5
681	3615	2335	B	2405	1005	3410	3490	1570	930	75	797,5
749	3935	2335	B	2405	1005	3410	3810	1570	930	75	797,5
816	4255	2335	B	2405	1005	3410	4130	1570	930	75	797,5
883	4575	2335	B	2405	1005	3410	4450	1570	930	75	797,5

3.12 Heat recovery sections

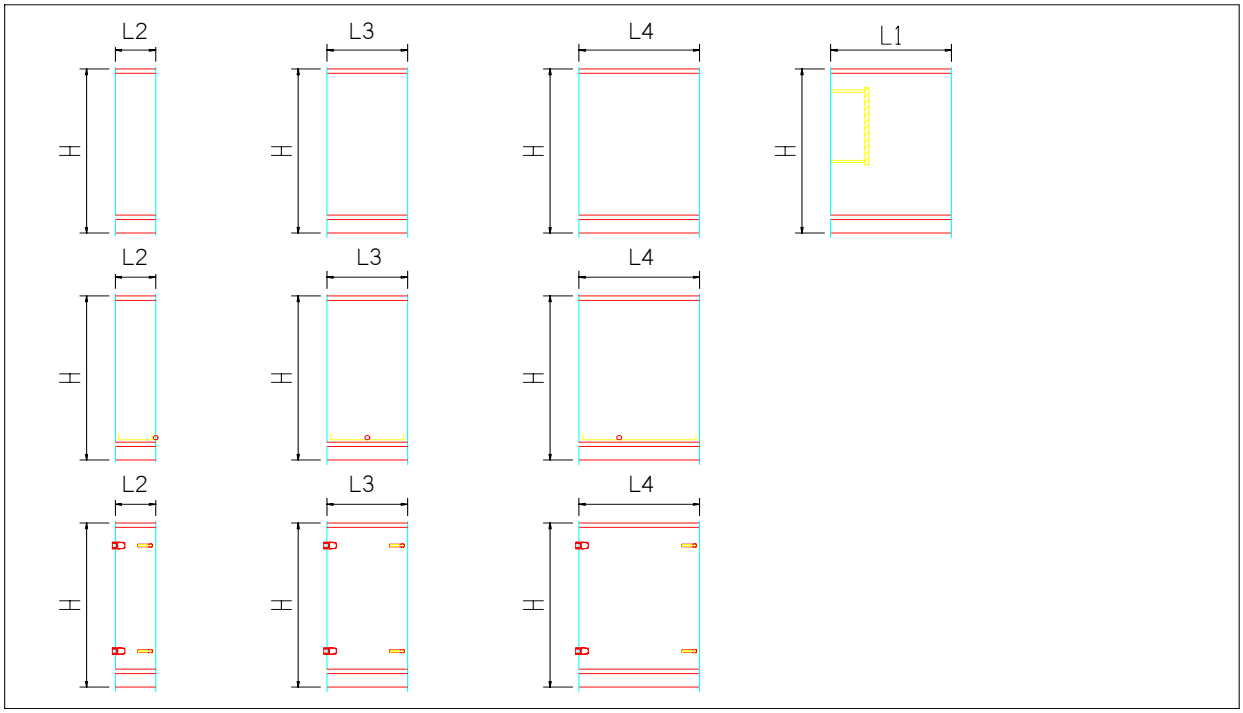


FM	Larghezza	H	L	M	AEF	AES	AR	C
	mm	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*
13	735	1325	735	895	450	300	290	190
20	735	1325	1055	1215	610	450	290	350
28	895	1325	1055	1215	610	450	290	350
35	1055	1325	1055	1215	610	450	290	350
42	1215	1325	1055	1215	610	450	290	350
50	1375	1325	1055	1215	610	450	290	350
57	1055	1965	1375	1535	930	610	610	350
69	1215	1965	1375	1535	930	610	610	350
82	1375	1965	1375	1535	930	610	610	350
105	1695	1965	1375	1535	930	610	610	350
119	1375	2285	1695	1855	930	770	610	670
154	1695	2285	1695	1855	930	770	610	670
194								
237								
286								
342								
413								
480								
547								
614								
681								
749								
816								
883								



FM	W	H	L	L1	L2	AE	AR	C	D	B
	mm	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*
13	735	645	1055			290	290	190	222,5	610
20	735	805	1375			450	450	190	222,5	610
28	895	805	1375			450	450	190	222,5	770
35	1055	805	1375			450	450	190	222,5	930
42	1215	805	1375			450	450	190	222,5	1090
50	1375	805	1375			450	450	190	222,5	1250
57	1055	1125	1695			610	450	190	382,5	930
69	1215	1125	1695			610	450	190	382,5	1090
82	1375	1125	1695			610	450	190	382,5	1250
105	1695	1125	1695			610	450	190	382,5	1570
119	1375	1445	2335			770	770	350	382,5	1250
154	1695	1445	2335			770	770	350	382,5	1570
194	1695	1765	2335			770	770	350	382,5	1570
237	2015	1765	2335			770	770	350	382,5	1890
286	2015	2085	2655			930	930	350	382,5	1890
342	2335	2085	2655			930	930	350	382,5	2210
413	2335	2405	2975			930	1250	350	382,5	2210
480	2655	2405	3070	1375	1695	1250	1250	125	382,5	2530
547	2975	2405	3070	1375	1695	1250	1250	125	382,5	2850
614	3295	2405	3070	1375	1695	1250	1250	125	382,5	3170
681	3615	2405	3070	1375	1695	1250	1250	125	382,5	3490
749	3935	2405	3070	1375	1695	1250	1250	125	382,5	3810
816	4255	2405	3070	1375	1695	1250	1250	125	382,5	4130
883	4575	2405	3070	1375	1695	1250	1250	125	382,5	4450

3.13 Plenums and empty sections



FM	H *mm*	L2 *mm*	L3 *mm*	L4 *mm*		Ventilatore ***Fan***	L1 *mm*
13	645	320	640	960		**180**	320
20	805	320	640	960		**200**	320
28	805	320	640	960		**225**	320
35	805	320	640	960		**250**	320
42	805	320	640	960		**280**	320
50	805	320	640	960		**315**	640
57	1125	320	640	960		**355**	640
69	1125	320	640	960		**400**	640
82	1125	320	640	960		**450**	640
105	1125	320	640	960		**500**	640
119	1445	320	640	960		**560**	640
154	1445	320	640	960		**630**	640
194	1765	320	640	960		**710**	960
237	1765	320	640	960		**800**	960
286	2085	320	640	960		**900**	1280
342	2085	320	640	960		**1000**	1280
413	2405	320	640	960			
480	2405	320	640	960			
547	2405	320	640	960			
614	2405	320	640	960			
681	2405	320	640	960			
749	2405	320	640	960			
816	2405	320	640	960			
883	2405	320	640	960			

3. Weights

The values indicated are guideline.

Total weight of the air handling unit is obtained by added together:

- *enclosure: weight shown in table multiplied by the length of the unit in metres;*
- *canopy (if fitted): weight shown in table multiplied by the length of the unit in metres;*
- *front panel;*
- *components to be installed;*
- *fan (values include the fan, baseplate and transmission);*
- *motor.*

COMPONENTS	FM	13	20	28	35	42	50	57	69	82	105	119	154
Enclosure	kg/m	30	34	38	42	46	49	49	53	57	65	65	72
Front wall	kg	5	6	7	9	10	11	13	15	17	20	22	27
Canopy	kg/m	7	7	9	11	12	14	11	12	14	17	14	17
1R coil	kg	6	7	8	9	10	11	13	14	15	17	20	23
2R coil	kg	7	9	10	12	13	14	16	18	22	25	29	33
3R coil	kg	8	10	12	14	16	19	21	24	26	31	35	41
4R coil	kg	10	13	15	17	20	22	27	30	33	39	45	53
6R coil	kg	12	16	19	22	25	28	34	38	43	51	58	69
8R coil	kg	15	21	25	28	32	36	41	46	52	62	74	88
Flat filters	kg	5	6	7	7	8	9	10	11	12	14	14	16
Bag filters	kg	4	5	6	6	7	9	11	12	15	17	19	23
Rigid bag filters	kg	6	8	8	8	10	14	17	19	24	28	31	38
Roll filters	kg	-	-	-	-	-	-	75	75	86	97	86	97
Absolute filters	kg	19	19	25	31	38	44	44	50	56	69	88	113
Activated carbon filters	kg	29	42	42	43	56	83	109	122	162	189	215	268
100 mm wet deck hum	kg	7	9	10	11	13	14	15	17	19	23	23	28
200 mm wet deck hum	kg	11	14	16	19	21	24	25	29	33	40	41	50
100 wet deck+pump	kg	10	12	13	14	16	17	18	20	22	26	26	31
200 wet deck+pump	kg	14	17	19	22	24	27	28	32	36	43	44	53
Steam humidifier	kg	6	6	7	8	9	11	8	9	11	13	11	13
Compressed air humidifier	kg	5	5	7	8	9	10	9	11	12	15	14	17
Zn droplet eliminator	kg	6	9	11	13	15	16	20	23	26	32	36	44
Al droplet eliminator	kg	3	4	5	6	6	7	9	10	12	14	16	20
Heat recovery section	kg	94	123	141	160	190	203	244	254	265	308	361	410

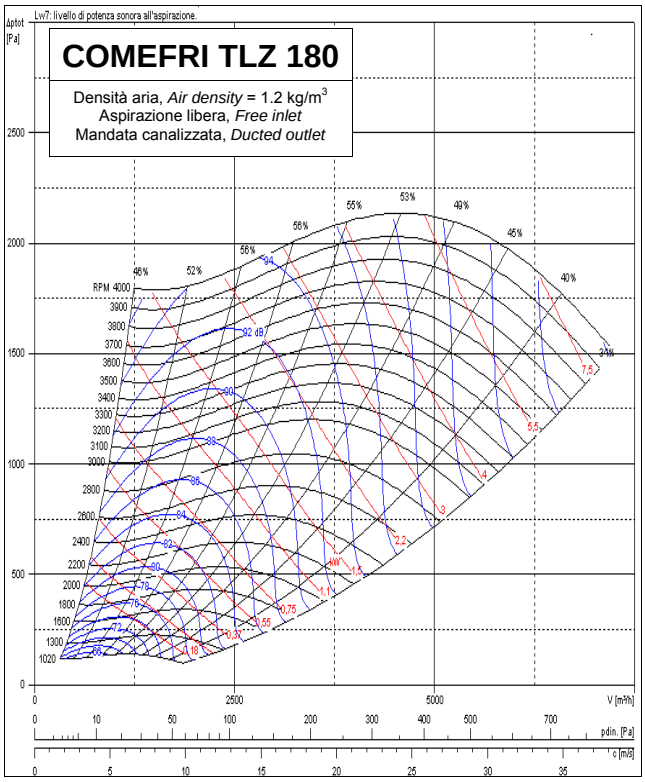
COMPONENTS	FM	194	237	286	342	413	480	547	614	681	749	816	883
Enclosure	kg/m	80	88	96	103	111	119	126	134	142	149	157	165
Front wall	kg	33	40	48	55	64	73	82	90	99	108	117	125
Canopy	kg/m	17	20	20	23	23	27	30	33	36	39	43	46
1R coil	kg	27	30	34	38	49	53	57	61	65	69	73	77
2R coil	kg	40	45	52	59	74	81	88	96	103	110	117	124
3R coil	kg	50	57	71	80	94	110	120	130	140	150	160	170
4R coil	kg	68	77	97	108	128	141	154	167	180	193	206	219
6R coil	kg	88	100	125	141	167	186	205	224	243	277	296	315
8R coil	kg	113	130	166	187	222	246	271	296	321	346	371	396
Flat filters	kg	19	21	24	27	29	33	35	39	41	44	49	50
Bag filters	kg	27	33	39	45	51	58	64	72	78	85	96	99
Rigid bag filters	kg	45	56	66	76	87	100	111	124	135	148	168	172
Roll filters	kg	101	107	110	121	124	192	203	214	220	226	237	248
Absolute filters	kg	138	165	198	238	285	342	410	492	591	710	851	1022
Activated carbon filters	kg	321	401	480	559	639	744	824	929	1009	1114	1272	1299
100 mm wet deck hum	kg	33	39	46	53	60	68	76	84	92	100	108	116
200 mm wet deck hum	kg	61	73	85	99	114	129	144	159	175	190	205	221
100 wet deck+pump	kg	36	42	49	56	63	71	79	87	95	103	111	119
200 wet deck+pump	kg	64	76	88	102	117	132	147	162	178	193	208	224
Steam humidifier	kg	13	16	16	18	18	20	23	25	28	30	33	35
Compressed air humidifier	kg	19	23	25	29	32	37	41	46	50	54	59	63
Zn droplet eliminator	kg	56	67	81	94	110	125	140	155	170	186	201	216
Al droplet eliminator	kg	25	30	36	42	49	56	62	69	76	82	89	96
Heat recovery section	kg	502	557	670	742	806	903	1001	1087	1195	1259	1357	1432

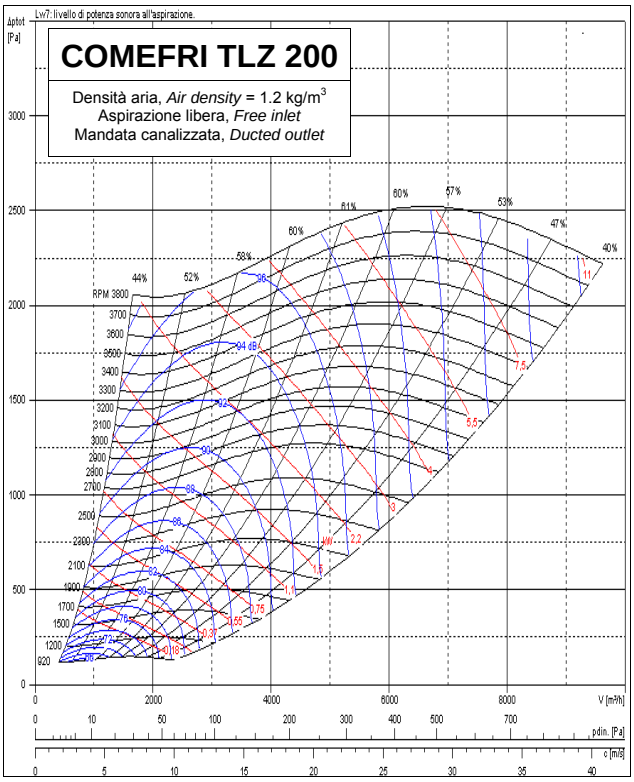
FANS									
Size		**180**	**200**	**225**	**250**	**280**	**315**	**355**	**400**
Forward curved blades	kg	24	31	43	51	60	77	104	132
Backward curved blades	kg	24	31	42	50	60	75	102	129
Backward aerofoil blades	kg				62		87		146
Size		**450**	**500**	**560**	**630**	**710**	**800**	**900**	1000
Forward curved blades	kg	164	201	244	287	338	467	547	616
Backward curved blades	kg	160	207	257	302	360	483	587	666
Backward aerofoil blades	kg	186	223	278	346	419	557	620	700

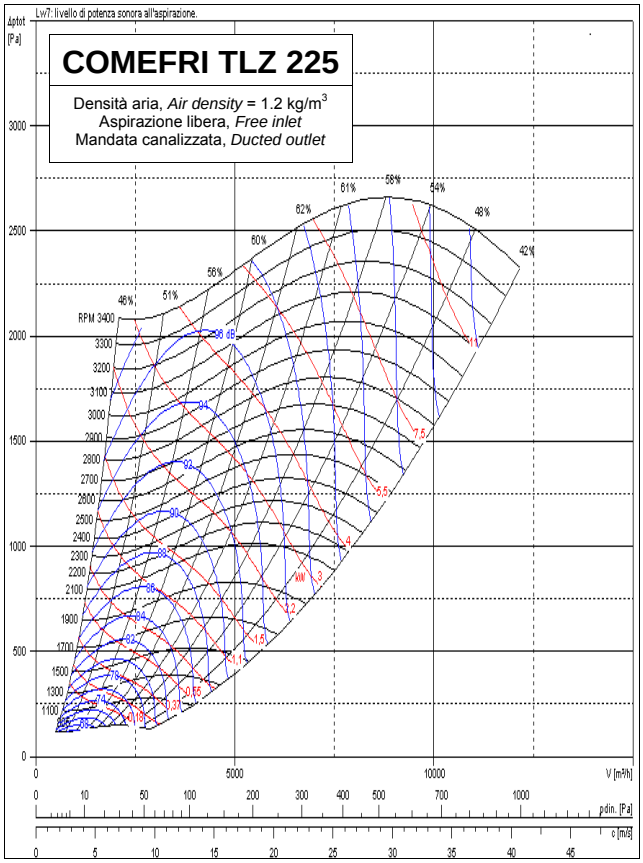
MOTORS												
Power [Kw]		**0,2**	**0,3**	**0,4**	**0,6**	**0,8**	**1,1**	**1,5**	**2,2**	**3**	**4**	**5,5**
2 poles	kg	3,5	4	5,5	6,3	8	9,6	12,9	15,5	22	27	39,5
4 poles	kg	3,9	5,3	6	8,4	9,5	12,8	15	21	24,8	31	42
6 poles	kg	5,8	6,3	8,8	10,3	13,4	17,5	21,2	28,8	39	48	58
Power [Kw]		**7,5**	**9,2**	**11**	**15**	**19**	**22**	**30**	**37**	**45**	**55**	**75**
2 poles	kg	45	52	64	72	84	103	130	148	210	238	335
4 poles	kg	52	58	72	85	108	144	168	207	225	264	362
6 poles	kg	67		86	110	125	145	216	258	314	353	426

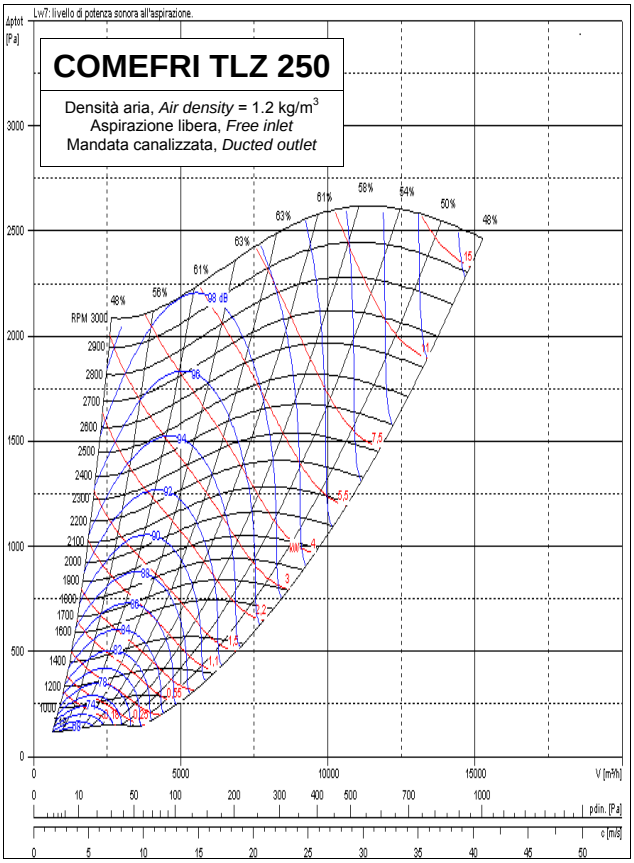
5. Fans characteristics curves

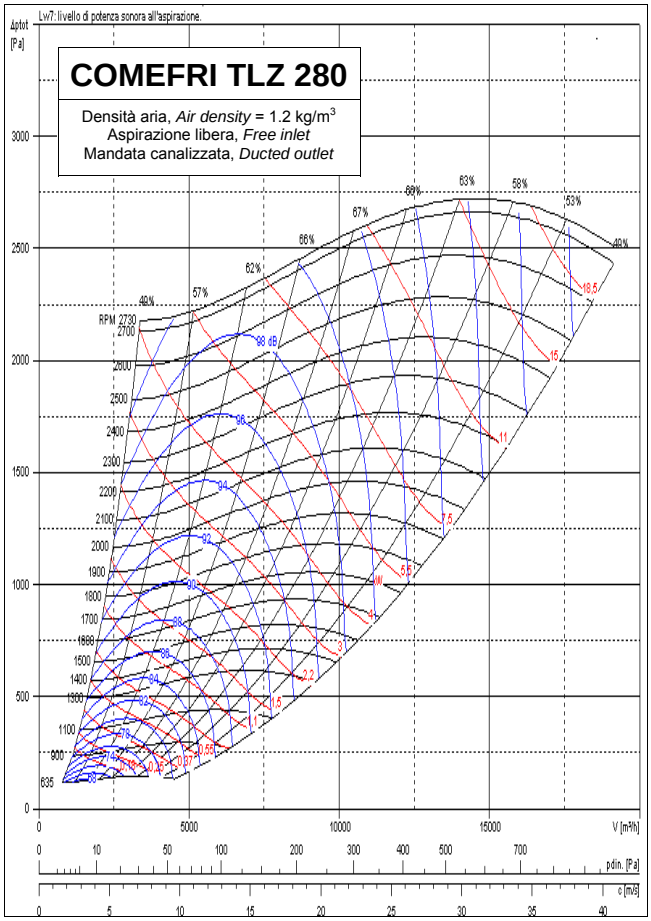
5.1 FORWARD CURVED BLADE FANS

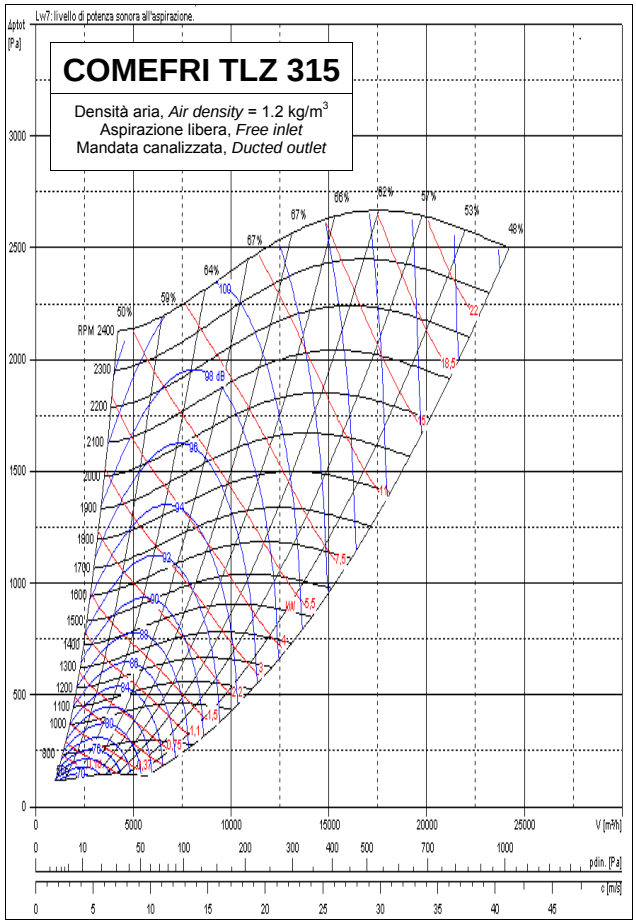


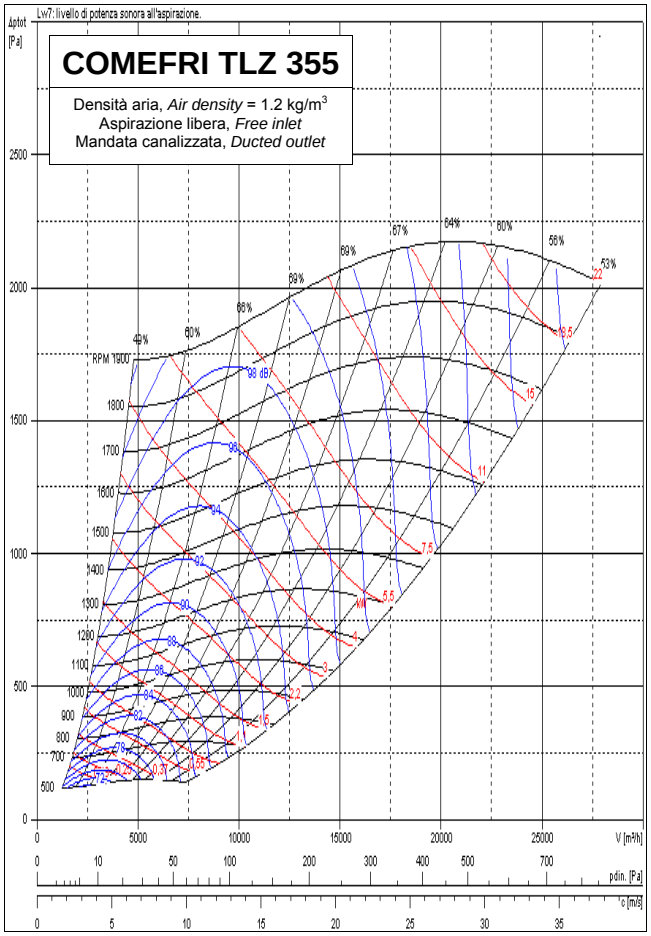


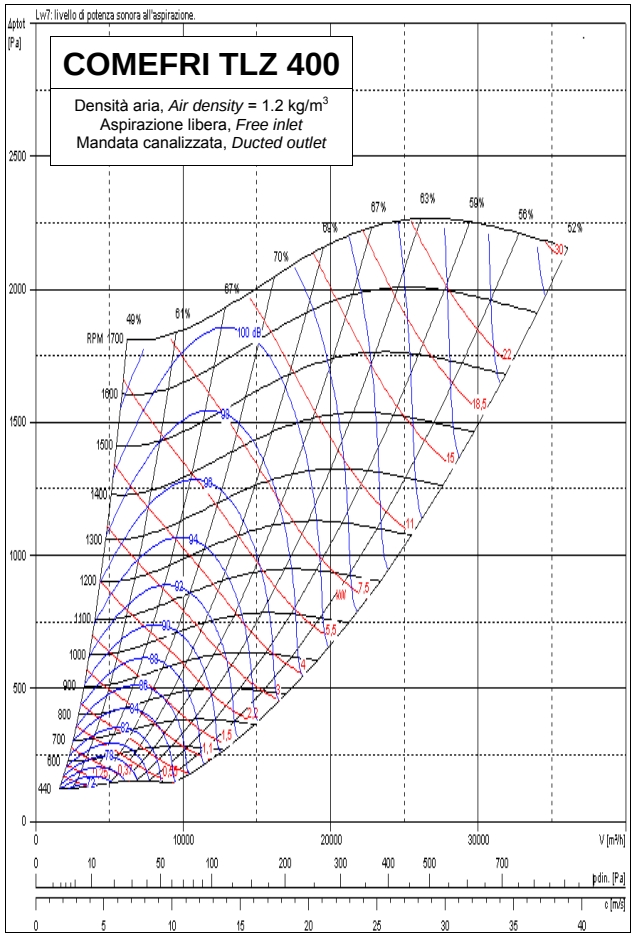


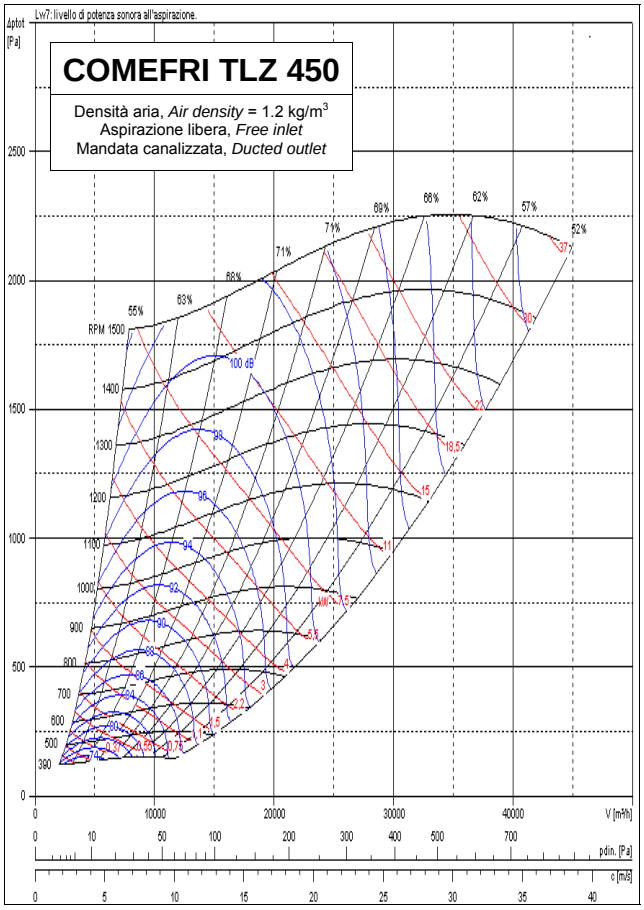


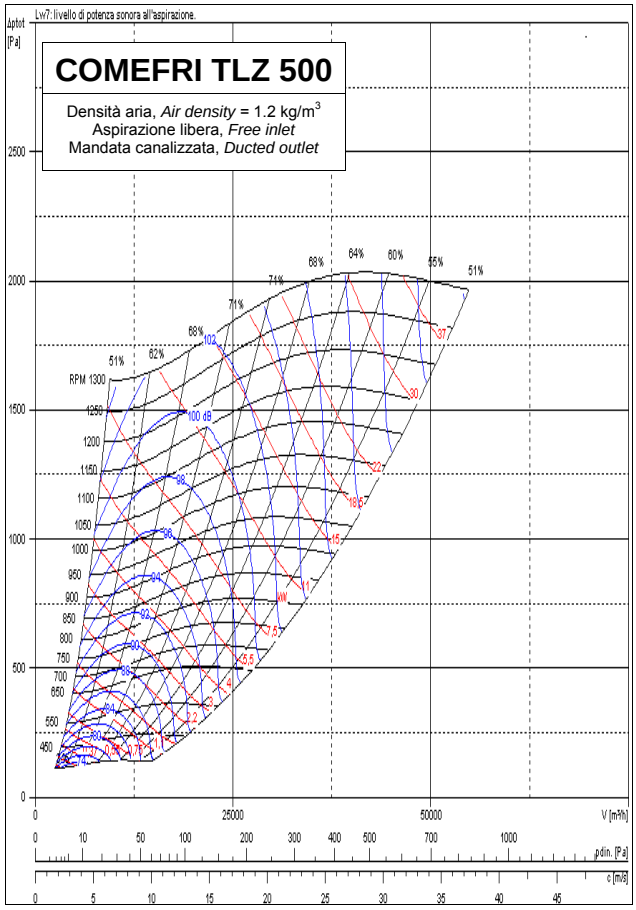

COMEFRI TLZ 280
Densità aria, *Air density* = 1.2 kg/m³
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*
Lw7: livello di potenza sonora all'aspirazione.
Δptot [Pa]
V [m³/h]
pdin. [Pa]
c [m/s]

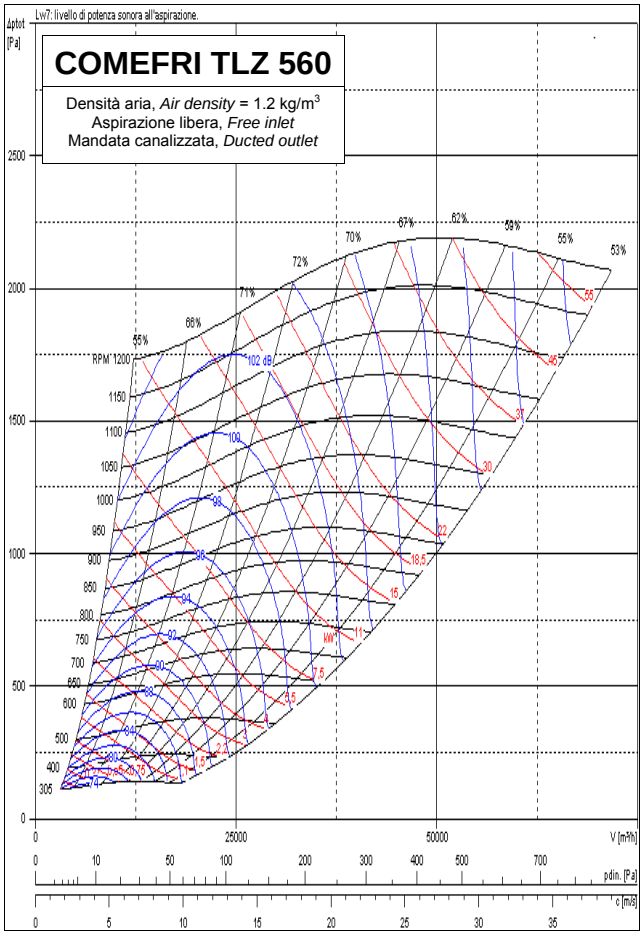

COMEFRI TLZ 315
Densità aria, *Air density* = 1.2 kg/m³
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*
Lw7: livello di potenza sonora all'aspirazione.
Δptot [Pa]
V [m³/h]
pdin. [Pa]
c [m/s]

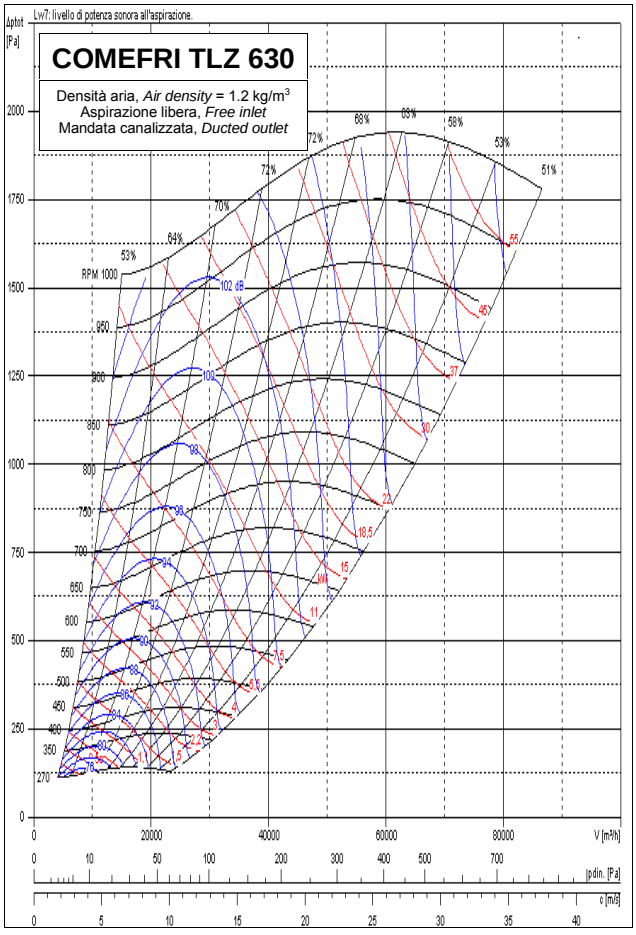

COMEFRI TLZ 355
Densità aria, *Air density* = 1.2 kg/m³
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*
Lw7: livello di potenza sonora all'aspirazione.
Δptot [Pa]
V [m³/h]
pdin. [Pa]
c [m/s]

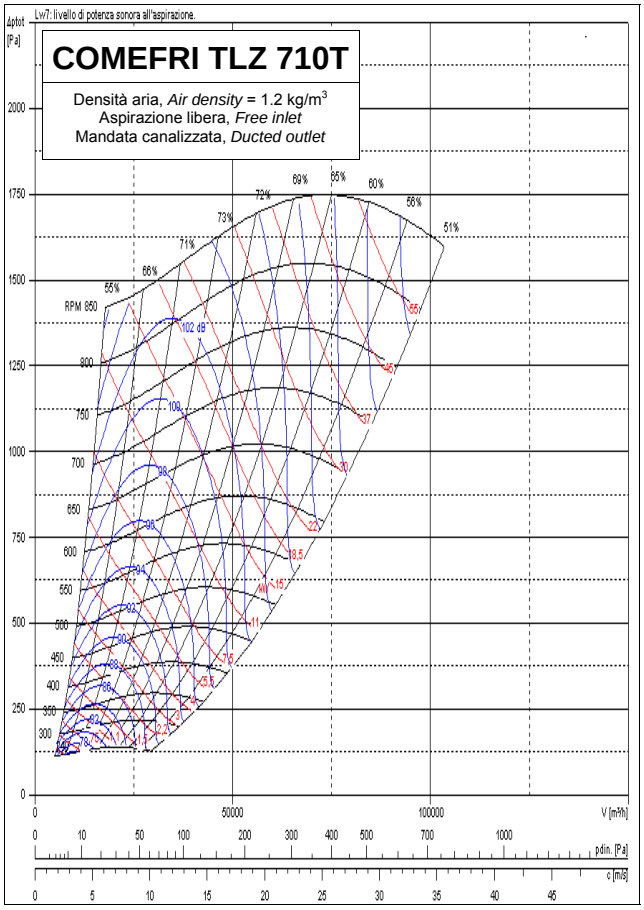

COMEFRI TLZ 400
Densità aria, *Air density* = 1.2 kg/m³
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*
Lw7: livello di potenza sonora all'aspirazione.
Δptot [Pa]
V [m³/h]
pdin. [Pa]
c [m/s]

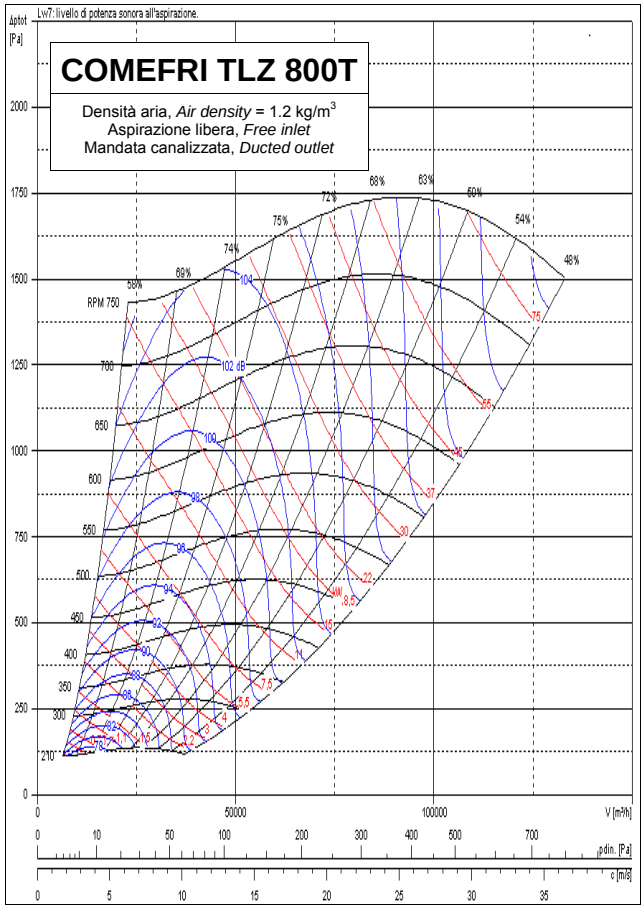

Lw7: livello di potenza sonora all'aspirazione.
COMEFRI TLZ 450
Densità aria, *Air density* = 1.2 kg/m³
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*
V [m³/h]
pdin. [Pa]
c [m/s]

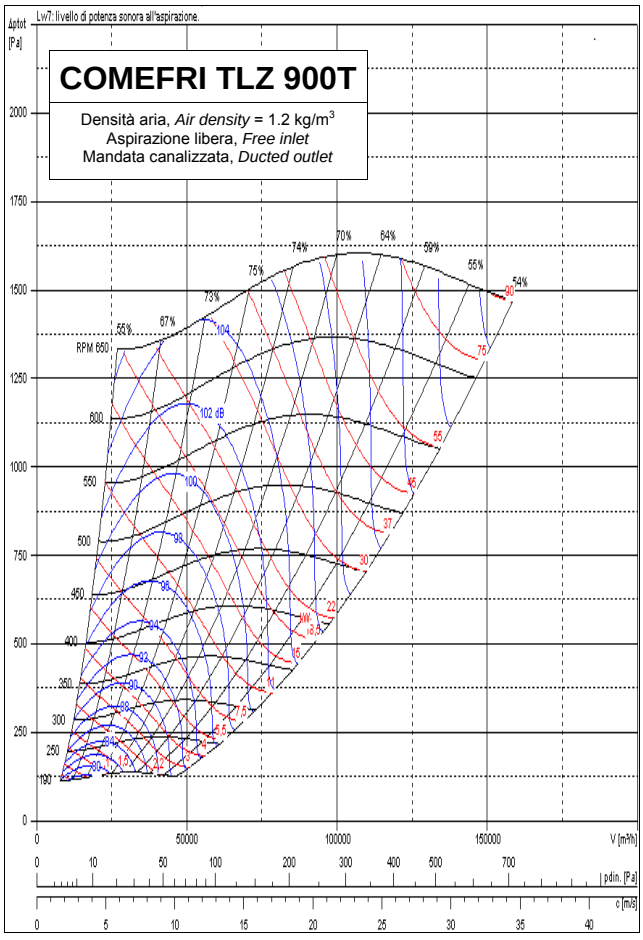

Lw7: livello di potenza sonora all'aspirazione.
COMEFRI TLZ 500
Densità aria, *Air density* = 1.2 kg/m³
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*
V [m³/h]
pdin. [Pa]
c [m/s]

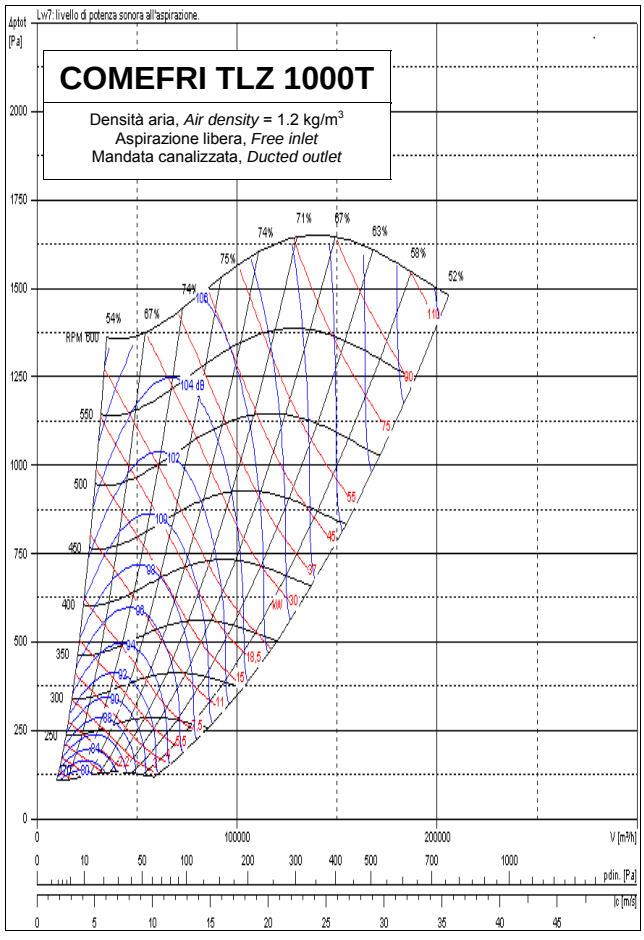

Lw7: livello di potenza sonora all'aspirazione.
COMEFRI TLZ 560
Densità aria, *Air density* = 1.2 kg/m³
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*
V [m³/h]
pdin. [Pa]
c [m/s]


Lw7: livello di potenza sonora all'aspirazione.
COMEFRI TLZ 630
Densità aria, *Air density* = 1.2 kg/m³
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*
V [m³/h]
pdin. [Pa]
c [m/s]

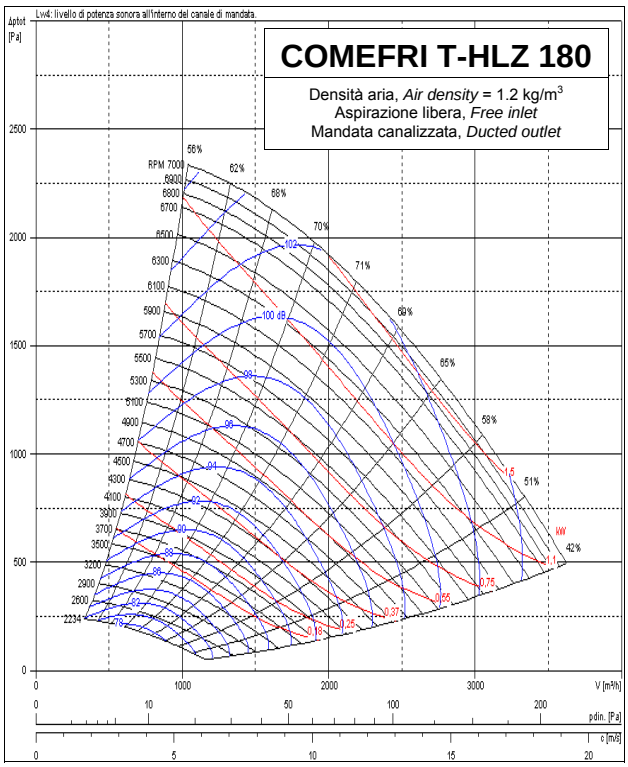

COMEFRI TLZ 710T
Densità aria, *Air density* = 1.2 kg/m³
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*
Lw7: livello di potenza sonora all'aspirazione.
Δptot [Pa]
RPM 850
102 dB
V [m³/h]
pdin. [Pa]
c [m/s]

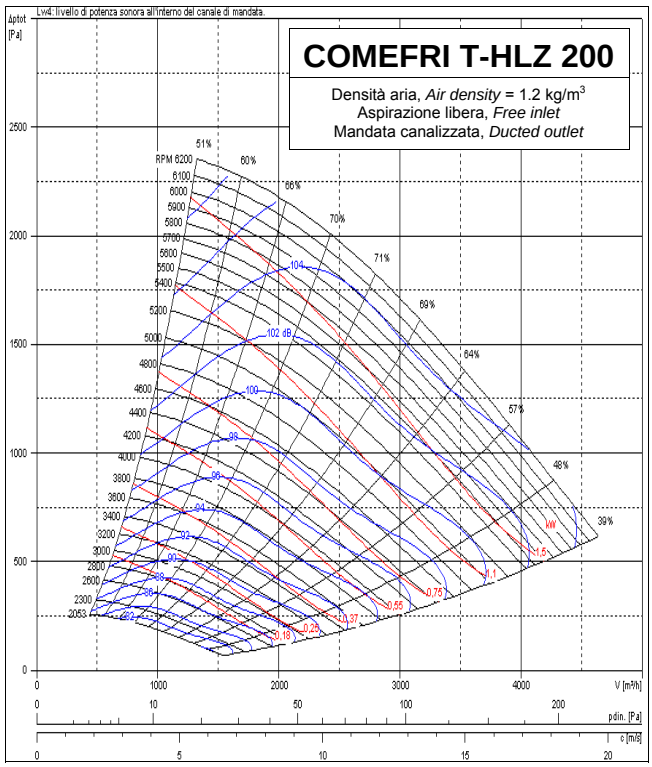

COMEFRI TLZ 800T
Densità aria, *Air density* = 1.2 kg/m³
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*
Lw7: livello di potenza sonora all'aspirazione.
Δptot [Pa]
RPM 750
102 dB
V [m³/h]
pdin. [Pa]
c [m/s]

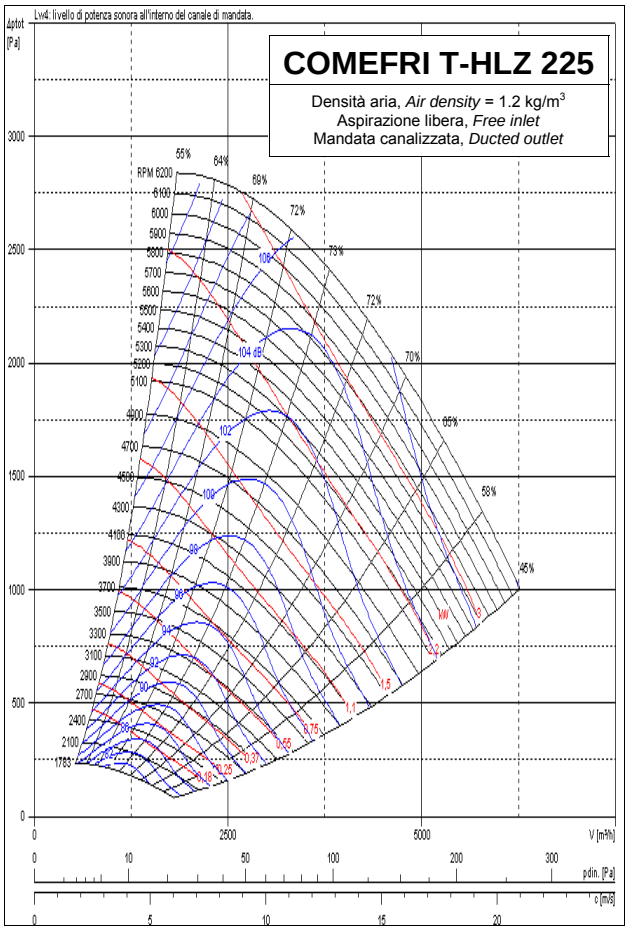

COMEFRI TLZ 900T
Densità aria, *Air density* = 1.2 kg/m³
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*
Lw7: livello di potenza sonora all'aspirazione.
Δptot [Pa]
RPM 660
102 dB
V [m³/h]
pdin. [Pa]
c [m/s]

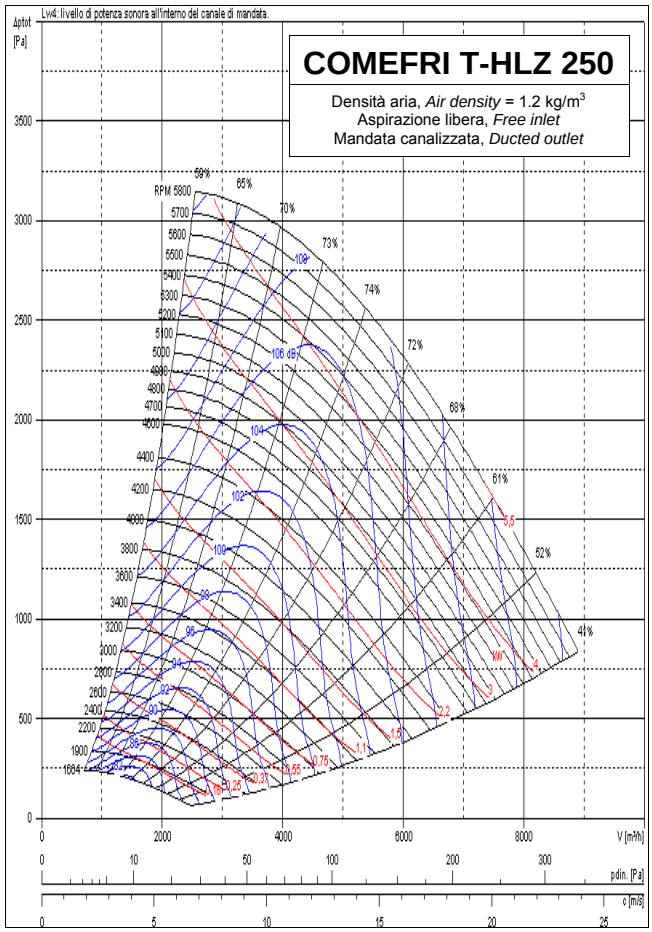

COMEFRI TLZ 1000T
Densità aria, *Air density* = 1.2 kg/m³
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*
Lw7: livello di potenza sonora all'aspirazione.
Δptot [Pa]
RPM 600
104 dB
V [m³/h]
pdin. [Pa]
c [m/s]

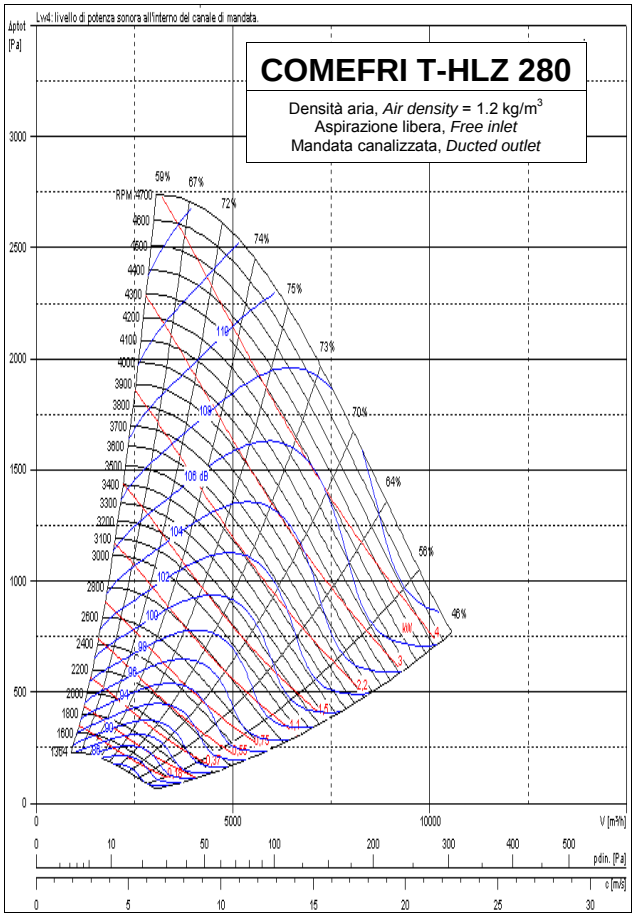
5.2 BACKWARD CURVED BLADE FANS

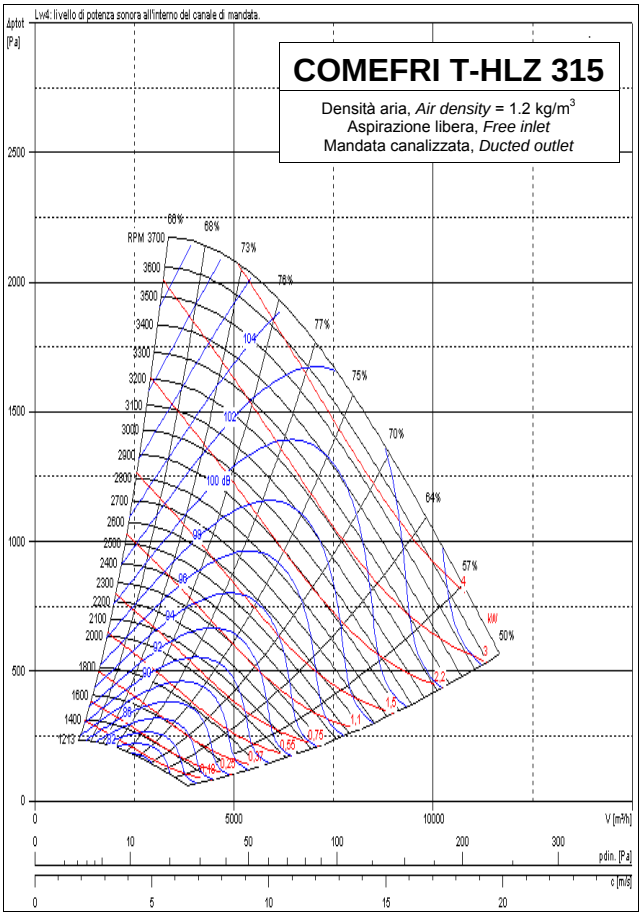


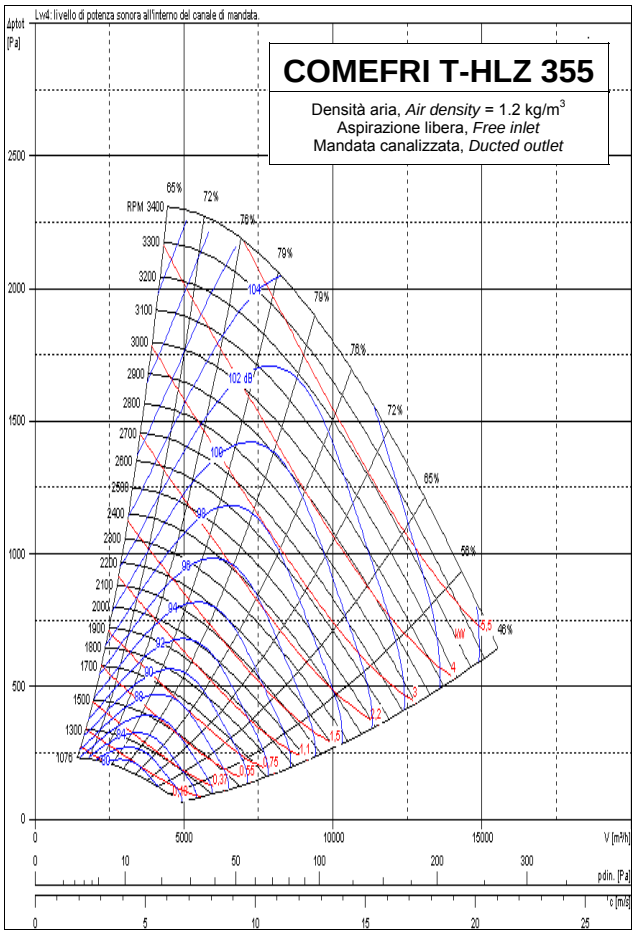


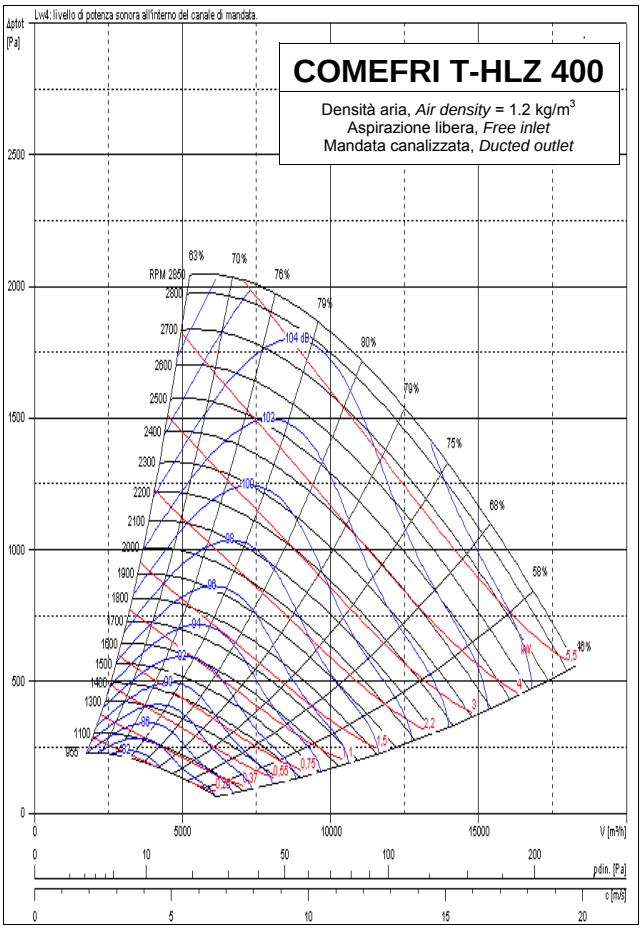





Lw4: livello di potenza sonora all'interno del canale di mandata.
Δptot [Pa]
COMEFRI T-HLZ 280
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
RPM 4700
RPM 3700
RPM 3400
RPM 2850
V [m³/h]
pdin. [Pa]
c [m/s]

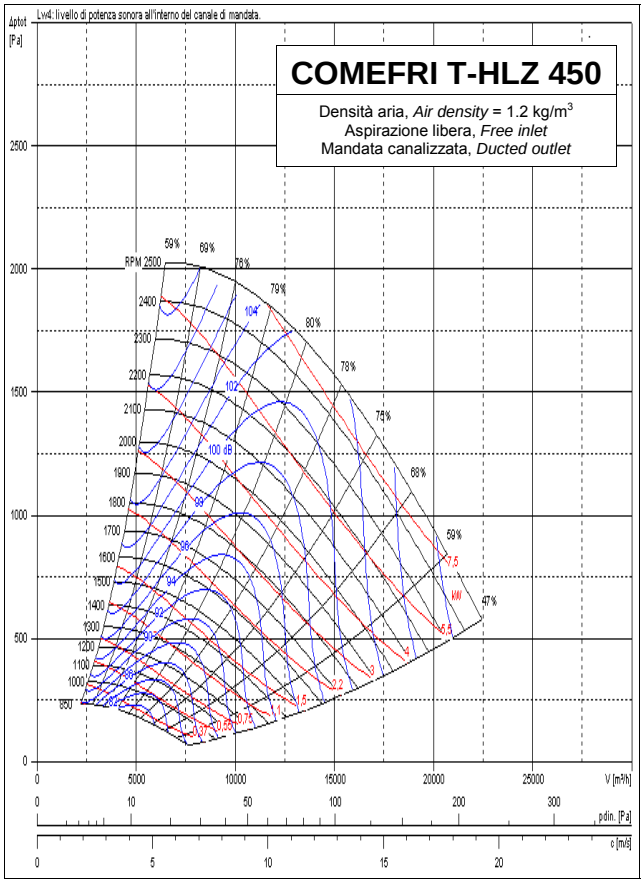

Lw4: livello di potenza sonora all'interno del canale di mandata.
Δptot [Pa]
COMEFRI T-HLZ 315
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
RPM 4700
RPM 3700
RPM 3400
RPM 2850
V [m³/h]
pdin. [Pa]
c [m/s]


Lw4: livello di potenza sonora all'interno del canale di mandata.
Δptot [Pa]
COMEFRI T-HLZ 355
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
RPM 4700
RPM 3700
RPM 3400
RPM 2850
V [m³/h]
pdin. [Pa]
c [m/s]


Lw4: livello di potenza sonora all'interno del canale di mandata.
Δptot [Pa]
COMEFRI T-HLZ 400
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
RPM 4700
RPM 3700
RPM 3400
RPM 2850
V [m³/h]
pdin. [Pa]
c [m/s]

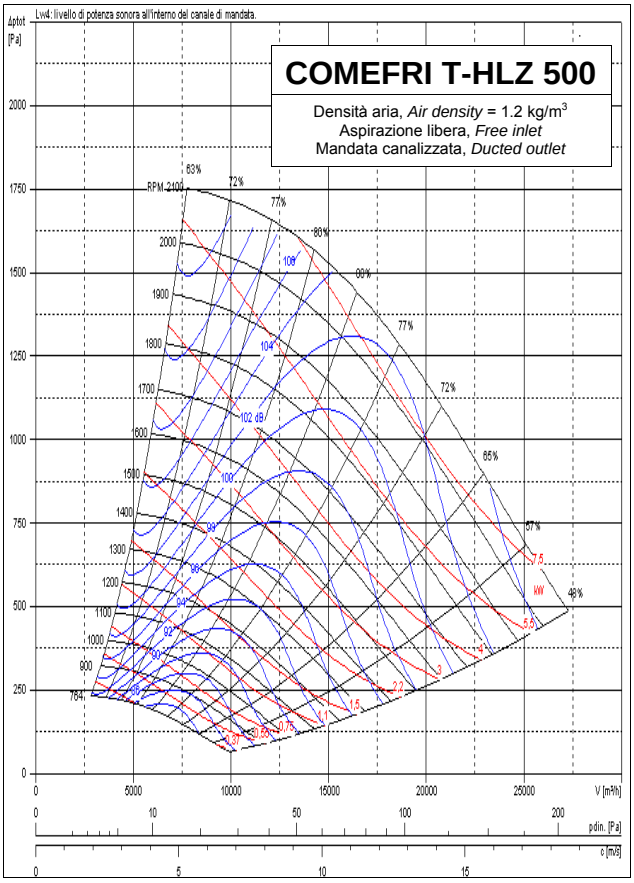
COMEFRI T-HLZ 450

Densità aria, *Air density* = 1.2 kg/m^3
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*



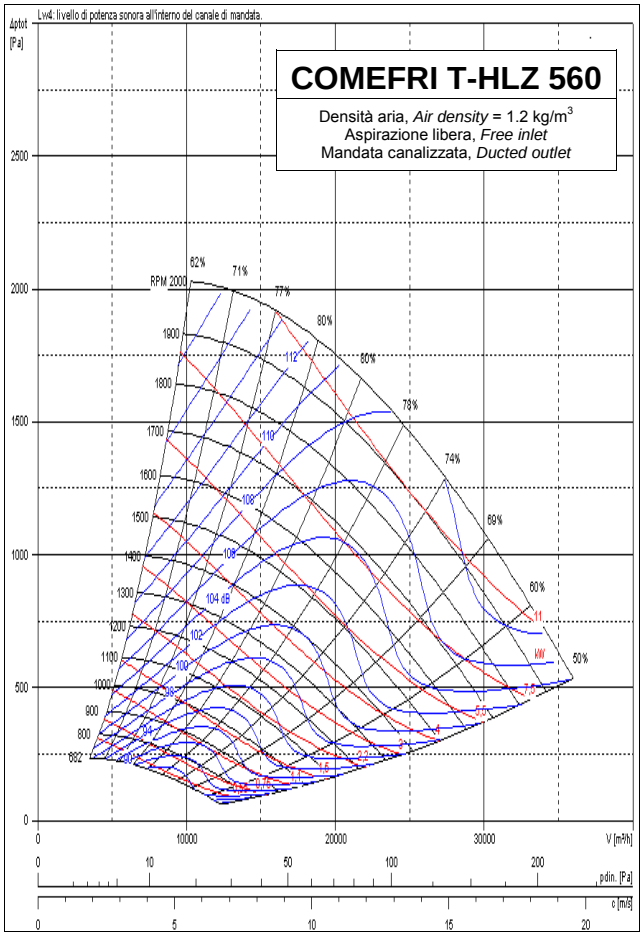
COMEFRI T-HLZ 500

Densità aria, *Air density* = 1.2 kg/m^3
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*



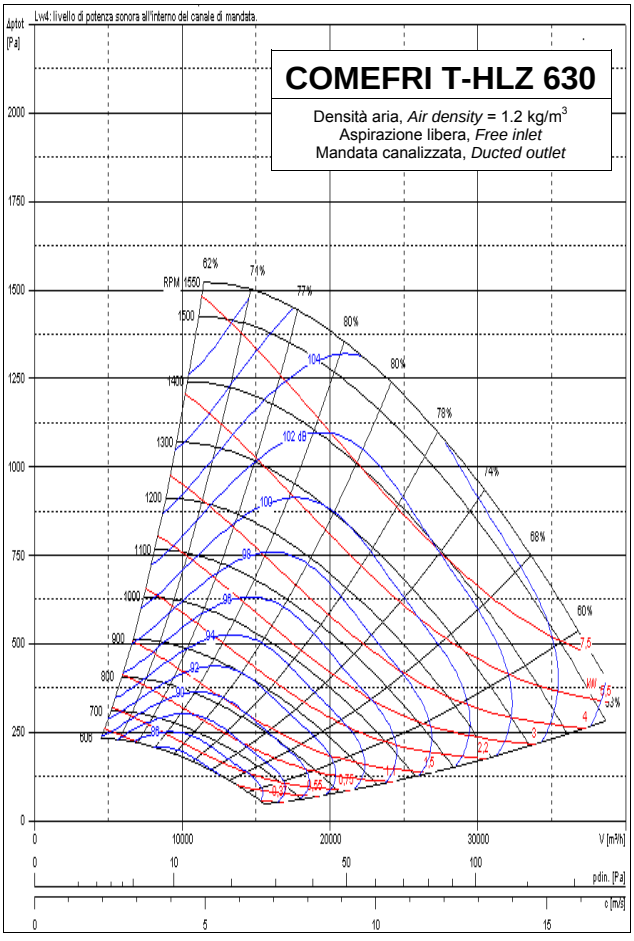
COMEFRI T-HLZ 560

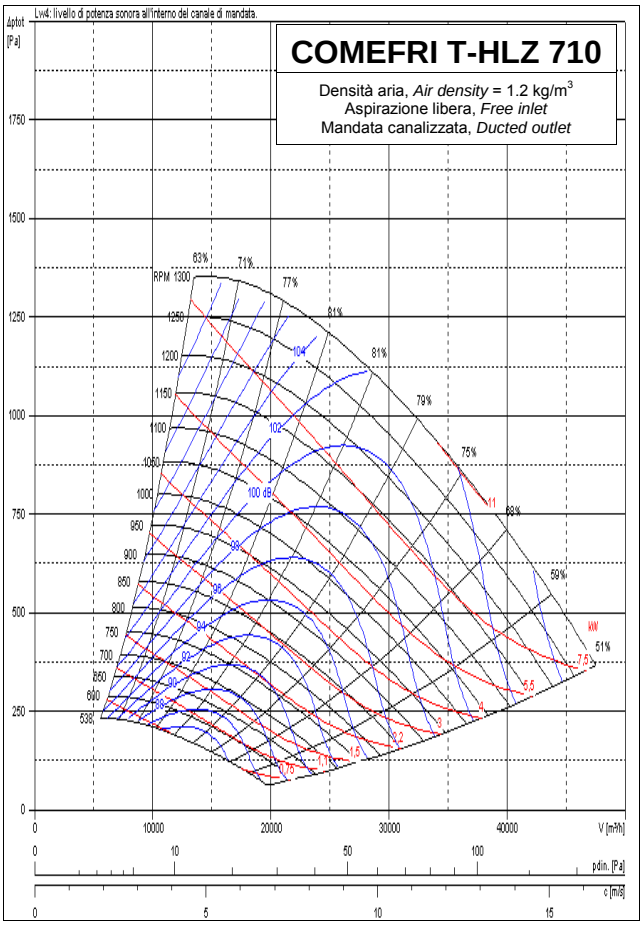
Densità aria, *Air density* = 1.2 kg/m^3
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*

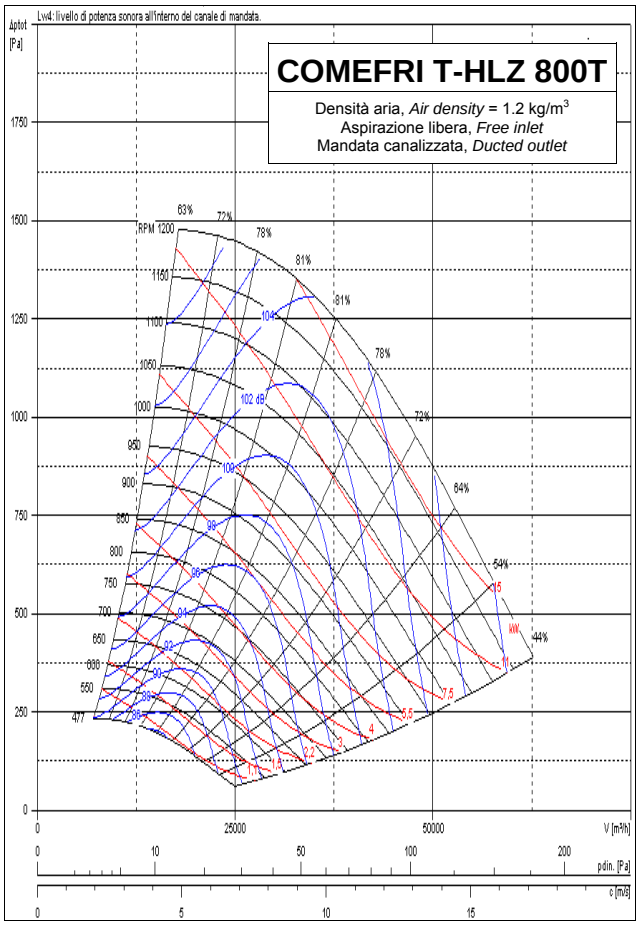


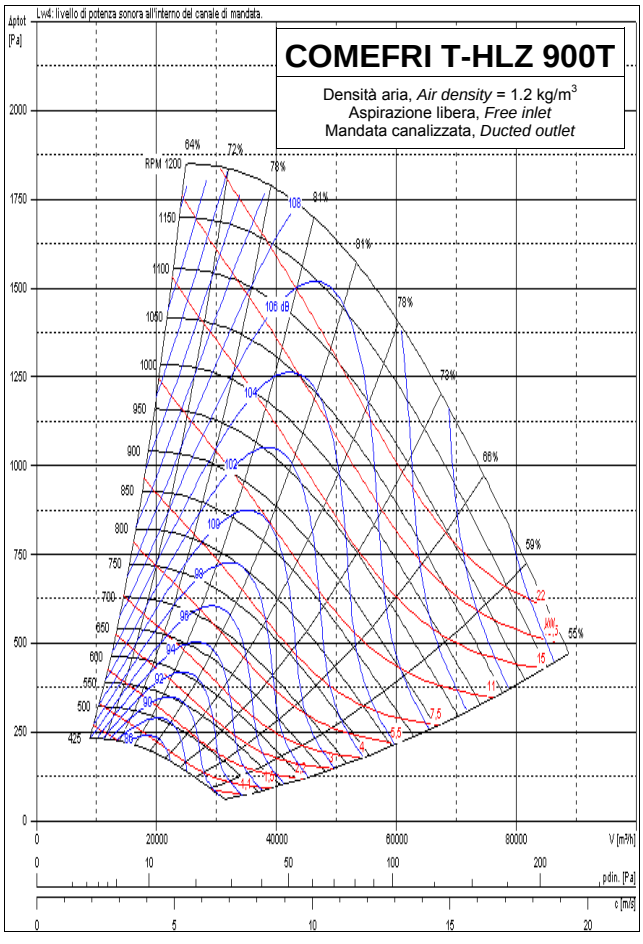
COMEFRI T-HLZ 630

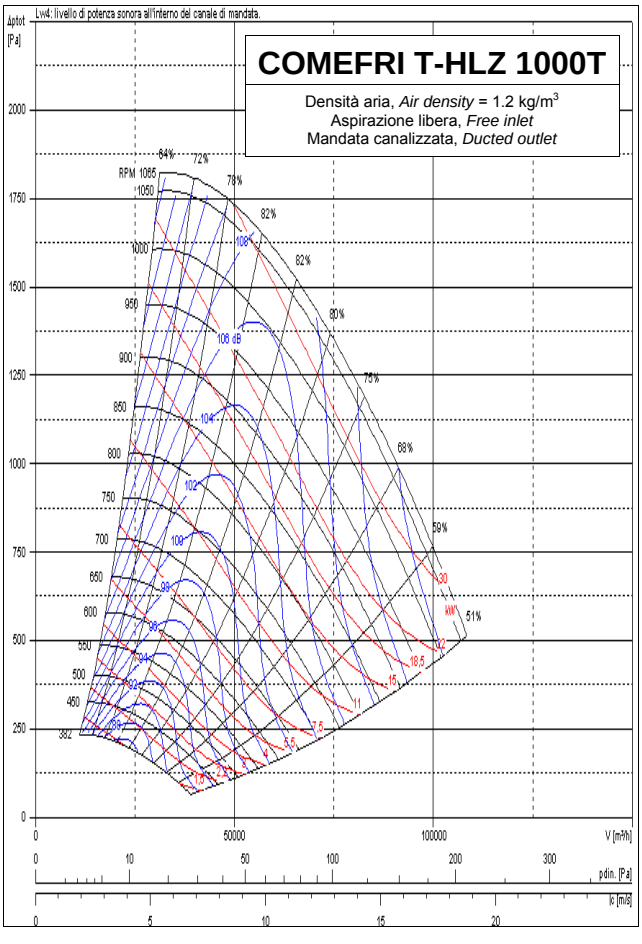
Densità aria, *Air density* = 1.2 kg/m^3
Aspirazione libera, *Free inlet*
Mandata canalizzata, *Ducted outlet*



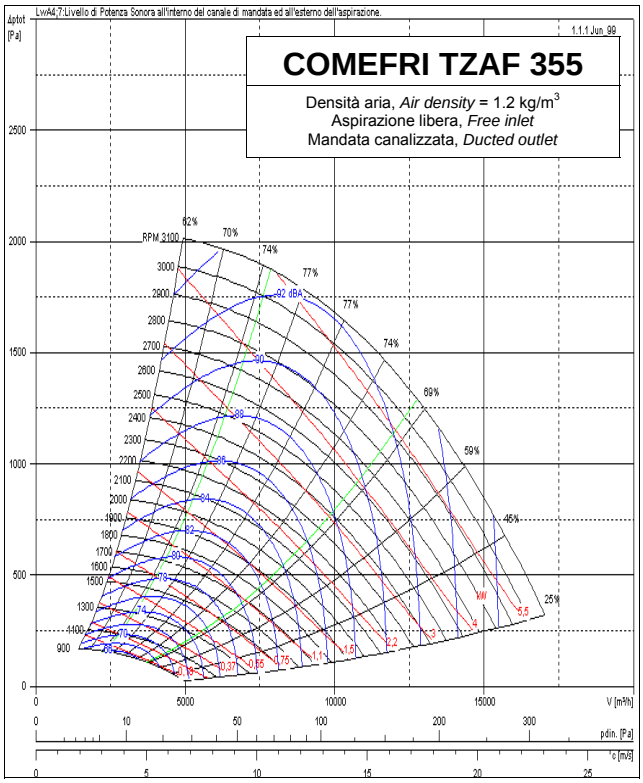

COMEFRI T-HLZ 710
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
Lw4: livello di potenza sonora all'interno del canale di mandata.
Aptot [Pa]
RPM 1300
V [m³/h]
pdin. [Pa]
c [m/s]
kW

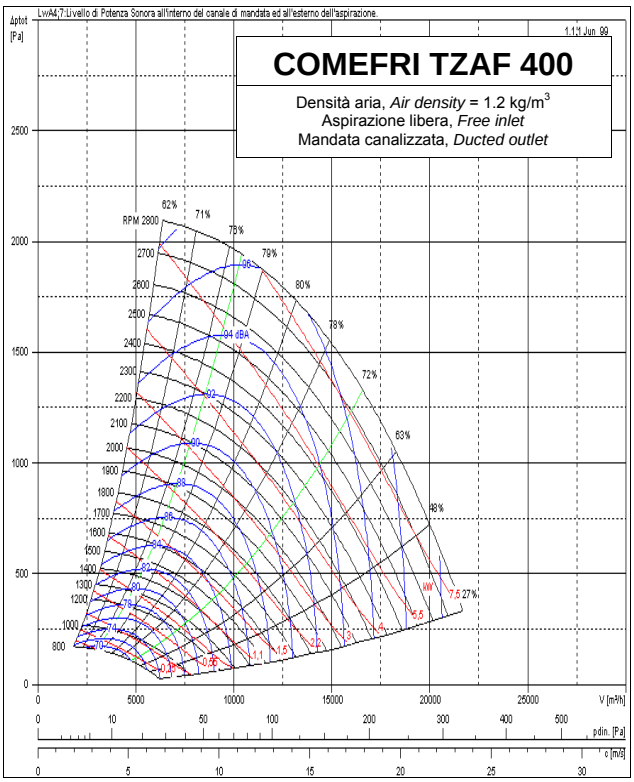

COMEFRI T-HLZ 800T
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
Lw4: livello di potenza sonora all'interno del canale di mandata.
Aptot [Pa]
RPM 1200
V [m³/h]
pdin. [Pa]
c [m/s]
kW

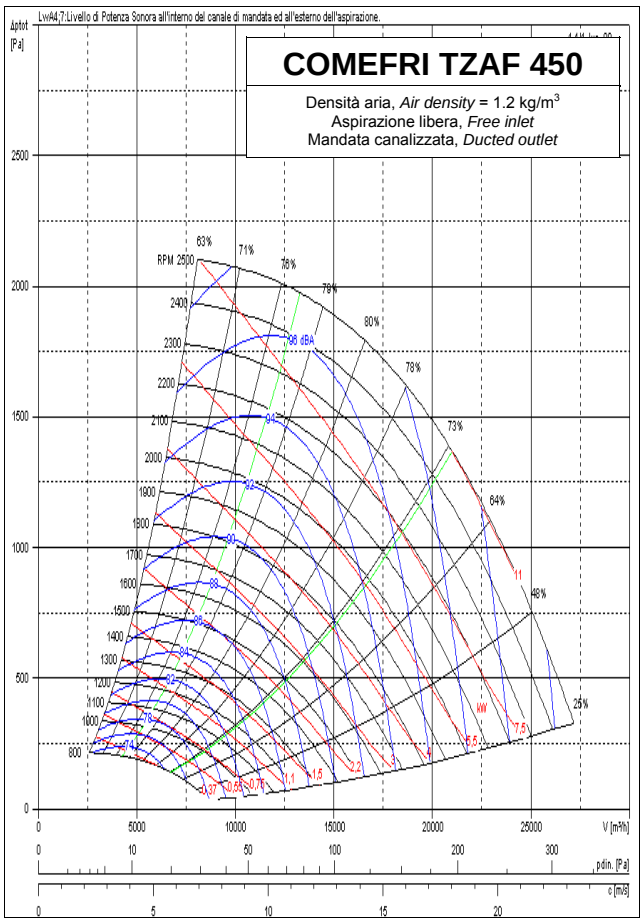

COMEFRI T-HLZ 900T
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
Lw4: livello di potenza sonora all'interno del canale di mandata.
Aptot [Pa]
RPM 1200
V [m³/h]
pdin. [Pa]
c [m/s]
kW

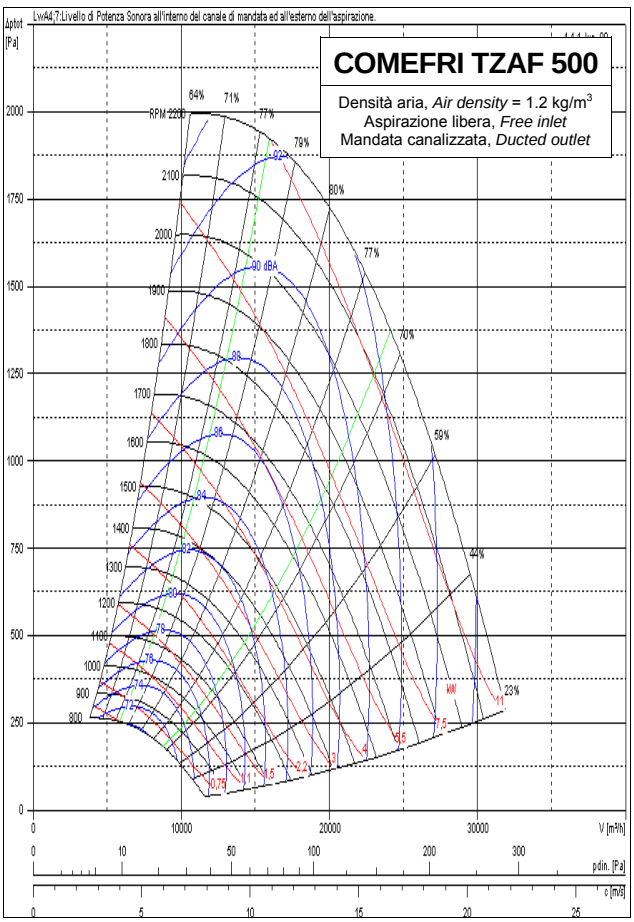

COMEFRI T-HLZ 1000T
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
Lw4: livello di potenza sonora all'interno del canale di mandata.
Aptot [Pa]
RPM 1085
V [m³/h]
pdin. [Pa]
c [m/s]
kW

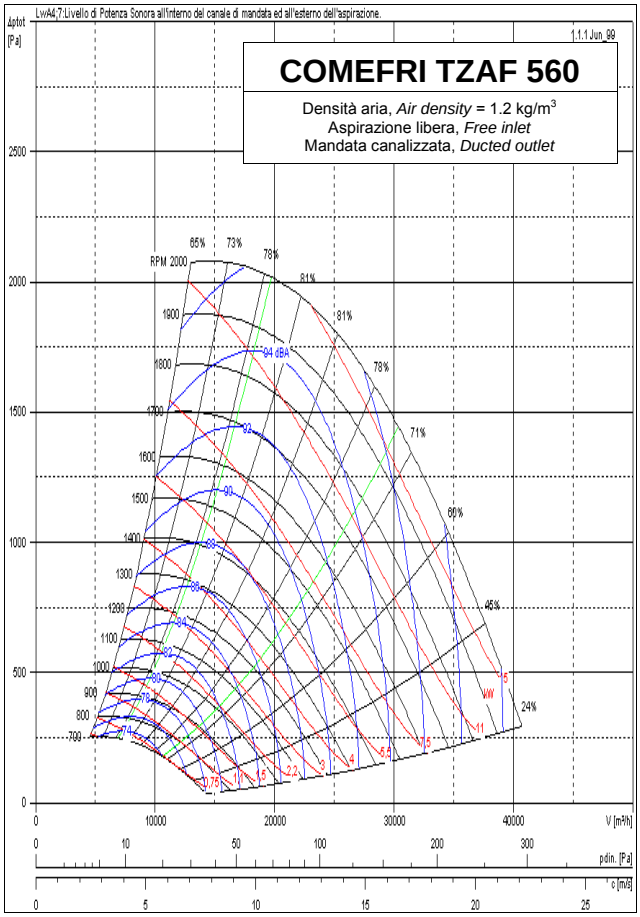
5.3 AIRFOIL BACKWARD CURVED BLADES FANS

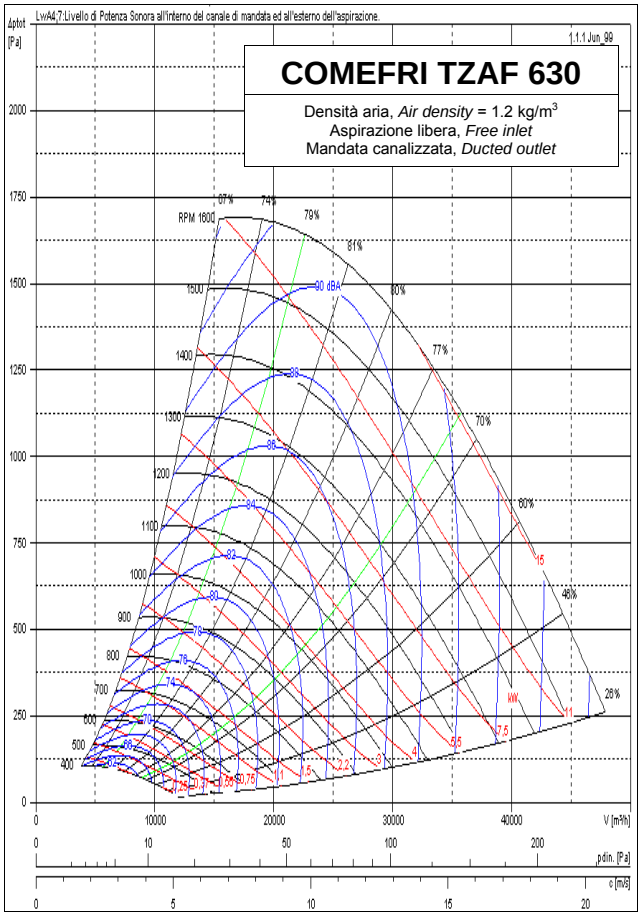


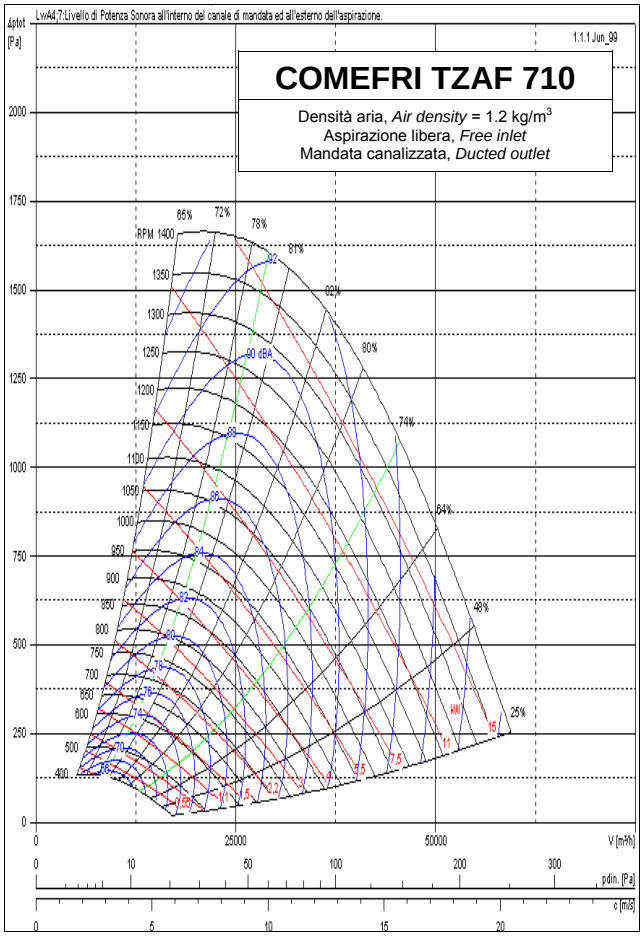


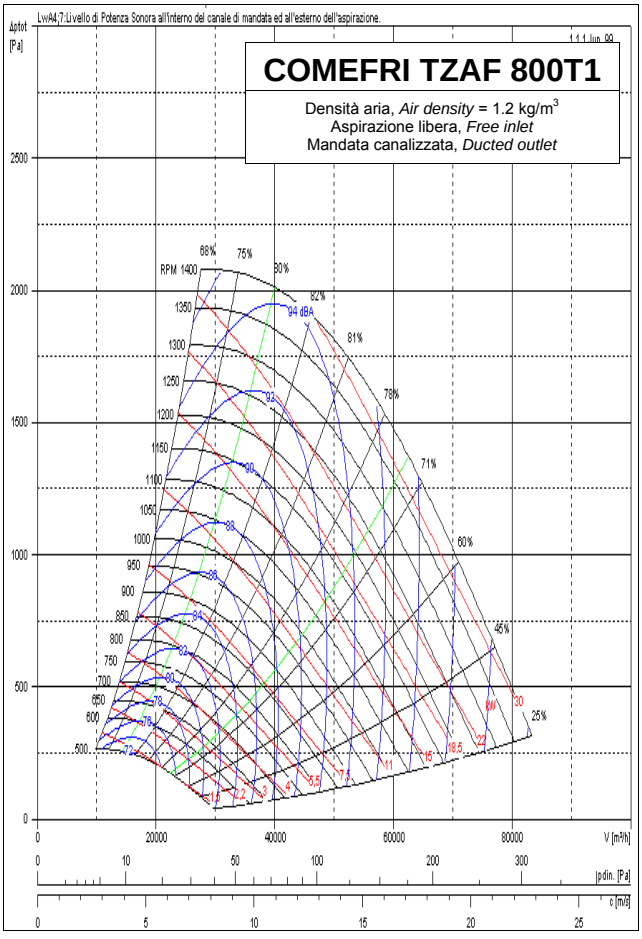


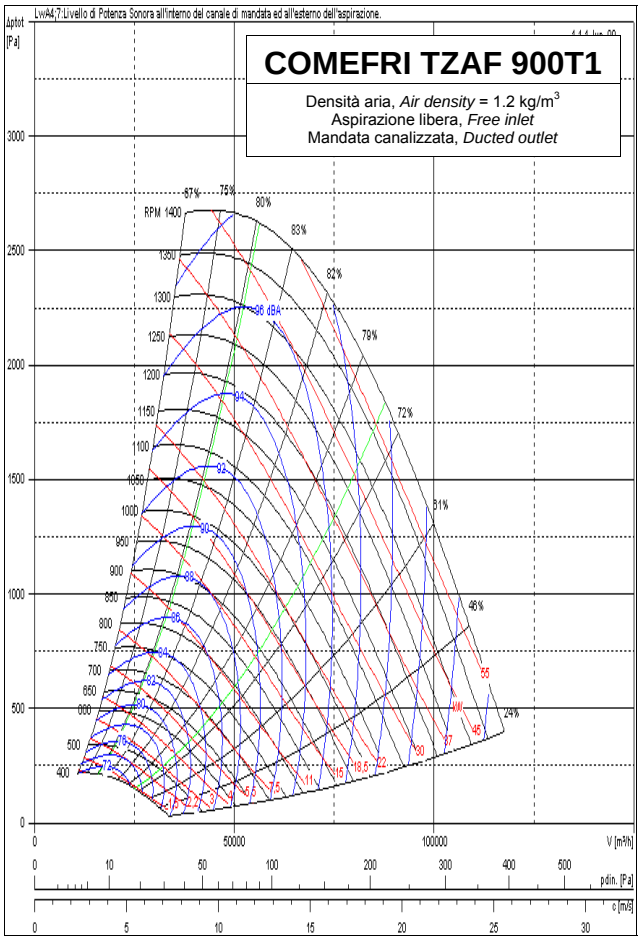


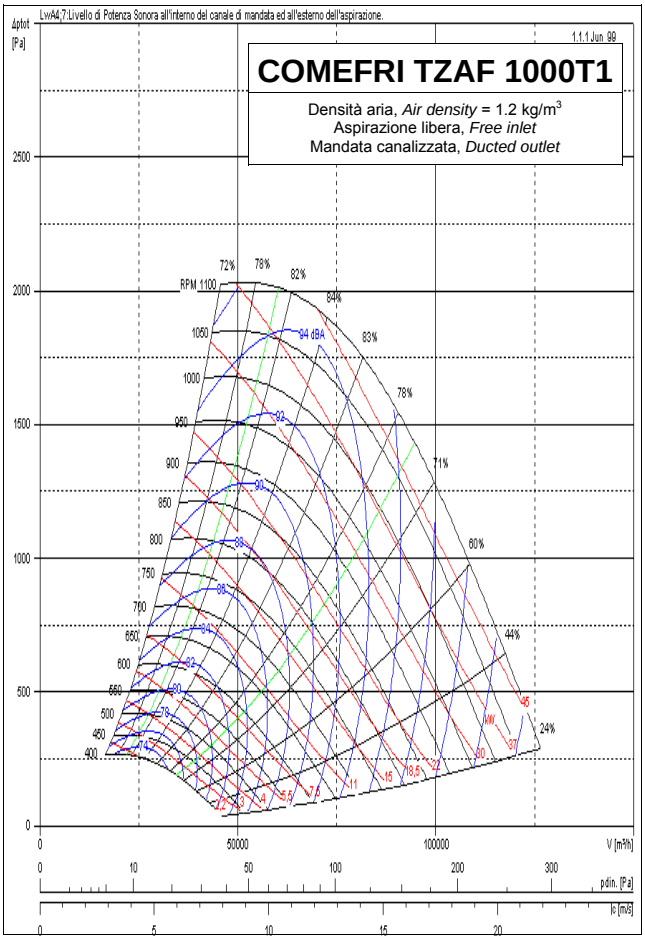

LwA4;7:Livello di Potenza Sonora all'interno del canale di mandata ed all'esterno dell'aspirazione.
1.1.1 Jun_99
Δptot [Pa]
COMEFRI TZAF 560
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
RPM 2000
94 dBA
kW
V [m³/h]
pdin. [Pa]
c [m/s]


LwA4;7:Livello di Potenza Sonora all'interno del canale di mandata ed all'esterno dell'aspirazione.
1.1.1 Jun_99
Δptot [Pa]
COMEFRI TZAF 630
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
RPM 1600
90 dBA
kW
V [m³/h]
pdin. [Pa]
c [m/s]


LwA4;7:Livello di Potenza Sonora all'interno del canale di mandata ed all'esterno dell'aspirazione.
1.1.1 Jun_99
Δptot [Pa]
COMEFRI TZAF 710
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
RPM 1400
90 dBA
kW
V [m³/h]
pdin. [Pa]
c [m/s]


LwA4;7:Livello di Potenza Sonora all'interno del canale di mandata ed all'esterno dell'aspirazione.
1.1.1 Jun_99
Δptot [Pa]
COMEFRI TZAF 800T1
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
RPM 1400
94 dBA
kW
V [m³/h]
pdin. [Pa]
c [m/s]


LwA4;7:Livello di Potenza Sonora all'interno del canale di mandata ed all'esterno dell'aspirazione.
COMEFRI TZAF 900T1
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
Δptot [Pa]
V [m³/h]
pdin. [Pa]
v [m/s]


LwA4;7:Livello di Potenza Sonora all'interno del canale di mandata ed all'esterno dell'aspirazione.
COMEFRI TZAF 1000T1
Densità aria, Air density = 1.2 kg/m3
Aspirazione libera, Free inlet
Mandata canalizzata, Ducted outlet
Δptot [Pa]
V [m³/h]
pdin. [Pa]
Ic [m/s]

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0406-6180631-rev.1

Technical data shown in this booklet are not binding.
FAST S.p.A. shall have the right to introduce at any time whatever modification deemed necessary to the improvement of the product.

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