

ATZAF FF

DOUBLE INLET CENTRIFUGAL FANS WITH
AIRFOIL BACKWARD CURVED BLADES



comefri



COMEFRI USA: Manufacturing and Warehouse facilities in Hopkinsville, KY.
Total facility: 125,000 sq.ft. Producing centrifugal fans for the HVAC industry



COMEFRI SpA factory at Magnano in Riviera (UD) – Italy with 156,000 sq.ft.
Manufacturing floor space, which produces radial fans for HVAC products.



COMEFRI SpA factory at Artegna (UD) – Italy with 68,000 sq.ft. manufacturing and
Laboratory floor space for the production of standard and special application industrial fan.
Test facilities: laboratory accredited by AMCA.



Comefri USA Inc. certifies that the Double Inlet Centrifugal Fans with Airfoil Backward Curved Blades - ATZAF FF shown herein are licensed to bear the AMCA Seal.

The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings Program.

The Comefri USA Inc. Test Laboratory is AMCA Accredited Laboratory of the Air Movement and Control Association.

Contents

	Page
1. Standard ATZAF FF fans range	2
2. Technical details	2
2.1 Forefinger®	2
2.2 Housing	2
2.3 Airfoil impeller	3
2.4 Shafts	3
2.5 Bearings	3
3. Labelling of fan components	4
4. Fan performances	5
4.1 Performance data	5
4.2 Operation area.....	6
4.3 Motor selection	6
4.4 Free outlet performances (installation type A)	6
4.5 Temperature and altitude correction factors	7
5. Sound levels	8
5.1 Total Sound Power Level at the free outlet, L_{w6}	9
5.2 Selection Example	10
6. Performance charts	13
7. Fan dimensions	38
7.1. ATZAF 12-12 FF R to 28-28 FF R	39
7.2. ATZAF 12-12 FF T1 / T2 to 40-40 FF T1 / T2	40
7.3. ATZAF 44-44 FF T1 / T2 to 49-49 FF T1 / T2	41
7.4. Base frames for ATZAF 12-12 FF to 49-49 FF	42
7.5. Side plate holes ATZAF 12-12 FF to 40-40 FF	44
8. Accessories	45
9. Rotation, discharge and accessories position	49
9.1 Rotation and Discharge Position	49
9.2 Accessories Position	49
10. Reference code / example	50

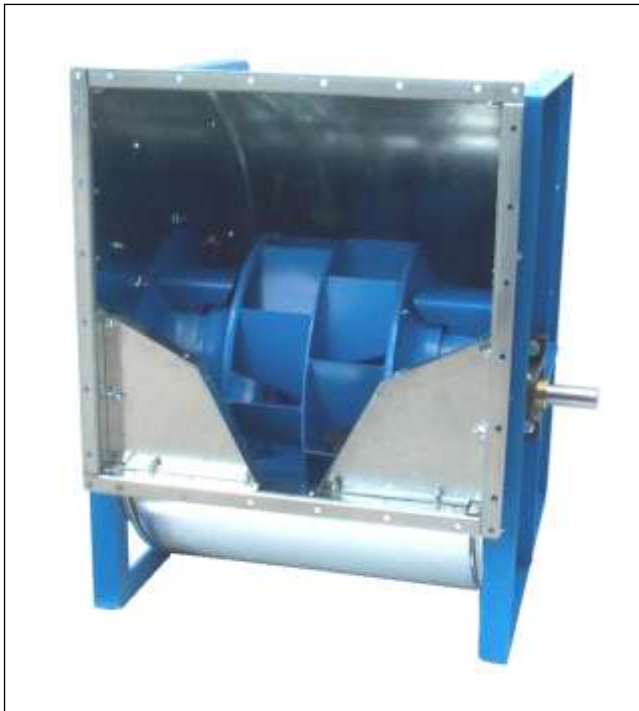


Fig.1



Fig.2



Fig.3

1. Standard ATZAF production range

Comefri's ATZAF FF double inlet centrifugal fans with Airfoil blades series cover a size range from 12 to 49. All fans within his range have the following characteristics:

- optimally engineered for HVAC applications;
- high quality, compact design;
- class I and class II versions available (as per AMCA operating limits specification 99-2408-69);
- high efficiency;
- low power consumption;
- quiet operation;
- all fans are fully performance tested and certified in Comefri's own state-of-the-art laboratory in accordance with DIN, ISO, BS and AMCA standards.

2. Technical details

2.1. Forefinger®

Forefinger® is an innovative device that has been engineered and fully developed by Comefri Engineers in the company's Aerodynamic and Acoustic Test Laboratory^(*). The principle of Forefinger® is to exploit the air swirl that are always present inside of the fan housing. It is accepted that recirculation of air within the fan housing is a major source of losses that result in a reduction in operating efficiency and an increase in fan noise. The Forefinger® device actively re-addresses the recirculation of the air at the fan outlet and this reduction in re-circulation results in a significant increase in fan performance, both from an aerodynamic and acoustic viewpoint.

(*) Patented by Comefri

2.2. Housing

All fan housings from size 12 to 40 are manufactured in galvanized sheet steel (Fig.2). From size 12 to 18, the fan sideplates are spot welded to the scroll housing. From size 20 to 40 the fan sideplates are locked to the scroll housing through a Pittsburgh seam (Fig.3) which ensures a high quality air tight seal as well as a structurally reinforced housing. The design of the inlet cones is of vital importance for the fan performance and sound levels. They have been engineered to guarantee an optimal airflow path through the wheel and thus very high performance levels are achieved. The inlet cones are manufactured in sheet steel, painted and bolted on the housing sideplates. A series of standard holes are located on the sideplates to allow the fitting of frames or mounting base. These holes are positioned in such a way that several standard accessories can directly be applied with the necessary fixing screws. Housings for sizes 44 and 49 are manufactured in black steel sheet, reinforced with steel stiffeners, completely welded and painted with an anticorrosive synthetic paint. The inlet cones are also manufactured in black steel sheet and painted.



Fig.4

2.3. Airfoil impeller

This high performance impeller is manufactured in corrosion resistant steel, with backward curved, true airfoil shaped blades, welded into position (Fig.4). All wheels are painted and are balanced, both statically and dynamically, to an accuracy grade of G = 2.5 in accordance to DIN ISO 1940-1 and ANSI S2.19 –1989. The impellers from size 28-28 T1 to 49-49 T1 and from size 12-12 T2 to 49-49 T2 are secured to the shaft via a steel hub. Aluminium hubs are used from size 12-12 R to 28-28 R and from size 12-12 T1 to 25-25 T1. The hub bore is precision machined and incorporates a keyway and locking screw.



Fig.5

2.4. Shafts

All shafts are designed with a high safety factor and with the first critical speed well in excess of the maximum fan speed.

Made in hardened steel, they are precision ground and polished, and incorporates keyways for the wheel hub and sheaves.

All shafts are coated with protective paint for added corrosion protection prior to shipping.



Fig.6

2.5. Bearings

From size 12-12 R to 28-28 R, bearings are self-aligning, single row, deep groove ball type, (Fig.5).

From size 12-12 T1 to 36-36 T1, size 44-44 T1 and from size 12-12 T2 to 18-18 T2, bearings are self-aligning, single row, deep groove ball type, (only 44-44 T1 have a sleeve with two locking setscrews) in pillow block cast iron housings (Fig.6).

Size 40-40 T1, size 49-49 T1 and from size 20-20 T2 to 49-49 T2 bearings are double row roller bearings in pillow block split cast iron housings (Fig.7).

All bearings have been selected to guarantee a minimum L₅₀ life time of 200,000 hours (as per AFBMA standards).

R-framed fans have the bearings mounted in a rubber interliner, which in turn fit in a sturdy, three-arm or four-arm spider bracket (Fig.5). These bearings are permanently lubricated and sealed for life.

T1 and T2 fans have the pillow block bearings mounted on a flat iron bar, welded to the T frame (Fig.6,7).

These bearings are complete with pre-installed re-lubrication fitting.

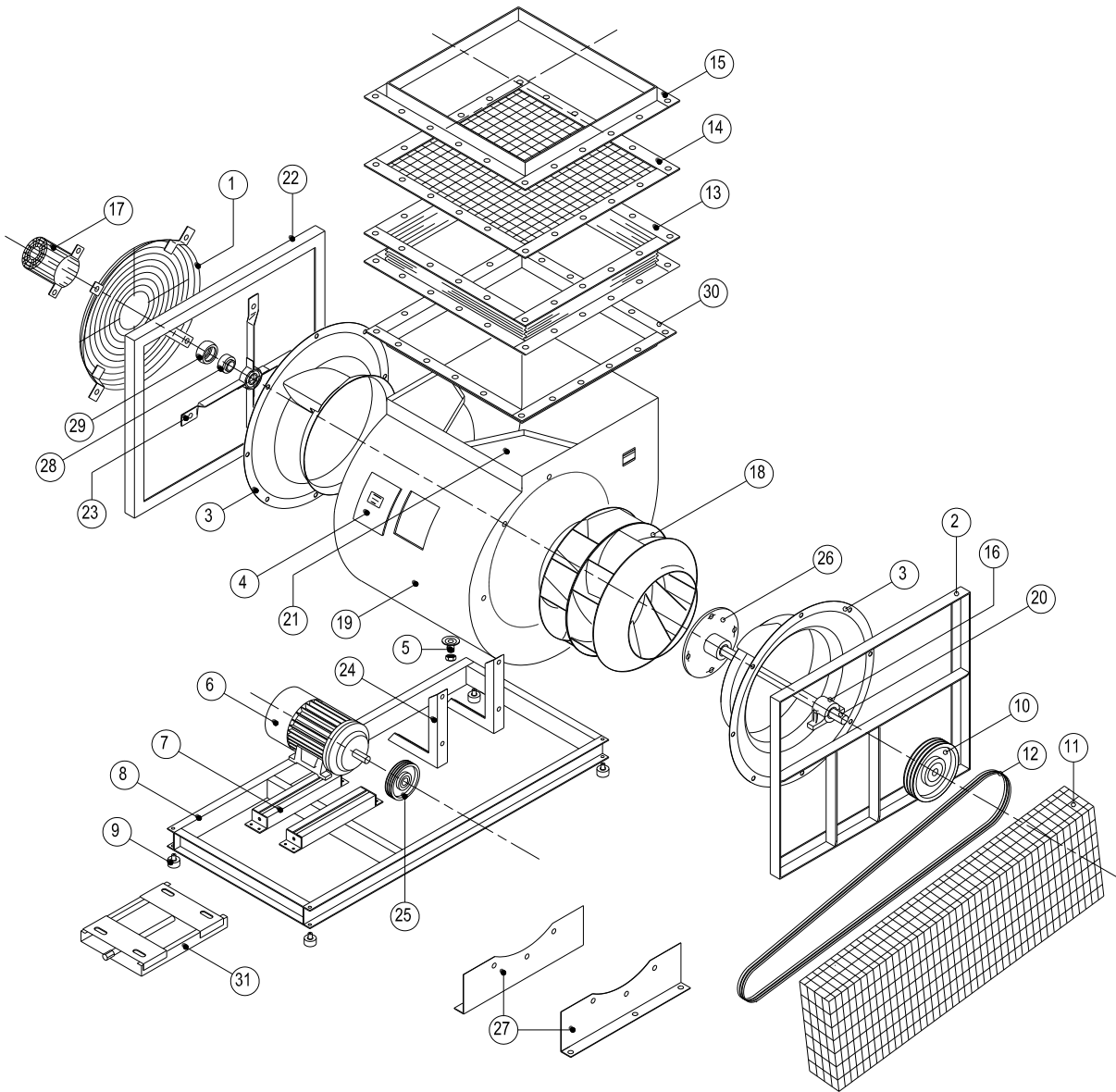
Operating temperatures range from -4 °F to +176 °F (-20 °C to +80 °C) for all blowers.



Fig.7



3. Labelling of fan components



1 - INLET GUARD	17 - SHAFT GUARD
2 - T FRAME	18 - WHEEL
3 - INLET CONE WITH FOREFINGER	19 - HOUSING
4 - INSPECTION DOOR	20 - SHAFT
5 - DRAIN PLUG	21 - CUT OFF
6 - MOTOR	22 - R FRAME
7 - MOTOR RAILS	23 - BEARING BRACKET
8 - BASE FRAME	24 - GUARD MOUNT
9 - ANTIVIBRATION MOUNTING	25 - MOTOR PULLEY
10 - FAN PULLEY	26 - HUB
11 - BELT GUARD	27 - FEET
12 - BELTS	28 - BEARING
13 - OUTLET FLEXIBLE CONNECTION	29 - RUBBER INTERLINER
14 - OUTLET GUARD	30 - OUTLET FLANGE
15 - OUTLET COUNTERFLANGE	31 - MOTOR BASE PLATE
16 - BEARING	32

4. Fan performances

4.1. Performance data

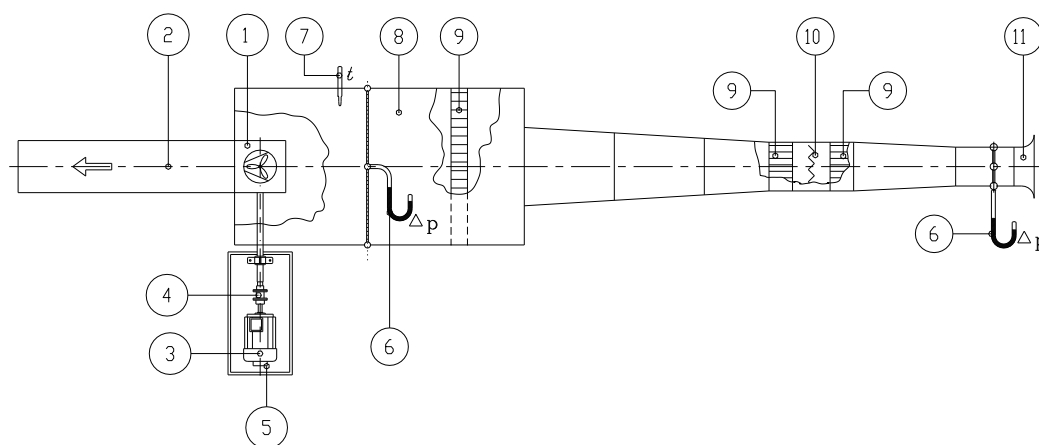
Comefri 's laboratory measured the data detailed in the performance chart section with modern, state-of-the-art testing instruments.

Fan performance is measured for an installation type B (ref. AMCA 210-85, par.7.1.1 installation type), i.e. free inlet and ducted outlet configuration and a reference density of $\rho = 0.075 \text{ lb/cu.ft}$.

Outlet velocity o.v. and Δp_{dyn} pressure, refer to the flange cross section area at the fan outlet.

The performance data tolerances are according to DIN 24166 Class1.

Performance test rig according to DIN 24163 / BS 848, Part1 / ISO 5801 / AMCA 210



- | | |
|--------------------------------|----------------------|
| 1. Fan | 7. Temperature probe |
| 2. Outlet duct | 8. Test chamber |
| 3. Electric motor drive | 9. Flow straightener |
| 4. Torquemeter | 10. Damper |
| 5. Tachometer | 11. Normalized inlet |
| 6. Differential pressure gauge | |

The performance curves include the following information:

Static pressure	Δp_{tot}	[In.W.G.]	inches water gauge
Dynamic pressure	p_{dyn}	[In.W.G.]	inches water gauge
Volume air flow	\dot{V}	[CFM]	cubic feet per minute
Absorbed power on fan shaft	P_w	[BHP]	brake horsepower
Fan speed	n	[RPM]	revolutions per minute
Total Efficiency	η_{stat}	[%]	$\frac{\Delta p_{\text{stat}} \cdot \dot{V} \cdot 100}{P_w \cdot 6362}$
Outlet velocity	o.v.	[ft/min]	feet per minute
Sound Power Level	$L_{wA4;7}$	[dB(A)]	decibel A

4.2. Operation area

To ensure optimum fan performance you should always aim to select a fan with an operating point in Zone 2 the fan curves. This guarantees a 'smooth' airflow characteristic and results in maximum fan efficiency fan and the lowest possible noise characteristic. When making a fan selection the following guidelines should be observed; Area 1 on the fan curves (shown as dashes on the curve), identify the area where the presence of an inlet obstruction (such as a fan sheave) could generate instability in the operation of the fan. This factor is relevant in the selection of medium to large size fans, especially when they are selected to operate at high running speed. You should avoid selecting a fan which has a duty point on the left of Area 1 (as indicated on the curve) as this will always lead to unstable operation.

4.3. Motor selection

To determine the motor rating P_N , the fan absorbed shaft power P_w must be increased by a factor f_w to accommodate for the drive losses, safety margins...etc.

$$P_N = P_w (1 + f_w)$$

The factor f_w can be chosen from the following figures:

$$\begin{aligned} P_w < 4 & \quad \text{BHP} \dots f_w = 0,20 \\ P_w \leq 13.4 & \quad \text{BHP} \dots f_w = 0,15 \\ P_w > 13.4 & \quad \text{BHP} \dots f_w = 0,10 \end{aligned}$$

When selecting the suitable motor, the run-up time must be considered. The run-up time " t_a " can be calculated according to the following formula:

$$t_a = 0.452 \frac{J \times n^2}{P_N} 10^{-6}$$

Where:

t_a	acceleration time	[s]
J	moment of inertia of the revolving parts	[Lbft ²]
n	impeller speed	[rpm]
P_n	motor rating	[HP]

If " t_a " exceed the motors' manufacturer recommendations, a larger motor or a high-torque type must be used.

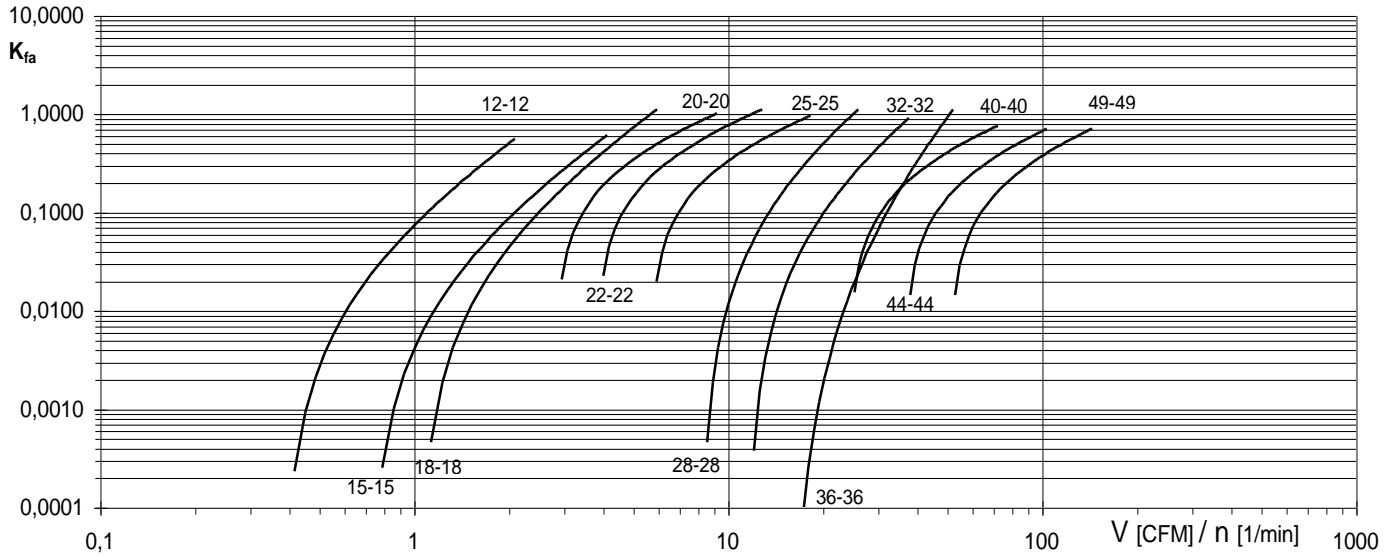
4.4. Free outlet performance (Installation type A)

As all data contained on the fan performance charts refers to a free inlet – ducted outlet configuration it is necessary, therefore, to apply a correction factor to obtain data relating to a free or open outlet installation.

In free discharge condition the static pressure Δp_{fa} , for a given fan speed, can be obtained as:

$$\Delta p_{fa} = \Delta p_{stat} - k_{fa} \cdot \Delta p_{dyn}$$

where K_{fa} is a correction factor, function of fan size and \dot{V}/n ratio, which can be found on the graph 4.4. Note that the static pressure obtained is less than the requested pressure. The final consequence is that, in the free outlet configuration, the fan has to run at a slightly higher speed than in the ducted outlet condition. Please refer to the Selection Example 5.2, for further details on the correct selection procedure.



Graph 4.4.

4.5. Temperature and altitude correction factors

The performance charts refer to the standard air condition, i.e. = 0.075 lb/cu.ft, 68 °F temperature at sea level. For different operating conditions the data performance must be corrected due to the change in air density.

Fan laws relate to performance variables for any fan of a given design.

Pressure, static and total, varies directly as the ratio of the air densities, K_p

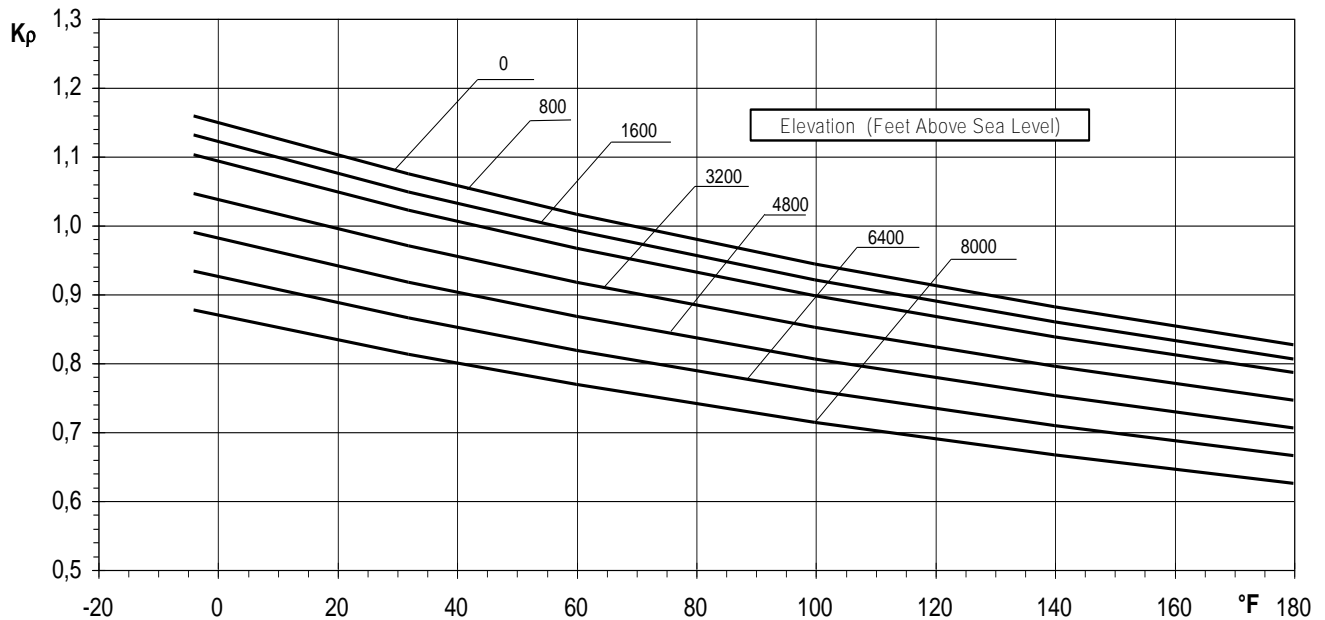
$$\Delta p_{stat2} = \Delta p_{stat1} \cdot K_p$$

Absorbed power varies directly as the ratio of the air densities, K_p

$$P_{w2} = P_{w1} \cdot K_p$$

The graph 4.5 contains air density ratios K for temperatures from -5 °F to 180 °F and elevations up to 8000 feet above sea level.

Please refer to the Selection Example 5.2, for further details on the correct selection procedure.



Graph n° 4.5.

5. Sound levels

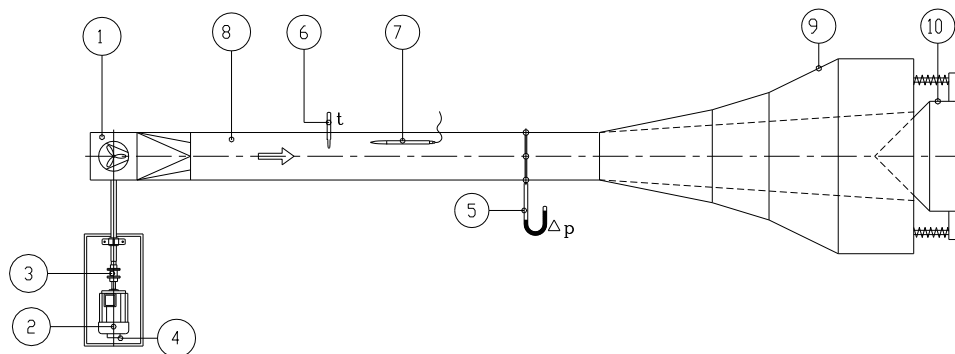
The measurement of noise levels have been made according to ISO, DIN and BS, ANSI-AMCA Standard using a Bruel &Kjaer real-time frequency analyser.

The Sound Power Level L_{wA} , referred to $W_o=10^{-12}$ watt, required for calculation and design of sound attention units, are marked on the performance curves.

Symbols and Formulae:

L_{wA4}	A-weighted Total Sound Power Level inside the outlet duct.....	[dB(A)]
L_{wA7}	A-weighted Total Sound Power Level at the fan inlet, with ducted outlet.....	[dB(A)]
L_{woct}	Sound Power Level at a specific Octave Band Mid-Frequency	[dB]
f_m	Octave Band Mid-Frequency.....	[Hz]
ΔL_{woct4}	Difference between the Total Sound Power Level at the specific Octave Band L_{woct4} and Total Sound Power Level, A-weighted, L_{wA4}	[dB]
ΔL_{w4}	Difference between the Total Sound Power Level L_{w4} and to the A-weighted Total Sound Power Level L_{wA4}	[dB]

Sound measurement test rig scheme according to DIN 45635, Part9 / BS 848, Part2 / ISO 5136 / ANSI-AMCA 330



- | | |
|--------------------------------|--------------------------------------|
| 1. Fan | 6. Temperature probe |
| 2. Electric motor drive | 7. Microphone with turbulence screen |
| 3. Torquemeter | 8. Test duct |
| 4. Tachometer | 9. Anechoic termination |
| 5. Differential pressure gauge | 10. Adjustable anechoic end |

Fan Sound Data is determined as follows:

1. The A-weighted Total Sound Power Level L_{wA4} inside the outlet duct can be read on the Performance Chart, for a given fan performance.
2. The Sound Power Level L_{woct4} , at a specific Octave Band Mid-Frequency, inside the outlet duct, can be determined from following formula:

$$L_{woct4} = L_{wA4} + \Delta L_{woct4}$$

3. The Total Sound Power Level inside the outlet duct can be obtained from the following formula:

$$L_{w4} = L_{wA4} + \Delta L_{w4}$$

The values for ΔL_{woct4} and ΔL_{w4} for each fan size can be found in the SOUND DATA TABLES section, considering the relevant Fan Performance Area and the range of fan speed.

Note that sound data is determined according to DIN 45635 Part9, BS 848 Part2, ISO 5136 / ANSI - AMCA 330 In-duct method. The accuracy class, as defined by DIN 24166, on catalogue sound data is defined Class 1, i.e. the permissible deviation t_{LWA} on the measured value is equal to +3 dB(A) (negative deviations are permissible).

5.1. Total Sound Power Level at the free outlet, L_{w6}

The value L_{w6} , at the fan outlet in a free outlet condition, can be considered approximately equal to the Total Sound Power Level outside the termination of the discharge duct.

The Total Sound Power Level, outside the termination of the outlet duct, can be calculated approximately, using the “End Reflection” concept, where part of the sound power generated by the fan at the discharge is reflected back into the duct when there is an abrupt termination. The value L_{w6} at the outlet, in a free discharge condition, can be considered approximately equal to the: Total Sound Power Level outside of the termination of the outlet duct.

The octave band values can be obtained subtracting, octave by octave, the end reflected portion of the sound power from the L_{woct4} value.

The following table gives the correction factors ΔL_{wcorr} , for each fan size, that have to be applied to the corresponding L_{woct4} value:

		Size											
		12	15	18	20	22	25	28	32	36	40	44	49
ΔL_{wcorr} [dB]	63 [Hz]	-12	-10	-9	-8	-7	-6	-5	-5	-4	-4	-3	-2.5
	125 [Hz]	-7	-6	-5	-4	-3	-3	-2	-2	-1	-1	-0.5	0
	250 [Hz]	-3	-2	-2	-1	-1	-1	0	0	0	0	0	0

Please refer to the selection example (found on page 10) for the detailed procedure to be followed.

Note that, as L_{w6} is an estimated value that the Class 1 tolerance level of + 3 dB cannot be applied.

Finally, it is important to consider that low frequencies (125 Hz and below) can be adversely affected by vibration in the fan assembly (from misaligned drive, out of balance sheaves ect...) or by other influences, such as inadequately acoustically insulated ductwork.

These factors can increase the generation of low frequency noise.



5.2. Selection Example

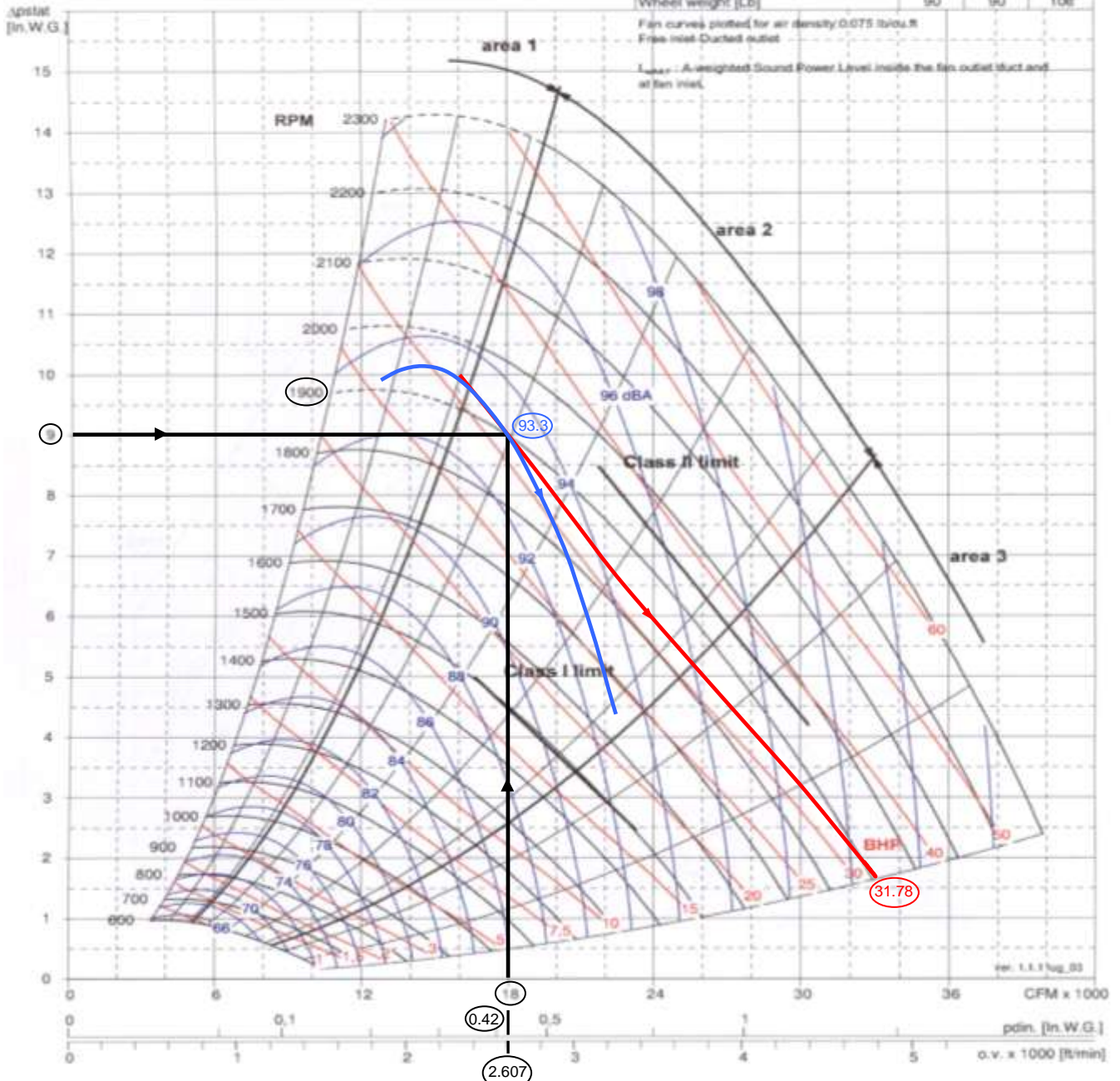
Fan selection for the following operating parameters:

Air volume = 18,000 CFM
 Δp_{stat} = 9 In.W.G.
 Operating temperature = 68 °F

ATZAF 25-25 FF			
	R	T1	T2
Fan Max RPM [min ⁻¹]	1500	1650	2200
Fan Max BHP	17	20	50
Fan Outlet Area O.A. [ft ²]	6.9		
Fan weight [Lb]	311	387	448
Wheel diameter [in.]	25.39		
Wheel width [in.]	20.39		
Wheel No. Blades	10		
Wheel Moment of Inertia [Lb ft ²]	69.5	69.5	82.8
Wheel weight [Lb]	90	90	106

Fan curves plotted for air density 0.075 lb/ft³
 Free inlet-Ducted outlet

L_{wA4} - A-weighted Sound Power Level inside the fan outlet duct and at fan inlet.



Selected model and size:
 ATZAF 25-25 FF T2
 n = 1900 RPM
 n_{max} = 2200 RPM
 L_{wA4} = 93.3 dB(A)
 Δp_{dyn} = 0.42 In.W.G.
 BHP = 31.78 HP
 o.v. = 2607 [ft/min]

a) Sound data

The following steps must be followed to determine the Octave Band values:

a1) Read on the Sound Data Table for ATZAF 25-25 FF T2, for each octave band and considering the selected fan performance zone and speed (AREA 2, n >1081 RPM) the appropriate values for $L_{w\text{oct}4}$:

7 2 3 -4 -6 -12 -17 -21

a2) Apply these corrections to $L_{wA4}=93.3$ dB(A) (add the $\Delta L_{w\text{oct}4}$ values) to obtain values of $L_{w\text{oct}4}$:

100.3 95.3 96.3 89.3 87.3 81.3 76.3 72.3 rounded off to:
 100 95 96 89 87 81 76 72

a3) To obtain the L_{w4} Total Sound Power value, add to L_{wA4} the ΔL_{w4} value

$$L_{w4} = L_{wA4} + \Delta L_{w4} = 93.3 \text{ dB(A)} + 9.7 = 103 \text{ dB}$$

a4) To obtain the A-weighted Octave Band values, apply to each octave-band value the correction factor listed below:

Octave Band Mid Frequency	63	125	250	500	1000	2000	4000	8000
A- Weighting	-26	-16	-9	-3	0	+1	+1	-1

(Values rounded off)

$L_{w\text{oct}A4}$, A-weighted values, are consequently $L_{w\text{oct}A4} = L_{w\text{oct}4} - (\text{A-weighting})$:

74 79 87 86 87 82 77 71

b) Free-outlet selection

If the same fan must be selected in a free-outlet configuration (type A installation) the step will be;

b1) Calculated the value of Δp_{fa} as explained at section 4.3.

Being \dot{V}/n equal to $18,000 / 1900 = 9.47$, from the relevant graph 4.3 the value K_{fa} of 0.3 is read:

$$\Delta p_{fa} = \Delta p_{\text{stat}} - K_{fa} \cdot \Delta p_{\text{dyn}} = 9 - 0.3 \cdot 0.42 = 8.87 \text{ In.W.G.}$$

The real obtainable Δp_{stat} pressure is 8.87 In.W.G., 0.13 In.W.G. less then required.

b2) To obtain a Δp_{stat} pressure of 9 In.W.G., in a free-outlet configuration, the fan must be selected at:

$$\Delta p_{\text{stat}} = 9 + 0.13 = 9.13 \text{ In.W.G.}$$

b3) With this new value for Δp_{stat} pressure, fan 's performance parameters are now:

$$n = 1911 \text{ RPM, } L_{wA4} = 93.4 \text{ dB(A), } \Delta p_{\text{dyn}} = 0.42 \text{ In.W.G. and BHP} = 32.19 \text{ HP.}$$

c) Free -outlet sound data

From the relevant table, for a ATZAF 25-25, the following values for $\Delta L_{w\text{corr}}$ can be obtained:

-6 dB at 63 Hz; -3 dB at 125 Hz; -1 dB at 250 Hz

As a consequence, the values of $L_{w\text{oct}4}$, in a free-outlet configuration, are now:

100.4	95.4	96.4	89.4	87.4	81.4	76.4	72.4
-6	-3	-1	0	0	0	0	0
94	92	95	89	87	81	76	72

(Values rounded off)

Following the same steps as in a4), the A-weighted values can be obtained:

68	76	86	86	87	82	77	71
----	----	----	----	----	----	----	----

d) Temperature and altitude correction

If temperature and altitude at which the fan will operate are not standard, the pressure values used for the selection must be corrected.

Let 's consider he following parameters:

Required Δp_{stat} pressure: 7.3 In.W.G.referred to the following conditions:
 Operating temperature: 100 °F
 Altitude: 4800 ft.a.s.l.
 Air volume: 18,000 CFM
 From K_p Air Density Correction Factor table (Graph 4.4) the value of 0.815 is read.

The corrected pressure, to be used for the selection on the performance chart,is therefore:

$$\Delta p_{\text{stat}1} = \Delta p_{\text{stat}2} / K_p = 7.3 / 0.815 = 9 \text{ In.W.G.}$$

Selection should be made with a $\Delta p_{\text{stat}1}$ equal to 9 In.W.G.

We obtain he following operation parameters:

Selected model and size: ATZAF 25-25 FF T2, n = 1900 RPM,

$$\text{effective } \Delta p_{\text{dyn}2} = \Delta p_{\text{dyn}1} \cdot K_p = 0.42 \text{ In.W.G.} \cdot 0.815 = 0.34 \text{ In.W.G.}$$

Effective absorbed power on fan shaft (corrected value) at that altitude and temperature, will be:

$$P_{w2} = \text{BHP} \cdot K = 31.78 \text{ HP} \cdot 0.815 = 25.90 \text{ HP}$$

6. Performance charts

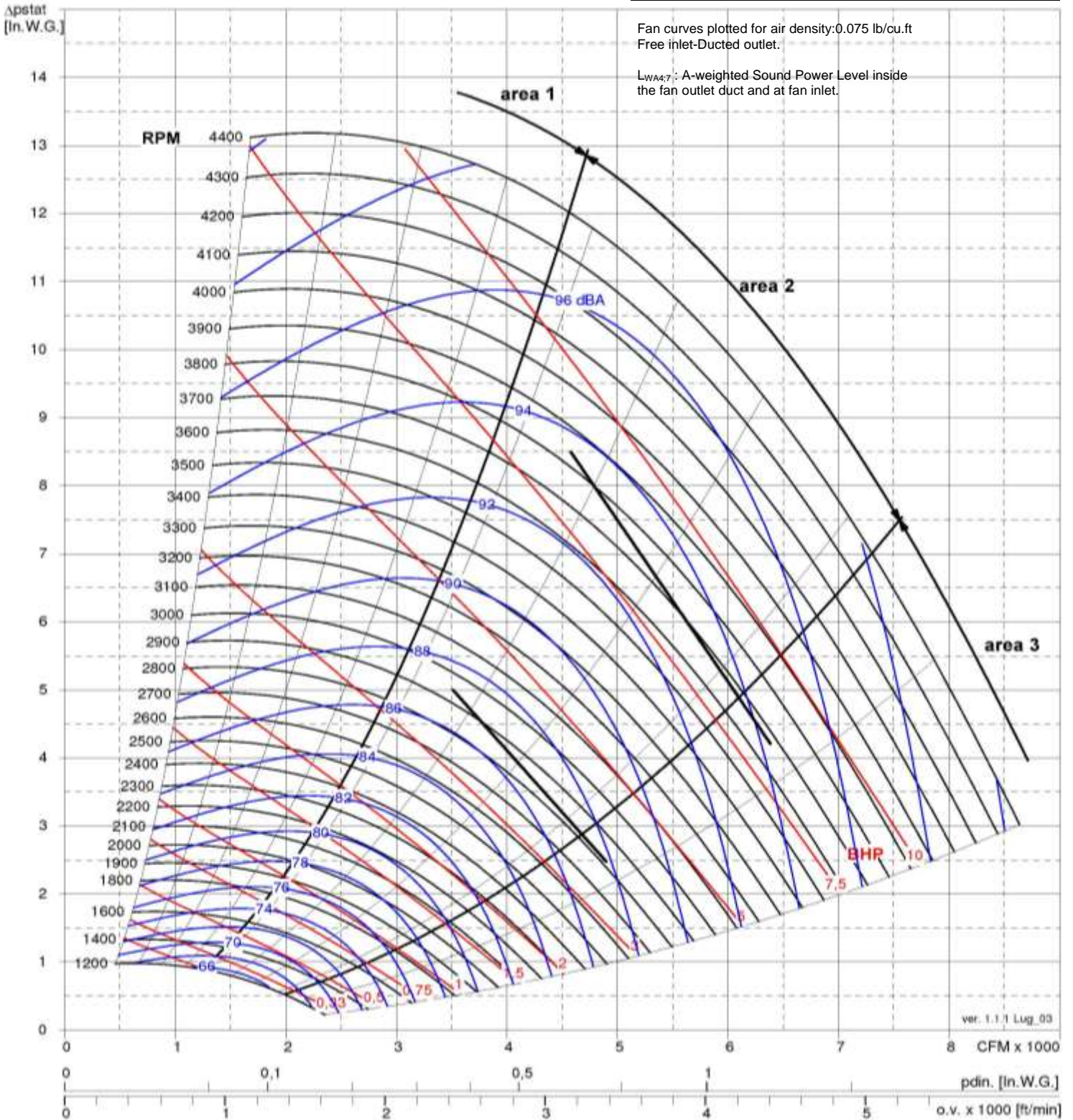
	Page
6.1. ATZAF 12-12 FF R / T1 / T2.....	14
6.2. ATZAF 15-15 FF R / T1 / T2.....	16
6.3. ATZAF 18-18 FF R / T1 / T2.....	18
6.4. ATZAF 20-20 FF R / T1 / T2.....	20
6.5. ATZAF 22-22 FF R / T1 / T2.....	22
6.6. ATZAF 25-25 FF R / T1 / T2.....	24
6.7. ATZAF 28-28 FF R / T1 / T2.....	26
6.8. ATZAF 32-32 FF R / T1 / T2.....	28
6.9. ATZAF 36-36 FF R / T1 / T2.....	30
6.10. ATZAF 40-40 FF R / T1 / T2.....	32
6.11. ATZAF 44-44 FF R / T1 / T2.....	34
6.12. ATZAF 49-49 FF R / T1 / T2.....	36



FEG 90

Peak $\eta_t = 75.8$

ATZAF 12-12 FF		R	T1	T2
Fan Max RPM	[min ⁻¹]	3300	3700	4350
Fan Max	[BHP]	6	8	10.05
Fan Outlet Area O.A.	[ft ²]	1.45		
Fan weight	[Lb]	53	66	74
Wheel diameter	[in.]	12.72		
Wheel width	[in.]	10.67		
Wheel No. Blades	z	10		
Wheel Moment of Inertia	[Lb ft ²]	3.45	3.45	4.25
Wheel weight	[Lb]	17	17	21





comefri

DOUBLE INLET AIRFOIL FANS – ATZAF FF

ATZAF 12-12 FF R / T1 / T2

V [CFM]	ΔP_{stat} [In.W.G.]																			
	2	3	4	5	5,5	6	6,5	7	7,5	8	8,5	9	9,5	10	10,5	11	11,5	12	12,5	
RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	
800	1716 0.51																			
1000	1717 0.57	2101 0.94	2429 1.35																	
1200	1725 0.63	2102 1.02	2426 1.46	2714 1.94	2848 2.19	2976 2.45	3099 2.71													
1400	1739 0.69	2109 1.11	2428 1.57	2712 2.08	2845 2.34	2971 2.61	3094 2.89	3211 3.17	3325 3.46	3436 3.76	3543 4.06	3647 4.36								
1600	1760 0.76	2121 1.20	2434 1.69	2715 2.22	2846 2.50	2971 2.78	3092 3.07	3209 3.37	3322 3.67	3431 3.98	3538 4.29	3641 4.61	3742 5.01	3840 5.35	3936 5.68	4030 6.02	4122 6.36			
1800	1787 0.83	2138 1.30	2445 1.81	2722 2.36	2851 2.65	2975 2.95	3095 3.25	3210 3.56	3322 3.88	3431 4.20	3536 4.52	3639 4.85	3739 5.28	3836 5.62	3932 5.97	4025 6.33	4116 6.68	4206 7.04	4293 7.40	
2000	1821 0.92	2161 1.41	2461 1.94	2733 2.51	2861 2.82	2983 3.12	3101 3.44	3215 3.76	3326 4.09	3434 4.42	3538 4.76	3640 5.10	3739 5.54	3836 5.90	3930 6.26	4023 6.63	4113 7.00	4202 7.37	4289 7.74	
2200	1860 1.01	2188 1.52	2482 2.08	2749 2.67	2874 2.99	2995 3.30	3111 3.63	3224 3.96	3333 4.30	3440 4.65	3543 5.00	3644 5.35	3742 5.81	3838 6.18	3932 6.56	4024 6.94	4114 7.32	4202 7.70	4288 8.08	
2400	1904 1.11	2221 1.64	2507 2.22	2768 2.84	2891 3.16	3010 3.49	3125 3.83	3236 4.18	3344 4.53	3449 4.88	3552 5.24	3651 5.61	3748 6.08	3843 6.47	3936 6.85	4027 7.24	4117 7.64	4204 8.03	4290 8.43	
2600	1953 1.22	2258 1.78	2536 2.38	2792 3.02	2912 3.35	3029 3.69	3142 4.04	3252 4.40	3358 4.76	3462 5.13	3563 5.50	3662 5.87	3758 6.36	3852 6.76	3944 7.16	4034 7.56	4123 7.96	4209 8.37	4294 8.78	
2800	2006 1.34	2300 1.92	2570 2.54	2819 3.21	2938 3.55	3052 3.90	3163 4.26	3271 4.63	3376 5.00	3478 5.38	3578 5.76	3675 6.15	3770 6.65	3863 7.06	3955 7.47	4044 7.88	4131 8.30	4217 8.71	4302 9.13	
3000	2063 1.48	2346 2.08	2607 2.72	2851 3.41	2966 3.76	3079 4.12	3188 4.49	3294 4.87	3397 5.25	3498 5.64	3596 6.03	3692 6.43	3786 6.95	3878 7.37	3968 7.79	4056 8.22	4143 8.64	4228 9.07	4312 9.50	
3200	2123 1.62	2395 2.25	2649 2.91	2886 3.62	2999 3.98	3109 4.36	3215 4.74	3320 5.13	3421 5.52	3520 5.92	3617 6.32	3712 6.84	3804 7.27	3895 7.69	3984 8.12	4071 8.56	4157 8.99	4241 9.43	4324 9.87	
3400	2186 1.78	2449 2.43	2694 3.12	2924 3.84	3035 4.22	3142 4.60	3247 5.00	3349 5.39	3449 5.80	3546 6.20	3641 6.62	3735 7.16	3826 7.59	3915 8.03	4003 8.47	4089 8.91	4174 9.36	4257 9.81	4339 10.26	
3600	2252 1.95	2505 2.62	2742 3.33	2966 4.08	3074 4.47	3179 4.86	3281 5.27	3381 5.67	3479 6.09	3575 6.51	3668 6.93	3760 7.49	3850 7.93	3938 8.38	4025 8.83	4110 9.28	4194 9.74	4276 10.19		
3800	2319 2.14	2564 2.83	2793 3.57	3011 4.34	3116 4.73	3219 5.14	3319 5.55	3417 5.97	3513 6.39	3607 6.82	3699 7.25	3789 7.83	3877 8.28	3964 8.74	4050 9.20	4134 9.66	4216 10.13			
4000	2389 2.34	2625 3.06	2848 3.81	3059 4.61	3162 5.02	3262 5.43	3360 5.85	3455 6.28	3549 6.71	3641 7.15	3732 7.73	3820 8.19	3907 8.65	3993 9.12	4077 9.59	4160 10.06				
4200	2461 2.55	2689 3.30	2904 4.08	3110 4.89	3210 5.31	3307 5.74	3403 6.17	3497 6.61	3589 7.05	3679 7.50	3768 8.09	3855 8.56	3940 9.03	4024 9.51	4107 9.99	4189 10.47				
4400	2535 2.79	2755 3.55	2964 4.36	3164 5.20	3261 5.62	3356 6.06	3449 6.50	3541 6.95	3631 7.40	3719 8.00	3806 8.47	3892 8.95	3976 9.43	4058 9.92	4140 10.41					
4600	2609 3.03	2822 3.83	3025 4.66	3220 5.52	3314 5.95	3407 6.40	3498 6.85	3588 7.31	3676 7.77	3762 8.38	3847 8.87	3931 9.36	4013 9.85	4095 10.34						
4800	2685 3.30	2892 4.12	3089 4.97	3278 5.85	3370 6.30	3460 6.76	3549 7.22	3637 7.69	3723 8.30	3808 8.79	3891 9.28	3973 9.78	4054 10.28							
5000	2762 3.58	2962 4.43	3154 5.31	3338 6.21	3428 6.67	3516 7.14	3603 7.61	3688 8.22	3772 8.72	3855 9.22	3937 9.72	4017 10.23								
5200	2840 3.89	3035 4.76	3221 5.66	3400 6.58	3488 7.05	3574 7.53	3658 8.15	3742 8.65	3824 9.15	3905 9.66	3985 10.17									
5400	2919 4.21	3108 5.11	3289 6.03	3464 6.98	3549 7.46	3633 7.94	3716 8.58	3798 9.09	3878 9.61	3957 10.12										
5600	2999 4.55	3183 5.47	3359 6.42	3529 7.39	3613 7.88	3695 8.52	3775 9.04	3855 9.56	3934 10.08											
5800	3080 4.91	3259 5.86	3430 6.83	3596 7.82	3677 8.47	3757 8.99	3836 9.51	3914 10.04												
6000	3161 5.29	3335 6.27	3503 7.26	3658 8.42	3744 8.94	3822 9.47	3899 10.01													
6200	3243 5.69	3413 6.70	3576 7.71	3734 8.90	3812 9.44	3888 9.98														
6400	3326 6.12	3491 7.15	3650 8.33	3805 9.41	3881 9.96															
6600	3409 6.56	3570 7.62	3726 8.83	3877 9.94	3951 10.50															
6800	3492 7.03	3650 8.25	3802 9.36	3950 10.49																
7000	3576 7.65	3730 8.78	3879 9.92																	
7200	3661 8.17	3811 9.33	3957 10.49																	
7400	3745 8.73	3893 9.91																		
7600	3830 9.30																			
7800	3916 9.90																			

SOUND DATA TABLE

Fan Model and Size	Fan Performance Area	Range of fan speed	ΔL_{W4}	ΔL_{wocT4} 63	ΔL_{wocT4} 125	ΔL_{wocT4} 250	ΔL_{wocT4} 500	ΔL_{wocT4} 1000	ΔL_{wocT4} 2000	ΔL_{wocT4} 4000	ΔL_{wocT4} 8000
			RPM < 2130	RPM > 2131	RPM < 2130	RPM > 2131	RPM < 2130	RPM > 2131	RPM < 2130	RPM > 2131	RPM < 2130
ATZAF 12-12 FF	Area 1	RPM < 2130	15,2	14	7	3	-3	-6	-11	-17	-24
		RPM > 2131	12,5	11	4	2	-2	-7	-9	-15	-21
	Area 2	RPM < 2130	12,8	10	6	6	-2	-5	-8	-15	-22
		RPM > 2131	9,4	7	2	0	-2	-6	-7	-12	-18
	Area 3	RPM < 2130	9,6	7	2	2	-3	-5	-8	-14	-22
		RPM > 2131	9,0	7	1	-2	-3	-6	-7	-13	-16

Performance shown is for installation type B, free inlet-ducted outlet, and doesn't include the effects of appurtenances in the airstream.

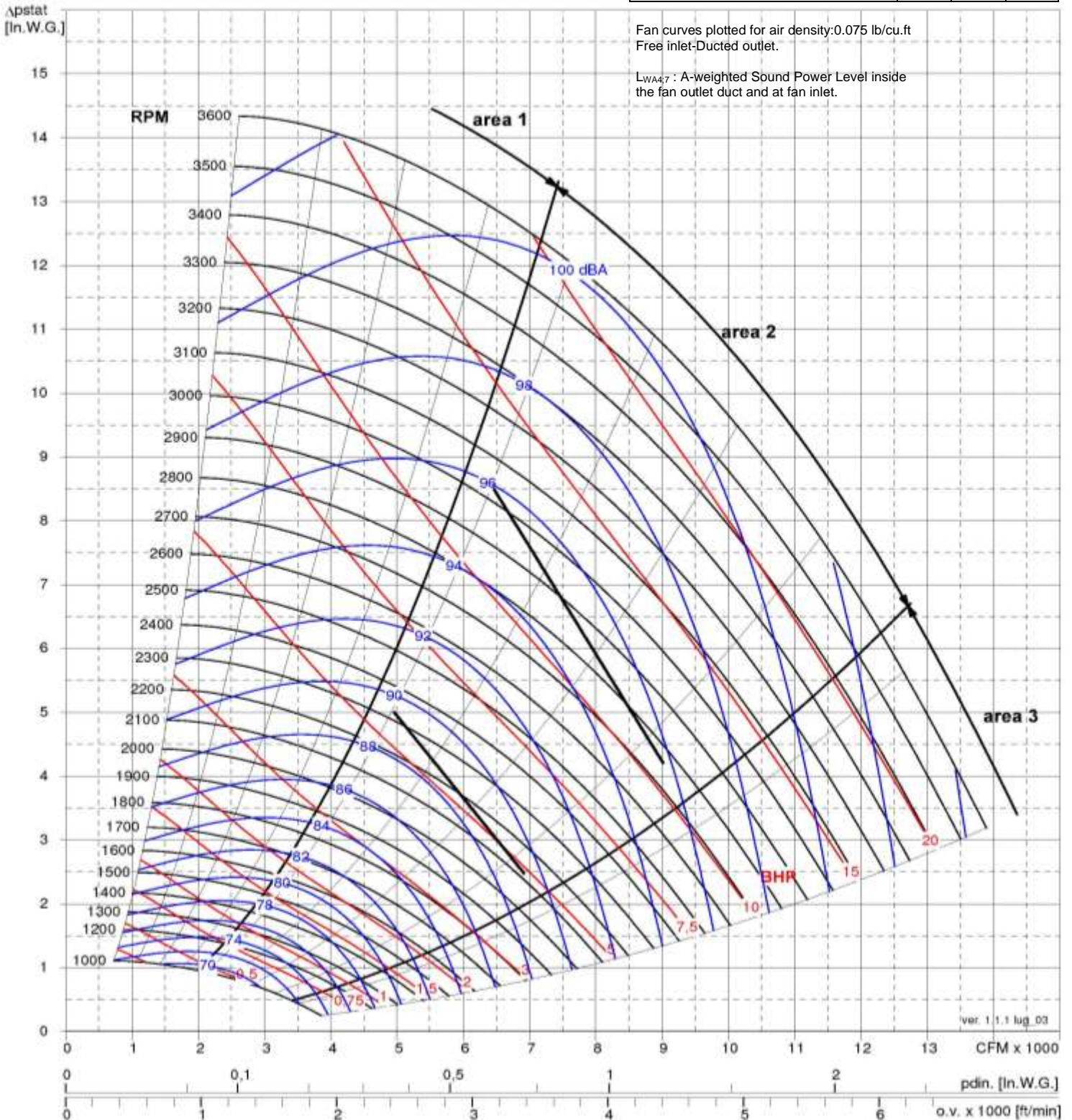
Power rating (BHP) doesn't include transmission losses. The AMCA Certified Ratings Seal applies to Air Performance only.



FEG 85

Peak $\eta_t = 75.3$

ATZAF 15-15 FF		R	T1	T2
Fan Max RPM	[min ⁻¹]	2600	2900	3500
Fan Max	[BHP]	8	10.5	15
Fan Outlet Area O.A.	[ft ²]	2.04		
Fan weight	[Lb]	82	102	116
Wheel diameter	[in.]	16.14		
Wheel width	[in.]	13.03		
Wheel No. Blades	z	10		
Wheel Moment of Inertia	[Lb ft ²]	8	8	10.5
Wheel weight	[Lb]	26	26	34



Fan curves plotted for air density: 0.075 lb/cu.ft
Free inlet-Ducted outlet.

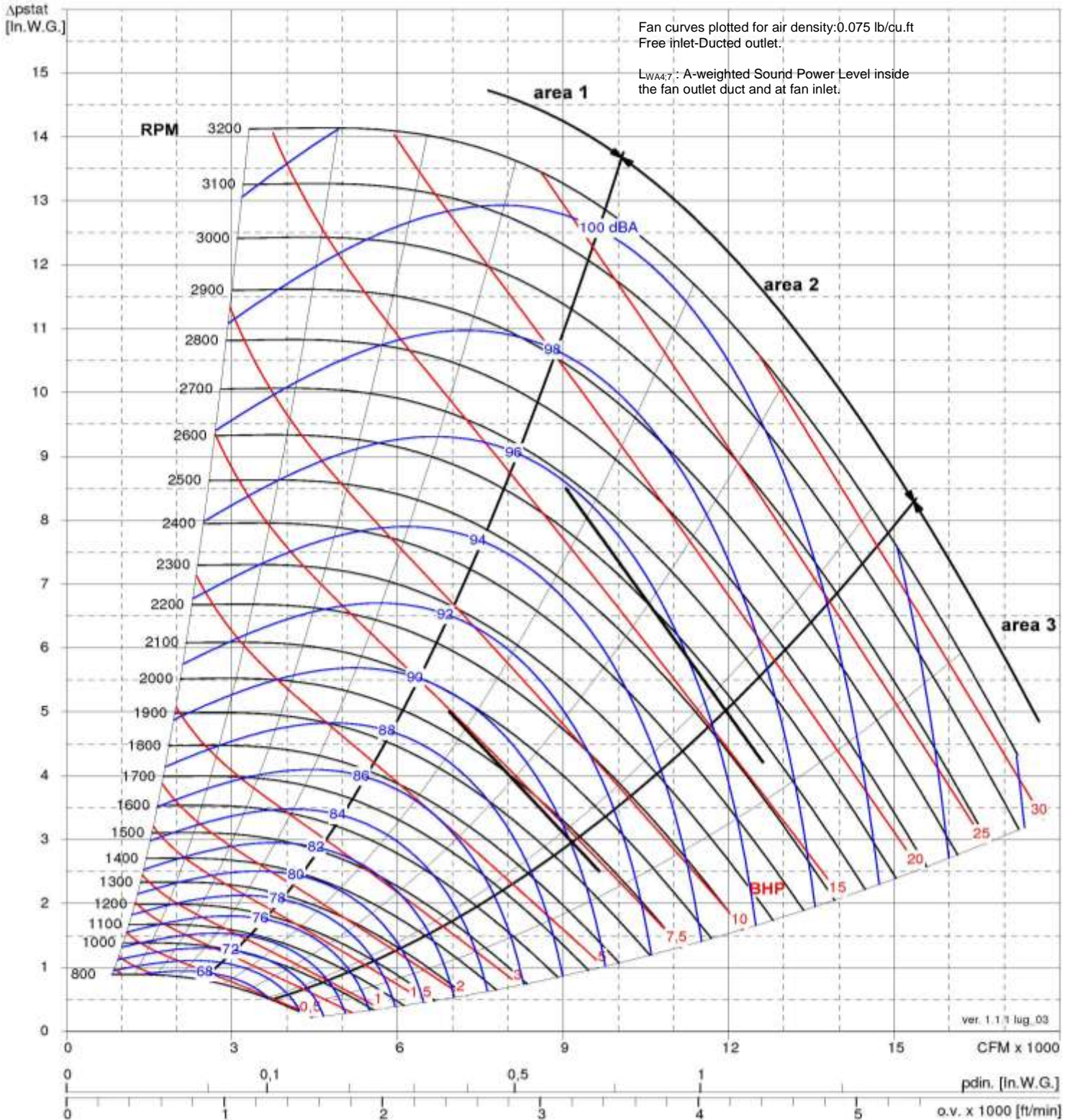
$L_{WA4,7}$: A-weighted Sound Power Level inside the fan outlet duct and at fan inlet.



FEG 85

Peak $\eta_t = 78.3$

ATZAF 18-18 FF		R	T1	T2
Fan Max RPM	[min ⁻¹]	2300	2450	3100
Fan Max	[BHP]	10	12.5	20
Fan Outlet Area O.A.	[ft ²]	2.86		
Fan weight	[Lb]	112	138	156
Wheel diameter	[in.]	18.11		
Wheel width	[in.]	14.49		
Wheel No. Blades	z	10		
Wheel Moment of Inertia	[Lb ft ²]	14.5	14.5	17.4
Wheel weight	[Lb]	37	37	45





comefri

DOUBLE INLET AIRFOIL FANS – ATZAF FF

ATZAF 18-18 FF R / T1 / T2

Table with columns V, 2, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10, 11, 12, 13 and rows for fan models 1800 to 15000. Header: ΔPstat [In.W.G.]

SOUND DATA TABLE

Table with columns: Fan Model and Size, Fan Performance Area, Range of fan speed, ΔLw4, ΔLwoc4 63, ΔLwoc4 125, ΔLwoc4 250, ΔLwoc4 500, ΔLwoc4 1000, ΔLwoc4 2000, ΔLwoc4 4000, ΔLwoc4 8000

Performance shown is for installation type B, free inlet-ducted outlet, and doesn't include the effects of appurtenances in the airstream.

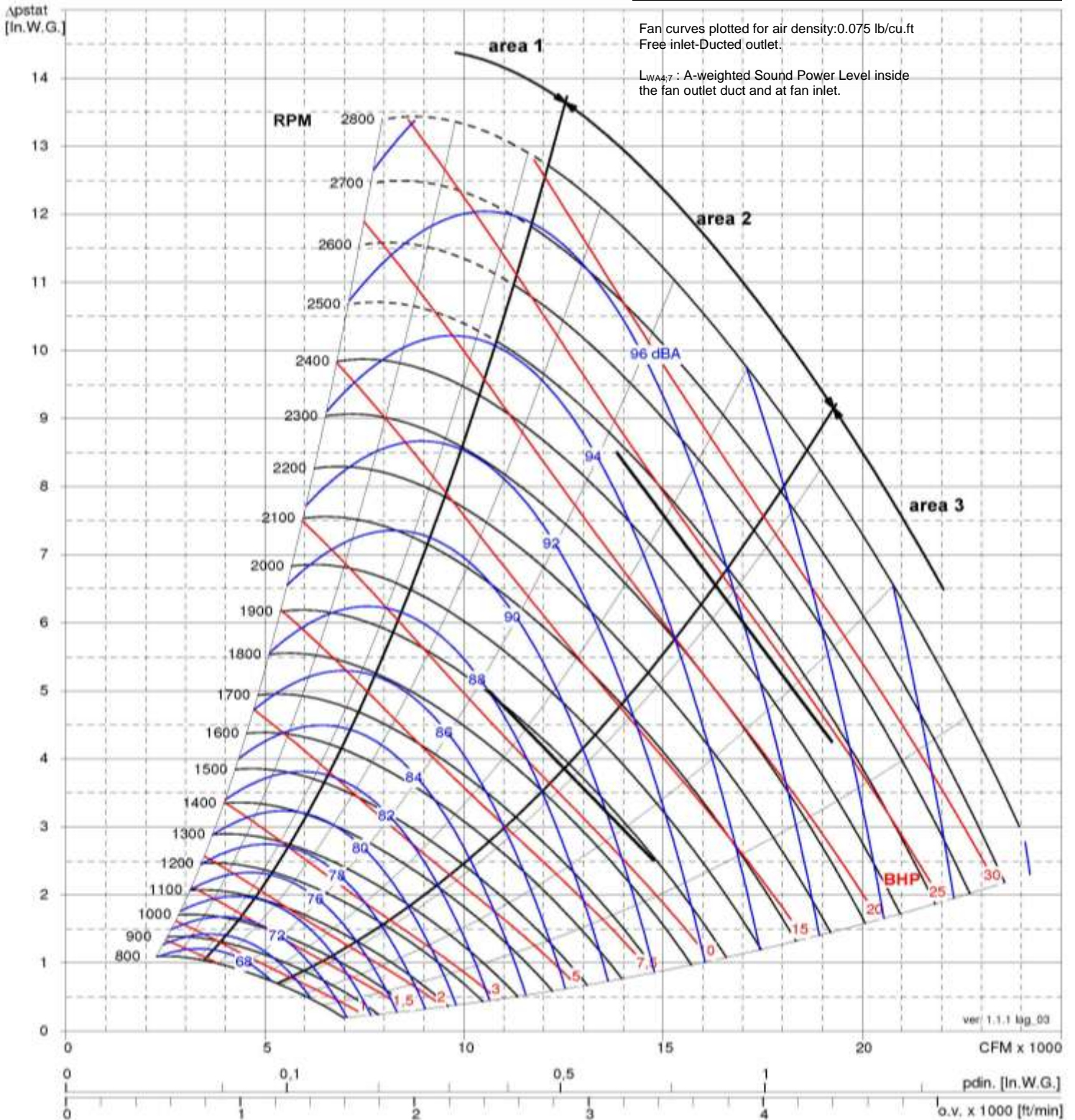
Power rating (BHP) doesn't include transmission losses. The AMCA Certified Ratings Seal applies to Air Performance only.



FEG 90

Peak $\eta_t = 83.0$

ATZAF 20-20 FF		R	T1	T2
Fan Max RPM	[min ⁻¹]	2100	2300	2750
Fan Max	[BHP]	12.5	17.5	29.5
Fan Outlet Area O.A.	[ft ²]	4.38		
Fan weight	[Lb]	168	209	241
Wheel diameter	[in.]	20.16		
Wheel width	[in.]	16.06		
Wheel No. Blades	z	10		
Wheel Moment of Inertia	[Lb ft ²]	28	28	32
Wheel weight	[Lb]	54	54	64

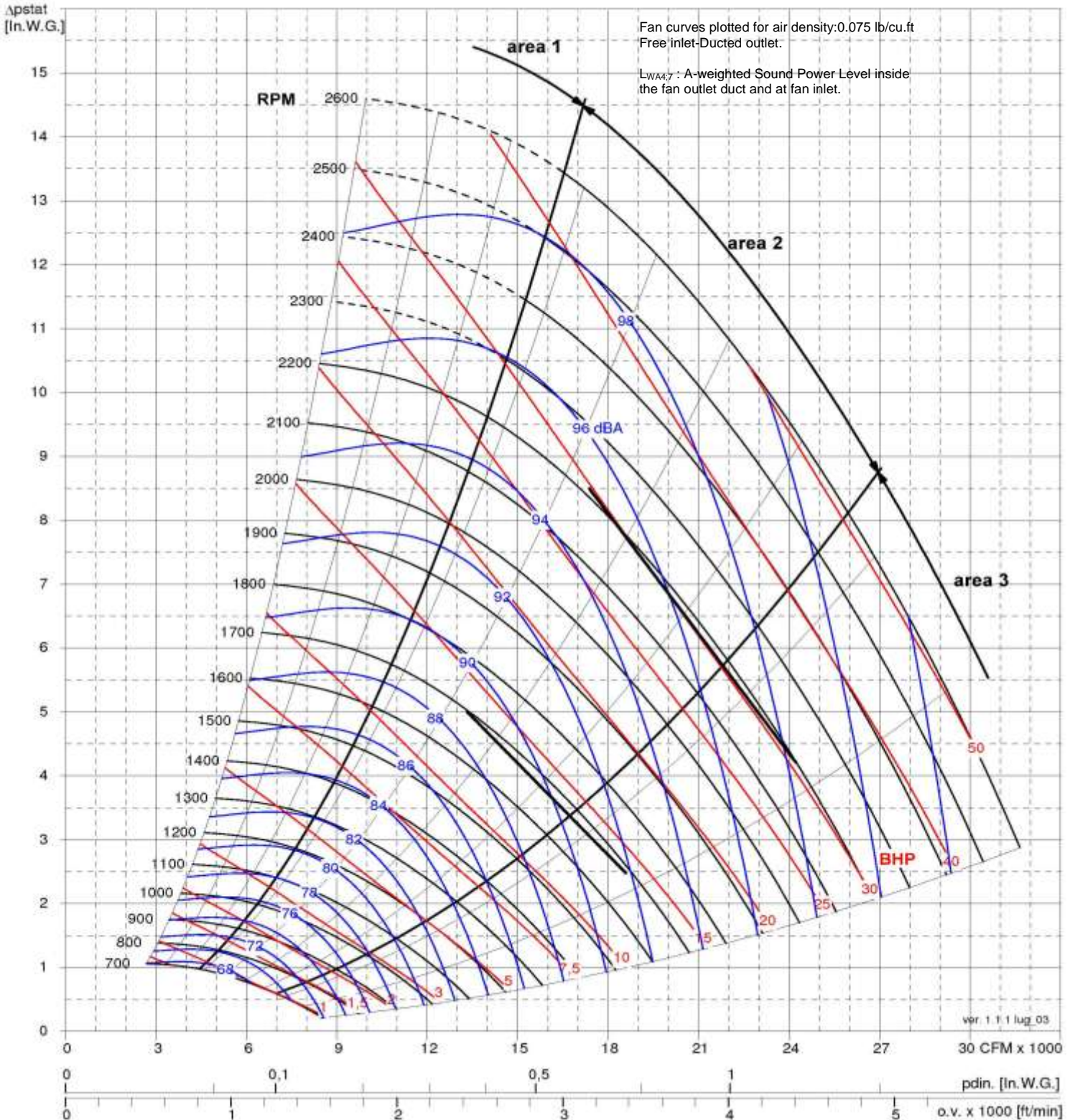




FEG 90

Peak $\eta_t = 83.8$

ATZAF 22-22 FF		R	T1	T2
Fan Max RPM	[min ⁻¹]	1850	1900	2500
Fan Max	[BHP]	15	17.5	50
Fan Outlet Area O.A.	[ft ²]	5.5		
Fan weight	[Lb]	231	281	353
Wheel diameter	[in.]	22.6		
Wheel width	[in.]	17.95		
Wheel No. Blades	z	10		
Wheel Moment of Inertia	[Lb ft ²]	42.8	42.8	49.5
Wheel weight	[Lb]	64	64	81

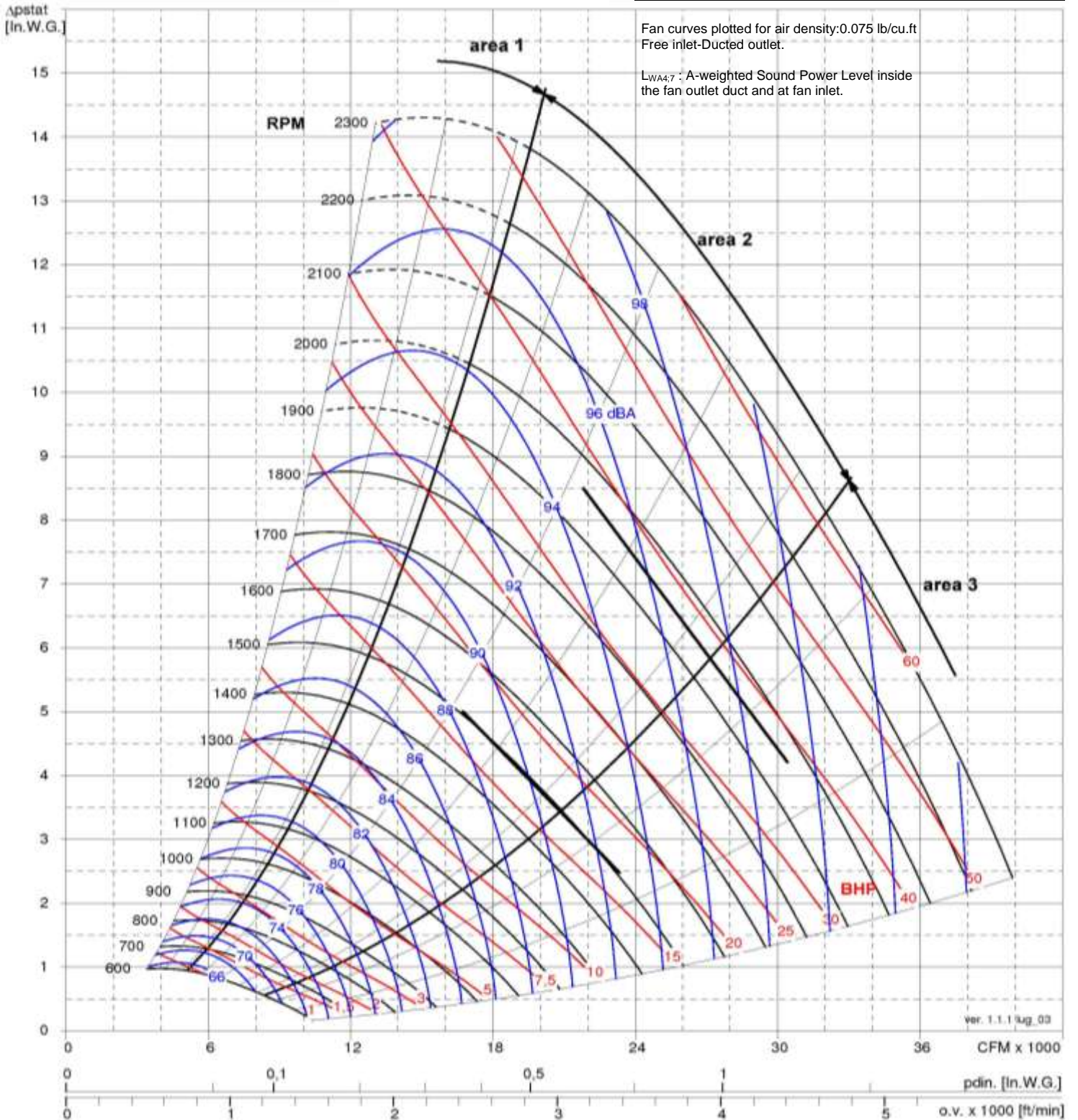




FEG 90

Peak $\eta_t = 85.0$

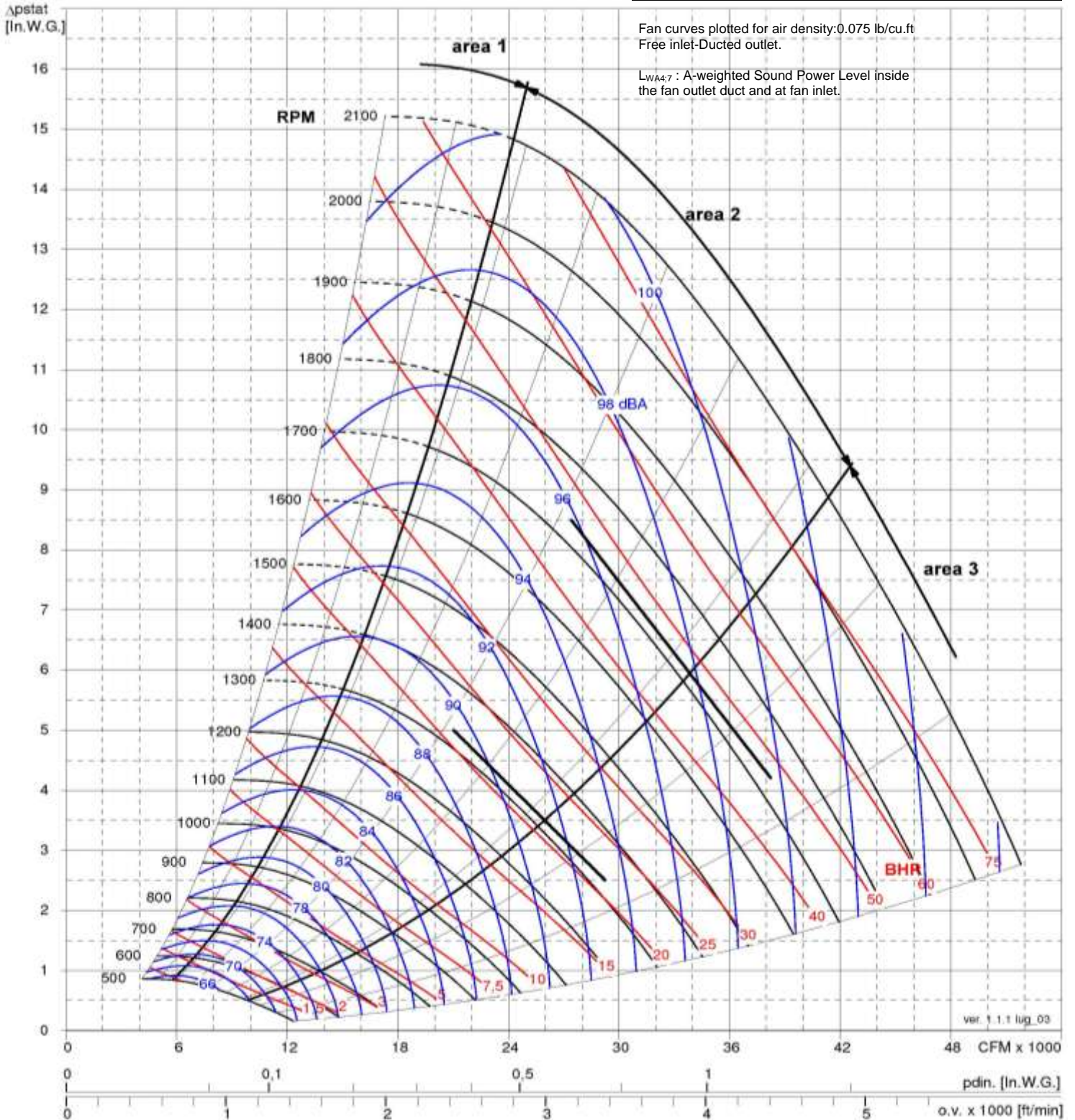
ATZAF 25-25 FF		R	T1	T2
Fan Max RPM	[min ⁻¹]	1500	1650	2200
Fan Max	[BHP]	17	20	50
Fan Outlet Area O.A.	[ft ²]	6.9		
Fan weight	[Lb]	292	323	382
Wheel diameter	[in.]	25.39		
Wheel width	[in.]	20.39		
Wheel No. Blades	z	10		
Wheel Moment of Inertia	[Lb ft ²]	69.5	69.5	82.8
Wheel weight	[Lb]	90	90	106





FEG 90
Peak $\eta_t = 84.8$

ATZAF 28-28 FF		R	T1	T2
Fan Max RPM	[min ⁻¹]	1400	1500	2050
Fan Max	[BHP]	18	24.5	60
Fan Outlet Area O.A.	[ft ²]	8.67		
Fan weight	[Lb]	410	444	507
Wheel diameter	[in.]	28.35		
Wheel width	[in.]	23.15		
Wheel No. Blades	z	10		
Wheel Moment of Inertia	[Lb ft ²]	127	140	143
Wheel weight	[Lb]	133	148	151

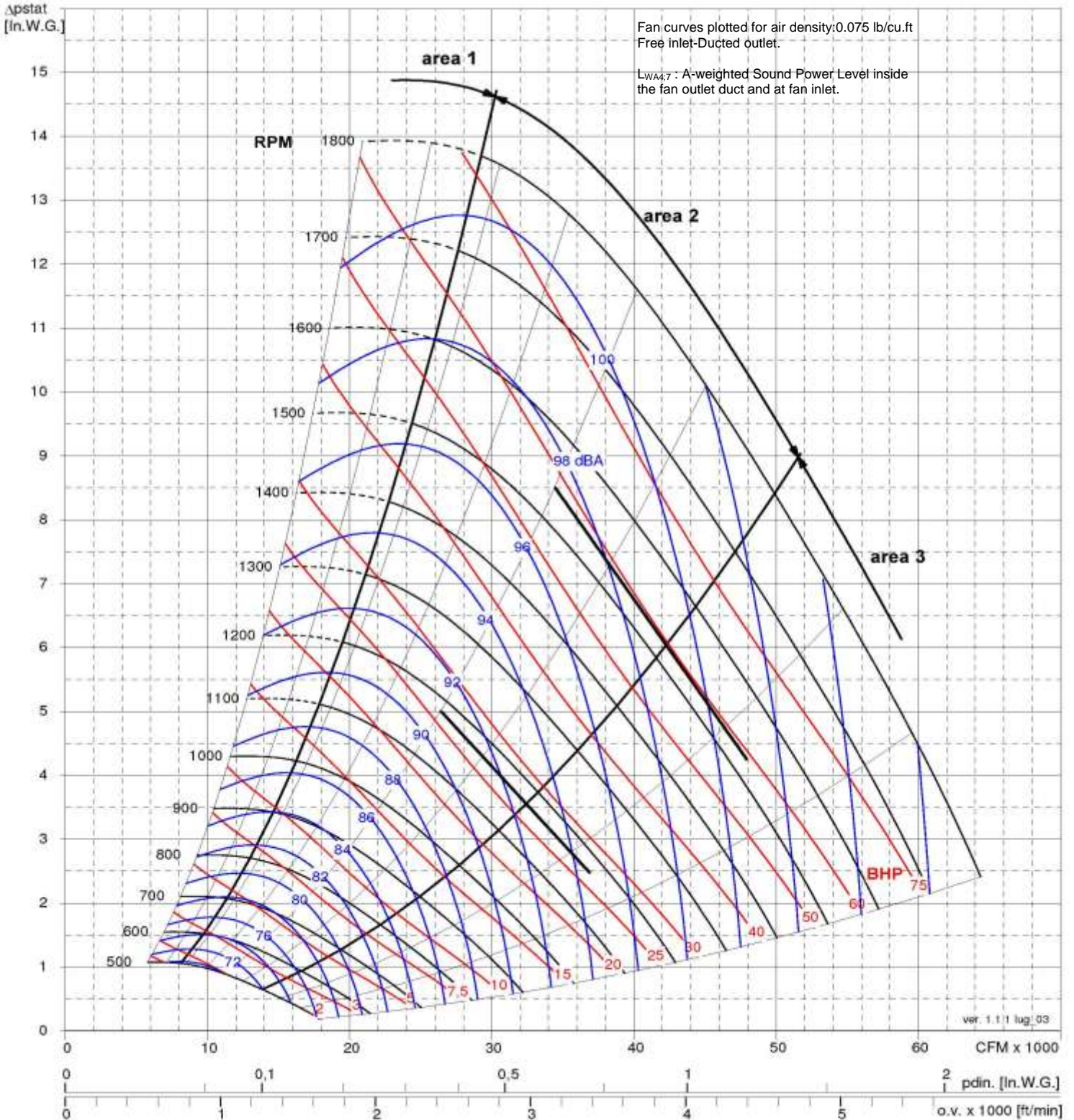




FEG 90

Peak $\eta_t = 86.1$

ATZAF 32-32 FF		R	T1	T2
Fan Max RPM	[min ⁻¹]	-	1300	1700
Fan Max	[BHP]	-	30.5	66.5
Fan Outlet Area O.A.	[ft ²]	-	10.91	
Fan weight	[Lb]	-	545	597
Wheel diameter	[in.]	31.89		
Wheel width	[in.]	25.98		
Wheel No. Blades	z	10		
Wheel Moment of Inertia	[Lb ft ²]	-	232	232
Wheel weight	[Lb]	-	195	195





comefri

DOUBLE INLET AIRFOIL FANS – ATZAF FF

ATZAF 32-32 FF T1 / T2

Table with columns for V [CFM], RPM, BHP, and ΔPstat [In.W.G.] for various fan sizes from 9000 to 57000. The table is organized into 12 columns for different static pressure ranges.

SOUND DATA TABLE

Table showing sound data for ATZAF 32-32 FF fans. Columns include Fan Model and Size, Fan Performance Area, Range of fan speed, and sound power level (ΔLw4) at various frequencies (63, 125, 250, 500, 1000, 2000, 4000, 8000 Hz).

Performance shown is for installation type B, free inlet-ducted outlet, and doesn't include the effects of appurtenances in the airstream.

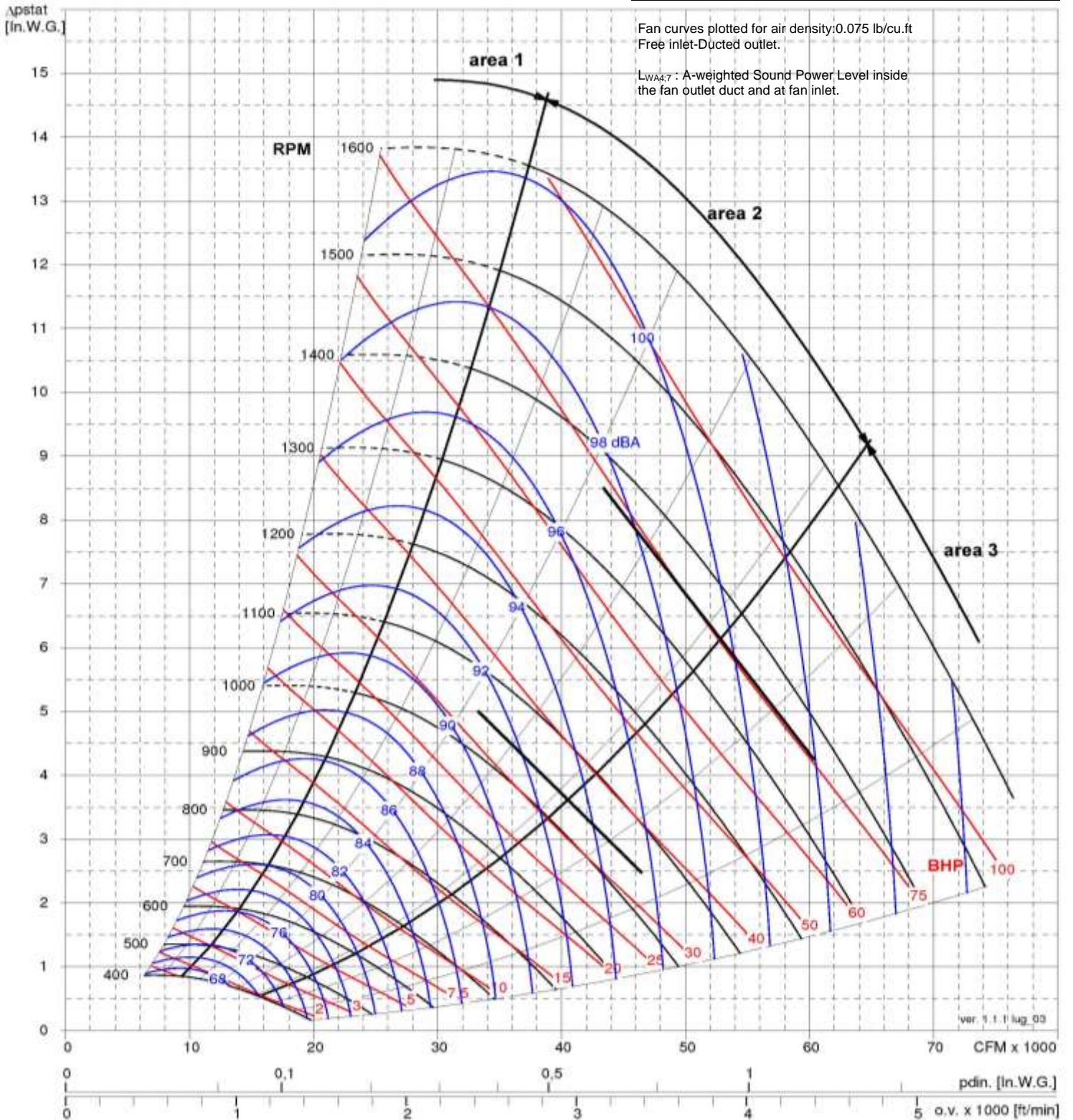
Power rating (BHP) doesn't include trasmission losses. The AMCA Certified Ratings Seal applies to Air Performance only.



FEG 90

Peak $\eta_t = 85.8$

ATZAF 36-36 FF		R	T1	T2
Fan Max RPM	[min ⁻¹]	-	1250	1550
Fan Max	[BHP]	-	39	95
Fan Outlet Area O.A.	[ft ²]	-	13.74	
Fan weight	[Lb]	-	731	800
Wheel diameter	[in.]	35.83		
Wheel width	[in.]	29.49		
Wheel No. Blades	z	10		
Wheel Moment of Inertia	[Lb ft ²]	-	392	405
Wheel weight	[Lb]	-	262	273





comefri

DOUBLE INLET AIRFOIL FANS – ATZAF FF

ATZAF 36-36 FF T1 / T2

Table with columns for flow rate (V [CFM]), fan speed (RPM), and pressure rise (ΔPstat [In.W.G.]). Rows represent different fan models from 10000 to 74000. Columns represent pressure rise in inches of water gauge from 2 to 12.5.

SOUND DATA TABLE

Table with columns for Fan Model and Size, Fan Performance Area, Range of fan speed, and sound power levels (ΔLw) at various fan speeds (63, 125, 250, 500, 1000, 2000, 4000, 8000 RPM). Rows are categorized by Area 1, Area 2, and Area 3 for ATZAF 36-36 FF.

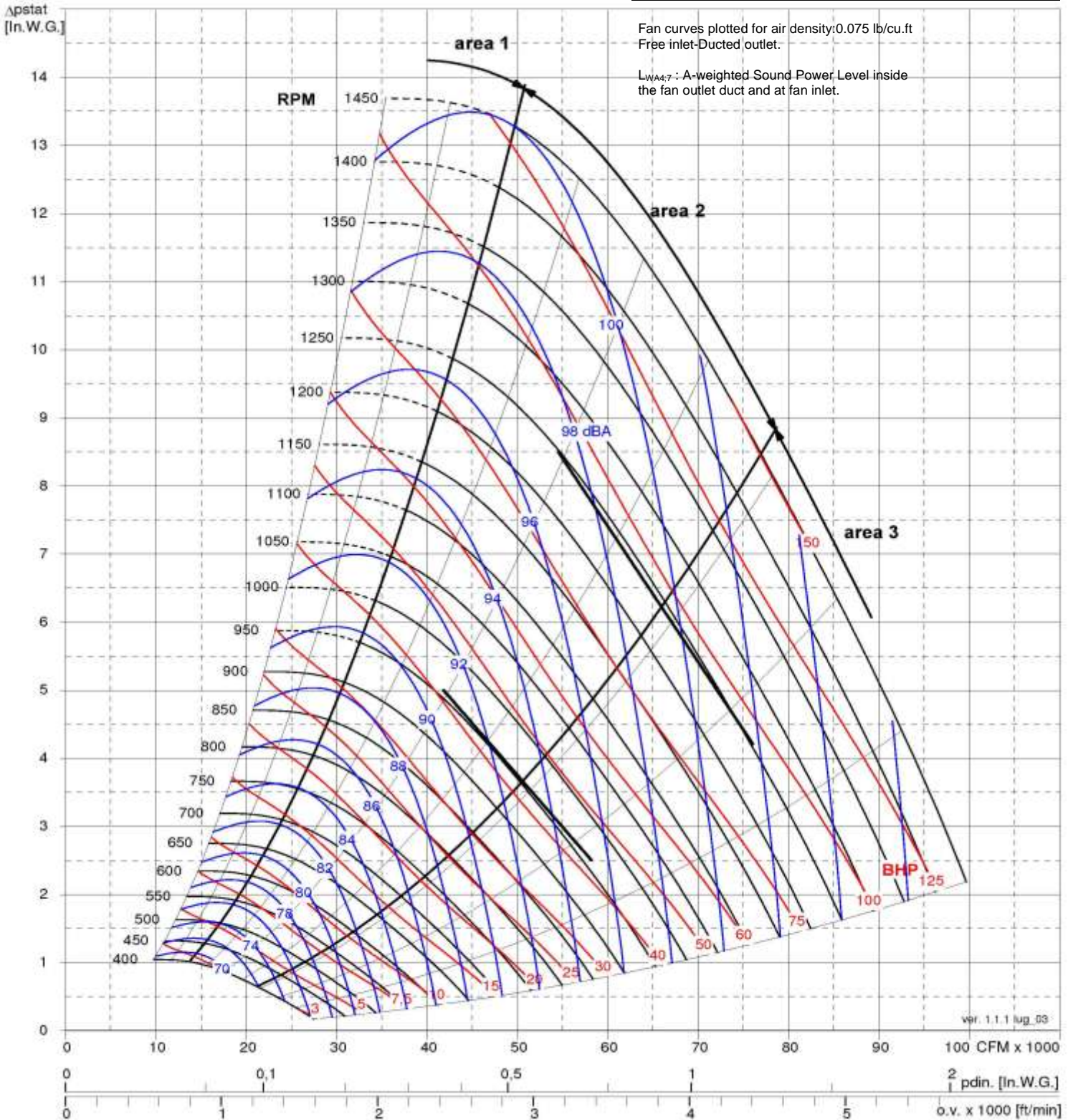
Performance shown is for installation type B, free inlet-ducted outlet, and doesn't include the effects of appurtenances in the airstream.

Power rating (BHP) doesn't include trasmission losses. The AMCA Certified Ratings Seal applies to Air Performance only.



FEG 90
Peak $\eta_t = 86.1$

ATZAF 40-40 FF		R	T1	T2
Fan Max RPM	[min ⁻¹]	-	1200	1350
Fan Max	[BHP]	-	66.5	110
Fan Outlet Area O.A.	[ft ²]	-	17.27	
Fan weight	[Lb]	-	917	956
Wheel diameter	[in.]	39.37		
Wheel width	[in.]	31.85		
Wheel No. Blades	z	10		
Wheel Moment of Inertia	[Lb ft ²]	-	630	650
Wheel weight	[Lb]	-	348	358

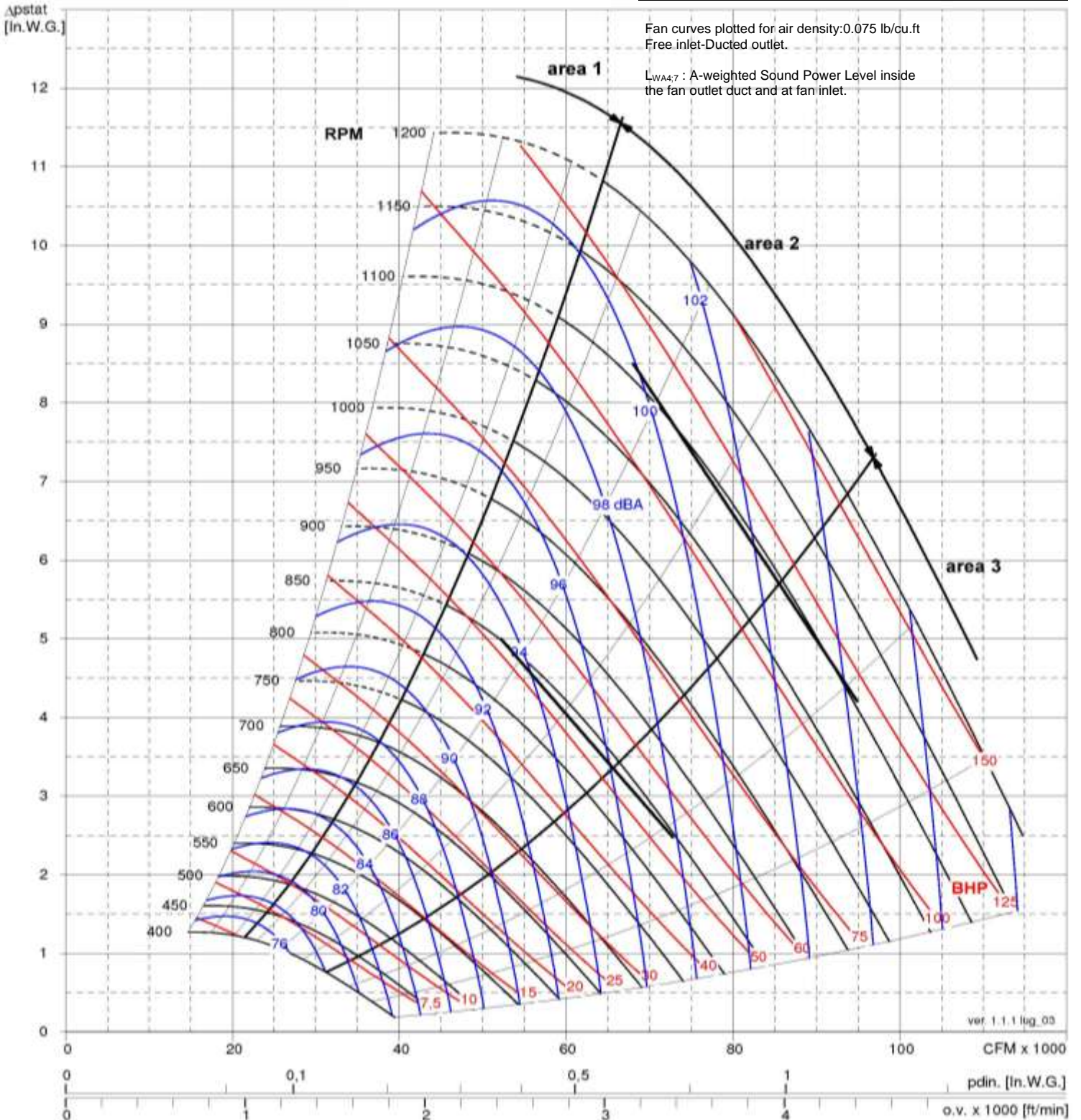




FEG 90

Peak $\eta_t = 84.7$

ATZAF 44-44 FF		R	T1	T2
Fan Max RPM	[min ⁻¹]	-	850	1150
Fan Max	[BHP]	-	44.5	130
Fan Outlet Area O.A.	[ft ²]	-	21.55	
Fan weight	[Lb]	-	1451	1616
Wheel diameter	[in.]	44.09		
Wheel width	[in.]	35.35		
Wheel No. Blades	z	10		
Wheel Moment of Inertia	[Lb ft ²]	-	1005	1045
Wheel weight	[Lb]	-	441	459

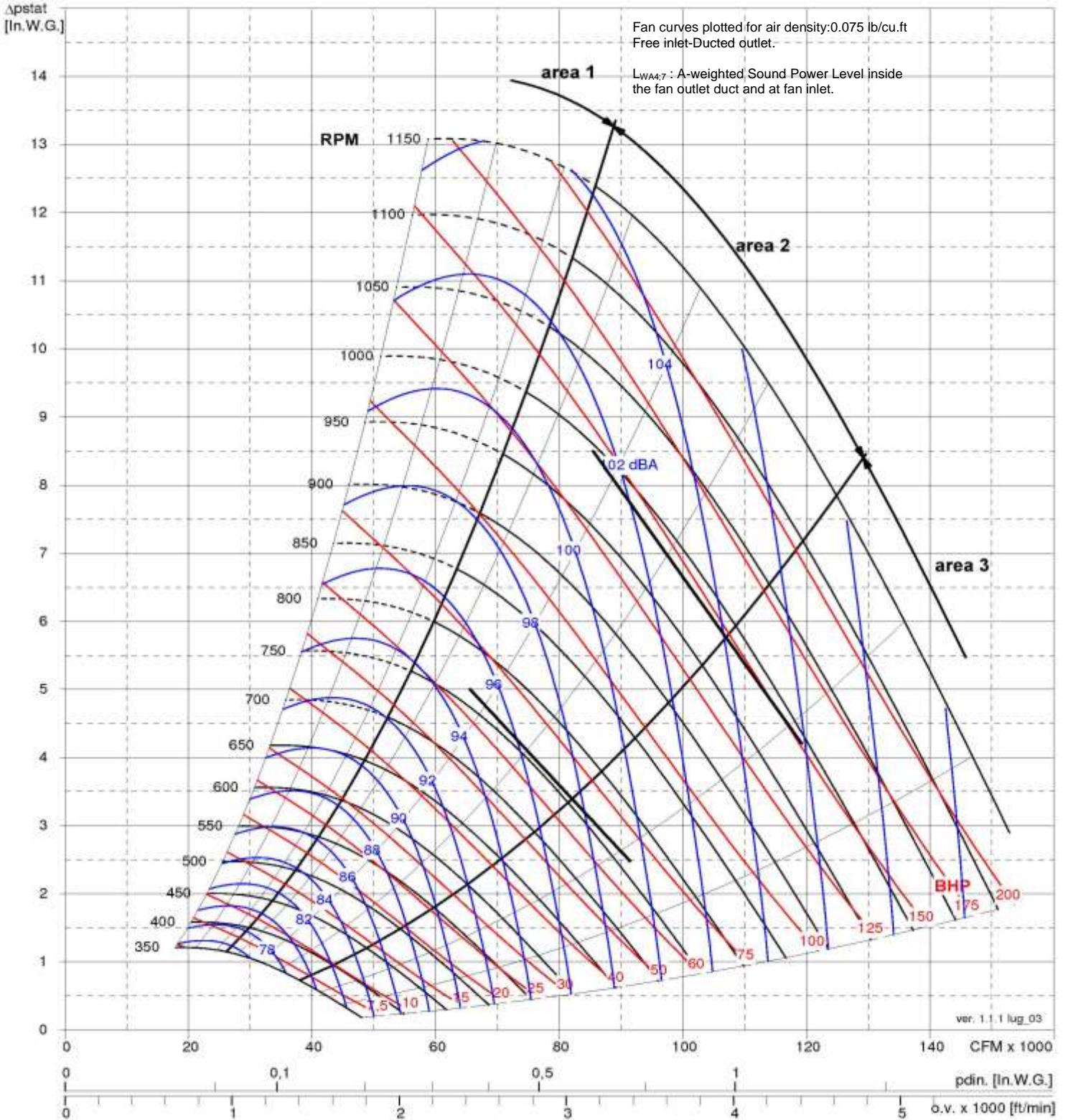




FEG 90

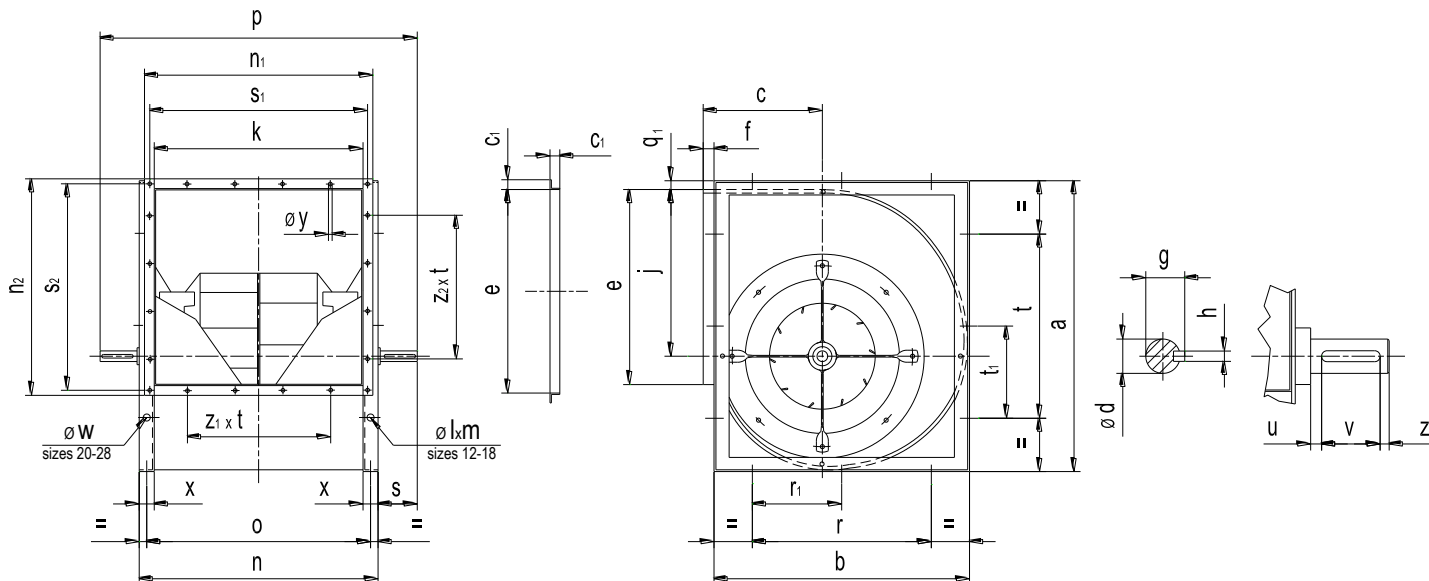
Peak $\eta_t = 84.7$

ATZAF 49-49 FF		R	T1	T2
Fan Max RPM	[min ⁻¹]	-	800	1100
Fan Max	[BHP]	-	110	170
Fan Outlet Area O.A.	[ft ²]	-	27.07	
Fan weight	[Lb]	-	1825	2056
Wheel diameter	[in.]	49.21		
Wheel width	[in.]	38.78		
Wheel No. Blades	z	10		
Wheel Moment of Inertia	[Lb ft ²]	-	1578	1597
Wheel weight	[Lb]	-	562	569



7. Fan dimensions

	Page
7.1. ATZAF 12-12 FF R to 28-28 FF R	39
7.2. ATZAF 12-12 FF T1 /T2 to 40-40 FF T1 /T2	40
7.3. ATZAF 44-44 FF T1 /T2 to 49-49 FF T1 /T2	41
7.4. Base frames for ATZAF 12-12 FF to 49-49 FF.....	42
7.5. Side plate holes ATZAF 12-12 FF to 40-40 FF	44

7.1. ATZAF 12-12 FF R to 28-28 FF R


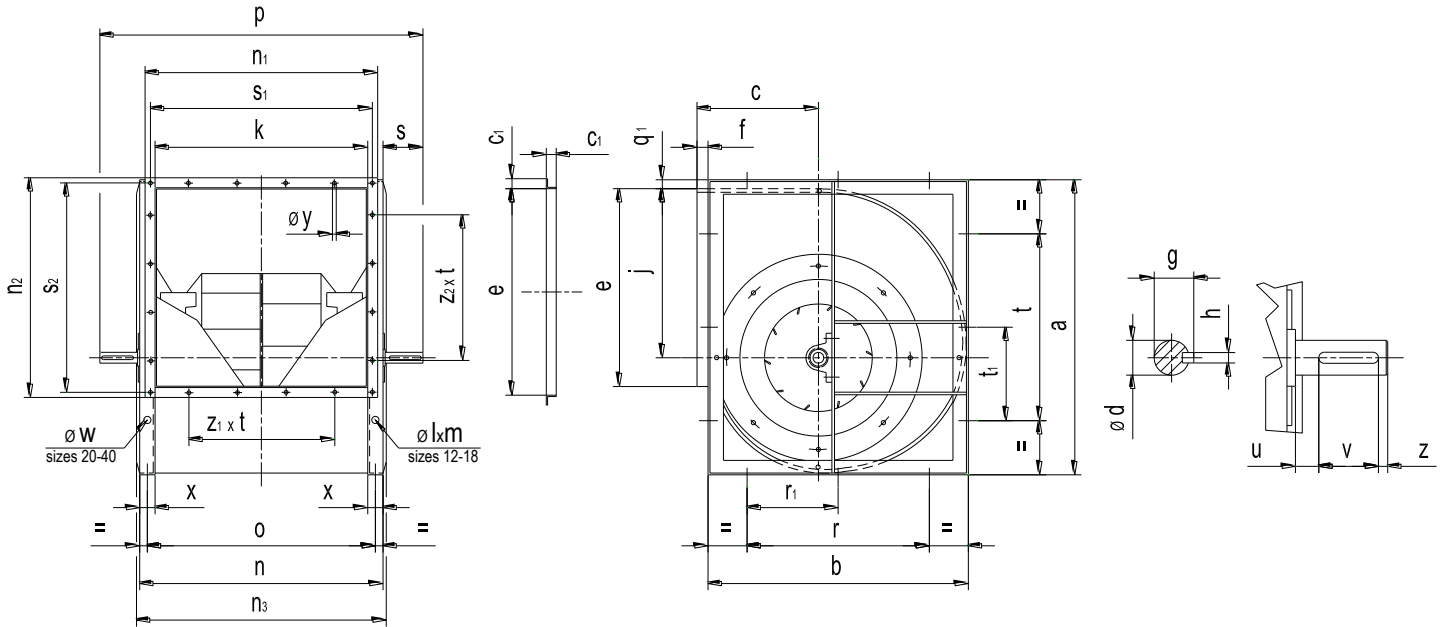
	a	b	c	c_1	$\varnothing d$	e	f	g	h	j	k
ATZAF 12-12 FF	21.61	18.62	9.09	0.98	1"	13.45	0.98	1.11	1/4"	11.65	15.55
ATZAF 15-15 FF	25.51	21.93	10.39		1-3/16"	15.87		18.78		1.30	13.46
ATZAF 18-18 FF	30.43	26.26	12.36		1-3/8"	25.12	2.21	1.51	5/16"	21.26	25.12
ATZAF 20-20 FF	36.14	29.29	13.86		1-1/2"	28.15	2.13	1.66	3/8"	23.84	28.15
ATZAF 22-22 FF	40.55	32.99	15.35		31.54	2.44	26.79			31.54	
ATZAF 25-25 FF	45.59	36.85	17.09		1-15/16"	35.35	2.81	2.17	1/2"	30.19	35.35

	$\varnothing l \times m$	n	n_1	n_2	o	p	r	r_1	s	s_1	s_2
ATZAF 12-12 FF	0.44x0.88	18.55	17.52	15.16	17.38	24.76	16.62	-	3.11	16.73	14.37
ATZAF 15-15 FF		21.54	20.51	17.60	20.33	27.87	19.93		3.17	19.72	16.81
ATZAF 18-18 FF		24.93	23.90	20.51	23.66	32.52	24.26		3.80	23.11	19.72
ATZAF 20-20 FF	-	28.26	27.09	27.09	26.69	34.45	17.71	8.86	3.09	26.30	26.30
ATZAF 22-22 FF		32.09	30.12	30.12	30.12	39.37	19.69	9.84	3.64	29.33	29.33
ATZAF 25-25 FF		35.48	33.50	33.50	33.50	42.91	22.05	11.02	3.72	32.72	32.72
ATZAF 28-28 FF		39.29	37.32	37.32	37.72	48.03	24.80	12.40	4.37	36.53	36.53

	t	t_1	u	v	z	x	$\varnothing y$	q_1	$\varnothing w$	$z_1 \times t$	$z_2 \times t$
ATZAF 12-12 FF	19.61	-	0.93	1.77	0.20	1.50	0.35	0.88	-	2x8.37	2x7.18
ATZAF 15-15 FF	23.51		0.86					1.00		2x9.86	2x8.40
ATZAF 18-18 FF	28.43		0.90	0.98				2x11.55		2x9.86	
ATZAF 20-20 FF	17.71	8.86	0.95	1.57		0.16	0.47	6x3.54			
ATZAF 22-22 FF	19.69	9.84	0.98	2.36		1.97	0.29	0.22	0.59	7x3.54	
ATZAF 25-25 FF	22.05	11.02	1.05					0.26		8x3.54	
ATZAF 28-28 FF	24.80	12.40	0.82		3.15			0.24		0.71	9x3.54



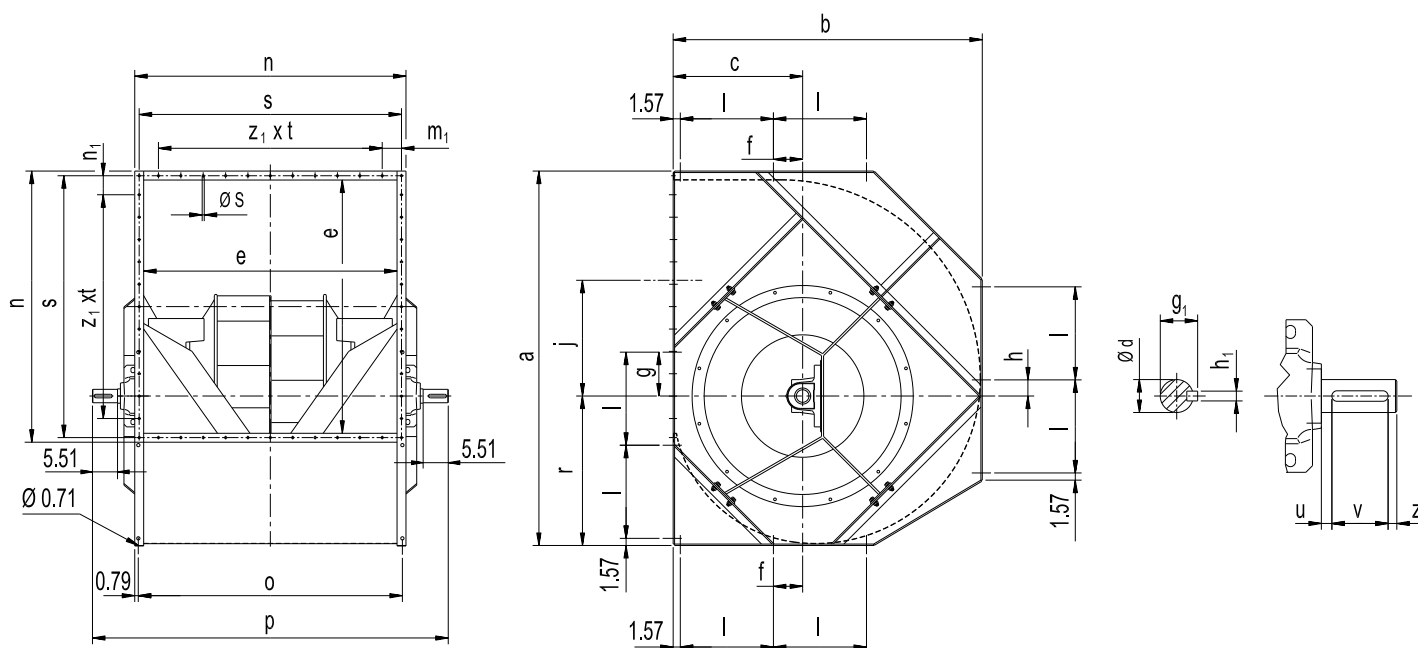
7.2. ATZAF 12-12 FF T1 / T2 to 40-40 FF T1 / T2



	a	b	c	c ₁	Ø d		e	f	g		h		j	k
					T1	T2			T1	T2	T1	T2		
ATZAF 12-12 FF	21.61	18.62	9.09	0.98	1"	1-3/16"	13.45	0.98	1.11	1.30	1/4"		11.65	15.55
ATZAF 15-15 FF	25.51	21.93	10.39		1-3/16"	1-7/16"	15.87		1.30	1.60	1/4"	3/8"	13.46	18.54
ATZAF 18-18 FF	30.43	26.26	12.36		1-1/2"	1-1/2"	18.78	1.66	1.66	3/8"			16.34	21.93
ATZAF 20-20 FF	36.14	29.29	13.86		1-1/2"	1-11/16"	25.12		2.21		1.85	3/8"	21.26	25.12
ATZAF 22-22 FF	40.55	32.99	15.35		1-11/16"	2"	28.15	2.13	2.22	1/2"	23.84		28.15	
ATZAF 25-25 FF	45.59	36.85	17.09		1-11/16"	2-3/16"	31.54	2.44			1.85	1/2"	26.79	31.54
ATZAF 28-28 FF	51.34	41.26	19.09		2-3/16"	2-3/16"	35.35	2.81	2.17	5/8"	30.19		35.35	
ATZAF 32-32 FF	57.80	46.22	21.26		2-7/16"	2-7/16"	39.65	3.19	2.41		5/8"	34.03	39.65	
ATZAF 36-36 FF	64.88	51.65	23.78	2-3/16"	2-7/16"	44.49	3.82	2.71	1/2"	38.26		44.49		
ATZAF 40-40 FF	71.26	56.85	25.87	2-3/16"	2-7/16"	49.88	3.82			2.41	2.71	42.06	49.88	

	Ø l x m	n	n ₁	n ₂	n ₃		o	p		r	r ₂	s		s ₁
					T1	T2		T1	T2			T1	T2	
ATZAF 12-12 FF	0.44x0.88	18.55	17.52	15.16	18.94		17.38	24.76		16.62	-	3.11		16.73
ATZAF 15-15 FF		21.54	20.51	17.60	22.01	22.40	20.33	27.87	28.54	19.93		3.17	3.50	19.72
ATZAF 18-18 FF		24.93	23.90	20.51	25.79	26.18	23.66	32.52	33.27	24.26		3.80	4.17	23.11
ATZAF 20-20 FF		28.26	27.09		29.37	30.16	26.69	35.67	38.70	17.71	8.86	3.70	5.22	26.30
ATZAF 22-22 FF		32.09	30.12		32.48	33.27	30.12	40.47	43.94	19.69	9.84	4.19	5.93	29.33
ATZAF 25-25 FF		35.48	33.50		36.65		33.50	43.90	48.03	22.05	11.02	4.21	6.28	32.72
ATZAF 28-28 FF		39.29	37.32		40.47		37.72	49.61	52.60	24.80	12.40	5.16	6.66	36.53
ATZAF 32-32 FF		43.58	41.61		44.76		42.01	53.82	56.89	27.95	13.98	5.12	6.65	40.83
ATZAF 36-36 FF		48.43	46.85		49.61		46.85	60.20	61.97	31.50	15.75	5.88	6.77	45.83
ATZAF 40-40 FF	53.82	52.24		55.00		52.24	67.40		35.43	17.72	6.79		51.22	

	s ₂	t	t ₂	U		v		z	x	Ø y	q ₁	Ø w	z _{1xt}	z _{2xt}
				T1	T2	T1	T2							
ATZAF 12-12 FF	14.37	19.61	-	0.81	0.68	1.77		0.20	1.50	0.35	0.88	-	2x8.37	2x7.18
ATZAF 15-15 FF	16.81	23.51		0.70	0.63	1.77	1.97				1.00		2x9.86	2x8.40
ATZAF 18-18 FF	19.72	28.43		0.64	0.68	2.36					0.98		2x11.55	2x9.86
ATZAF 20-20 FF	26.30	17.71	8.86	0.68	0.73	1.97	2.76	0.20	1.57	0.29	0.16	0.47	6x3.54	
ATZAF 22-22 FF	29.33	19.69	9.84	0.74	1.30	2.76	3.15		1.97		0.29	0.22	0.59	7x3.54
ATZAF 25-25 FF	32.72	22.05	11.02	0.56	1.65							0.26	8x3.54	
ATZAF 28-28 FF	36.53	24.80	12.40	1.12	1.34	3.15	3.54			0.24		0.71	9x3.54	
ATZAF 32-32 FF	40.83	27.95	13.98	0.93	1.34				0.26	11x3.54				
ATZAF 36-36 FF	45.83	31.50	15.75	1.18	1.36	3.54			0.24		11x3.94			
ATZAF 40-40 FF	51.22	35.43	17.72	1.48	1.38			0.26	12x3.94					

7.4. ATZAF 44-44 FF T1 / T2; 49-49 FF T1 / T2


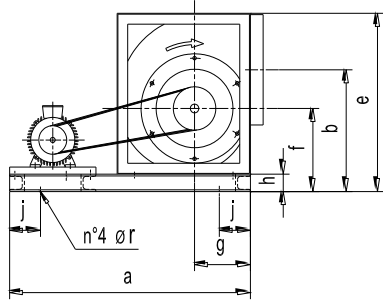
	a	b	c	$\varnothing d$		e	f	g	h	g_1		h_1		j	l
				T1	T2					T1	T2	T1	T2		
ATZAF 44-44 FF	82.36	68.00	28.50	2-15/16"		55.71	6.44	9.65	3.54	3.26		3/4"		19.69	20.47
ATZAF 49-49 FF	91.69	75.95	31.89	2-3/4"	2-15/16"	62.44	7.28	10.97	3.66	3.03	3.26	5/16"	3/4"	21.81	23.03

	m_1	n	n_1	o	p		r	s	$\varnothing s$	$z_1 \times t$	u		v	z	
					T1	T2					T1	T2		T1	T2
ATZAF 44-44 FF	4.23	59.65	4.23	58.07	73.82	77.76	32.87	57.68	0.45	10x4.92	1.18	0.79	3.94	0.39	0.79
ATZAF 49-49 FF	2.87	66.38	2.87	64.80	83.66		36.65	64.80	0.59	12x4.92	0.79		0.79	3.94	

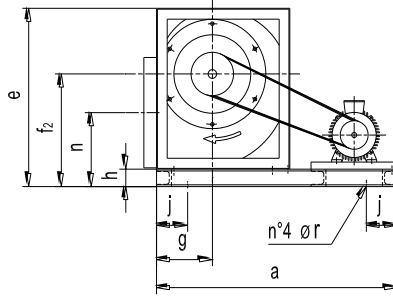


7.5. Base frames for ATZAF 12-12 FF to 49-49 FF

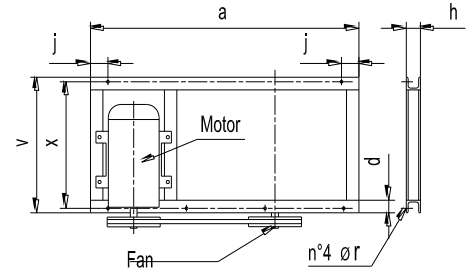
RD 90° (12-12 / 40-40)



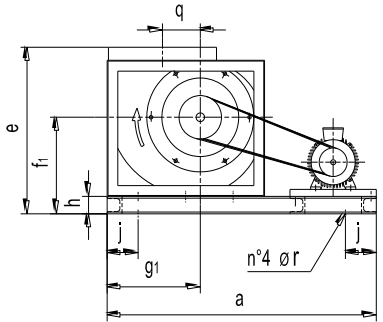
RD 270° (12-12 / 40-40)



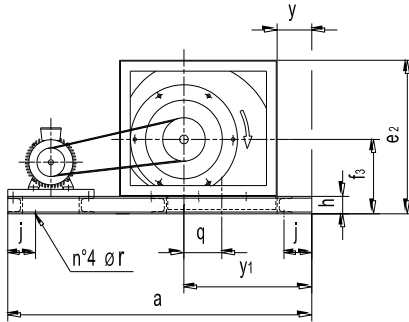
Top view (only base frame)
0° - 90° - 270° (12-12 / 40-40)



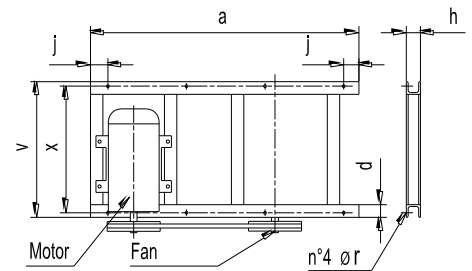
RD 0° (12-12 / 40-40)



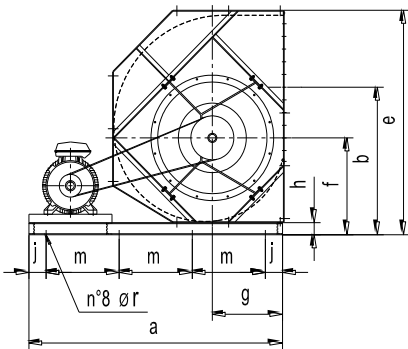
RD 180° (12-12 / 40-40)



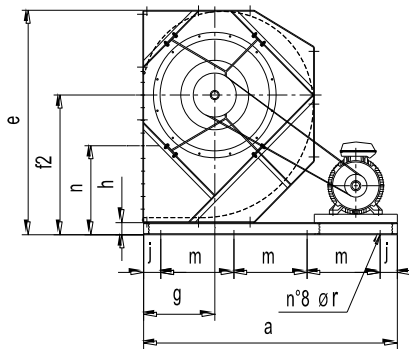
Top view (only base frame)
180° (12-12 / 40-40)



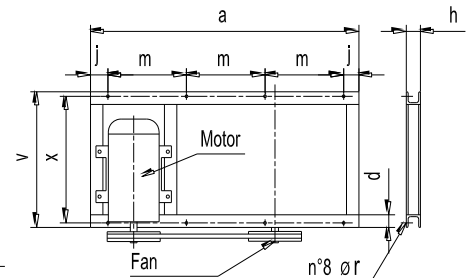
RD-LG 90° (44-44-49-49)



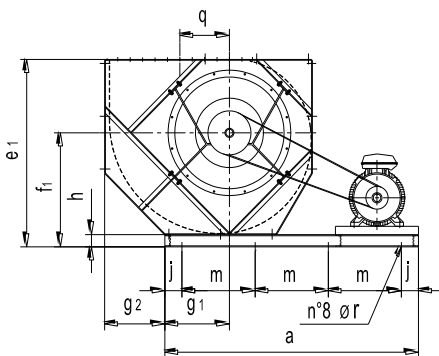
RD-LG 270° (44-44-49-49)



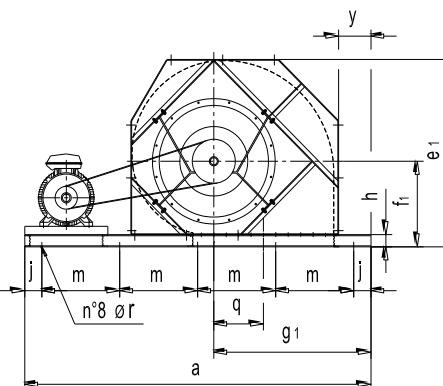
Top view (only base frame)
0° - 90° - 270° (44-44-49-49)



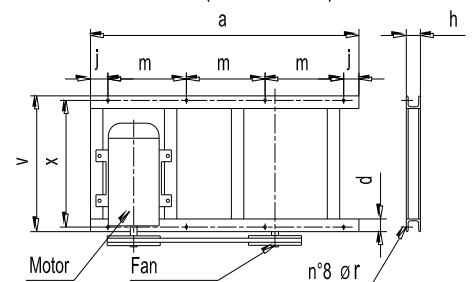
RD-LG 0° (44-44-49-49)



RD-LG 180° (44-44-49-49)



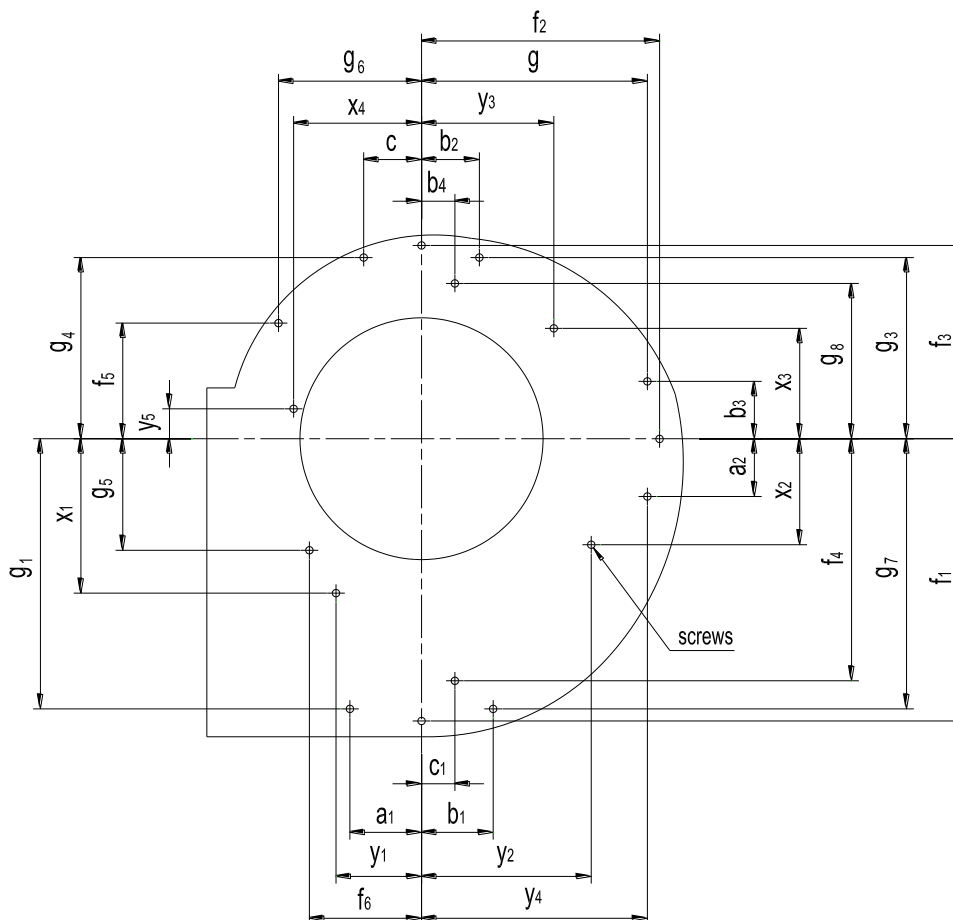
Top view (only base frame)
180° (44-44-49-49)





	Motor base plates	a			b	d	e	e ₁	e ₂	f	f ₁	f ₂	f ₃	g	g ₁	g ₂	h	j	j ₁	m	m ₁	n	q	Ø r	v	x	y	y ₁
		RD-LG 0°	RD-LG 180°	RD-LG 90°/270°																								
12-12	SY1	34.21	44.84	34.21	17.01	1.50	24.61	22.61	21.62	12.08	13.52	15.53	11.11	8.11	12.53	-	3.00	1.97	1.18	-	-	10.61	4.93	0.39	18.55	17.38	3.94	16.47
	SH2	44.84	48.78	44.84																								
15-15	SY1	40.87	46.77	40.87	19.58	1.50	28.51	25.91	24.93	14.05	15.52	17.46	12.41	9.41	14.46	-	3.00	1.97	1.97	-	-	11.94	5.53	0.39	21.54	20.33	5.91	20.37
	SY2	40.87	46.77	40.87																								
	SH2	54.65	54.65	46.77																								
	SH3	54.65	60.55	54.65																								
18-18	SY1	45.79	53.66	45.79	23.06	1.50	33.43	30.24	29.26	16.11	17.88	20.32	14.38	11.38	17.32	-	3.00	1.97	1.97	-	-	13.37	6.95	0.39	24.92	23.66	5.91	23.23
	SY2	45.79	53.66	45.79																								
	SH2	59.57	59.57	53.66																								
	SH3	59.57	65.47	59.57																								
20-20	SY1	48.03	59.37	48.03	27.43	1.72	40.14	35.50	33.29	18.72	21.64	25.42	15.61	11.61	21.42	-	4.00	1.97	1.97	-	-	16.72	8.70	0.39	28.56	26.69	7.87	29.29
	SY2	48.03	59.37	48.03																								
	SH2	59.37	73.15	59.37																								
	SH3	59.37	73.15	59.37																								
22-22	SY1	53.15	62.99	53.15	30.26	1.72	44.55	39.12	36.99	20.50	23.76	28.06	17.19	13.19	24.06	-	4.00	3.94	1.97	-	-	18.29	9.76	0.39	31.59	30.12	7.87	31.93
	SY2	53.15	62.99	53.15																								
	SH2	62.99	77.56	62.99																								
	SH3	62.99	77.56	62.99																								
25-25	SY1	57.87	66.06	57.87	33.57	1.72	49.59	43.29	40.85	22.58	26.20	31.05	18.61	14.61	27.01	-	4.00	3.94	1.97	-	-	20.02	11.02	0.59	34.98	33.50	7.87	34.88
	SY2	57.87	66.06	57.87																								
	SH2	72.83	88.11	66.06																								
	SH3	72.83	88.11	66.06																								
	SH4	88.11	72.83	66.06																								
28-28	SY1	71.81	71.81	56.30	37.43	1.72	55.34	48.06	45.26	24.94	28.96	34.43	20.22	16.22	30.39	-	4.00	3.94	1.97	-	-	21.91	12.52	0.59	38.80	37.72	7.87	38.27
	SY2	71.81	82.44	56.30																								
	SH2	82.44	71.81	56.30																								
	SH3	82.44	93.86	71.81																								
	SH4	93.86	82.44	71.81																								
32-32	SY1	72.83	85.83	61.02	42.72	1.89	62.80	54.41	51.22	28.54	33.15	39.29	23.07	18.07	34.25	-	5.00	3.94	1.97	-	-	25.08	14.21	0.59	43.46	42.05	7.87	42.13
	SY2	72.83	85.83	61.02																								
	SH2	85.83	94.80	72.83																								
	SH3	85.83	108.19	72.83																								
	SH4	94.80	85.83	72.83																								
	SH5	108.19	94.80	72.83																								
36-36	SY1	79.53	92.52	66.93	47.40	1.89	69.88	60.47	56.65	31.38	36.69	43.50	25.00	20.00	38.50	-	5.00	3.94	1.97	-	-	27.48	16.02	0.59	48.26	46.85	7.87	46.38
	SY2	79.53	92.52	66.93																								
	SH2	92.52	101.89	79.53																								
	SH3	92.52	115.28	79.53																								
	SH4	101.89	92.52	79.53																								
	SH5	115.28	101.89	79.53																								
40-40	SY1	89.76	104.72	72.05	51.06	1.89	76.26	65.67	61.85	33.98	39.80	47.32	27.05	22.05	42.28	-	5.00	3.94	1.97	-	-	30.20	17.13	0.59	53.65	52.24	7.87	50.16
	SY2	89.76	104.72	72.05																								
	SH2	104.72	113.78	72.05																								
	SH3	104.72	113.78	72.05																								
	SH4	113.78	104.72	72.05																								
	SH5	113.78	121.65	104.72																								
44-44	SH2/SH5	110.24	129.92	110.24	63.35	1.89	87.36	72.99	-	37.87	44.49	54.49	33.50	28.50	25.00	24.49	5.00	4.92	1.38	33.46	56.69	29.02	25.47	0.59	59.49	58.07	5.71	55.20
49-49	SH2/SH5	116.14	138.58	116.14	71.08	2.03	97.69	81.94	-	42.65	50.07	61.05	37.89	31.89	27.68	27.36	6.00	4.92	1.38	35.43	61.42	32.63	28.43	0.59	66.54	64.80	5.51	60.51

Motor base plates	Motor sizes
SY1	56 ÷ 145
SY2	182 ÷ 215
SH2	254 ÷ 256
SH3	284 ÷ 326
SH4	364 ÷ 405
SH5	444 ÷ 505

7.5. Side plate holes ATZAF 12-12 FF to 40-40 FF


	a ₁	a ₂	b ₁	b ₂	b ₃	b ₄	c	c ₁	f ₁	f ₂	f ₃	f ₄	f ₅	f ₆	g ₁	g ₂	g ₃
ATZAF 12-12 FF	3.92	1.73	5.73	1.44	8.21	1.46	3.90	1.44	-	9.61	-	10.79	3.03	6.54	10.79	3.62	8.15
ATZAF 15-15 FF	6.52	0.59	7.60	0.98	5.10	-	5.43	-	12.80	-	-	-	5.98	-	10.24	7.44	9.84
ATZAF 18-18 FF	0.65	0.85	8.98	1.04	7.07	-	5.79	-	-	-	-	-	7.09	8.80	15.67	8.98	12.03
ATZAF 20-20 FF	8.39	8.39	8.39	8.39	8.39	-	8.39	-	20.43	16.65	13.74	-	-	-	15.75	11.02	8.15
ATZAF 22-22 FF	9.25	9.25	9.25	9.25	9.25	-	9.25	-	22.87	18.58	15.31	-	-	-	19.45	14.25	10.87
ATZAF 25-25 FF	9.25	9.25	9.25	9.25	9.25	-	9.25	-	25.83	21.06	17.36	-	-	-	22.32	16.97	12.91
ATZAF 28-28 FF	10.43	10.43	10.43	10.43	10.43	-	10.43	-	29.02	23.66	19.53	-	-	-	25.08	18.74	14.61
ATZAF 32-32 FF	-	-	-	-	-	-	-	-	32.87	26.81	22.13	-	-	-	-	-	-
ATZAF 36-36 FF	-	-	-	-	-	-	-	-	37.13	30.31	25.00	-	-	-	-	-	-
ATZAF 40-40 FF	-	-	-	-	-	-	-	-	40.91	33.43	27.56	-	-	-	-	-	-

	g ₄	g ₅	g ₆	g ₇	g ₈	x ₁	x ₂	x ₃	x ₄	y ₁	y ₂	y ₃	y ₄	y ₅	screws
ATZAF 12-12 FF	6.83	1.75	6.54	8.48	6.83	6.04	-	4.35	-	4.11	-	8.09	8.21	-	Self-Tapping B6.3
ATZAF 15-15 FF	6.63	-	6.67	9.35	-	-	-	7.07	7.99	-	-	7.44	11.30	0.12	Self-Tapping B8
ATZAF 18-18 FF	8.74	10.43	8.35	11.79	-	11.69	8.78	8.54	9.76	7.72	8.48	8.50	13.44	1.67	Self-Tapping B8
ATZAF 20-20 FF	8.15	-	-	15.75	-	10.63	-	-	-	10.63	-	-	11.02	-	M 10
ATZAF 22-22 FF	10.87	-	-	19.45	-	12.01	-	-	-	12.01	-	-	14.25	-	M 12
ATZAF 25-25 FF	12.91	-	-	22.32	-	13.39	-	-	-	13.39	-	-	16.97	-	M 12
ATZAF 28-28 FF	14.61	-	-	25.08	-	14.86	-	-	-	14.86	-	-	18.74	-	M 12
ATZAF 32-32 FF	-	-	-	-	-	16.63	-	-	-	16.63	-	-	-	-	M 12
ATZAF 36-36 FF	-	-	-	-	-	18.60	18.60	-	-	18.60	11.71	-	-	-	M 12
ATZAF 40-40 FF	-	-	-	-	-	20.67	20.67	-	-	20.67	12.76	-	-	-	M 12

8. Accessories

		Page
8.1. Spark proof execution	EX.....	46
8.2. Mounting Feet	F.....	46
8.3. Outlet flange	A.....	46
8.4. Flexible outlet connection	AEL.....	46
8.5. Drain plug	K.....	46
8.6. Inspection door	I.....	46
8.7. Outlet guard	AS.....	47
8.8. Inlet guard	ZS.....	47
8.9. Belt guard	RIS.....	47
8.10. Shaft guard	WES.....	47
8.11. Anti vibration mountings	DAG, DAM.....	47
8.12. Motor rails	SH.....	48
8.13. Motor base plate	SY.....	48
8.14. Standard baseframe	GR.....	48
8.15. Airflow measuring device	Cometer.....	48



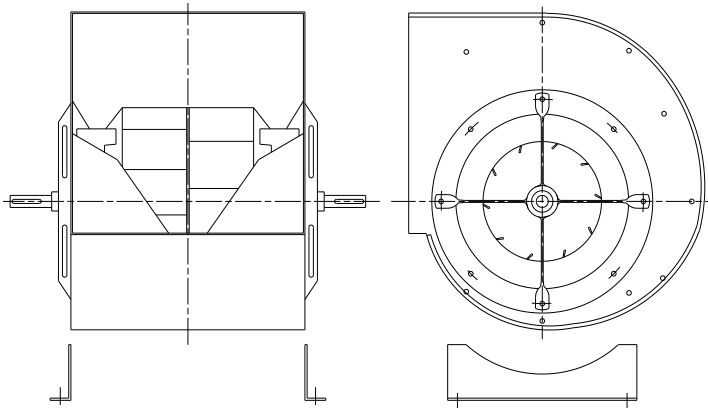
8.1. Spark resistant construction ..EX

Comefri 's ATZAF fans can also be supplied in a spark resistant construction that conforms to the requirements of AMCA 99-0401-86 (standard specification spark resistant construction).

8.2. Mounting Feet ..F

The basic ATZAF fans, 12-12 R up to 18-18 R are usually supplied with square frames, manufactured in galvanized steel sheet. However, on request, the frames can be removed and a pair of feet can be installed. This accessory is available up to and including size 18.

Note: Mounting feet effects the fan's rigidity, so please consider a maximum applicable RPM reduction of 20% on RPM limits data when feet are going to be used.

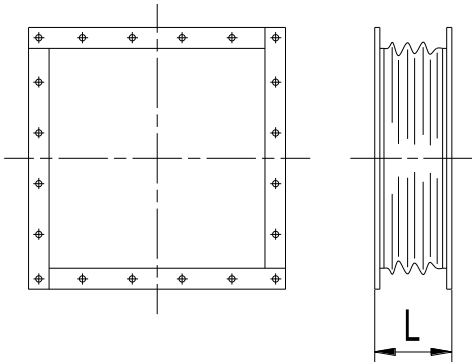


8.3. Outlet flange ..A

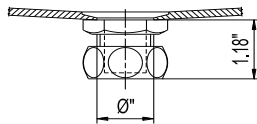
An outlet flange can be supplied separately or fitted at the customer 's request. Manufactured in galvanized steel, the dimensions and hole locations are given in the fan dimension ables. Sizes 44 and 49 include an integral outlet flange.

8.4. Flexible outlet connection ..AEL

The flexible connection for the outlet is manufactured from a polyester / PVC fabric and two matching flanges, made in galvanized steel sheet. The "L" dimension, for all fan sizes, is equal to 6.10". Special flexible connections can be manufactured on request.



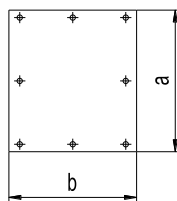
	\varnothing "
ATZAF 12 FF to 40 FF	1/2"
ATZAF 44 FF; ATZAF 49 FF	1"



8.5. Drain plug ..K

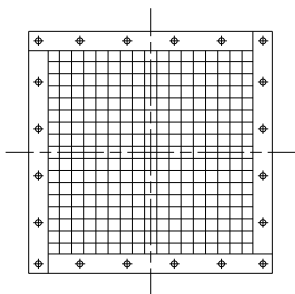
Usually fitted at the lowest part of the fan to facilitate draining of condensation.

	a	b
ATZAF 12 FF to 22 FF	8.66	9.45
ATZAF 25 FF to 40 FF	10.63	11.42
ATZAF 44 FF; ATZAF 49 FF	22.05	22.05

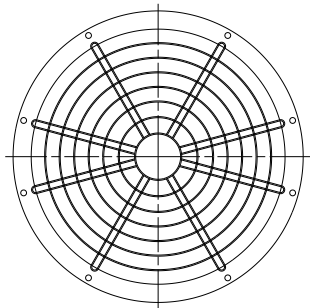


8.6. Inspection door ..I

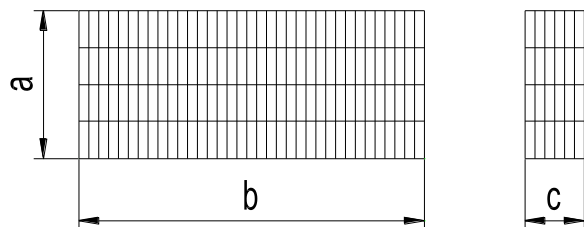
Can be fitted to the fan casing and made of a galvanized steel plate fixed by quick release fasteners. A synthetic gasket prevents leakage. Position of the inspection door must be clearly stated in the order.


8.7. Outlet guard ..AS

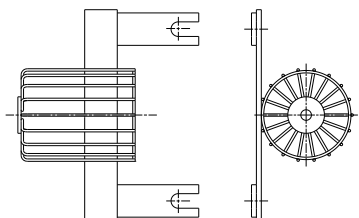
Industrial safety regulations specify that reliable guards must be provided for rotating machine elements. Inlet and outlet protections are available, in full accordance to EN 294 and OSHA requirements.


8.8. Inlet guard ..ZS

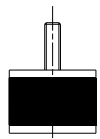
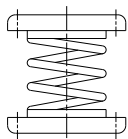
Industrial safety regulations specify that reliable guards must be provided for rotating machine elements. Inlet and outlet guards are available, according to EN 294 and OSHA requirements.


8.9. Belt guard ..RIS

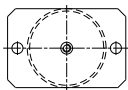
Belt guards are manufactured in a zinc coated steel wire mesh, in full accordance with EN 294 and OSHA requirements. Dimensions denoted with "a", "b" and "c" depend upon the corresponding sheave diameters and number of belts. Upon request, access for speed measurement can be provided.

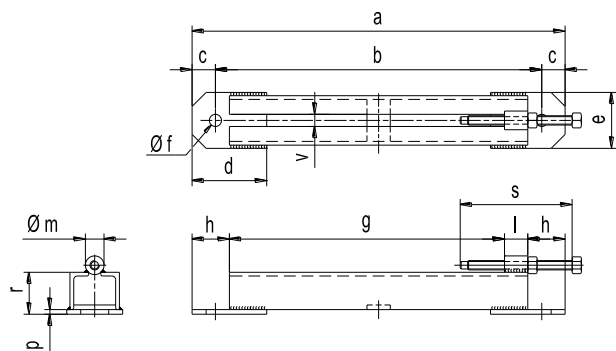

8.10. Shaft guard ..WES

A wire meshed shaft guard is available, for both R and T1/T2 versions.


8.11. Anti vibration mountings, rubber type ..DAG and Anti vibration mountings, spring type ..DAM

The anti-vibration mountings are normally delivered separately, together with the necessary bolts and nuts to fix the mountings to the base frames. They are selected taking into consideration the total weight of the fan, belt drive, motor and all the ordered accessories. On request, and to suit special applications, spring type mountings can be ordered and supplied.

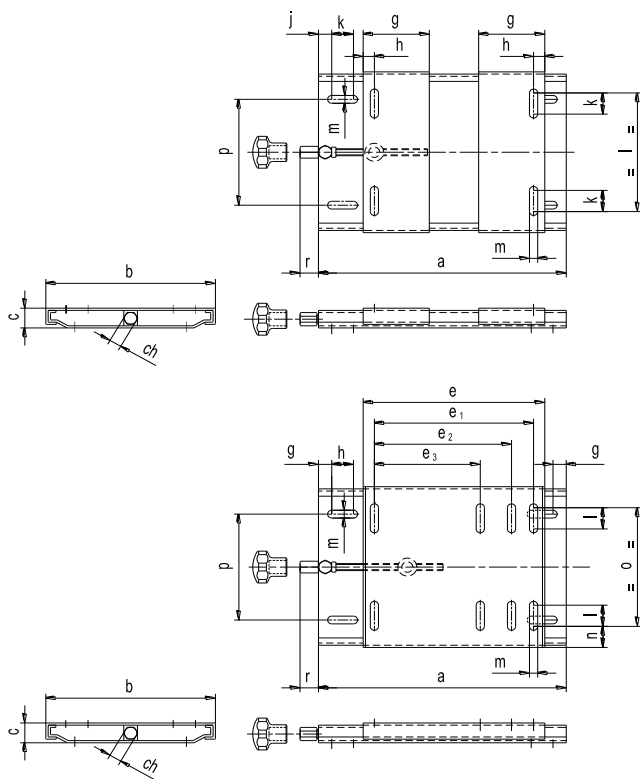

DAM
DAG


8.12. Motor base plate ..SY

Four sizes of motor rails are available, covering motor sizes from 254 to 505 included.

	motor sizes	a	b	c	d	e	Ø f	g
SH 2	254 to 256	21.26	12.29	0.98	3.15	2.76	0.51	17.13
SH 3	284 to 326	27.17	23.62	1.77	3.94	3.54	0.71	20.67
SH 4	364 to 405	32.68	29.13	1.77	4.33	3.54	0.87	25.79
SH 5	444 to 505	40.55	37.01	1.77	5.12	3.94	0.87	33.66

	motor sizes	h	l	Ø m	p	r	s	v
SH 2	254 to 256	1.57	0.98	0.79	0.20	1.77	4.72	0.79
SH 3	284 to 326	2.56	1.38	1.18	0.31	2.28	6.30	1.18
SH 4	364 to 405	2.56	1.77	1.57	0.31	2.28	7.87	1.18
SH 5	444 to 505	2.56	1.77	1.57	0.39	2.76	7.87	1.18


8.13. Motor base plate ..SY

Two size of base plates are available, for motor sizes from 56 to 215 included.

	motor sizes	a	b	c	g	h	k		
SY 1	56 to 145	10.63	7.68	1.30	2.76	0.79	1.97		

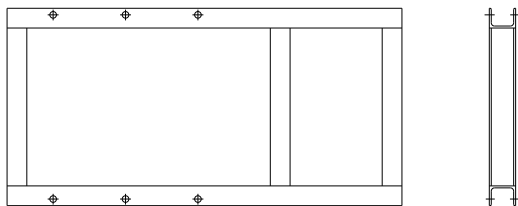
	motor sizes	j	l	m	p	r	ch.		
SY 1	56 to 145	0.98	1.69	0.41	3.86	1.18	0.75		

	motor sizes	a	b	c	e	e ₁	e ₂	e ₃	g
SY 2	182 to 215	13.39	11.42	1.57	11.26	8.50	7.48	6.30	1.10

	motor sizes	h	l	m	n	o	p	r	ch.
SY 2	182 to 215	2.48	1.87	0.49	1.48	8.46	6.50	1.18	0.87

8.14. Standard base frame ..GR

Made in carbon steel, welded "C" profile and painted. For dimensions see the relevant pages 42/43.


8.15. Airflow measuring device ..Cometer

A compact, precise and economic instrument to measure and control fan's airflow. Available in two versions: for immediate reading on a manometer or with a pressure transducer for further electronic control. Please refer to Cometer technical data sheet for further details.

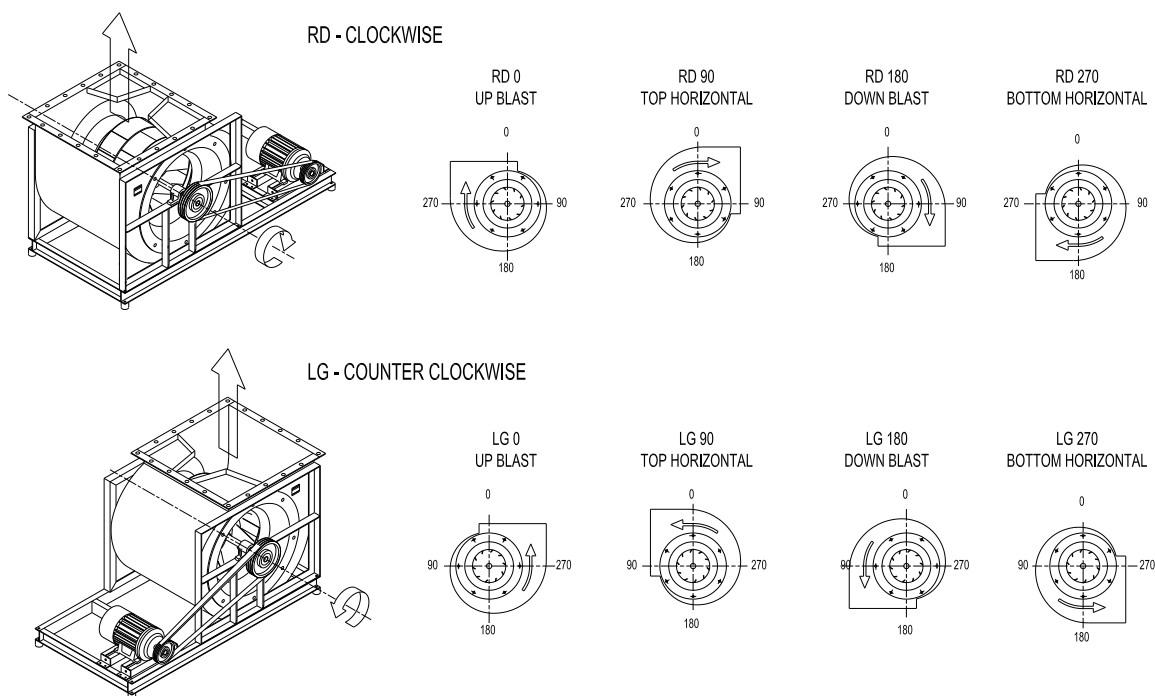
9. Rotation, discharge and accessories position

9.1. Rotation and discharge position

The fan direction of rotation, when seen from drive side is:

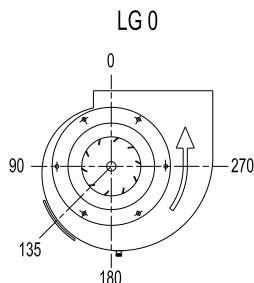
- clockwise, if indicated with the symbol RD, or
- counter-clockwise if indicated with the symbol LG

The fan discharge position is indicated firstly by the rotation symbol (RD or LG) and, secondly, by the angle with respect to the reference line perpendicular to the mounting surface (e.g. RD 90)



9.2. Accessory Positions

The position is indicated, gives the rotation RD or LG, by the angle measured in degrees, with respect to the reference perpendicular line to the mounting surface.



- 9.3. Example:** Fan LG 0
 Drain plug 180
 Inspection door 135



10. Reference code / example

ATZAF	40-40	FF	T2	A	RD90	GR, I225, K180, RIS, ZS
						Fan type
						Fan size
						Forefinger
						with T2 frame
						with A Outlet flange
						Discharge position RD 90
						Baseframe Inspection door 225, Drain plug 180, Belt guard, Inlet guard



A series of horizontal dotted lines spanning the width of the page, providing a template for technical drawing or notes.

Comefri SpA

Via Buja, 3
I-33010 Magnano in Riviera (UD)
Italy
Tel. +39-0432-798811
Fax +39-0432-783378
www.comefri.com
E-mail: info@comefri.com

Comefri GmbH

Landshuter Str.55
84030 Ergolding
Germany
Tel. +49-871-43070-0
Fax +49-871-43070-40
www.comefri.de
E-mail: info@comefri.de

Comefri France S.A.

10, Rue des Frères Lumière
69740 Genas
France
Tel. +33-4-72 79 03 80
Fax +33-4-78 90 69 73
www.comefri.com
E-mail: info@comefrifrance.fr

Comefri UK Ltd

Carters Lane, 8 Kiln Farm
Milton Keynes, MK11 3 ER
Great Britain
Tel. +44-1908-56 94 69
Fax +44-1908-56 75 66
www.comefri.com
E-mail: sales@comefri.co.uk

Comefri Nordisk ApS

Mileparken, 18
DK 2740 Skovlunde
Denmark
Tel. +45-44-92 76 00
Fax +45-44-92 55 33
www.comefri.com
E-mail: mail.dk@comefri.com

Comefri USA, Inc

330 Bill Bryan Boulevard
Hopkinsville, KY 42240
USA
Tel. +1-270-881-1444
Fax + 1-270-889-0309
www.comefriusa.com
E-mail: sales@comefriusa.com

