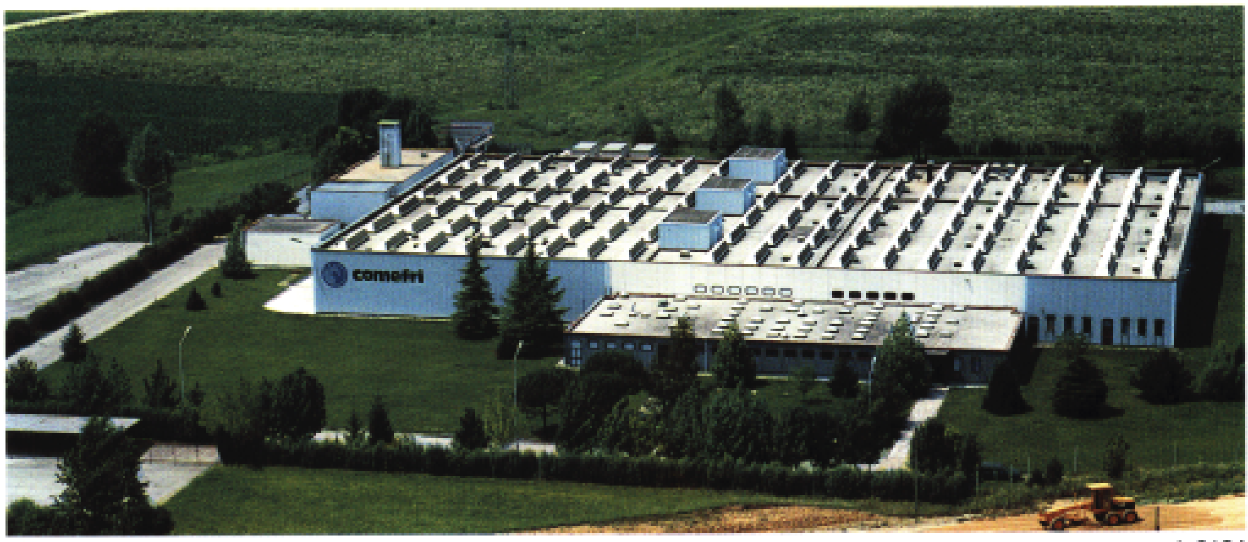
RADIAL FANS
SINGLE INLET

comefri

COMEFRI SpA's factory in Magnano in Riviera (UD), Italy with an 11.000 m² workshop where our radial fans for air-conditioning and general ventilation are manufactured.

In 1987 COMEFRI SpA was registered by BSI (British Standard Institution) in accordance to BS 5750 p. 1 as well as ISO 9001. The test laboratory has been accredited by the Italian Institute SINAL (Sistema Nazionale per l'Accreditamento di Laboratori) according to UNI EN 45000. It has also been approved by TÜV Bayern E.V.

COMEFRI SpA's factory in Artegna (UD), Italy with a 6.300 m² workshop where our industrial and special execution fans are manufactured. Our testing facilities and fan laboratory are also found at this location.



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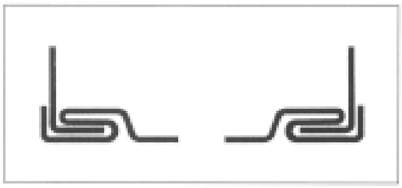
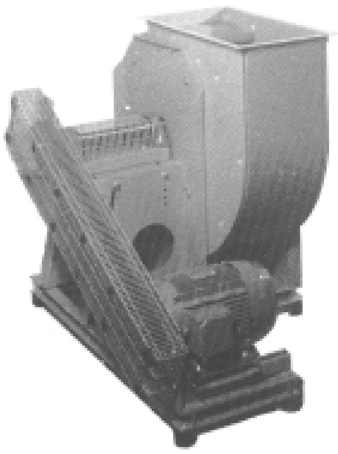
1. GENERAL DESCRIPTION



Scroll and side plates, assembled with Pittsburg seam.

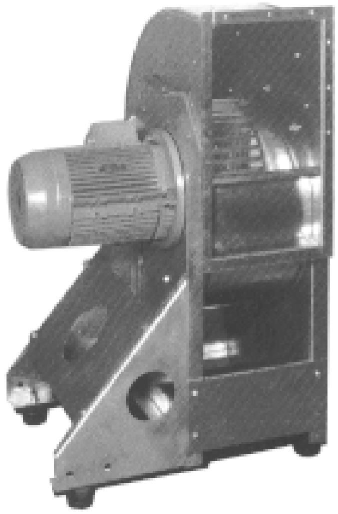
All single inlet radial fans have this common construction characteristics:
- Compact design
- High efficiency
- Economic exercise
- High quality execution
- Interchangeability between TLE and THLE series
- Sizes according to DIN 323-R20 norm
- Application flexibility
- Low noise and quiet running
- Wide temperature operation range from -30°C to +80°C (For special execution up to 400°C)

Fan housing, motor support and baseframe are in galvanized steel execution



THLE-LK execution

The executions MK, LK, MF, RMF and RMFV are standard equipped with outlet flange according to DIN 24 159 pages 2 and 3



TLE-MF execution

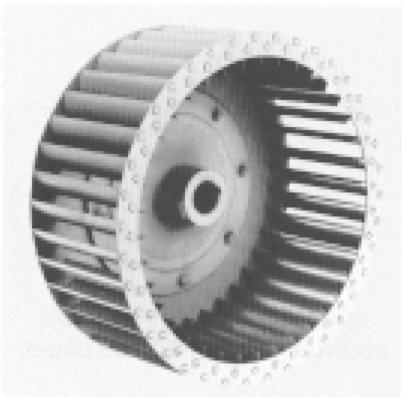
Basically all housing are built with galvanized steel sheets; scroll and sideplated are joined together with a Pittsburgh seam system. (On client's request the housing can be made, in addition, continuously welded on the internal side.)

These four layers of steel act as a reinforcement ring on housing borders.
Feet and frames can be easily fixed on fan sides with screws via annealed threaded bolts execution.

THLE with feet

Inlet cones have a correct airstreamed profile and allow a optimized wheel feeding.
In THLE and TLE series the inlet cones are built as separate pieces, in galvanized steel, and fixed to the sideplates with screws.

Shafts, built with h7 tolerances, have keys and keyseats according to DIN 6885 - page 1;
All shafts are shipped with a protective paint against rust.



FC impeller

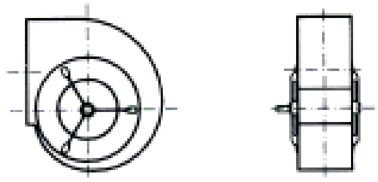
The wheel size serie is according to DIN 323 - R20 (normalized series number). All wheel are statically and dynamically balanced on special balancing machines according to grade Q = 6,3 - ISO 1940 - (on Client's request the balancing certificates are given and / or the balancing can be executed according to different balance grades).
TLE impellers are built in galvanized steel sheet, those of THLE series in welded and coated steel.
(on request, galvanized and up to 450 diameter in PLV reinforced plastic material).

Hubs of both series are in aluminium up to 710 size, and in welded steel for 800 up to 1000 sizes.

BC impeller

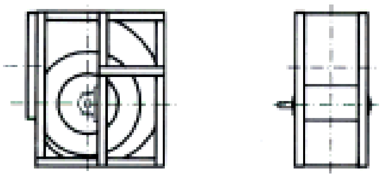
Ball bearing are maintenance free and with rubber lip sealing are locked to the shaft with an eccentric collar; between the ball bearing and the supporting bracket a shock absorbing rubber ring is inserted for vibration and noise reduction.
Theorical life L10 of the bearings is at least equal to 20.000 hours at maximum performance.
From sizes 710 up, cast iron support bearings are supplied as standard.

2. SERIES DESCRIPTION



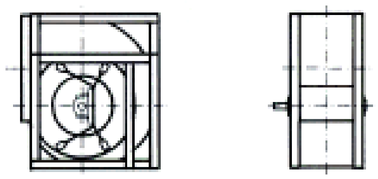
Comefri single inlet radial fans can be divided into the following series and executions:

2.1. **TLE 200 - 710 TLE 200 - 710 F TLE 200 - 710 R**
Single inlet forward curved blades for belt drive applications.
Ball bearings on both sides of the housing (Setting 0)
THLE 200 - 710 THLE 200 - 710 R THLE 200 - 710 R
As above, but with backward curved blades



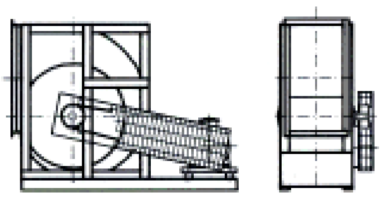
2.2. **TLE 200 - 1000 T**
Single inlet forward curved blades for belt drive applications.
Ball bearings on both sides on separate frame (Setting 0)

THLE 200 - 1000 T
As above, but with backward curved blades



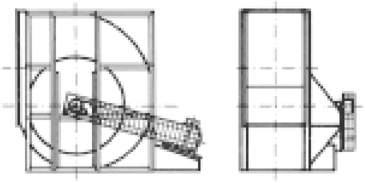
2.3. **TLE 200 - 1000 TG**
Single inlet forward curved blades for belt drive applications
Ball bearings on both sides on separate special frame for direct connection to inlet duct (Setting 0)

THLE 200 - 1000 TG
As above, but with backward curved blades

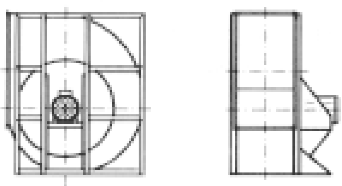


2.4. **TLE 200 - 1000 T-GR TLE 200 - 1000 TG-GR**
Single inlet forward curved blades with belt drive.
Ball bearings on both sides on separate frame - fan and motor on a common baseframe (Setting 11)

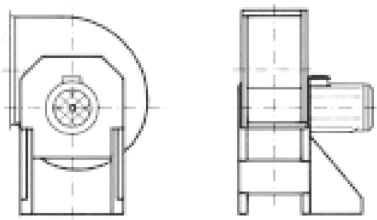
THLE 200 - 1000 TGR TLE 200 - 1000 TG-GR
As above, but with backward curved blades



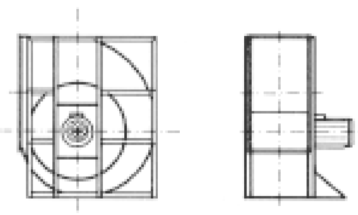
2.5. **TLE 315 ÷ 1000 LK**
Single inlet forward curved blades - impeller overhung on fan shaft - Ball bearings on one side for belt drive - up to 630 size fan and motor on common baseframe from 710 size with separate baseframe (Setting 12-12b and 1)
TLE 315 ÷ 1000 LK
As above, but with backward curved blades



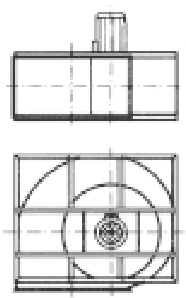
2.6. **TLE 315 ÷ 630 MK**
Single inlet forward curved blades - impeller on motor shaft - motor on a support
(Setting 4)
THLE 315 ÷ 1000 MK
As above, but with backward curved blades



2.7. **TLE 315 ÷ 630 MF**
Single inlet forward curved blades - impeller on motor shaft - motor flanged on fan sideplate - fan and motor support - motor fixing flange with 45° degree stepped position
(Setting 5)
THLE 315 ÷ 630 MF
As above, but with backward curved blades

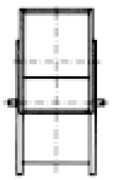


2.8. **TLE 200 ÷ 630 RMF**
Single inlet forward curved blades - impeller on motor shaft - motor flanged on fan sideplate - additional side frame that can be rotated 90° (Setting 5)
THLE 200 ÷ 1000 RMF
As above, but with backward curved blades

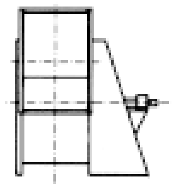


2.9. **TLE 200 ÷ 630 RMFV**
Single inlet forward curved blades - impeller on motor shaft motor flanged on fan sideplate - additional side frame - adequate for vertical motor shaft installation (Setting 5 V)
THLE 200 ÷ 1000 RMFV
As above, but with backward curved blades

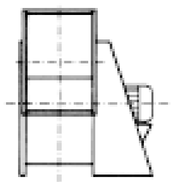
3. DESIGN EXECUTION AND SETTINGS



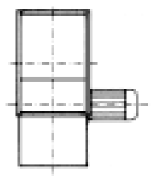
Setting 0 (corresponding to F - R - T - TG)
Single inlet - belt or through flexible coupling drive - one bearing on each side of the impeller and supported by fan housing

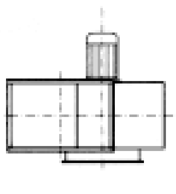


Setting 1 (corresponding to LK)
Single inlet - belt or coupling drive - impeller overhung on fan shaft - bearing supports with single bearing or mono-block bearing

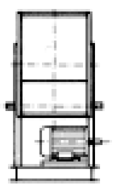


Setting 4 (corresponding to MK)
Single inlet - direct drive - impeller on motor shaft - motor on bearing support

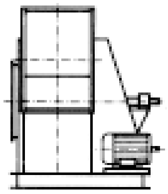


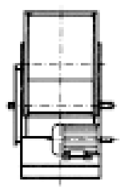


Setting 5 and 5V (corresponding to MF - RMF and RMFV)
Single inlet - direct drive - impeller on motor shaft - flanged motor on the fan housing



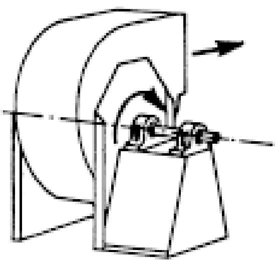
Setting 11 (corresponding to T - TG with baseframe)
Single inlet - belt drive - one bearing on each side of the impeller and supported by fan housing - fan and motor on common baseframe. Drive layout W or Z



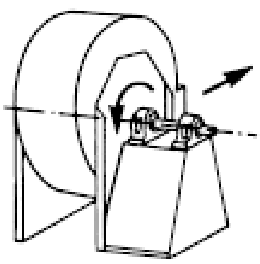


Setting 12 and 12B (corresponding to LK with baseframe)
Single inlet - belt drive - impeller overhung on motor shaft - fan and motor on a common base frame. Drive layout W or Z

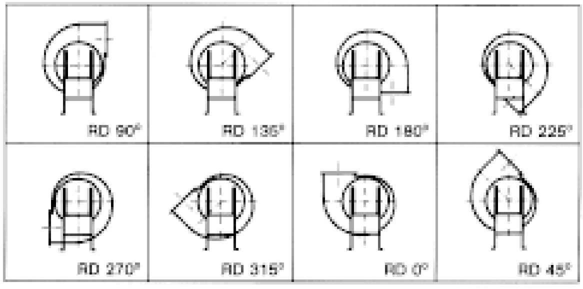
4. ROTATION, DISCHARGE POSITION AND ACCESSORIES POSITION

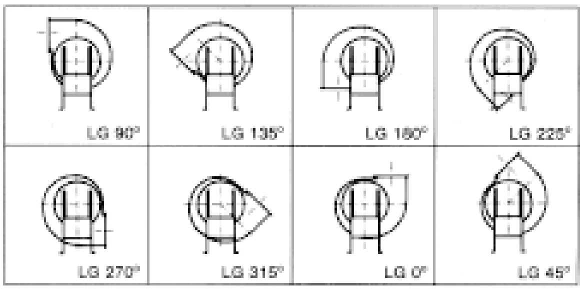


a) Clockwise



b) Counter clockwise

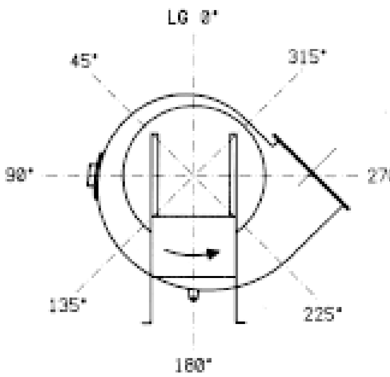




Rotation and Discharge Position

The rotation of the fan from the drive side is a) clockwise if indicated with the symbol RD or b) counter-clockwise if indicated with the symbol LG.

The radial fan's discharge position is determined by the outlet position. This is indicated firstly, by the rotation symbol (RD or LG) and secondly, by the angle with respect to the line of reference perpendicular to the mounting surface (eg. RD 90°).

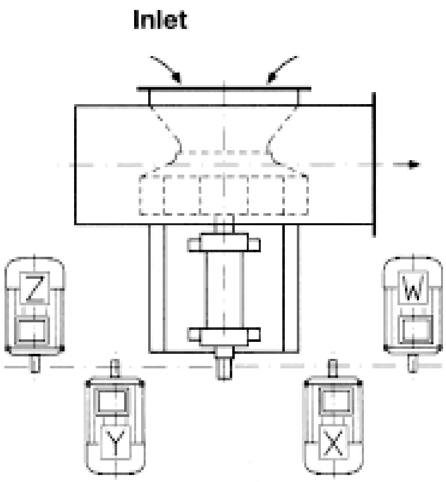


Accessories Position

The position, for example, of an inlet box, an inspection door, or other accessories are indicated by the rotation symbol RD or LG and by the angle measured in degrees, with respect to the line of reference perpendicular to the mounting surface and the position of each respective accessory.

Example: Fan LG 315°
Drain plug 180°
Inspection door 90°

5. DRIVE LAYOUT



The layout of the motor, indicated by the symbols W, X, Y, Z is seen perpendicular to the mounting surface of the fan. In standard execution the motor can be mounted in layout W or Z.

6. MAXIMUM ALLOWABLE MOTOR SIZES FOR SETTINGS 4 - MOTOR SELECTION

Maximum allowable motor size

Fan size	Setting 4 - max. motor size
315	112
355-400-450	132
500-560-630	160
710-800-900	200

With the selection of the motor, it must be verified whether the time required to accelerate the mass from a stationary position remains within the allowable tolerances specified by the motor manufacturer.

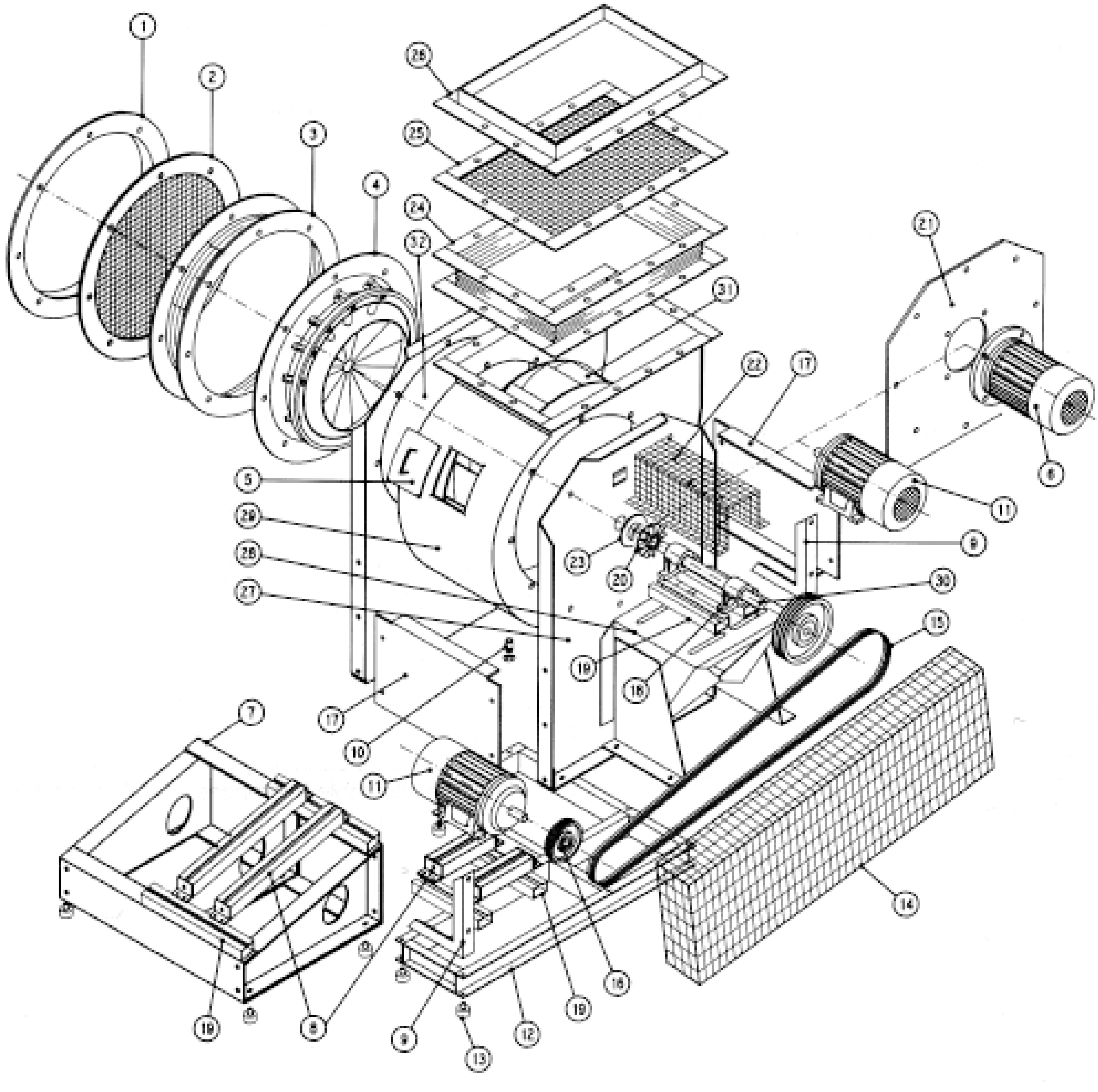
The acceleration time "ta" can be approximated using the following formula:

$$t_a = 0.8 \frac{J \cdot n^2}{P_M} \cdot 10^{-5} \text{ [s]}$$

J [kgm²] - moment of inertia
n [min⁻¹] - nominal fan speed
PM [kW] - motor power

In the event that "ta" exceeds the maximum allowable start-up indicated by the motor manufacturer, i.e. the maximum start-up exceeds the release time for the motor protection switch, a more powerful motor must be used. The protection switch should be calculated for heavy-duty start-ups.

7. LABELLING OF FAN COMPONENTS



1 Inlet flange
2 Inlet guard
3 Inlet flexible connection
4 Inlet vane control
5 Inspection door
6 Motor - B5 execution
7 Motor support
8 Motor rails
9 Support
10 Drain plug
11 Motor - B3 execution
12 Common base frame
13 Anti-vibration mounts (spring or rubber)
14 Belt guard
15 Belt
16 Pulley
17 Sideplate
18 Bearing
19 Bearing support rail
20 Cooling wheel
21 Flange for B5 motor
22 Shaft guard
23 Shaft seal
24 Outlet flexible connection
25 Outlet guard
26 Outlet flange
27 Frame
28 Motor or Bearing support
39 Fan housing
30 Shaft
31 Impeller
32 Inlet cone

8. SPARK PROTECTION

Fan operation in areas with combustible gases, vapours or with a possible danger of explosion must adhere to the explosion-proof guidelines (EX-RL9) specified by the Association of Chemical Industries.

According to the likelihood of the occurrence of an explosion, the degree of danger is divided into three different categories, namely: zone 0, 1 and 2:

Zone	Danger of explosion	Possible explosion sources to be avoided
0	Continuously or for a long period of time	Even in case of infrequent operation interference
1	Sometimes	2 Seldom or for a short period of time
2	Even in case of operating interferences	occurring more frequently during normal operation

Possible explosion sources from a standard fan which must be taken into consideration are as follows:

– a hot surface, due to, for example, the gripping of a bearing or an impeller.
– friction- grinding or impact sparks due to, for example, the contact of the impeller with stationary fan components
– sparks as a result of an electrostatic discharge from non-conducting components (eg. plastic surfaces)

In **Zone 2** there are no special fan explosion precautions. VDE 0165 applies for the motor and control elements.

In **Zone 1** (ignition group G1-G3, with respect to explosion class 1 and 2) fan operation is possible under the following conditions:

1) The combination of the air coming into contact with the fan's construction materials must not be inflammable. To avoid spark formation the following material pairings must be considered:

a) steel or cast-iron, combined with bronze, brass or copper;
b) stainless steel combined with stainless steel;

Material pairing with light metal or light metal coatings are not suitable.

2) The bearing's life-span should amount to a minimum of 40 000 hours of operation.

3) The critical fan shaft speed should exceed the operation speed by a minimum of 30%.

4) The fan shaft may only be horizontally installed.

5) The maximum permissible fan speed must be reduced by 20 %.

6) The allowable shaft power for certain pulley diameters must be reduced by 30%.

7) The belt must be an electrostatic conductor and at least 3 belts must be applied.

8) To prevent foreign elements from falling into the fan's inlet, guards should protect the fan according to safety regulations.

In **Zone 0** fan operation is not permitted.

Fans operating in an area threatened by the danger of an explosion are the manufacturer's and user's responsibility to comply to the Ex-RL. This regulation is justifiable since according to the Ex-RL, the effectiveness of a fan operation must be inspected by experts . This entails both an inspection of the minimum required volume as well as adherence to design demands.

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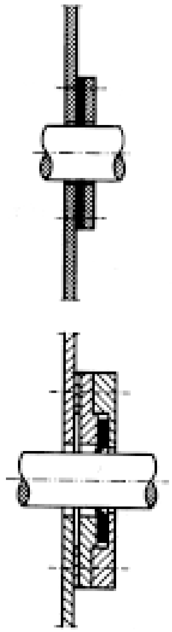
9. SHAFT SEAL



Considering that industrial fans operate mostly in areas where harmful gases or steam are present, their adequate sealing prevents the escape of such gases.

A. Simple Seal

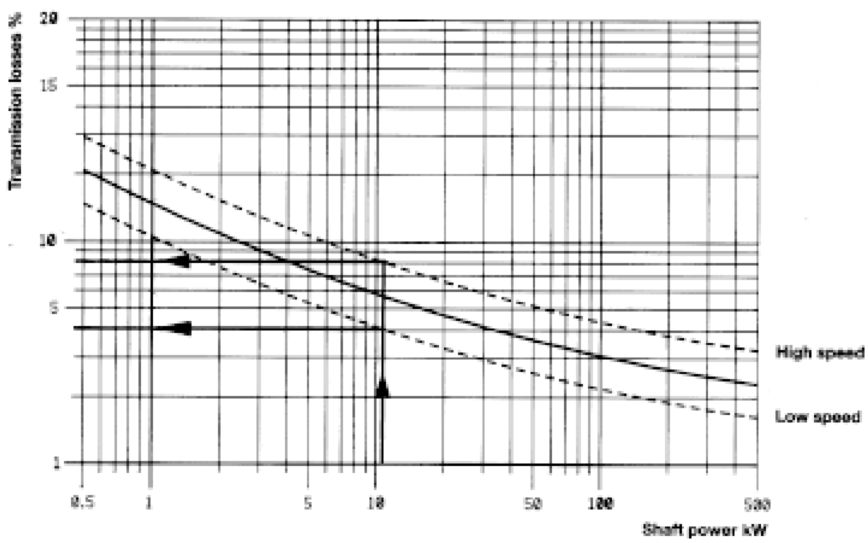
This seal is constituted of a disc made from low friction materials which seals the housing with respect to the shaft and is fixed on the fan housing.

B. Rubber Seal

This seal is constituted of a rubber ring which seals the housing with respect to the shaft and is fixed in the fan housing. Between the shaft and the housing possible tolerances can thereby be balanced . The maximum operating temperature is 200° C.

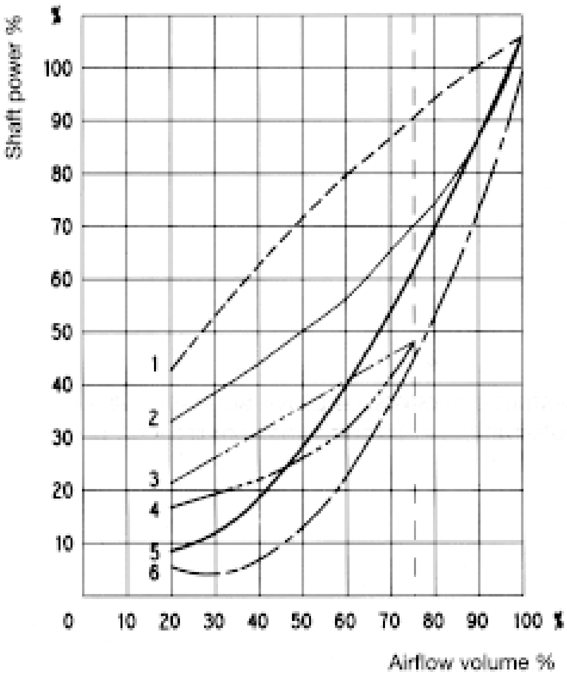
10. TRANSMISSION LOSSES

The absorbed fan power at the shaft shown in the performance diagram does not take transmission losses into consideration. Therefore, the transmission losses indicated in the diagram below must be added (in accordance with AMCA).



Example: Pw = 12 kW + transmission losses according to the above diagram are between 4% and 8% corresponding to the fan speed.

11. INLET VANE CONTROL



Power absorption with different airflow control systems:

1. Throttle control

2. Inlet vane control

3. Throttle control with multi-pole motor

4. Inlet vane control with multi-pole motor

5. Hydraulic coupling control

6. Fan power at the shaft

The efficiency of a control device also depends upon the energy consumption of the selected system. Lower air flow mainly leads to lower energy consumption. The different control systems are distinguished from one another by the level of energy consumption. An important deciding feature, with respect to the choice of a control system, vis-à-vis energy costs, is the air flow quantity.

1) If the air flow quantity accounts for only 85% to 90% of the maximum volume, a simple throttle control, according to the operation duration of the reduced airflow can be a very economical solution.

2) If the air flow quantity accounts for up to 70% of the maximum air flow, the inlet vane control indicates a power absorption very close to the motor speed control .
For an airflow quantity under 60% of maximum airflow, two stage operation motors are recommended. In this way, a good adaptation to the power absorption on the motor speed control can be achieved. Given that the power absorption of a fan is proportional to the number cubed number of revolutions, the performance developments can be monitored in the best way by using a motor speed control.

3) If continuos volume control is required, the fan operating system can be adjusted in order to adapt the fan to the different possible operating conditions by using an inlet vane control type DRE. Therefore, the following advantages can be realized:
- continuous air flow control yielding considerable electrical power savings
- decreased air resistance achieved through normal throttle control
- space savings

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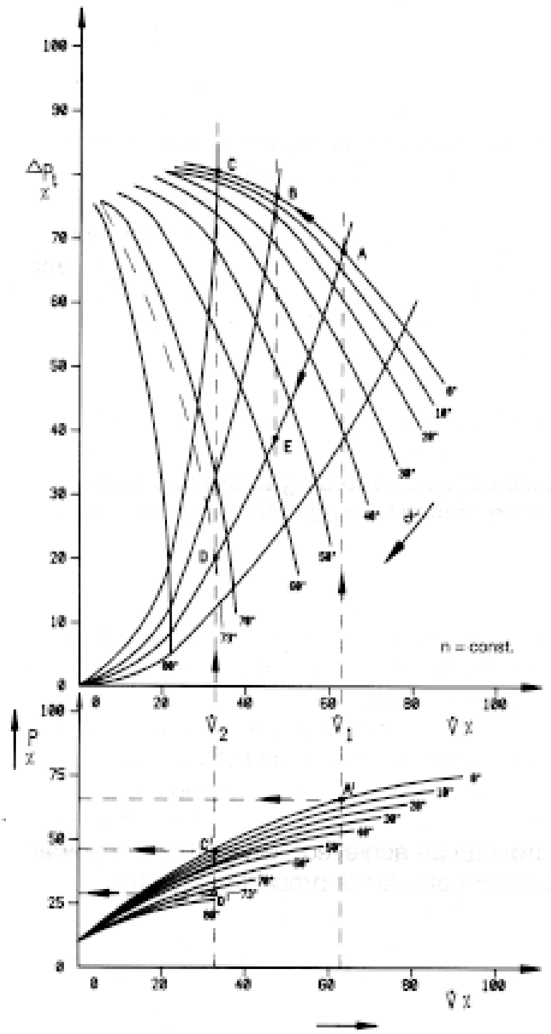


Airflow regulation by the inlet vane control occurs through the closing or opening of a series of fan blades assembled radially in or before the fan inlet.

The blades can be rotated 90° and a continuous regulation of the airflow can be controlled from an "entirely open" (0°) to an "entirely closed" (90°) position. This allows for performance adjustments to be made.
The operation point where volume and pressure are specified moves along the plant resistance curve.
Less air flow results in less absorbed shaft power. The drive of the entire adjustable system can either be provided in manual or automatic, i.e. through linear or rotating drive, which operates either electrically, hydraulically or pneumatically.
Through the installation of I.V.C. there is a slight increase both in the number of revolutions as well as in the absorbed shaft power in order to achieve nominal performance. I.V.C. installation also results in a slight increase in the noise level.

We can compare the efficiency of a outlet damper and a I.V.C..
Starting from a airflow volume V1 to a volume V2, with the outlet damper we shall move from A to C (on the 0° curve); with I.V.C. from A to D , through E.The difference in power between points C' and D' on the power diagram is approximately 33%.

12. SOUND DATA

General

The formulae signs and SIunits used in this catalogue correspond to the standards DIN 1301, DIN 1345, DIN 5492, DIN 45635 and to the EuroventRecommendations 0/1 and 1/1.

Standard operating conditions for the fan performance curves:
ρ air = 1.2 kg/m³ (at 1013 mbar and 293 K (= 20°C))

Sound Levels

The measurement of noise levels are taken according to DIN 45635 and DIN 45633. For this purpose a harmonic analyzer type 2107 and HerzOctave Band Filter type 1615 of Messrs. Bruel + Kjaer are used. These precision measuring instruments comply with DIN 45633. The sound power level Lw, referred to Wo=1012 watt, required for calculation and design of sound absorbing units is marked in the performance curves.

Key to Formula Symbols:

L_W	Total Sound Power Level in the outlet duct	[dB]
L_W^*	Sound Power Level at a specific Octave Band MidFrequency	[dB]
L_{WA}^*	Sound Power Level (weighted)	[dB (A)]
L_{WS}^*	Sound Power Level with free inlet and ducted outlet	[dB]
L_P^*	Sound Pressure Level at a specific Octave Band MidFrequency	[dB]
L_{PA}	Sound Pressure Level (weighted)	[dB(A)]
f_m	Octave Band MidFrequency	[Hz]
ΔL	Difference between the total Sound Power Level L_W and the non weighted Sound Pressure Level L_P	[dB]
ΔL_{WO}	Difference between the total Sound Power Level L_W and the measured value at the corresponding Octave Band MidFrequency	[dB]
ΔL_{WOS}	Difference between the total Sound Power Level L_W and to the weighted Sound Pressure Level LPA	[dB]
ΔL_{PO}	The value of the pressure level L^P can be obtained subtracting this attenuation value from the total Sound Power Level L_W	[dB]

The Sound Data of the fans is determined as follows:

1. The total Sound Power Level Lw can be ascertained from the Performance Curves.

2. The Sound Power Level Lw* at a specific Octave Band MidFrequencies is determined from following equation:
   $L_W^* = L_W - \Delta L_{WO}$
   The values for ΔL_{WO} are given in Table 1.

3. The Sound Power Level Lws* at a specific Octave Band Mid-frequency can be calculated using the following equation:
   $L_{WS}^* = L_W - \Delta L_{WOS}$
   The difference ΔL_{WOS} is also tabulated in Table 1.

Table 1:

Octave Band MidFrequency	63	125	250	500	1000	2000	4000	8000
ΔL_{wo} [dB] for TLE 200-1000	4	7	9	12	13	16	22	27
ΔL_{wo} [dB] for THLE 200-1000	7	6	7	9	11	16	22	28
ΔL_{wos} [dB] for TLE 200-630	5	8	10	12	13	16	22	27
ΔL_{wos} [dB] for THLE 200-630	9	8	9	9	11	17	22	28
ΔL_{wos} [dB] for TLE 710-1000	4	8	9	12	13	16	22	27
ΔL_{wos} [dB] for THLE 710-1000	8	7	8	9	11	17	22	28

4. The weighted Sound Power Level values LwA can be obtained from the following:
$L_{WA} = L_W$ - 8,5 dB for TLE version
$L_{WA} = L_W$ - 7,5 dB for THLE version

5. The non weighted Sound Pressure Level Lp of for all fan sizes at various measuring distances is obtained from the following equation:

$L_P = L_W - \Delta L_{PO}$
The values for ΔL_{PO} are given in Table 2.

Table 2:

Distance from the fan	1,5 m	3 m	10 m	20 m	50 m
ΔL_{po} [dB] in free field-ducted outlet and floor mounted	12	18	28	34	42
ΔL_{po} [dB] in industrial environment-ducted outlet and floor mounted	12	15	24	27	32

6. The Sound Pressure Level Lp* at the different Octave Band MidFrequencies is obtained from the following equation:
$L_P^* = L_P - \Delta L_{WOS}$
The values for ΔL_{WOS} are given in Table 1.

7. The weighted Sound Pressure Level Lp [dB (A)] can be obtained from the following:
$L_{PA} = L_P$ - 8,5 dB for TLE version
$L_{WA} = L_P$ - 7,5 dB for THLE version

8. Example: Using the data in the diagram at page 18: Fan THLE 630 with a L_W = 89 dB

Octave Band MidFrequency	63	125	250	500	1000	2000	4000	8000
L_w [dB]	89	89	89	89	89	89	89	89
ΔL_{wo} [dB]	7	6	7	9	11	16	22	28
L_w^* [dB]	80	81	80	80	78	72	67	61

The Sound Power Level with free inlet and ducted outlet L_{WS}^* can be calculated:

Octave Band MidFrequency	63	125	250	500	1000	2000	4000	8000
L_w [dB]	89	89	89	89	89	89	89	89
ΔL_{wos} [dB]	9	8	9	9	11	17	22	28
L_{ws}^* [dB]	80	81	80	80	78	72	67	61

For the weighted Sound Power Level L_{WA} - pressure side - we have the following:
L_{WA} = 89 - 8,5 = 80, 5 [dB (A)]
For the non-weighted Sound Pressure Level L_P - at 3 meters distance - with ducted outlet and floor mounted - we have:
L_P = 89 - 18 = 71 [dB]
For the non-weighted Sound Pressure Level L_P - at 3 meters distance - with ducted outlet and floor mounted - for each Octave band Mid-Frequencies we have:

Octave Band MidFrequency	63	125	250	500	1000	2000	4000	8000
L_w [dB]	89	89	89	89	89	89	89	89
ΔL_{po} [dB]	18	18	18	18	18	18	18	18
L_{wos} [dB]	9	8	9	9	11	17	22	28
L_{ws}^* [dB]	62	63	62	62	60	54	49	43

13. TEMPERATURE CORRECTION FACTORS

The performance diagrams refer to airflow with a specific mass of ρ =1,2 kg/m^3 and at 20°C as well as 760 mm Hg.
Therefore, in different operating conditions the required performance data must be corrected by multiplying by a correction factor of "k" before selecting a fan from the performance diagram.
One can obtain the actual absorbed shaft power by dividing the diagram data by a factor of "k".

Correction factor "K"

meters above sea level	Temperature (°C)													
	-40	-20	0	+20	+40	+60	+80	+100	+150	+200	+250	+300	+350	+400
0	0,79	0,86	0,93	1,00	1,07	1,14	1,20	1,27	1,44	1,61	1,78	1,95	2,13	2,30
250	0,81	0,88	0,95	1,02	1,09	1,16	1,23	1,30	1,48	1,65	1,83	2,00	2,18	2,35
500	0,83	0,91	098	1,05	1,12	1,19	1,27	1,34	1,52	1,70	1,58	2,05	2,23	2,41
750	0,85	0,93	1,00	1,08	1,15	1,22	1,30	1,37	1,56	1,74	1,92	2,11	2,30	2,46
1.000	0,88	0,95	1,03	1,11	1,18	1,26	1,33	1,41	1,60	1,79	1,98	2,17	2,35	2,54
1.500	0,93	1,01	1,09	1,17	1,25	1,33	1,41	1,49	1,69	1,89	2,09	2,29	2,49	2,69
2.000	0,99	1,07	1,16	1,24	1,32	1,41	1,49	1,58	1,79	2,00	2,21	2,42	2,64	2,85

Example:
At 100° C and 500 m above sea level (locate the adjustment factor of k=1,34 from the above table) using the results in the fan selection example on page 18, the following changed performance data would be obtained:

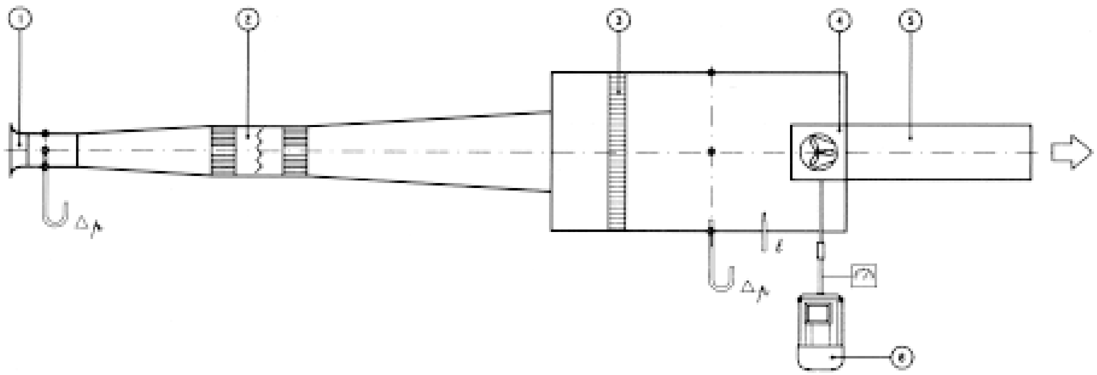
Airflow:	2,4 m^3/s
Total pressure:	800 Pa
Fan speed:	1200 min^{-1}
Absorbed shaft power:	1.71 kW
Total efficiency:	83 %
Outlet velocity:	7,4 m/s
Dynamic pressure (ducted outlet)	25 Pa
Dynamic pressure (free outlet)	45 Pa

14. TEST LABORATORY

Fan performance data indicated on the diagrams have been determined by the company's own test laboratory which adheres to internationally established guidelines DIN 24163, BSI 848 and AMCA. Operating conditions that were used to determine the fan characteristic curves are:

ρ air flow = 1,2 kg/m³ at 1013 mbar and 20°C. For the performance data, the tolerances for class 2 must be taken into consideration. Upon request, class 1 can be provided.

The performance data is valid for an uninterrupted flow towards and away from the medium, i.e. straight connection.
With irregular flows towards and away, significant differences may appear in the performance data.



1. Normalized inlet
2. Adjustable damper
3. Flow straightener
4. Fan
5. Duct
6. Motor

N.B. Dynamic pressure Pd of the TLE / THLE series indicated on the performance diagram refers to a "ducted fan". The "free", non-ducted fan value is obtained as follows:
pd free = pd ducted x 1,8

The "absorbed shaft power" indicated on the performance diagram does not account for transmission losses which must be added for each diagram (see page 11).

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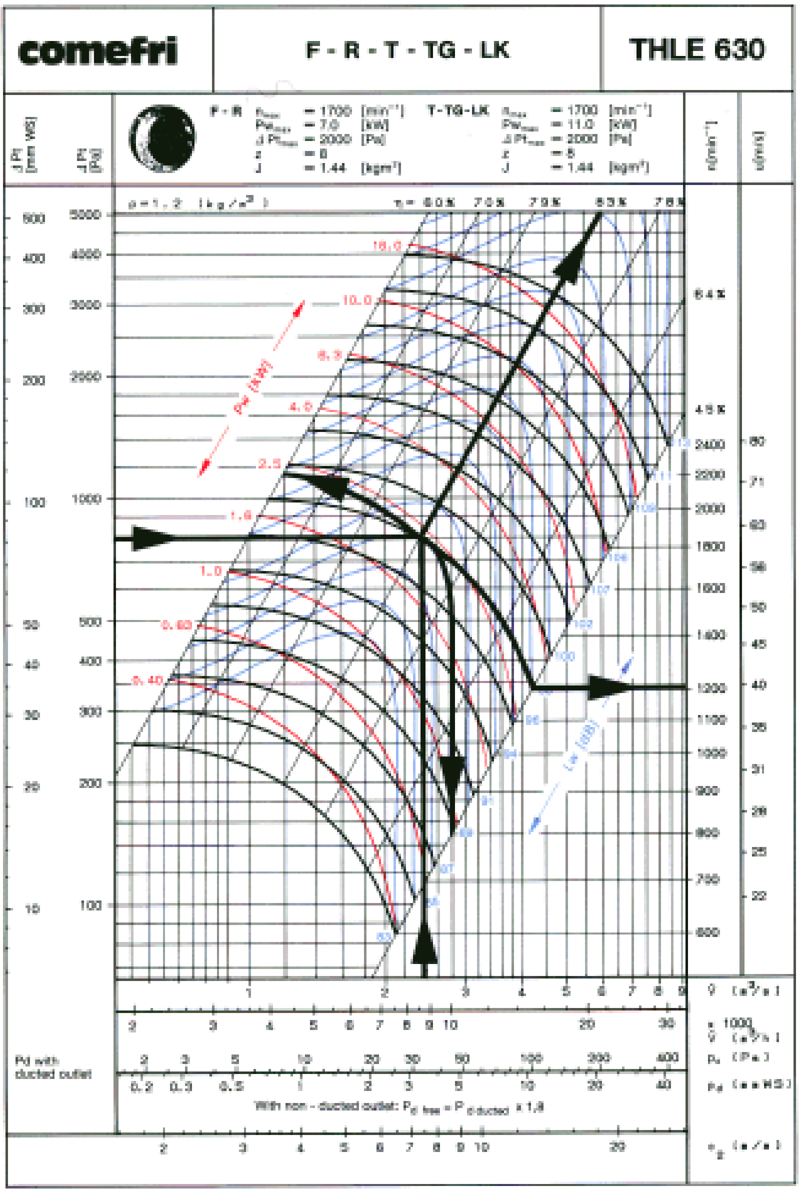
15. SELECTION OF A SINGLE INLET FAN THLE WITH TRANSMISSION



Required:

Volume flow	V = 2,4 m³/s
Total pressure	Δ pt = 800 Pa
Air density	ρ = 1,2 kg/m³
Air temperature	t = 20°C

Fan speed	n = 1200 min⁻¹
Peripherical speed	u = 39 m/s
Dynamic pressure ducted outlet	P_{dk} = 33 Pa
Dynamic pressure free outlet	= 59 Pa
Outlet velocity	= 7,4 m/s
Efficiency	e = 83 %
Absorbed power	Pw = 2,3 kW
Motor rating	= 2,6 kW
Sound power level	Lw = 89 dB

Chosen: single inlet THLE 630, belt driven.

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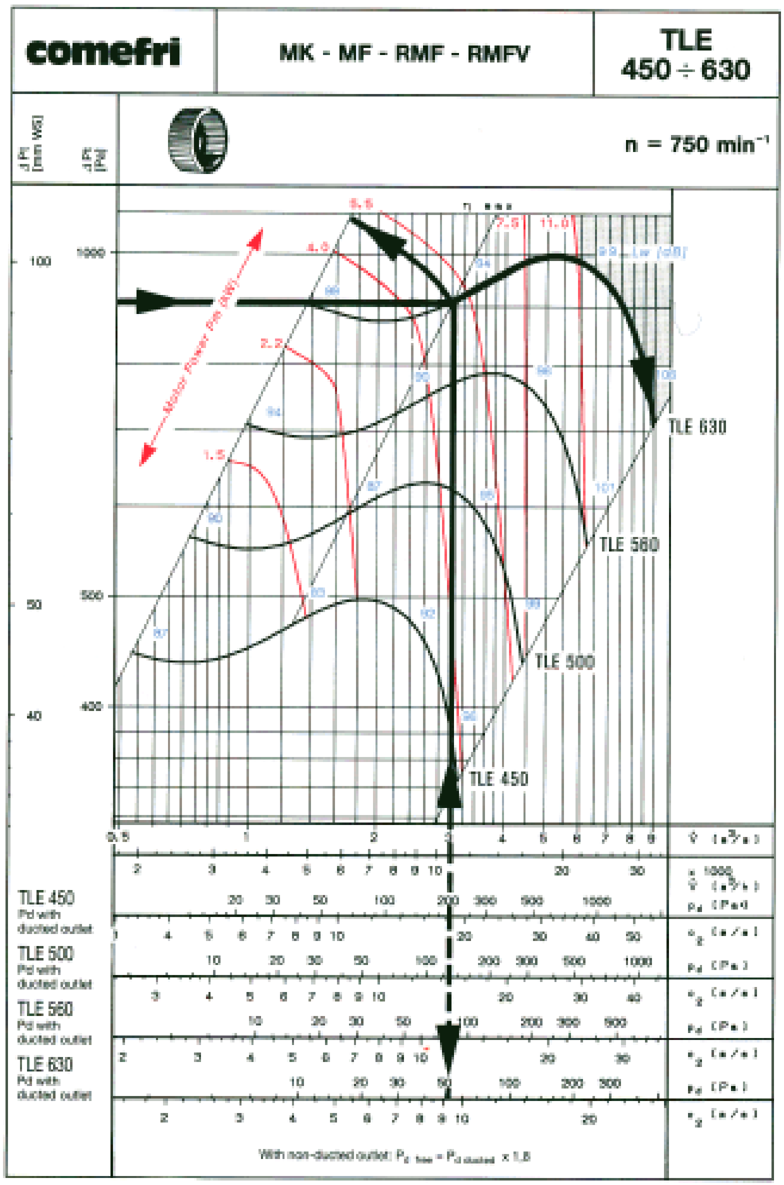
16. SELECTION OF A SINGLE INLET TLE, DIRECT DRIVEN



Gray zone: special execution

Required:	
Volume flow	V = 3 m³/s
Total pressure	Δ pt = 900 Pa
Air density	ρ = 1,2 kg/m³
Air temperature	t = 20°C

Fan speed	n = 750 min⁻¹
Dynamic pressure, ducted outlet	P_{dk} = 52 Pa
Dynamic pressure, free outlet	= 93 Pa
Outlet velocity	= 9,3 m/s
Motor ratius	P_m = 5,5 kW
Sound power level	Lw = 94 dB

17. ORDER EXAMPLE

Radial fan, single inlet, THLE 355 LK - LG90° - Sist.12

Section by section, this translates into:

THLE:	Radial, backward curved blades, single inlet
355:	Size, specifying the outside impeller diameter
LK	Constructive execution, class 2
LG 90°:	Housing position
Sist. 12:	Setting 12 specification

It is necessary to specify additional order information separately, such as accessories and their respective positions.

18. DIMENSIONS
for transmission series of fans

Series:

- TLE 200 ÷ 710, F
- THLE 200 ÷ 710, F
- TLE 200 ÷ 1000 R, T, TG
- THLE 200 ÷ 1000 R, T, TG
- TLE 200 ÷ 1000 T, TG-GR
- THLE 200 ÷ 1000 T, TG-GR
- TLE 315 ÷ 1000 LK
- THLE 315 ÷ 1000 LK

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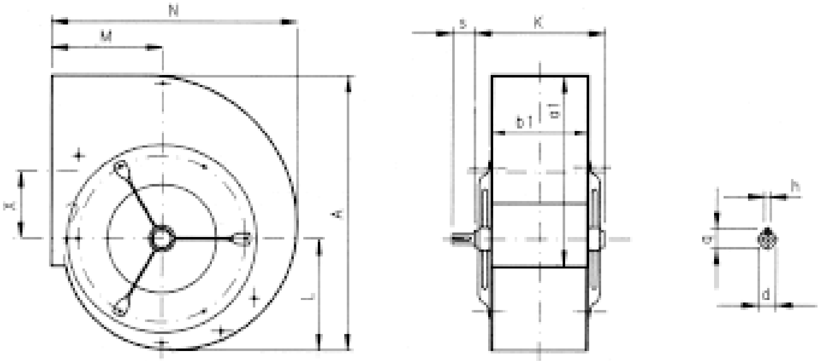
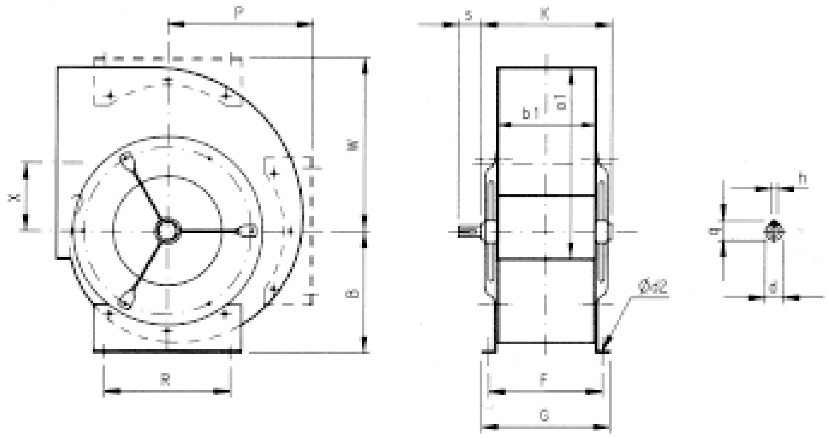
TLE/THLE 200 ÷ 710
TLE/THLE 200 ÷ 710 F

TLE/THLE 200 ÷ 710



TLE/THLE 200 ÷ 710 F



	A	B	F	G	L	M	N	P	R	W	X	K	a1	b1	d	h	q	s	d2
200	364	181	157	182	149	164	342	184	224	245	89	210	256	131	20	6	22.5	45	7.5
225	412	197	172	197	167	180	380	204	224	274	100	225	288	146	20	6	22.5	45	7.5
250	458	210	190	215	186	195	417	227	224	299	109	245	322	164	20	6	22.5	45	7.5
280	512	233	214	244	208	215	464	252	280	328	123	266	361	183	25	8	28	64	10
315	575	258	237	267	233	236	516	280	280	367	139	291	404	205	25	8	28	64	10
355	647	274	270	310	262	261	576	320	355	411	158	319	453	229	30	8	33	66	10
400	728	302	298	338	295	290	645	359	355	462	179	344	507	256	30	8	33	66	10
450	819	336	330	370	332	322	722	407	450	518	202	389	569	288	35	10	38	76	12
500	908	375	365	405	368	352	795	448	450	568	221	424	638	322	35	10	38	76	12
560	1017	416	414	464	412	390	887	502	500	634	248	469	715	361	40	12	43	96	15
630	1144	468	457	507	463	434	993	571	560	707	280	514	801	404	40	12	43	96	15
710	1304	531	516	556	531	485	1116	636	630	797	318	560	898	453	50	14	53.5	107	18

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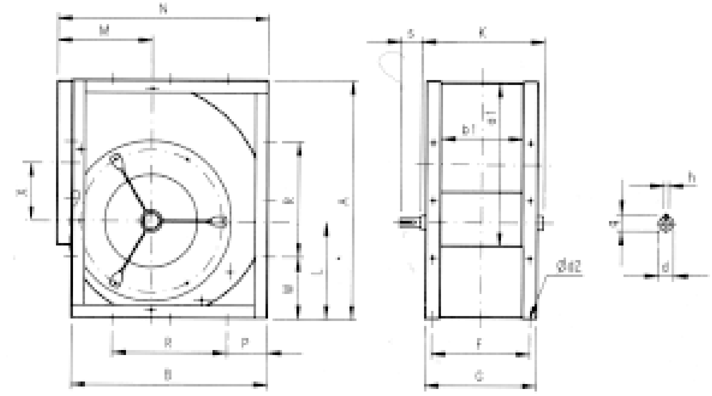
TLE/THLE 200 ÷ 710 R
TLE/THLE 200 ÷ 1000 T
TLE/THLE 200 ÷ 1000 TG

TLE/THLE 200 ÷ 710 R



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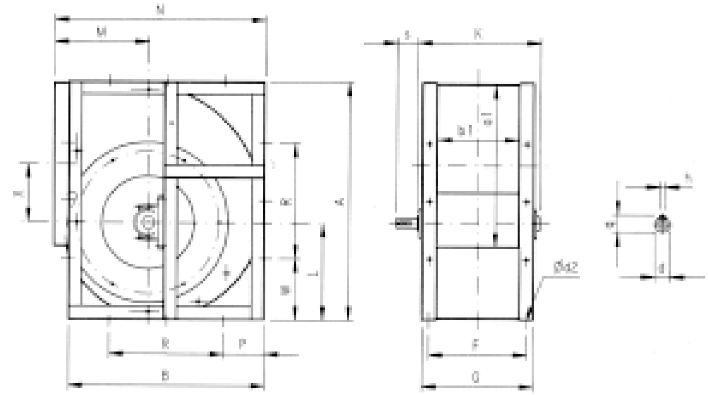
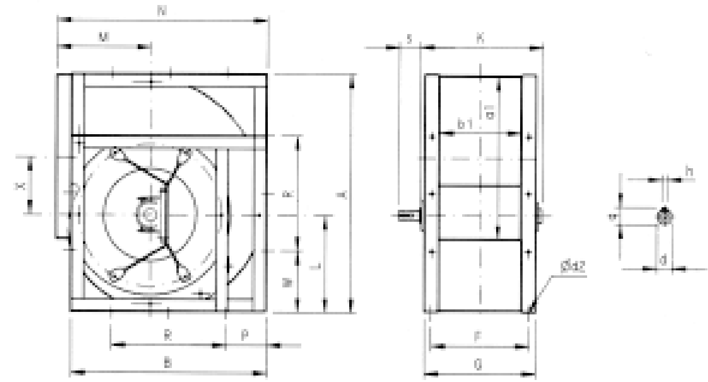


TLE/THLE 200 ÷ 1000 TG



	A	B	F	G	L	M	N	P	R	W	X	K	a1	b1	d	h	q	s	d2
200	372	312	157	182	150	164	344	45	224	73	89	210	256	131	20	6	22.5	45	7.5
225	416	348	172	197	169	180	382	62	224	96	100	225	288	146	20	6	22.5	45	7.5
250	460	384	190	215	188	195	420	80	224	118	109	245	322	164	20	6	22.5	45	7.5
280	518	432	214	244	211	215	467	77	280	119	123	266	361	183	25	8	28	64	10
315	578	480	237	267	235	236	519	101	280	149	139	291	404	205	25	8	28	64	10
355	654	542	270	310	266	261	579	94	355	150	158	319	453	229	30	8	33	66	10
400	738	606	298	338	300	290	651	126	355	191	179	344	507	256	30	8	33	66	10
450	828	674	330	370	336	322	726	112	450	189	202	389	569	288	35	10	38	76	12
500	918	744	365	405	374	352	800	147	450	234	221	424	638	322	35	10	38	76	12
560	1030	838	414	464	419	390	892	169	500	265	248	469	715	361	40	12	43	96	15
630	1158	936	457	507	471	434	998	188	560	299	280	514	801	404	40	12	43	96	15
710	1304	1048	516	556	531	485	1120	209	630	336	318	560	898	453	50	14	53.5	107	18
800	1468	1174	571	611	597	540	1255	232	710	379	361	618	1007	507	50	14	53.5	107	18
900	1648	1312	633	673	670	604	1409	256	800	424	407	718	1130	569	60	18	64	107	18
1000	1810	1444	702	742	735	657	1541	272	900	455	435	788	1267	638	60	18	64	107	18

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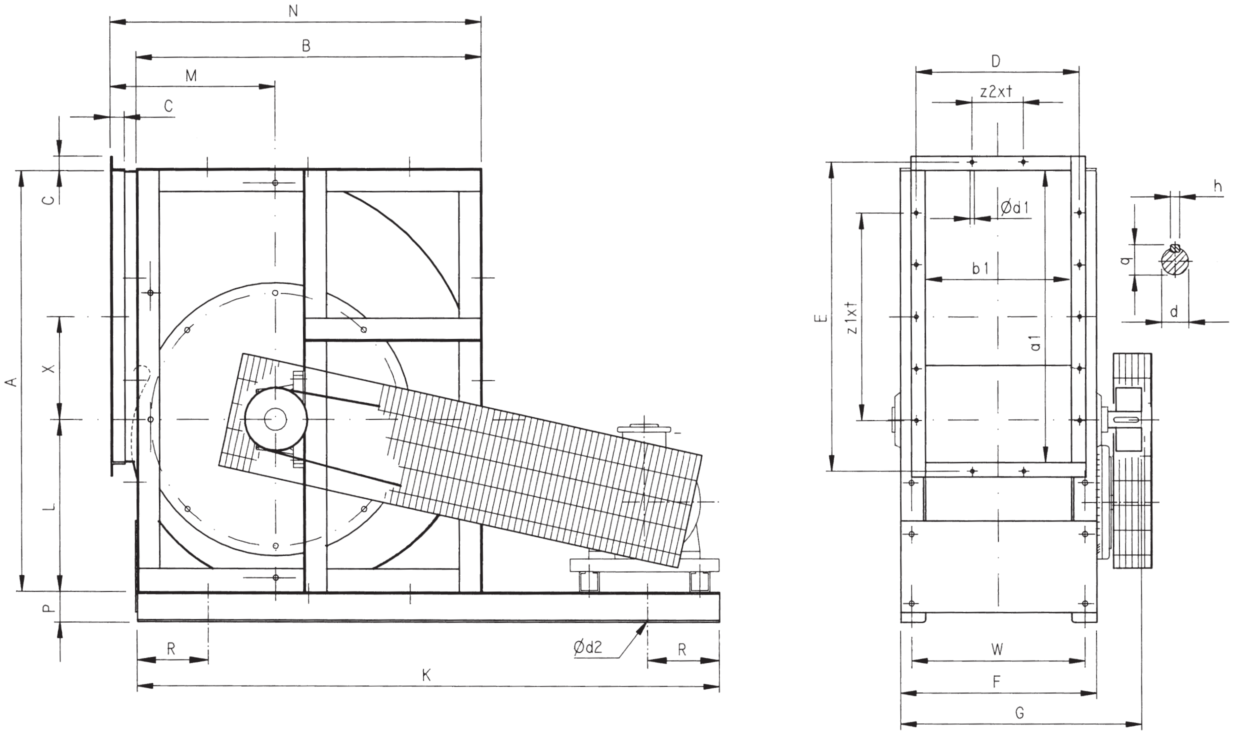
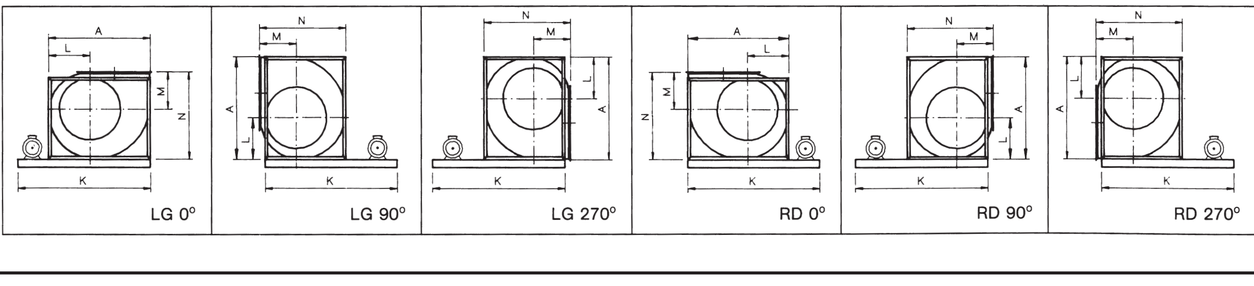
TLE/THLE 200÷1000 T-GR
TLE/THLE 200÷1000 TG-GR



	A	B	C	D	E	F	G	K	L	M	N	P	R	W	X	a1	b1	d	d1	d2	h	z1	z2	t	q
200	372	312	25	161	286	182	240	700	150	168	348	40	45	157	89	256	131	20	7.5	10	6	2	1	90	22.5
225	416	348	25	176	318	197	260	700	169	184	386	40	62	172	100	288	146	20	7.5	10	6	3	1	90	22.5
250	460	384	25	194	352	215	280	900	188	199	424	40	80	190	109	322	164	20	7.5	10	6	3	1	90	22.5
280	518	432	25	213	391	244	310	900	211	219	471	40	77	214	123	361	183	25	7.5	10	8	3	1	90	28
315	578	480	25	235	434	267	335	1050	235	240	523	50	101	237	139	404	205	25	7.5	12	8	4	2	90	28
355	654	542	25	259	483	310	380	1150	266	265	583	50	94	270	158	453	229	30	7.5	12	8	4	2	90	33
400	736	606	25	286	537	338	410	1150	300	294	655	50	126	298	179	507	256	30	7.5	12	8	5	2	90	33
450	828	674	25	318	599	370	445	1400	336	326	730	60	112	330	202	569	288	35	7.5	12	10	6	3	90	38
500	918	744	25	352	668	405	485	1400	374	357	805	60	147	365	221	638	322	35	7.5	15	10	6	3	90	38
560	1030	838	25	391	745	464	550	1600	419	395	897	60	169	414	248	715	361	40	7.5	15	12	7	3	90	43
630	1158	936	25	434	831	507	595	1600	471	439	1003	60	188	457	280	801	404	40	7.5	15	12	8	4	90	43
710	1304	1048	25	483	928	556	685	1800	531	490	1125	100	209	516	318	898	453	50	7.5	18	14	9	4	90	53.5
800	1468	1174	25	537	1037	611	750	2150	597	545	1260	100	232	571	361	1007	507	50	7.5	18	14	11	5	90	53.5
900	1648	1312	30	599	1164	673	825	2350	670	609	1414	100	256	633	407	1130	569	60	10	18	18	11	5	100	64
1000	1810	1445	30	668	1301	742	895	2500	735	662	1546	100	272	702	435	1267	638	60	10	18	18	12	6	100	64



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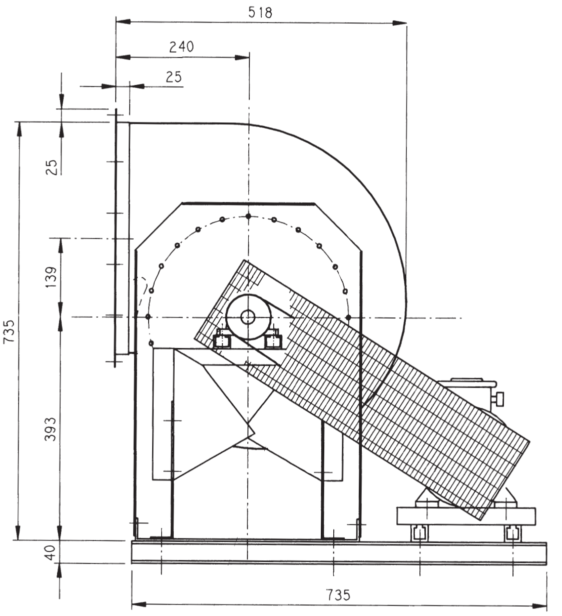
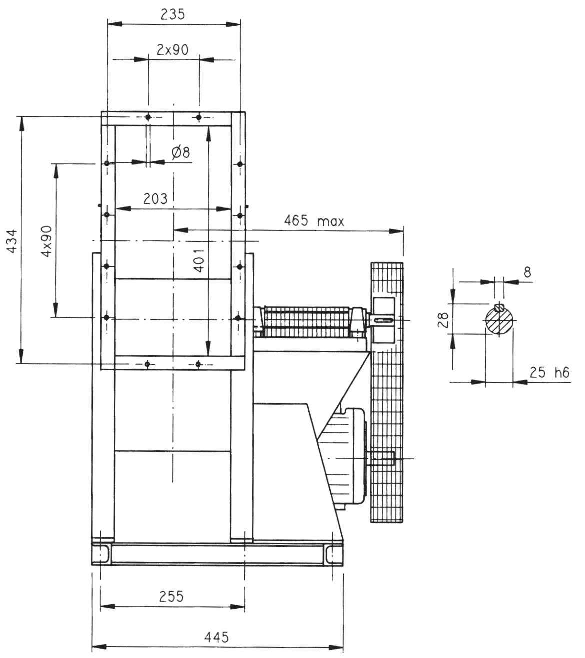
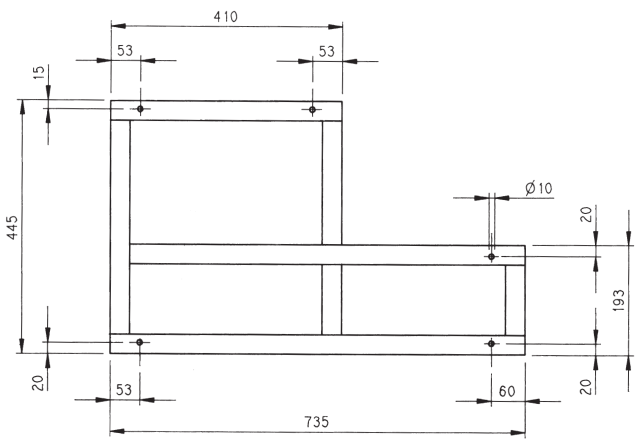
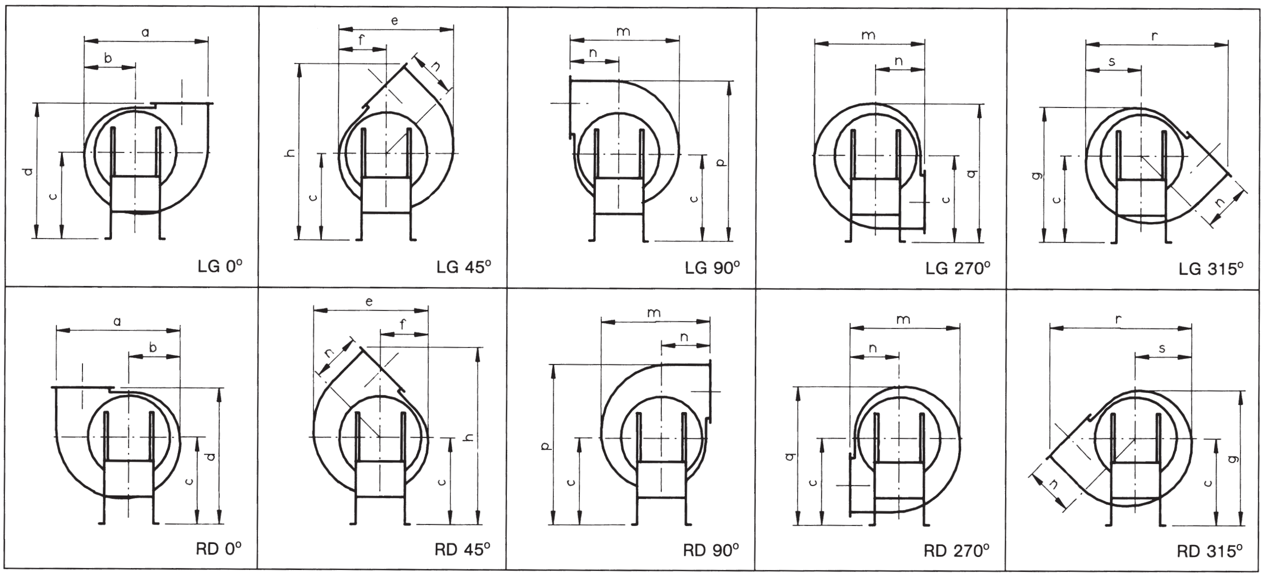
TLE/THLE 315 LK







	a	b	c	d	e	f	g	h	m	n	p	q	r	s
315	575	233	393	633	523	215	610	820	518	240	735	626	680	254



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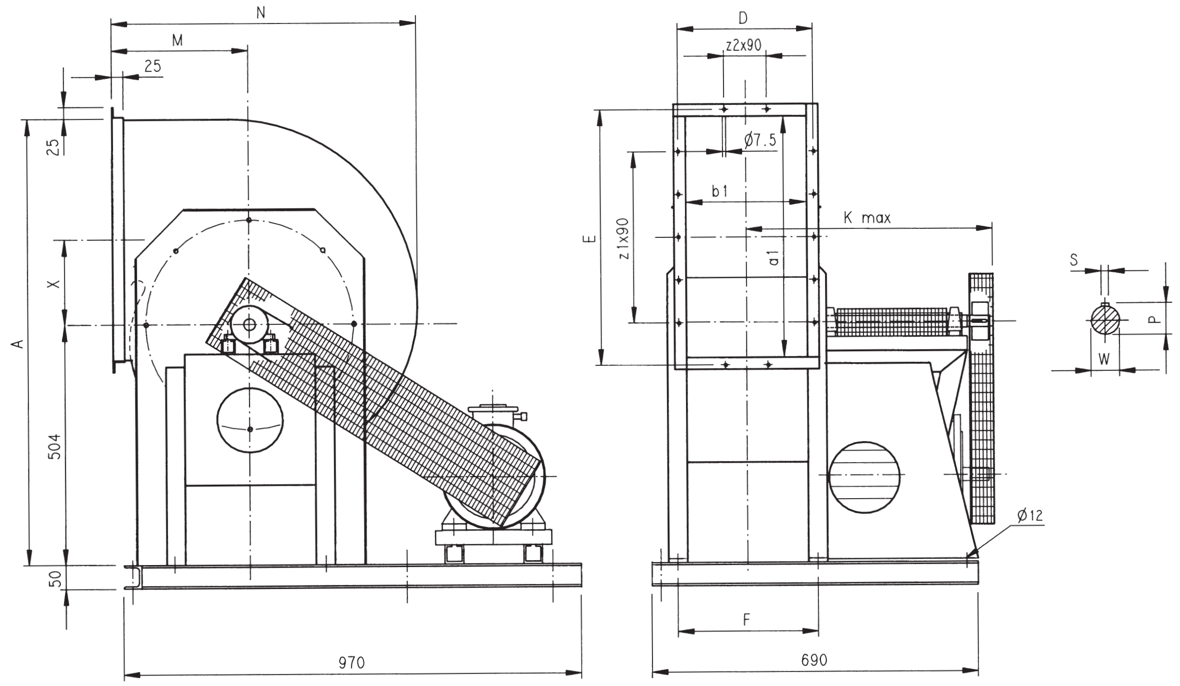
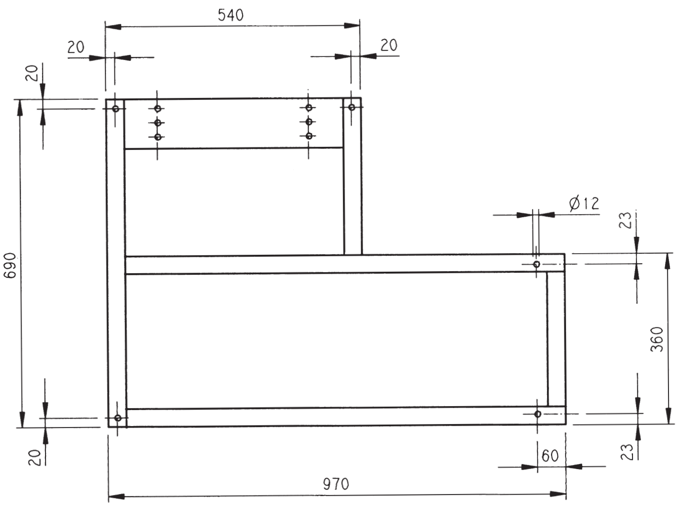
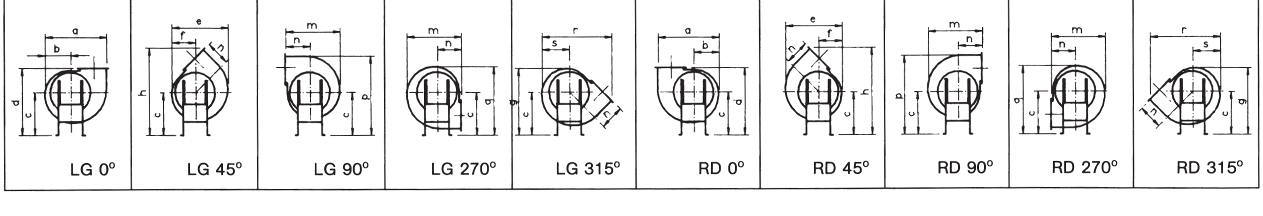
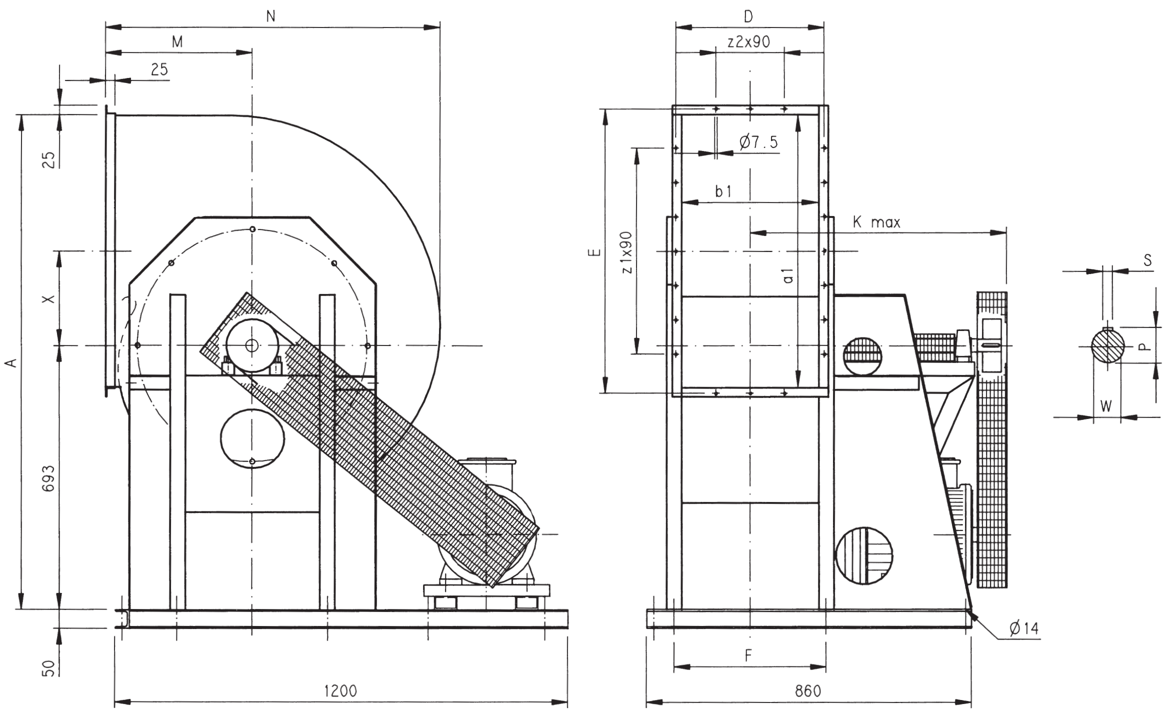


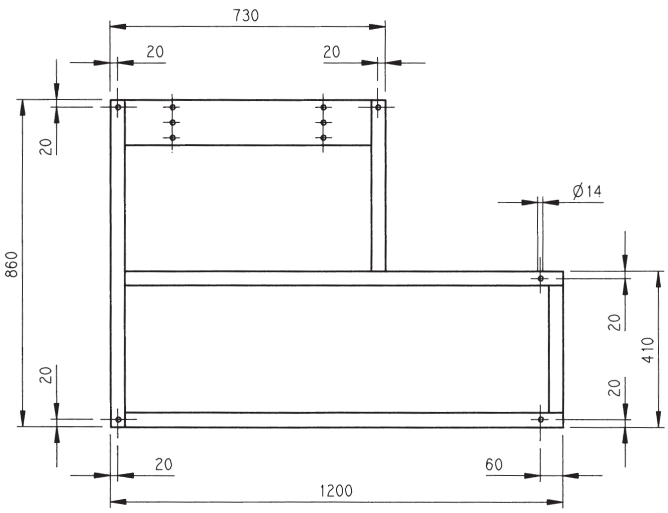


	A	D	E	F	K_{max}	M	N	P	S	W	X	a1	b1	z1	z2
355	889	259	483	270	585	265	586	33	8	30	158	453	229	4	2
400	937	286	537	298	600	294	649	33	8	30	179	507	256	5	2
450	991	318	599	330	605	326	726	38	10	35	202	569	288	6	3

	a	b	c	d	e	f	g	h	m	n	p	q	r	s
355	647	262	504	769	590	245	747	979	586	265	889	766	760	286
400	728	295	504	798	665	274	779	1034	649	294	937	799	834	322
450	819	332	504	830	742	308	814	1092	726	326	991	836	950	362







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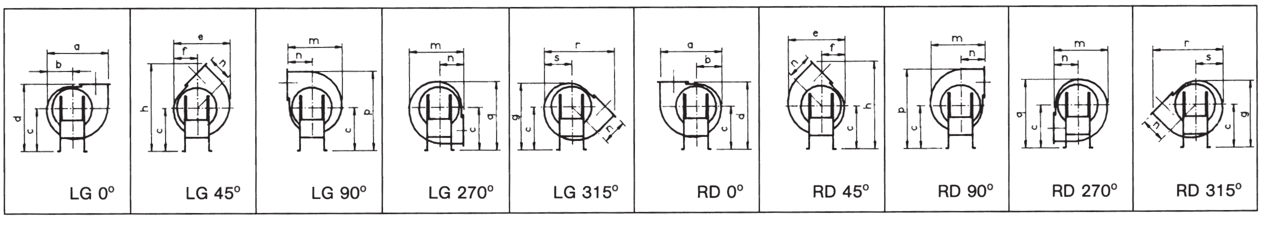
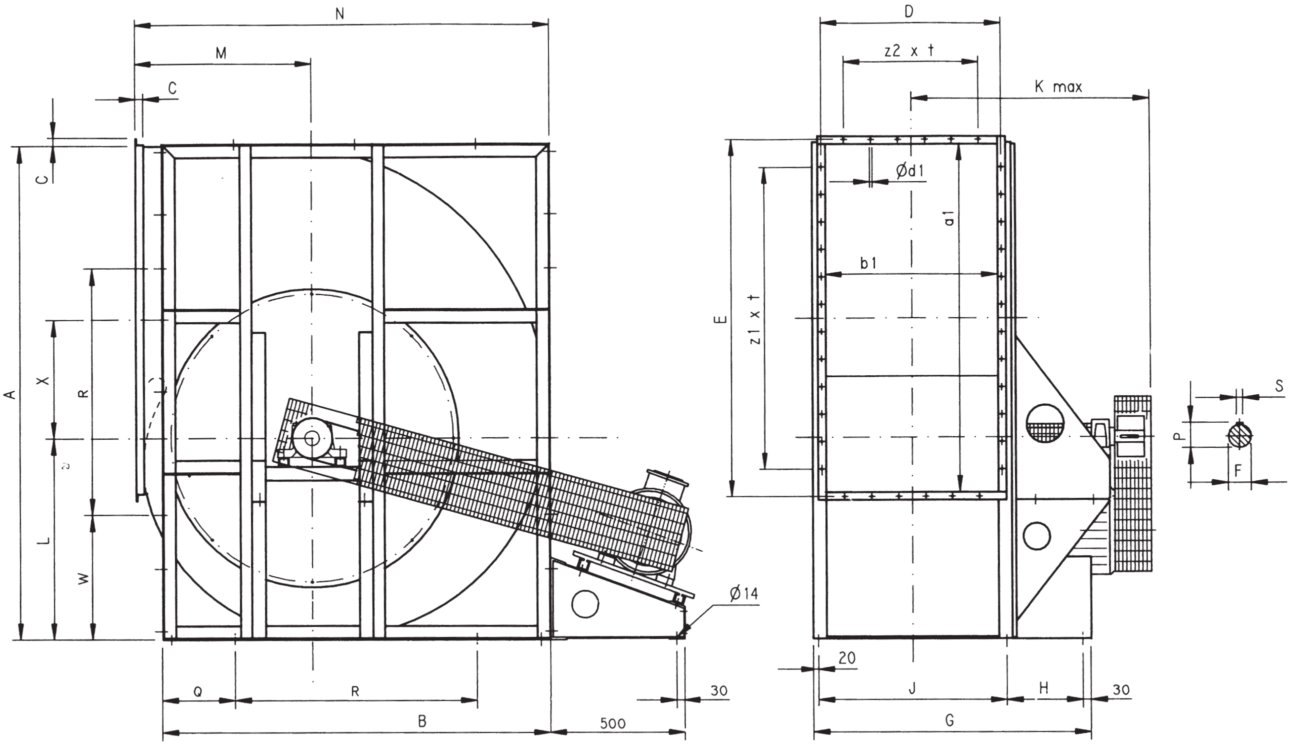
500	1233	352	668	365	720	357	800	38	10	35	221	638	322	6	3
560	1298	391	745	414	750	395	891	43	12	40	248	715	361	7	3
630	1374	434	831	457	750	439	997	43	12	40	280	801	404	8	4

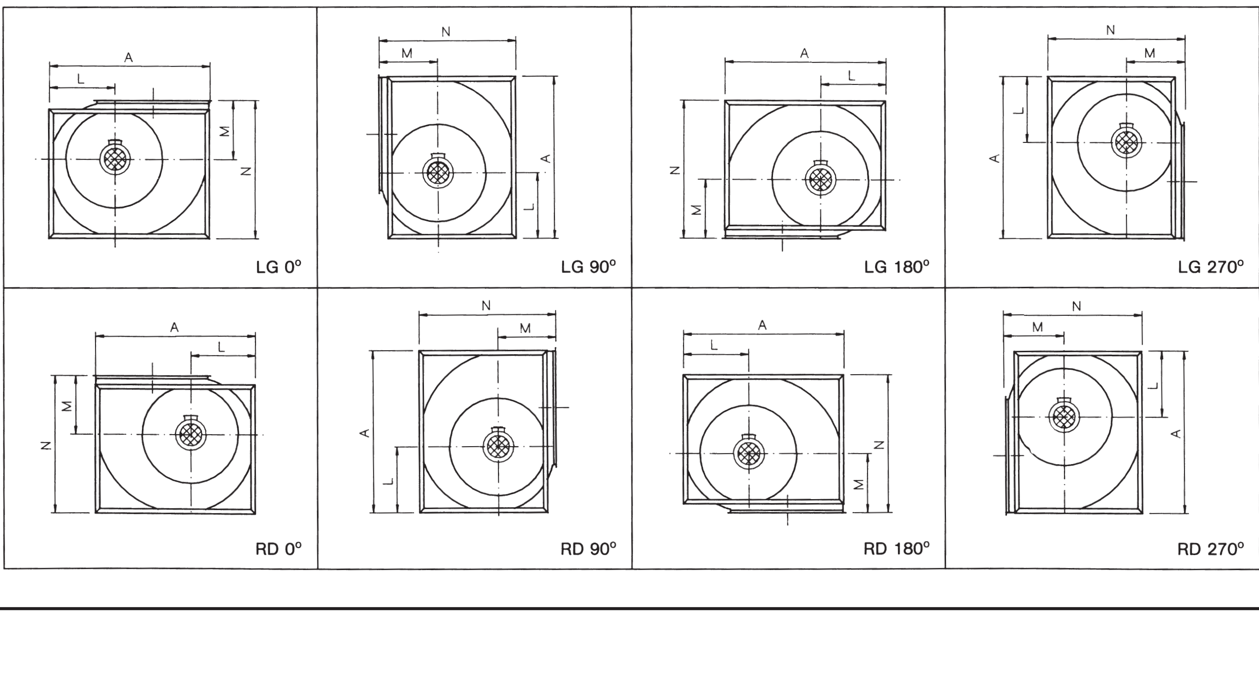
	a	b	c	d	e	f	g	h	m	n	p	q	r	s
500	908	368	693	1050	825	338	1036	1342	800	358	1233	1061	1051	402
560	1016	411	693	1088	930	384	1077	1415	891	395	1298	1104	1173	451
630	1142	462	693	1132	1047	432	1125	1500	997	439	1374	1155	1314	508



TLE/THLE 710÷1000 LK



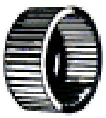
	A	B	C	D	E	F	G	H	J	K_{max}	L	M	N	P	Q	R	W	X	a1	b1	d1	z1	z2	t
710	1303	1049	25	483	928	50	932	354	516	847	531	490	1125	53.5	209	630	336	318	898	453	7.5	9	4	90
800	1467	1174	25	537	1037	50	932	300	570	874	597	545	1261	53.5	232	710	379	361	1007	507	7.5	11	5	90
900	1648	1313	30	599	1164	60	1044	350	632	905	670	609	1414	64	256	800	424	407	1130	569	10	11	5	100
1000	1809	1444	30	668	1301	60	1044	281	701	940	735	662	1546	64	272	900	455	435	1267	638	10	12	6	100



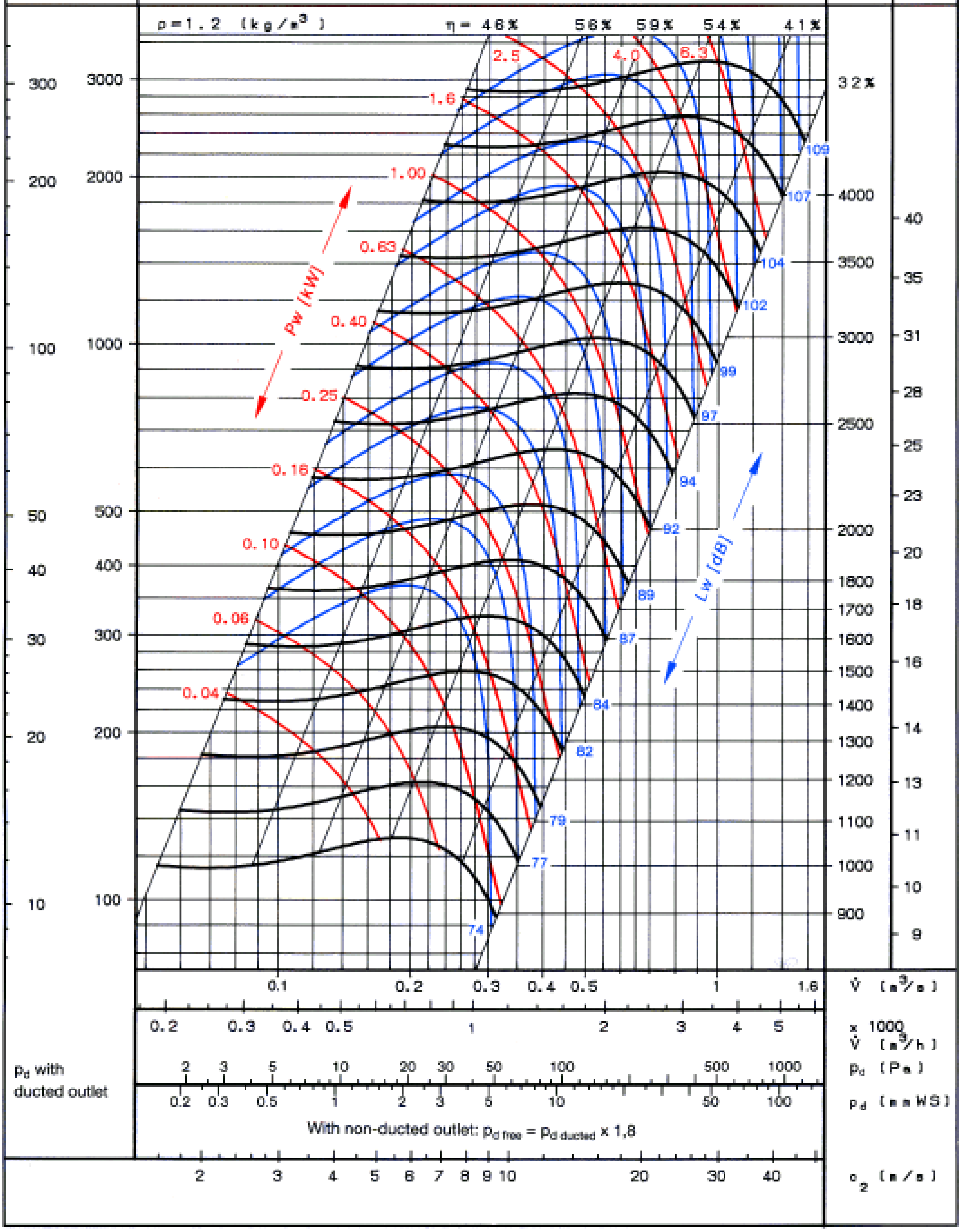
19. PERFORMANCE CURVES - TRASMISSION

Series:
- TLE 200 ÷ 1000
- THLE 200 ÷ 1000

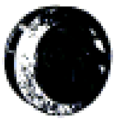
comefri	F - R - T - TG	TLE 200



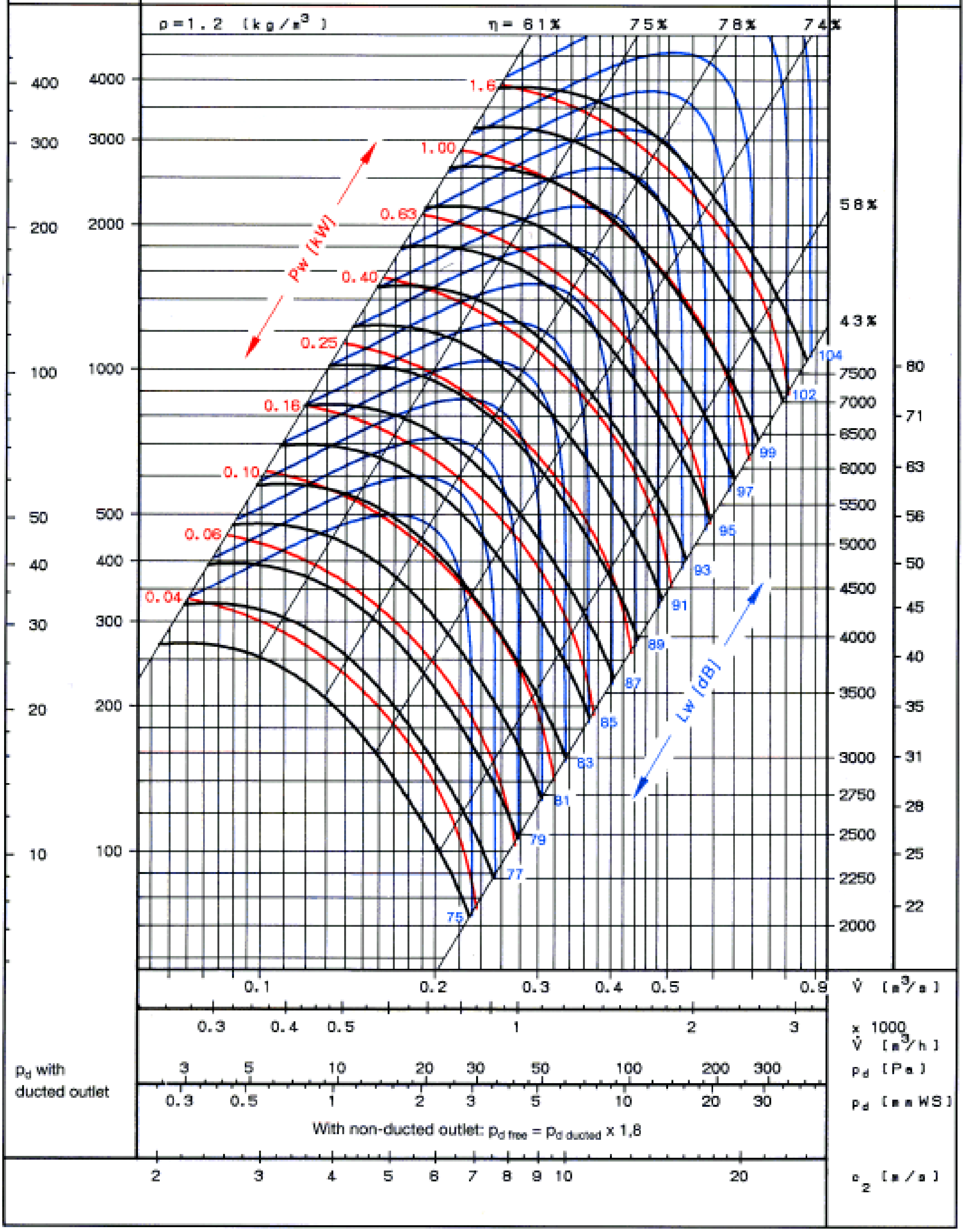
F - R				T - TG			
n_{max}	=	3800	[min^{-1}]	n_{max}	=	3800	[min^{-1}]
Pw_{max}	=	2.0	[kW]	Pw_{max}	=	4.0	[kW]
ΔPt_{max}	=	2200	[Pa]	ΔPt_{max}	=	2200	[Pa]
z	=	38		z	=	38	
J	=	0.005	[kgm^2]	J	=	0.005	[kgm^2]



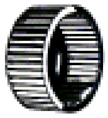
comefri	F - R - T - TG	THLE 200



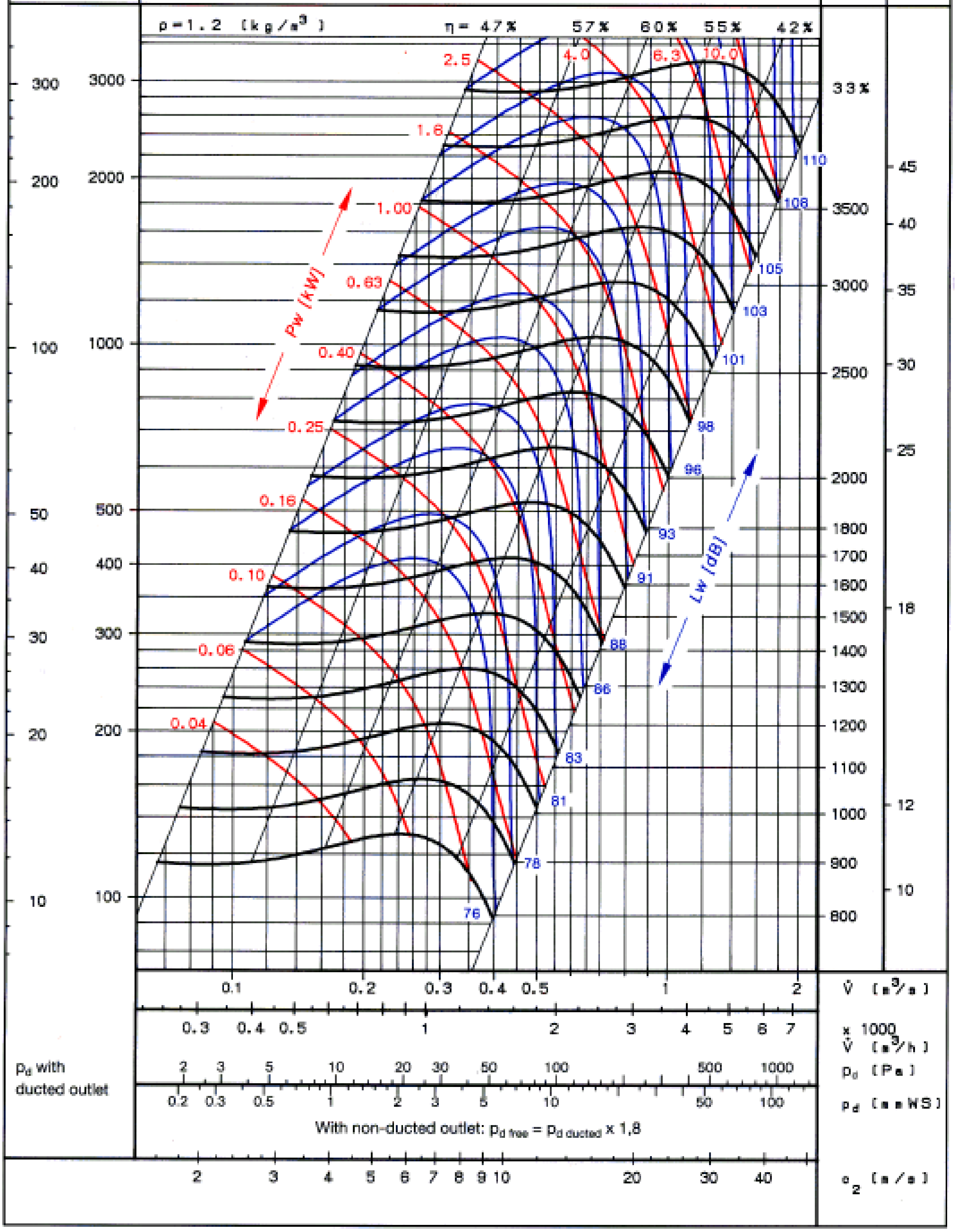
n_{max} = 6200 [min^{-1}]
Pw_{max} = 2.0 [kW]
ΔPt_{max} = 2400 [Pa]
z = 8
J = 0.01 [kgm^2]



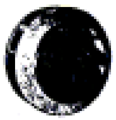
comefri | **F - R - T - TG** | **TLE 225**



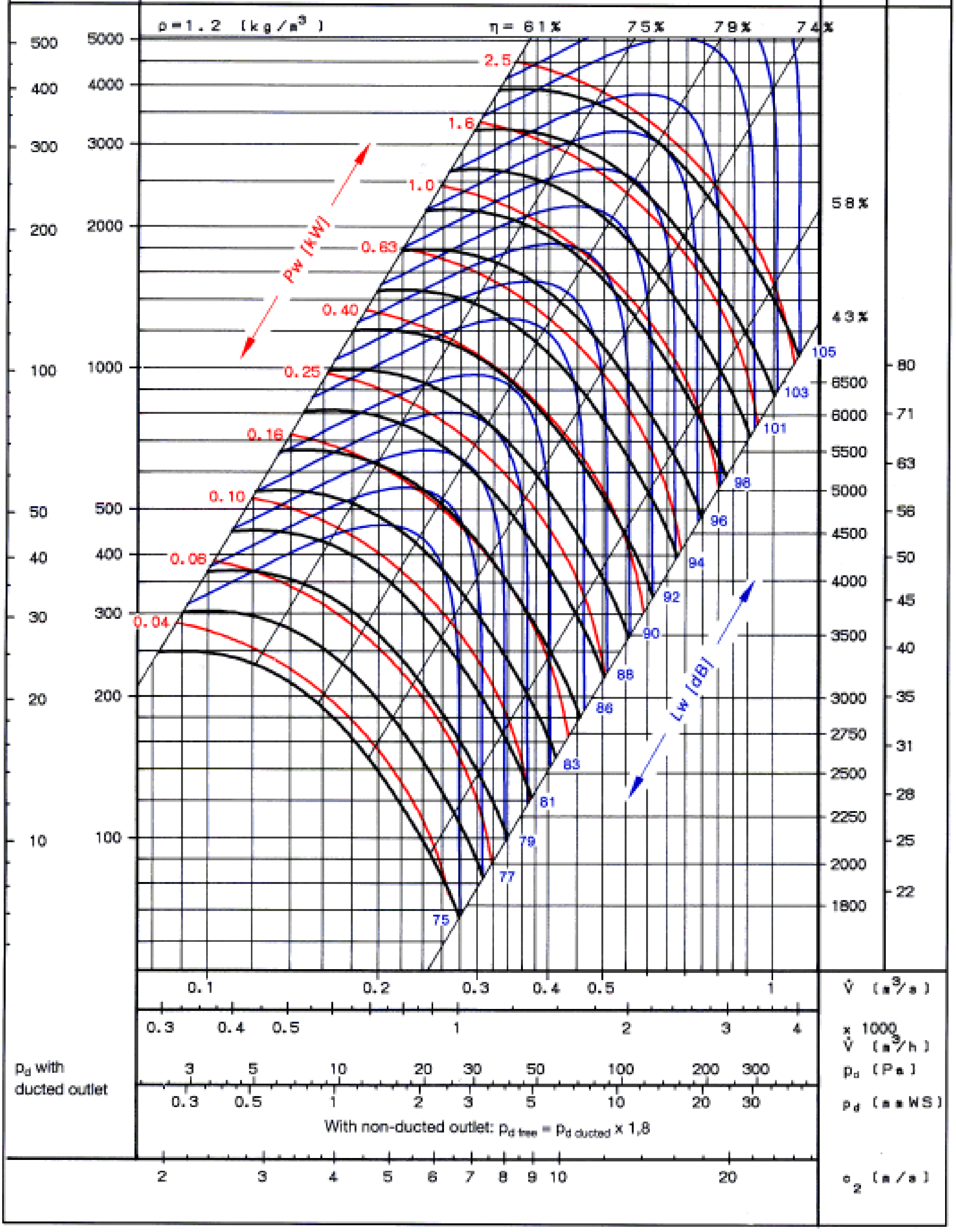
F - R			T - TG		
n_{max}	= 3400	[min⁻¹]	n_{max}	= 3400	[min⁻¹]
Pw_{max}	= 3.0	[kW]	Pw_{max}	= 5.0	[kW]
ΔPt_{max}	= 2400	[Pa]	ΔPt_{max}	= 2400	[Pa]
z	= 42		z	= 42	
J	= 0.008	[kgm²]	J	= 0.008	[kgm²]



comefri	F - R - T - TG	THLE 225

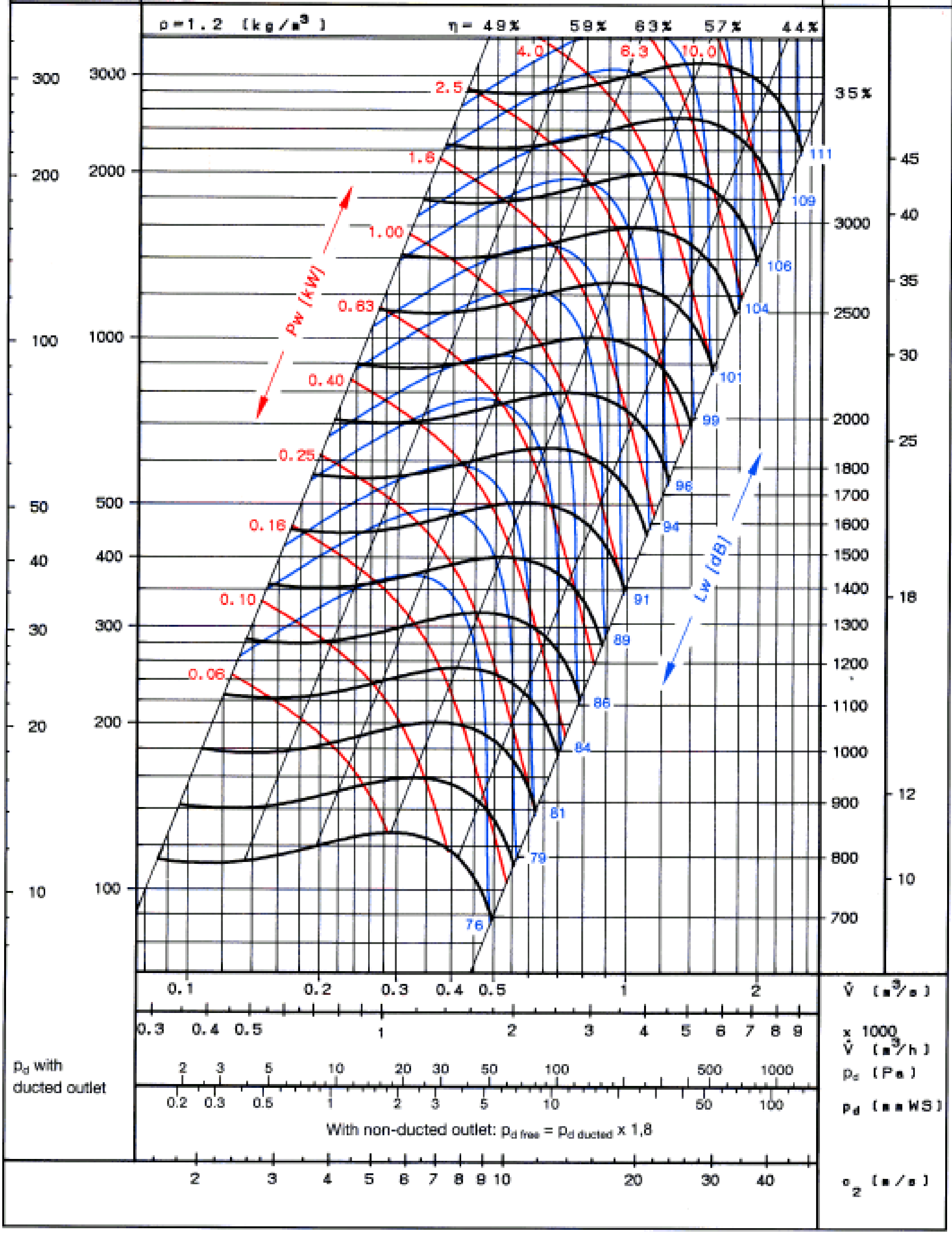


n_{max} = 6200 [min^{-1}]
Pw_{max} = 3.0 [kW]
ΔPt_{max} = 3100 [Pa]
z = 8
J = 0.015 [kgm^2]

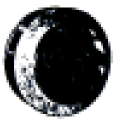


comefri	F - R - T - TG	TLE 250

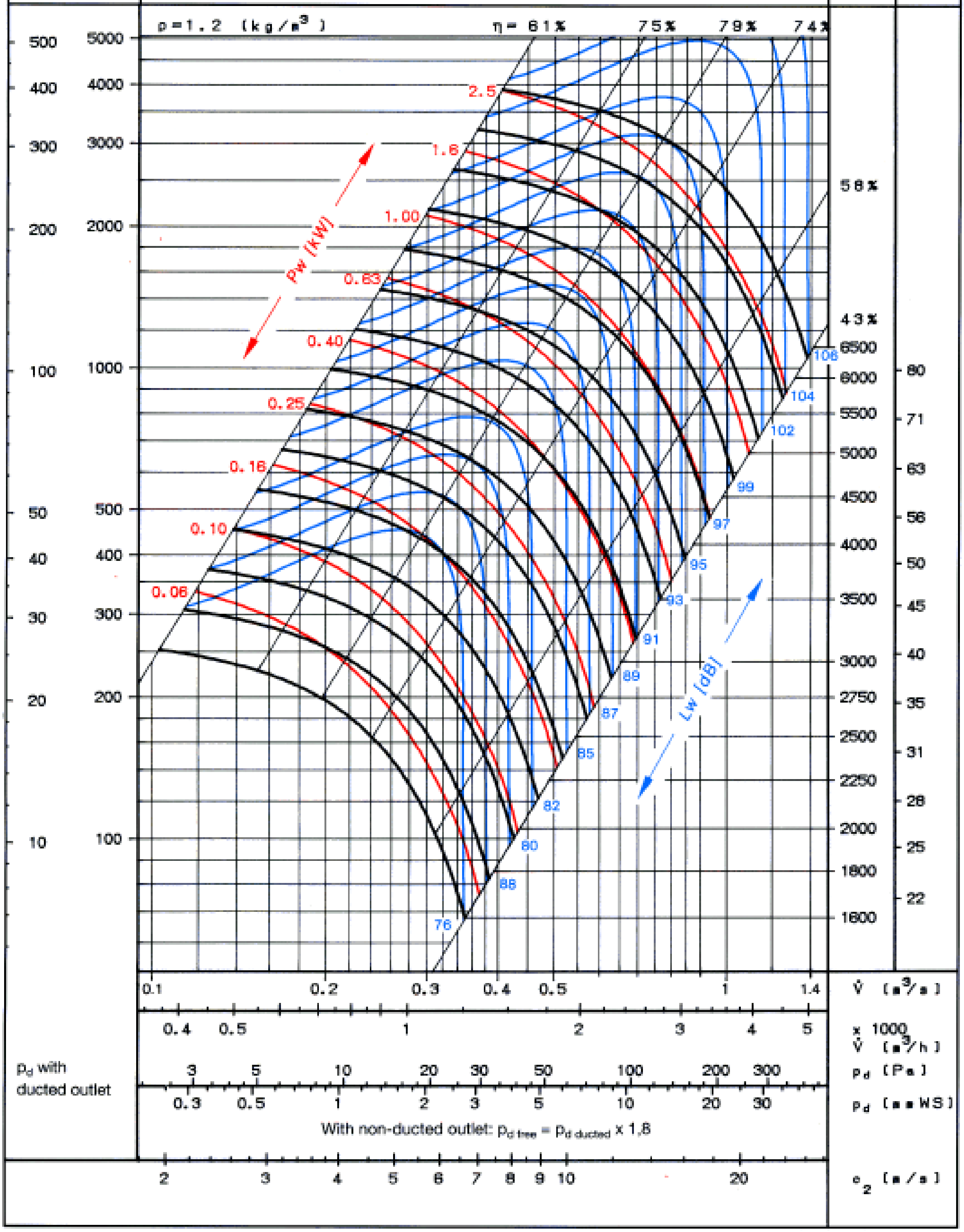
	F - R			T - TG		
n_{max}	= 3000	[min^{-1}]	n_{max}	= 3000	[min^{-1}]
Pw_{max}	= 3.5	[kW]	Pw_{max}	= 5.0	[kW]
ΔPt_{max}	= 2400	[Pa]	ΔPt_{max}	= 2400	[Pa]
z	= 38		z	= 38	
J	= 0.012	[kgm^2]	J	= 0.012	[kgm^2]



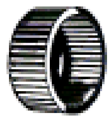
comefri	F - R - T - TG	THLE 250



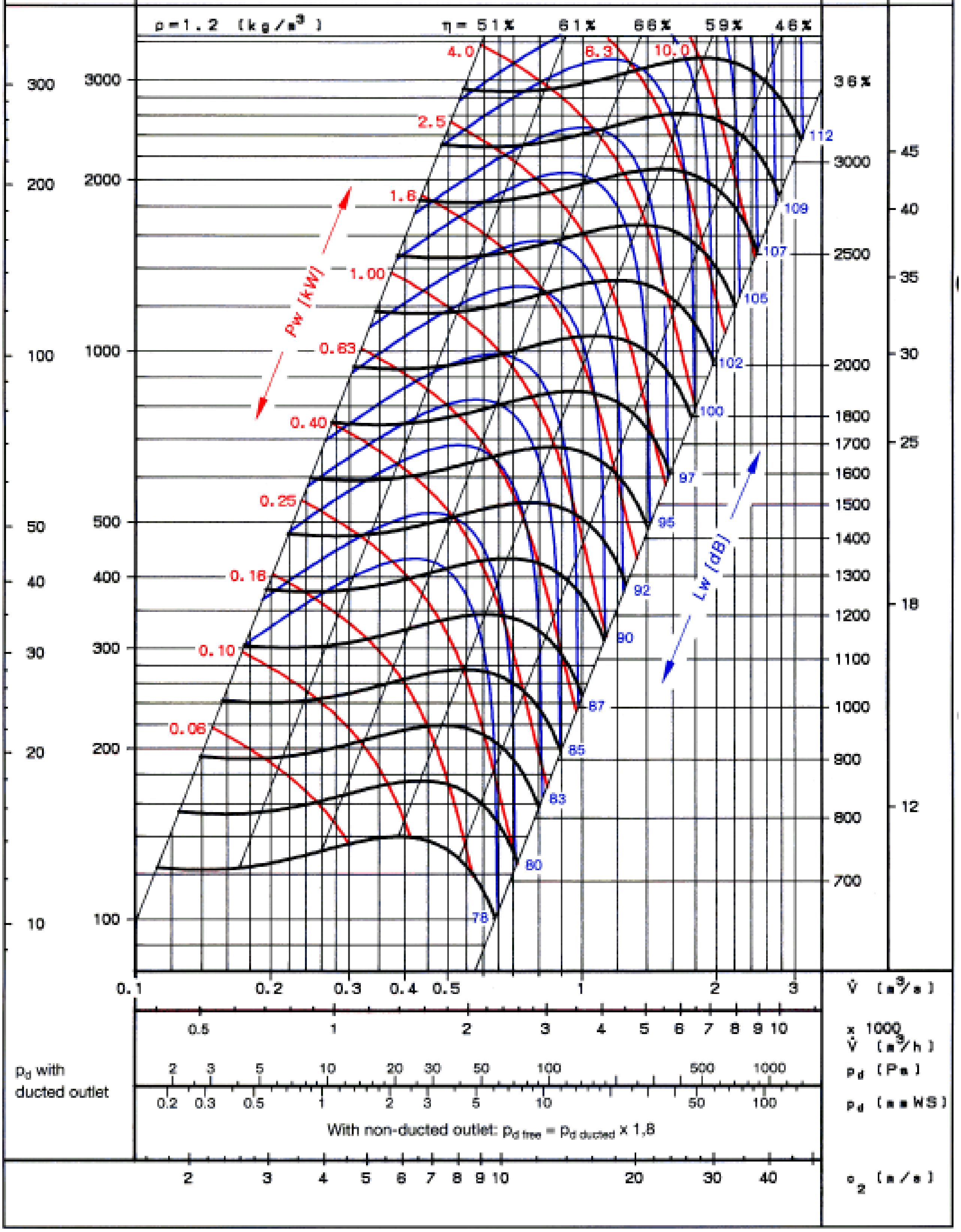
n_{max} = 5800 [min^{-1}]
Pw_{max} = 3.0 [kW]
ΔPt_{max} = 3400 [Pa]
z = 8
J = 0.023 [kgm^2]



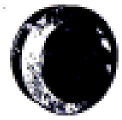
comefri	F - R - T - TG	TLE 280



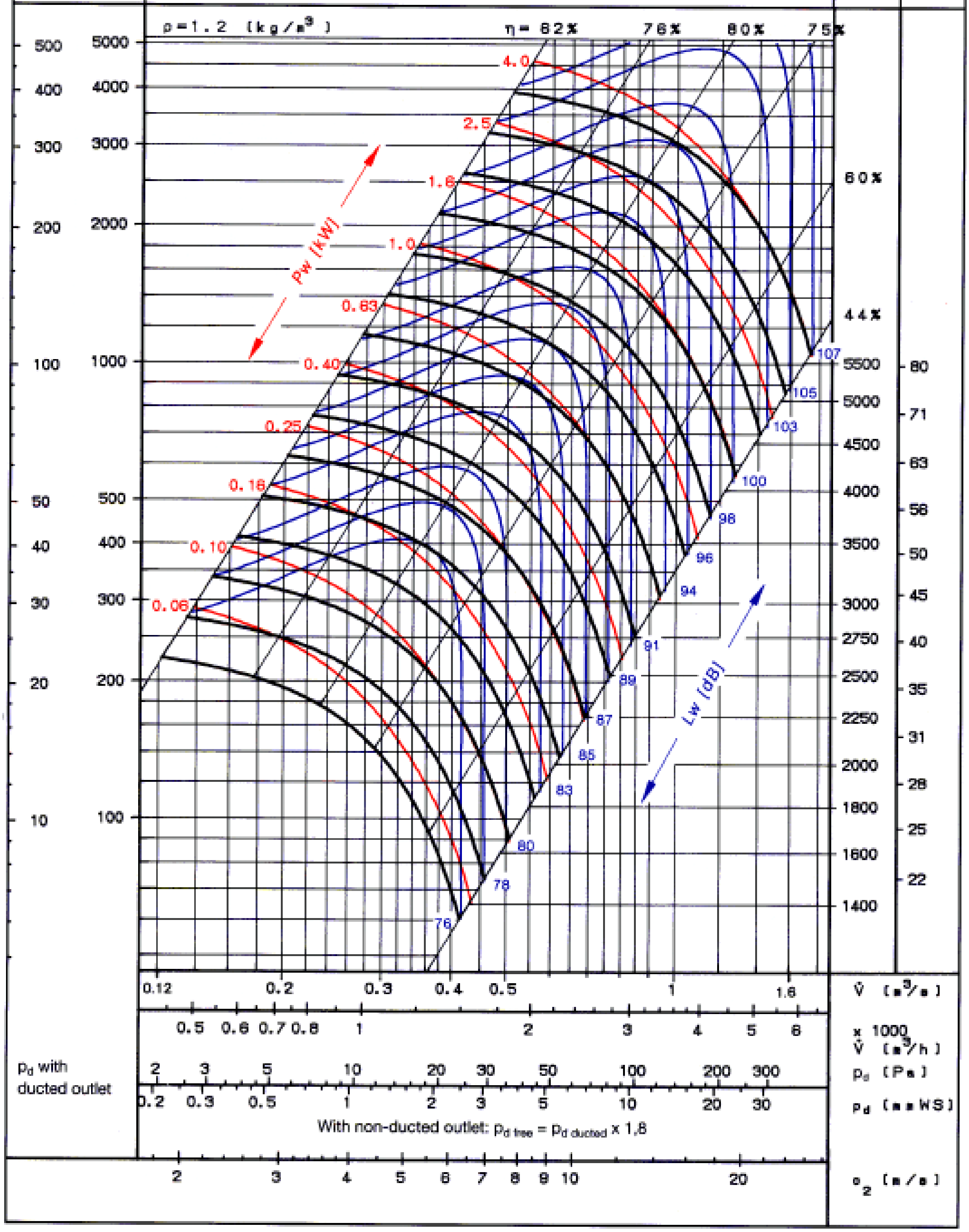
	F - R			T - TG		
	n_{max}	= 2730	$[min^{-1}]$	n_{max}	= 2730	$[min^{-1}]$
	Pw_{max}	= 4.5	[kW]	Pw_{max}	= 6.3	[kW]
	ΔPt_{max}	= 2400	[Pa]	ΔPt_{max}	= 2400	[Pa]
	z	= 42		z	= 42	
	J	= 0.020	$[kgm^2]$	J	= 0.020	$[kgm^2]$



comefri	F - R - T - TG	THLE 280



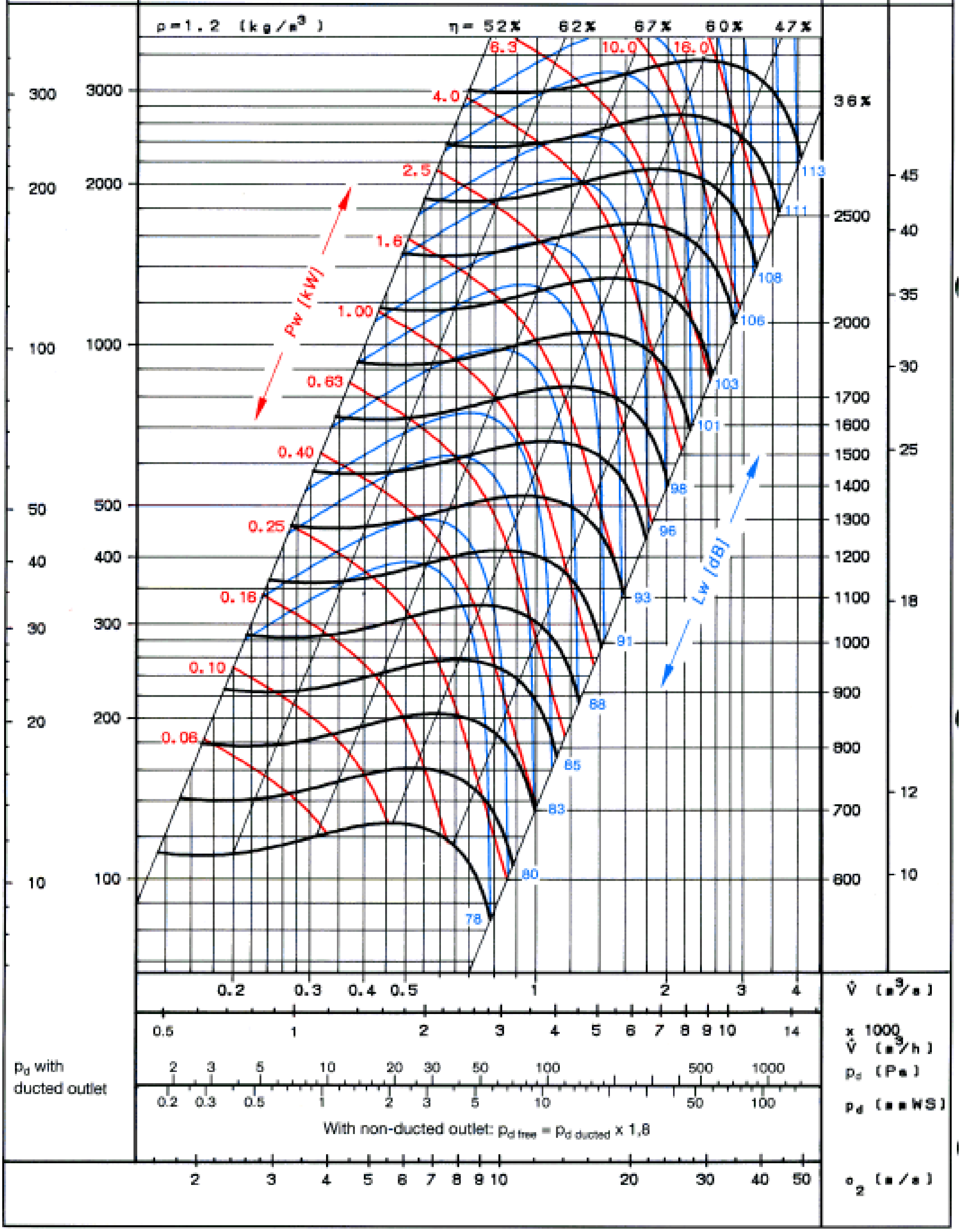
n_{max} = 4700 [min⁻¹]
Pw_{max} = 3.5 [kW]
ΔPt_{max} = 2800 [Pa]
z = 8
J = 0.044 [kgm²]



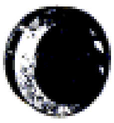
comefri	F - R - T - TG - LK	TLE 315

F - R
n_{max} = 2400 [min⁻¹]
Pw_{max} = 4.5 [kW]
ΔPt_{max} = 2500 [Pa]
z = 38
J = 0.043 [kgm²]

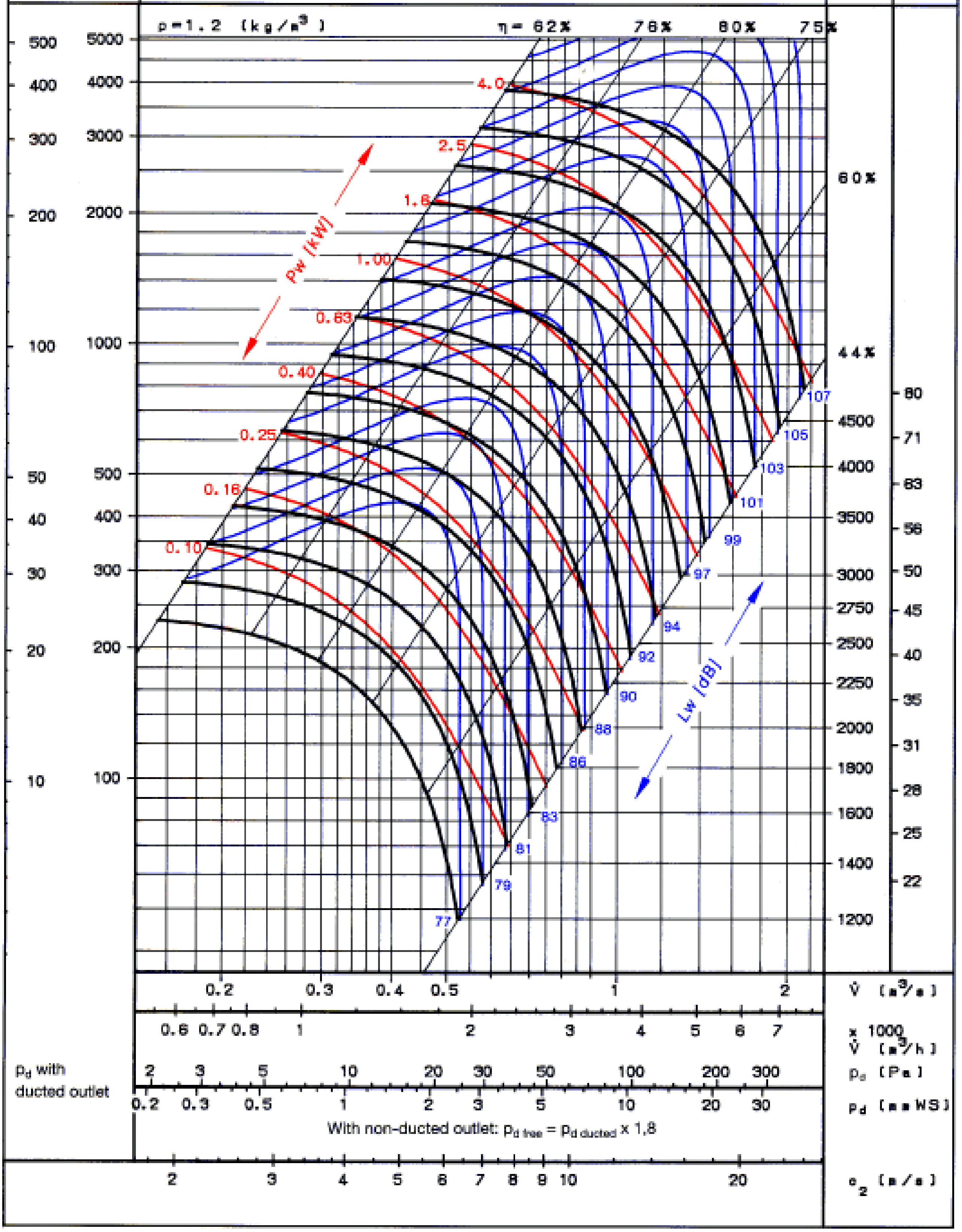
T - TG - LK
n_{max} = 2400 [min⁻¹]
Pw_{max} = 7.0 [kW]
ΔPt_{max} = 2500 [Pa]
z = 38
J = 0.043 [kgm²]



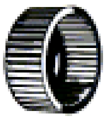
comefri	F - R - T - TG - LK	THLE 315



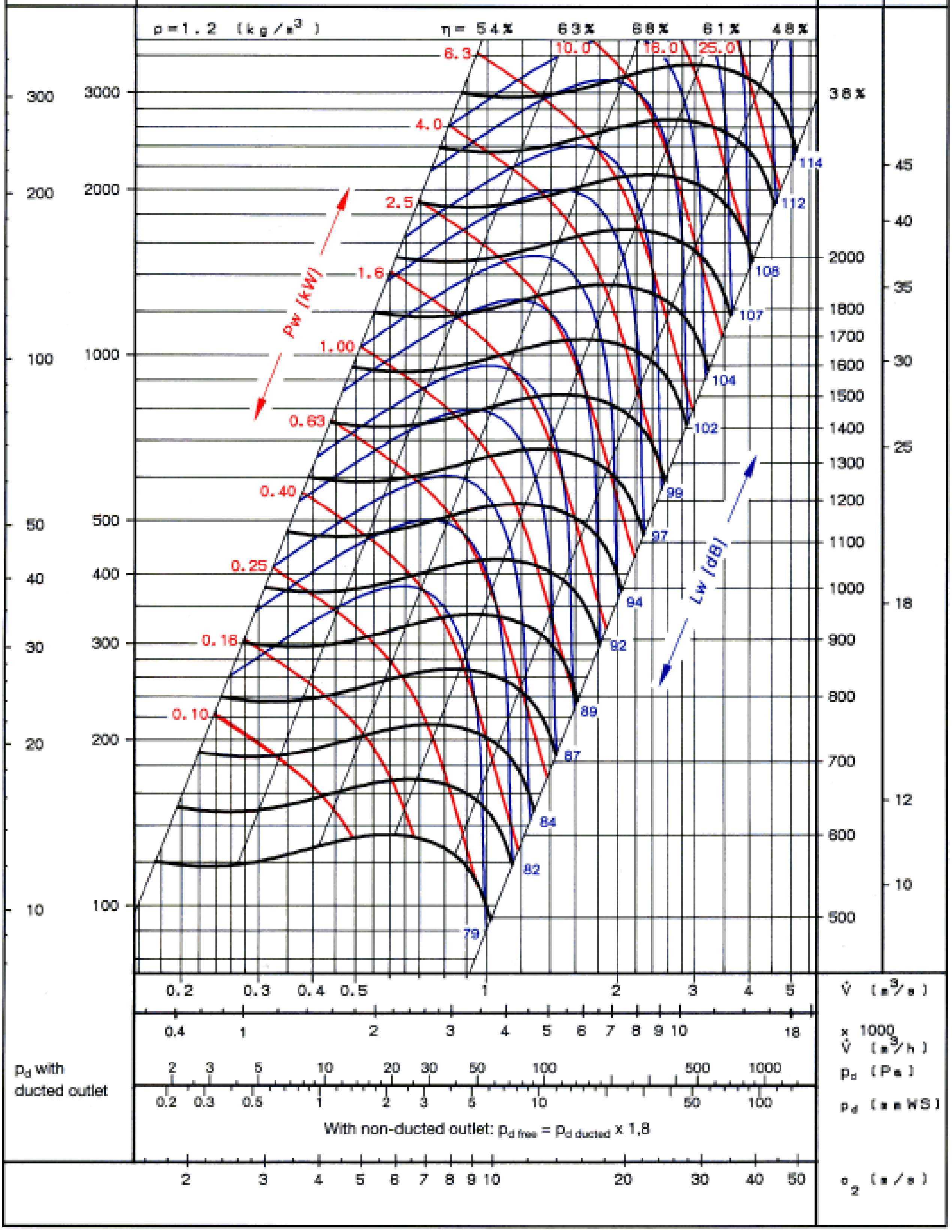
n_{max} = 3700 [min^{-1}]
Pw_{max} = 4.5 [kW]
ΔPt_{max} = 2200 [Pa]
z = 8
J = 0.075 [kgm^2]



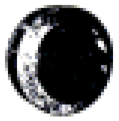
comefri | **F - R - T - TG - LK** | **TLE 355**



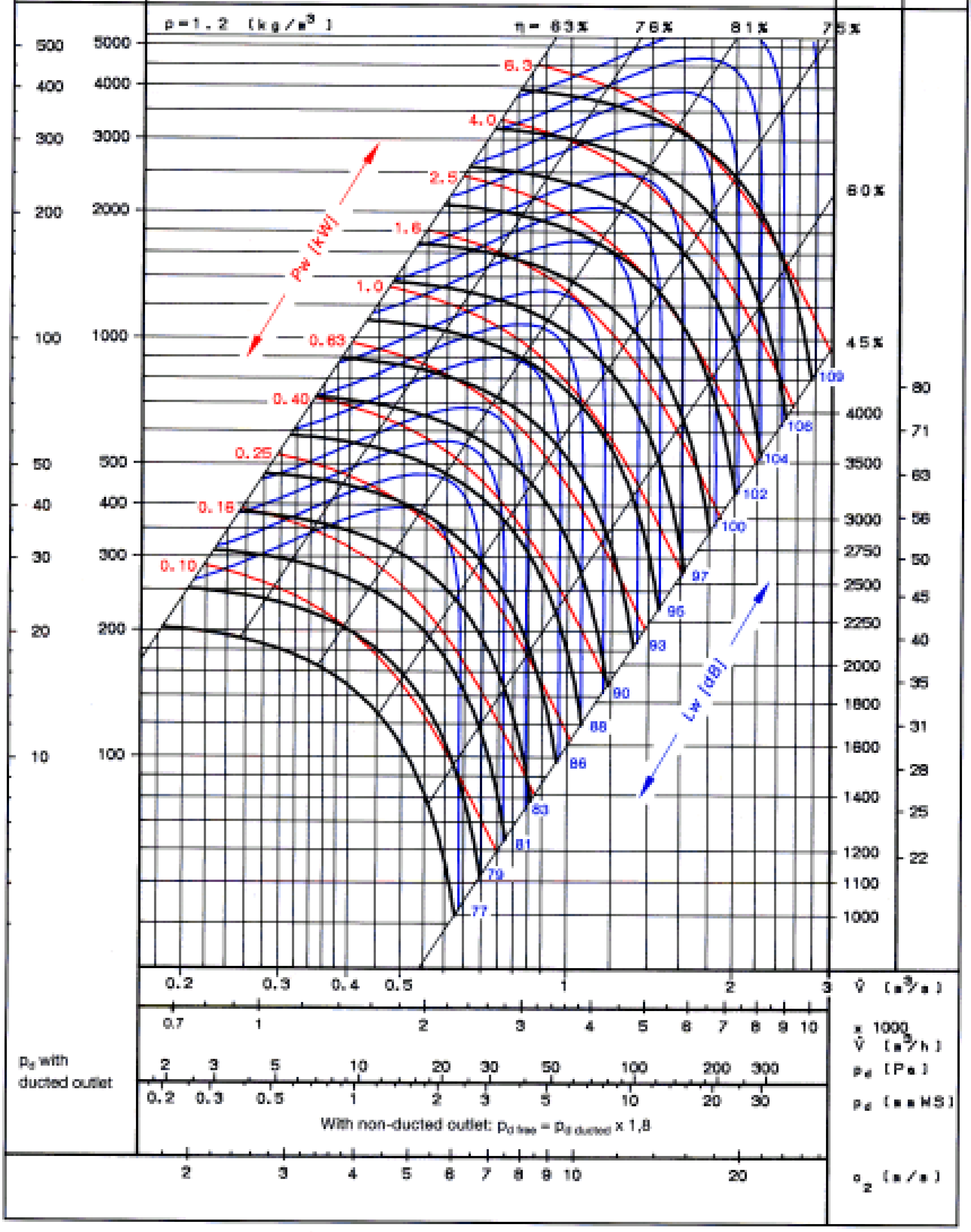
F - R			T - TG - LK		
n_{max}	= 1900	[min^{-1}]	n_{max}	= 1900	[min^{-1}]
Pw_{max}	= 6.3	[kW]	Pw_{max}	= 9.0	[kW]
ΔPt_{max}	= 2000	[Pa]	ΔPt_{max}	= 2000	[Pa]
z	= 42		z	= 42	
J	= 0.07	[kgm^2]	J	= 0.07	[kgm^2]



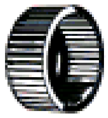
comefri | **F - R - T - TG - LK** | **THLE 355**



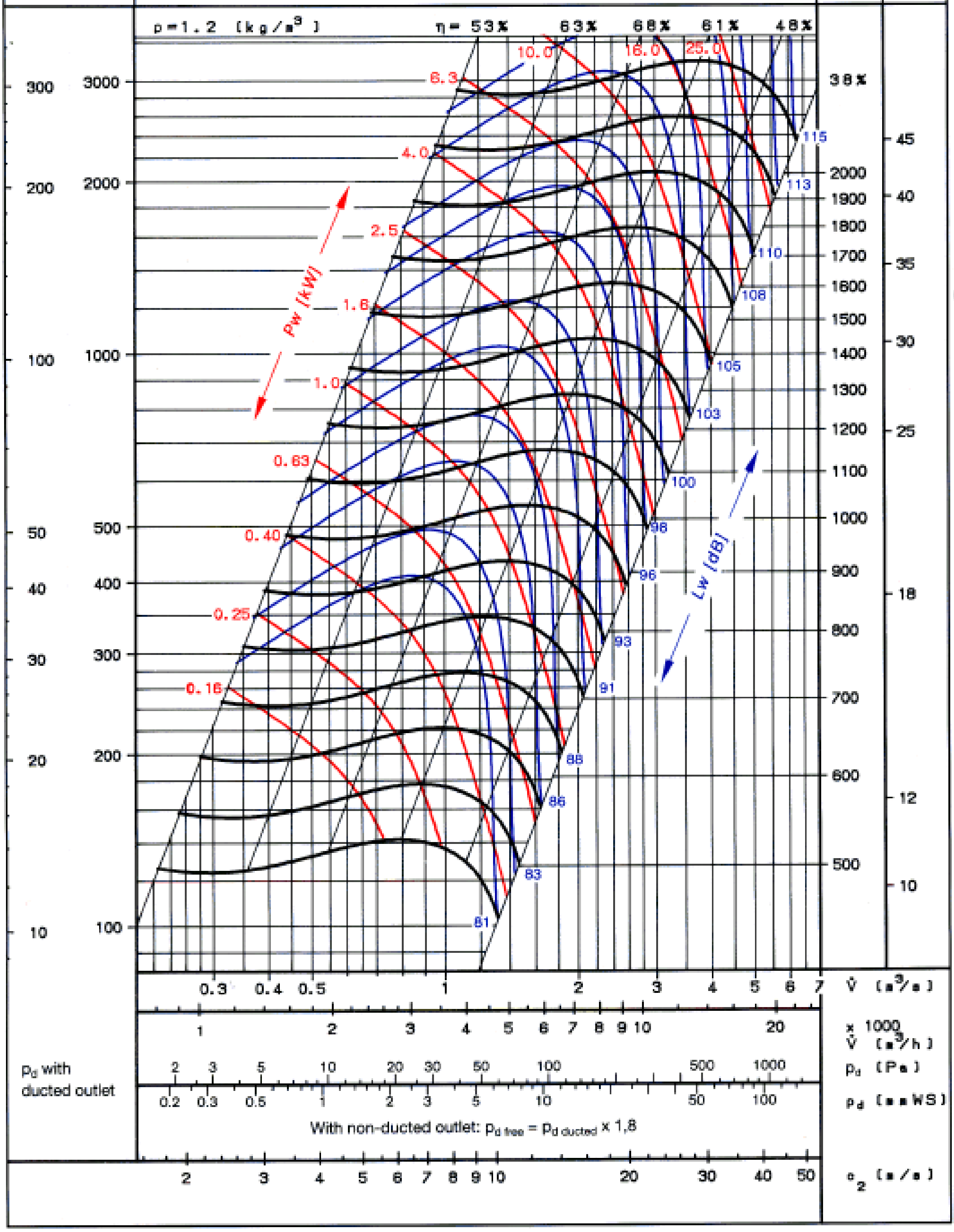
n_{max} = 3400 [min⁻¹]
Pw_{max} = 5.5 [kW]
ΔPt_{max} = 2400 [Pa]
z = 8
J = 0.12 [kgm²]



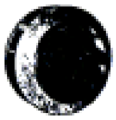
comefri	F - R - T - TG - LK	TLE 400



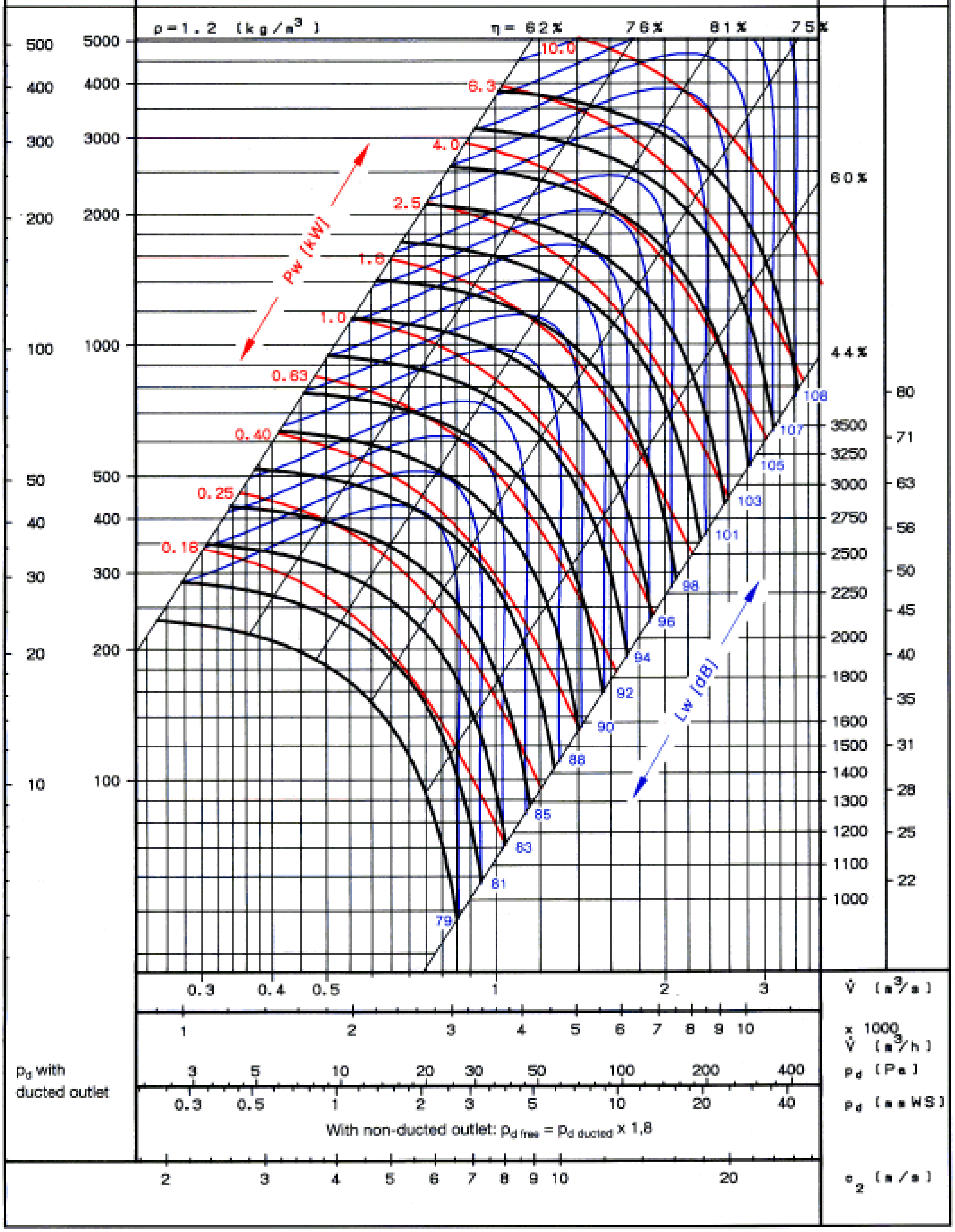
F - R			T-TG-LK		
n_{max}	= 1700	[min^{-1}]	n_{max}	= 1700	[min^{-1}]
Pw_{max}	= 6.3	[kW]	Pw_{max}	= 9.0	[kW]
ΔPt_{max}	= 2000	[Pa]	ΔPt_{max}	= 2000	[Pa]
z	= 38		z	= 38	
J	= 0.13	[kgm^2]	J	= 0.13	[kgm^2]



comefri	F - R - T - TG - LK	THLE 400

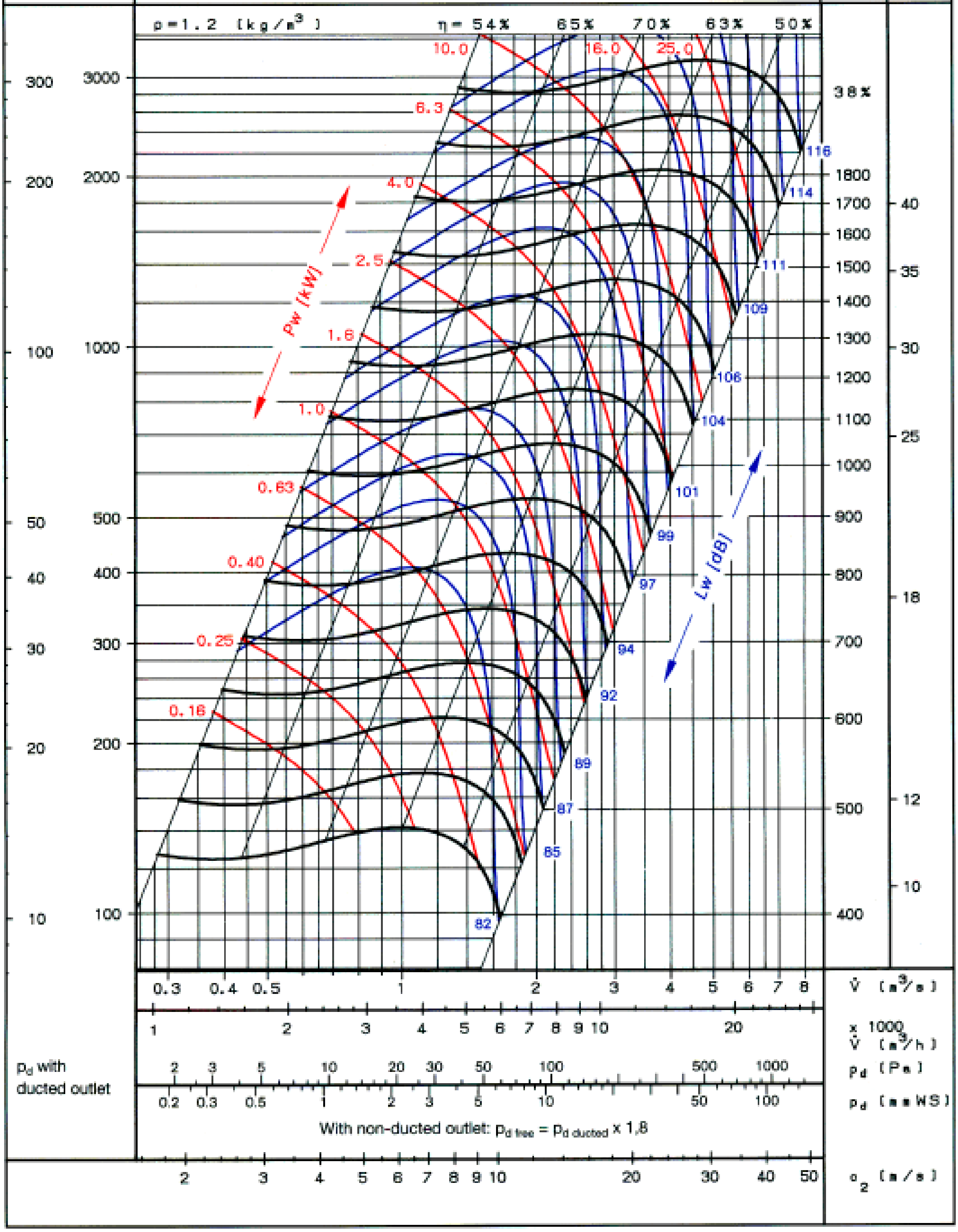


n_{max} = 3050 [min^{-1}]
Pw_{max} = 6.3 [kW]
ΔPt_{max} = 2200 [Pa]
z = 8
J = 0.23 [kgm^2]



comefri	F - R - T - TG - LK	TLE 450

	F - R			T-TG-LK		
n_{max}	= 1530	[min⁻¹]		= 1530	[min⁻¹]	
Pw_{max}	= 7.0	[kW]		= 11.0	[kW]	
ΔPt_{max}	= 2000	[Pa]		= 2000	[Pa]	
z	= 42			= 42		
J	= 0.19	[kgm²]		= 0.19	[kgm²]	

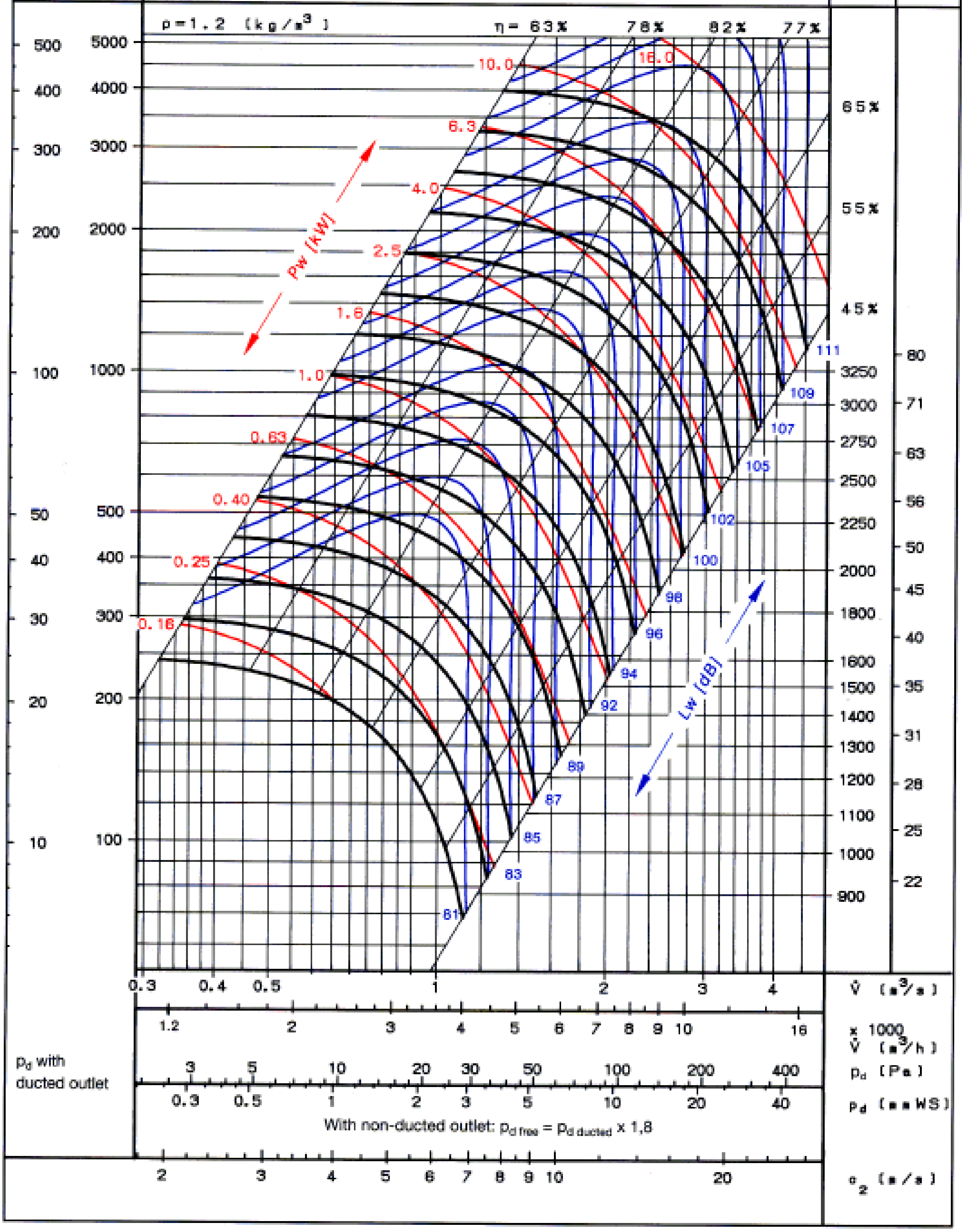


comefri

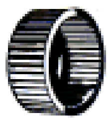
F - R - T - TG - LK

THLE 450

F - R			T - TG - LK		
n_{max}	= 3000	[min^{-1}]	n_{max}	= 3000	[min^{-1}]
Pw_{max}	= 6.3	[kW]	Pw_{max}	= 9.0	[kW]
ΔPt_{max}	= 3000	[Pa]	ΔPt_{max}	= 3000	[Pa]
z	= 8		z	= 8	
J	= 0.38	[kgm^2]	J	= 0.38	[kgm^2]



comefri | **F - R - T - TG - LK** | **TLE 500**

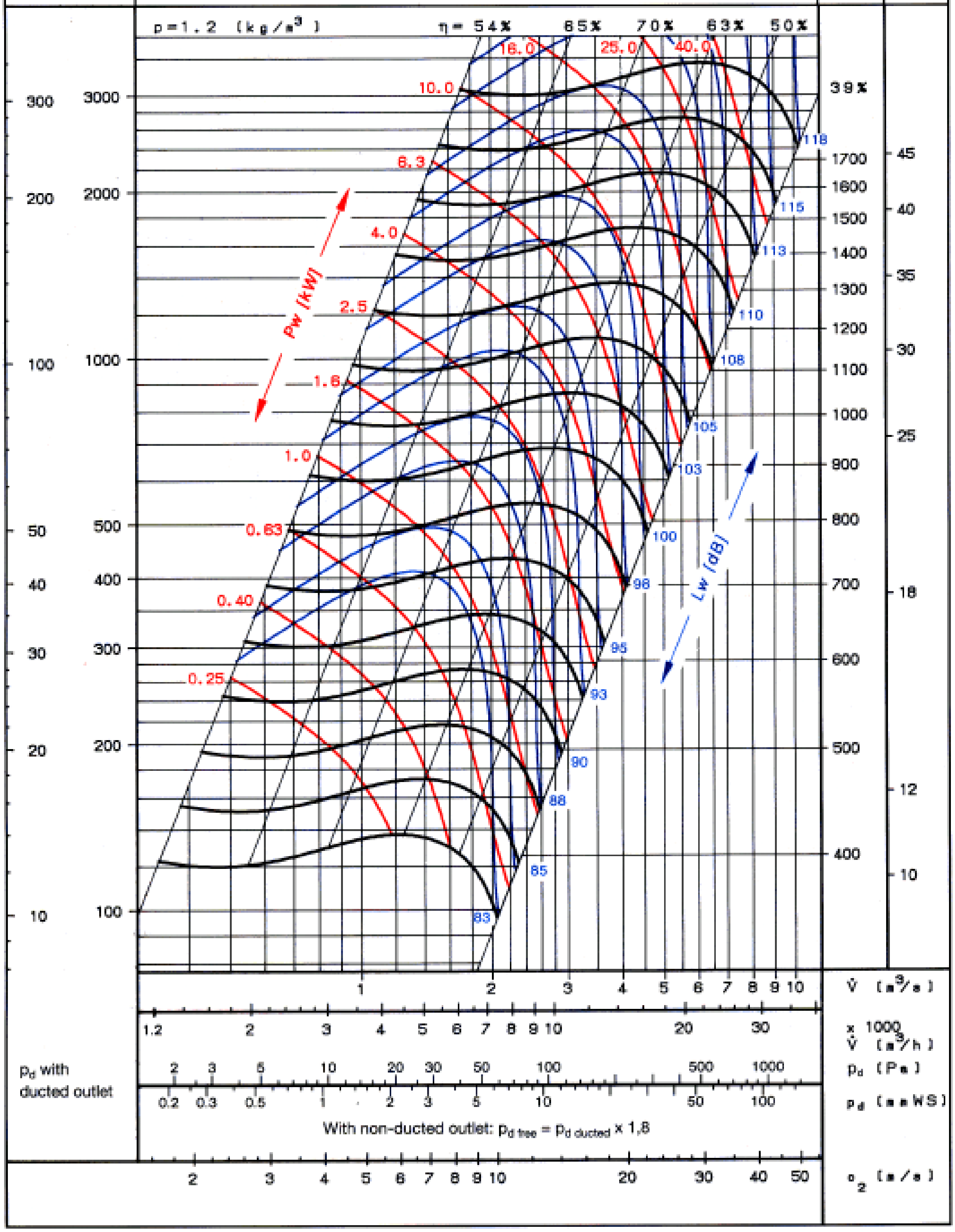


F - R

n_{max} = 1300 [min^{-1}]
Pw_{max} = 7.0 [kW]
ΔPt_{max} = 1800 [Pa]
z = 38
J = 0.42 [kgm^2]

T-TG-LK

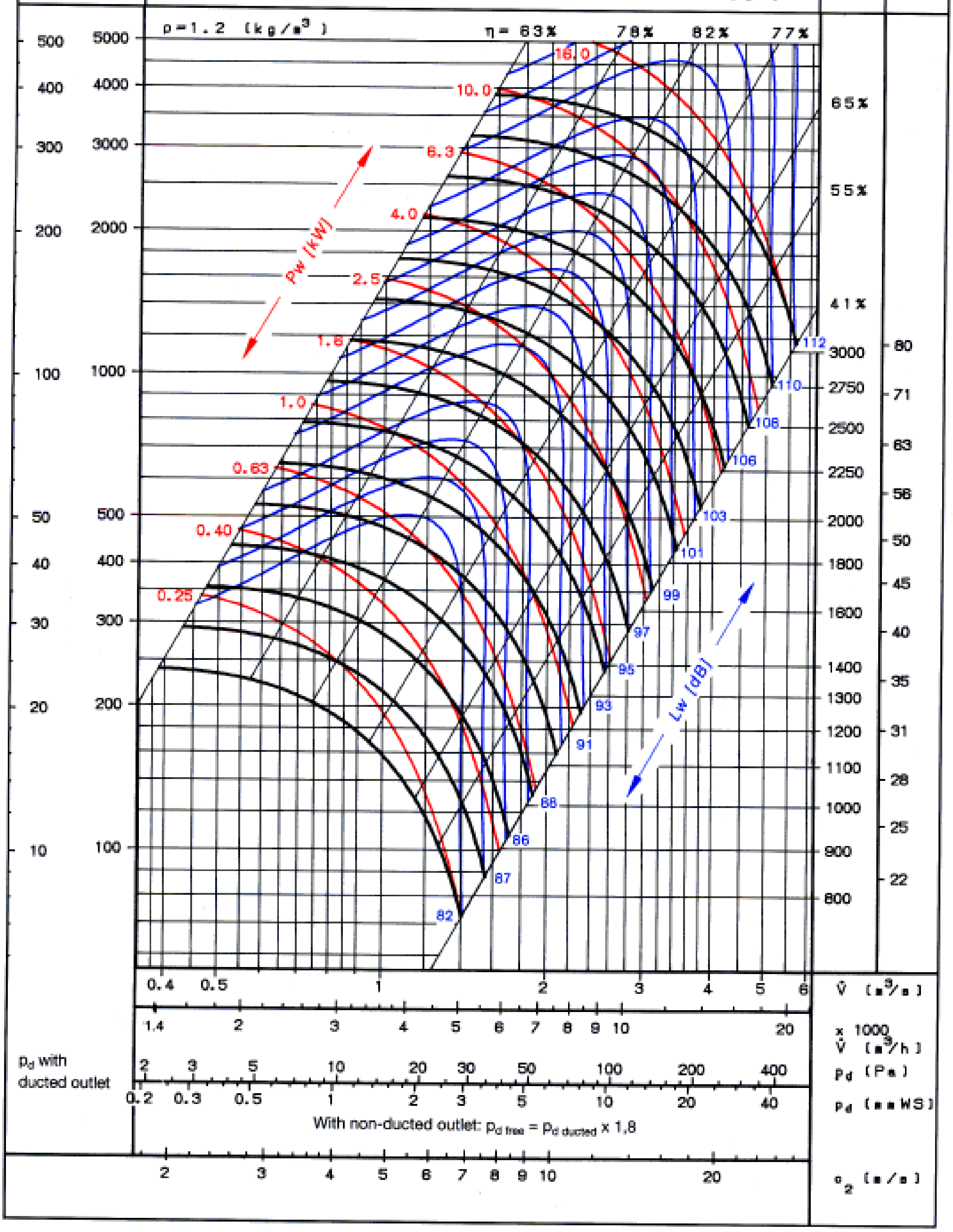
n_{max} = 1300 [min^{-1}]
Pw_{max} = 11.0 [kW]
ΔPt_{max} = 1800 [Pa]
z = 38
J = 0.42 [kgm^2]



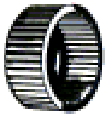
comefri	F - R - T - TG - LK	THLE 500

F - R: n_{max} = 2300 [min^{-1}]; Pw_{max} = 6.3 [kW]; ΔPt_{max} = 2300 [Pa]; z = 8; J = 0.56 [kgm^2]

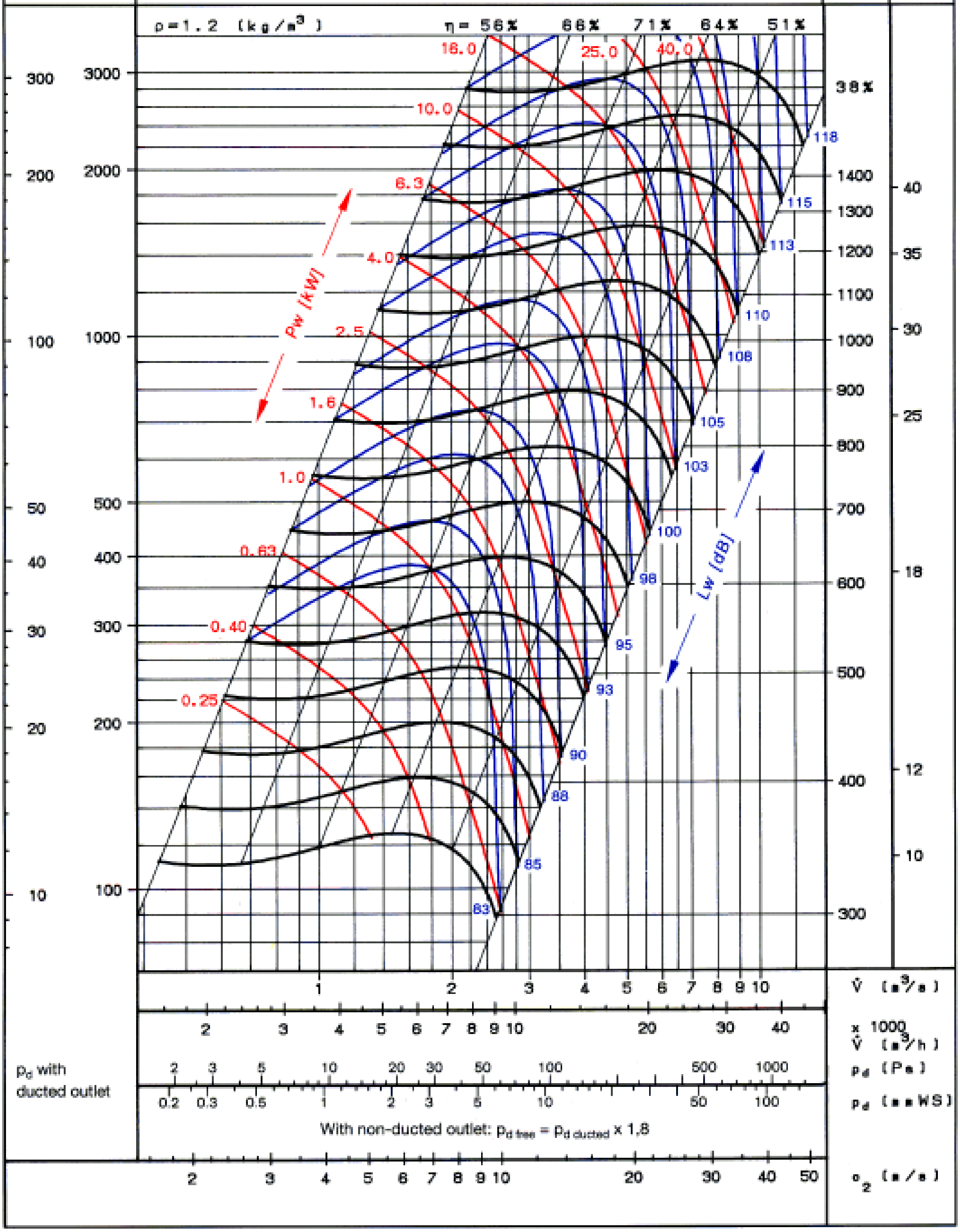
T - TG - LK: n_{max} = 2300 [min^{-1}]; Pw_{max} = 9.0 [kW]; ΔPt_{max} = 2300 [Pa]; z = 8; J = 0.56 [kgm^2]



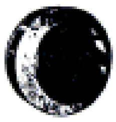
comefri	F - R - T - TG - LK	TLE 560



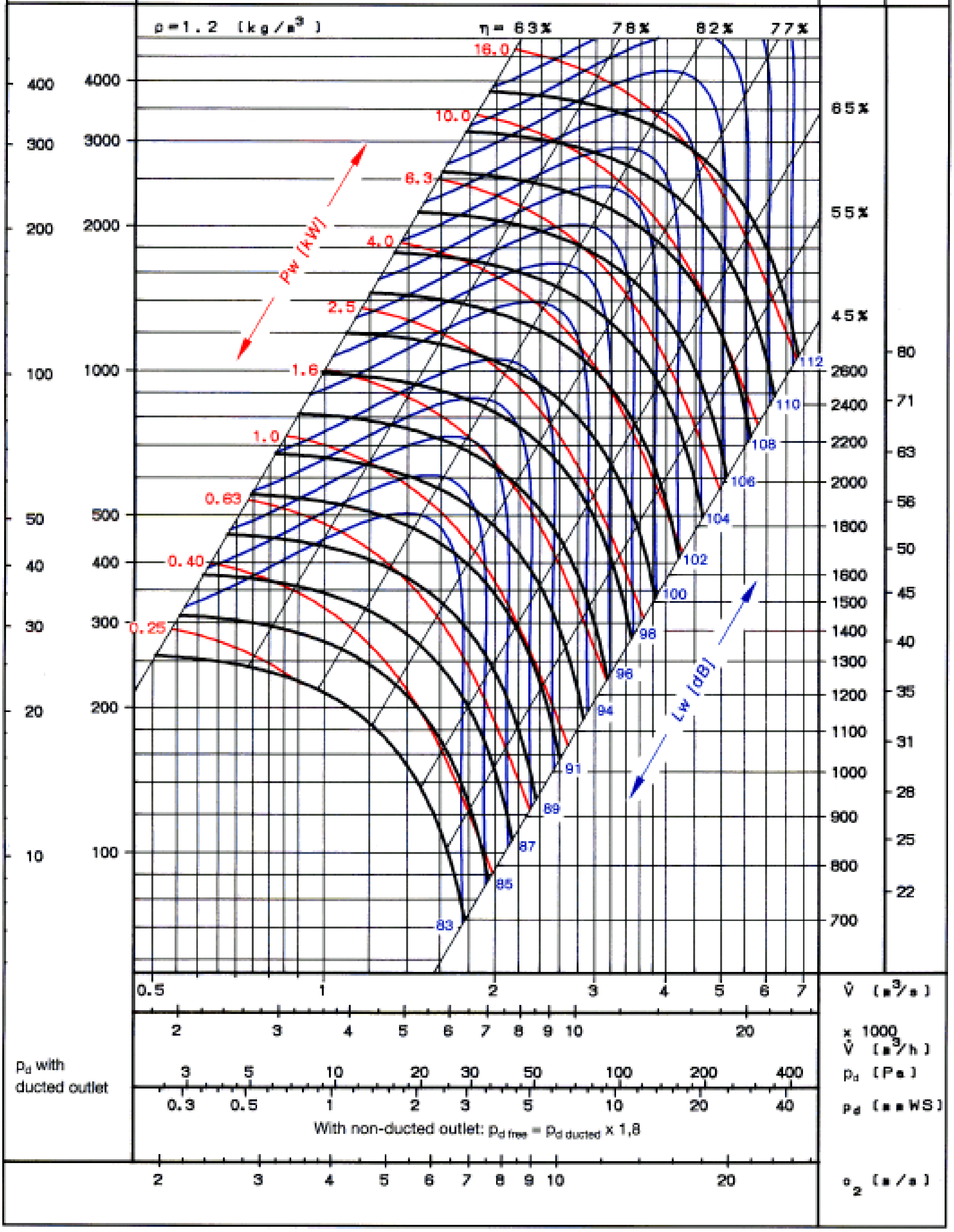
F - R			T - TG - LK		
n_{max}	= 1200	[min^{-1}]	n_{max}	= 1200	[min^{-1}]
Pw_{max}	= 10.0	[kW]	Pw_{max}	= 13.5	[kW]
ΔPt_{max}	= 2000	[Pa]	ΔPt_{max}	= 2000	[Pa]
z	= 42		z	= 42	
J	= 0.66	[kgm^2]	J	= 0.66	[kgm^2]



comefri	F - R - T - TG - LK	THLE 560

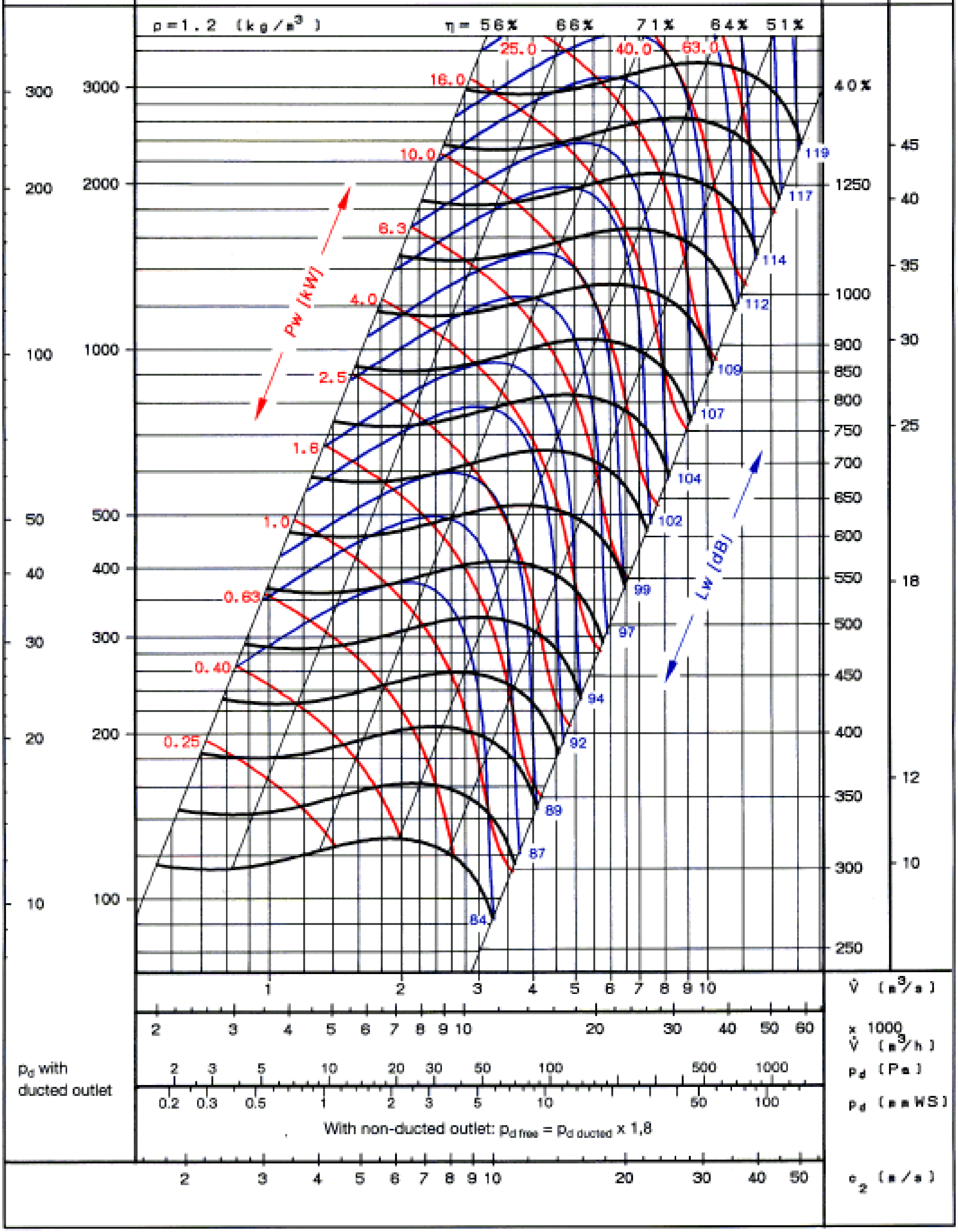


F - R			T-TG-LK		
n_{max}	= 2000	[min^{-1}]	n_{max}	= 2000	[min^{-1}]
Pw_{max}	= 6.3	[kW]	Pw_{max}	= 11.0	[kW]
ΔPt_{max}	= 2200	[Pa]	ΔPt_{max}	= 2200	[Pa]
z	= 8		z	= 8	
J	= 0.92	[kgm^2]	J	= 0.92	[kgm^2]

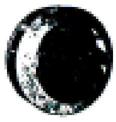


comefri	F - R - T - TG - LK	TLE 630

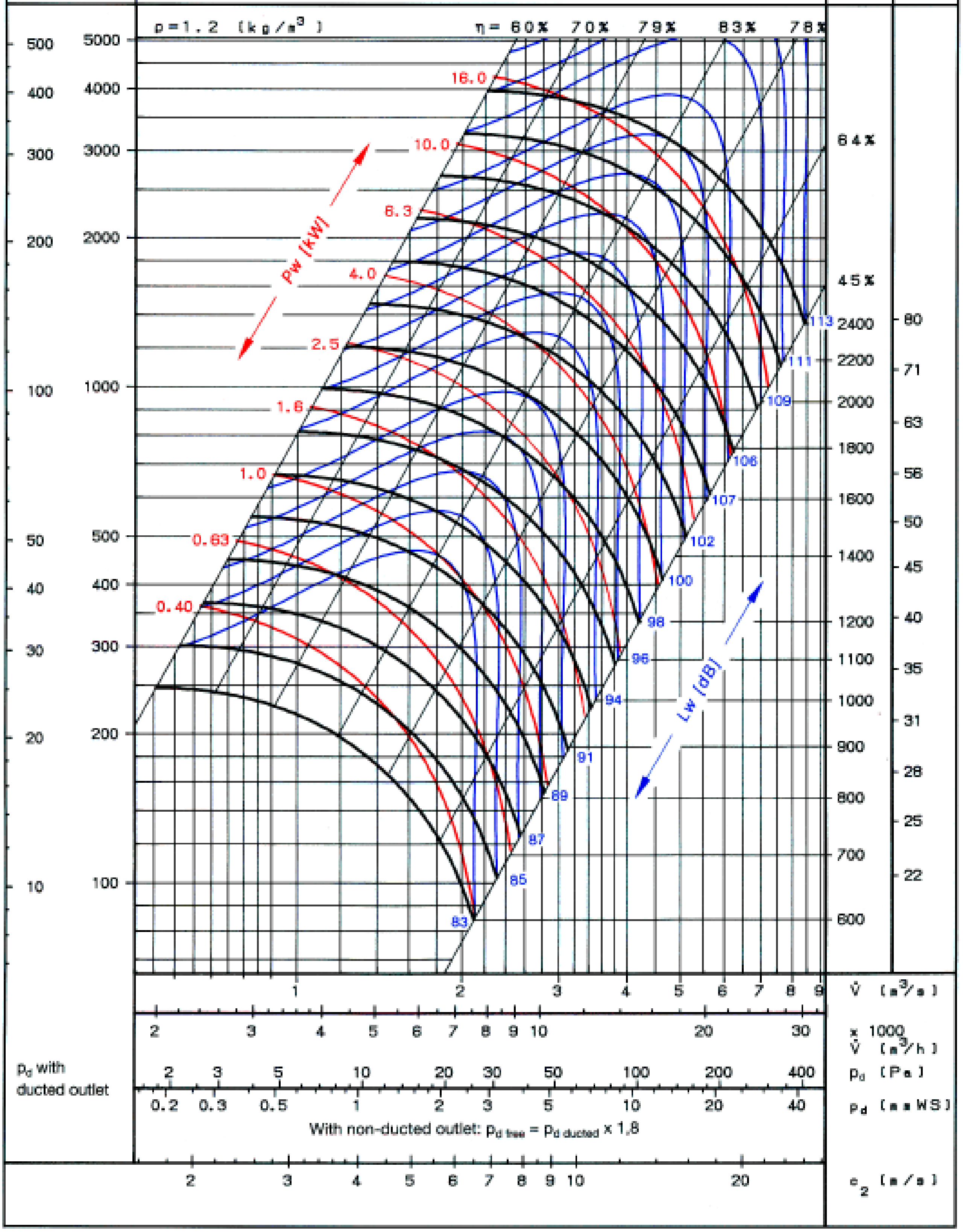
	F - R			T - TG - LK		
	n_{max}	= 1000	$[min^{-1}]$	n_{max}	= 1000	$[min^{-1}]$
	Pw_{max}	= 10.0	[kW]	Pw_{max}	= 13.5	[kW]
	ΔPt_{max}	= 1800	[Pa]	ΔPt_{max}	= 1800	[Pa]
	z	= 38		z	= 38	
	J	= 1.20	$[kgm^2]$	J	= 1.20	$[kgm^2]$



comefri	F - R - T - TG - LK	THLE 630

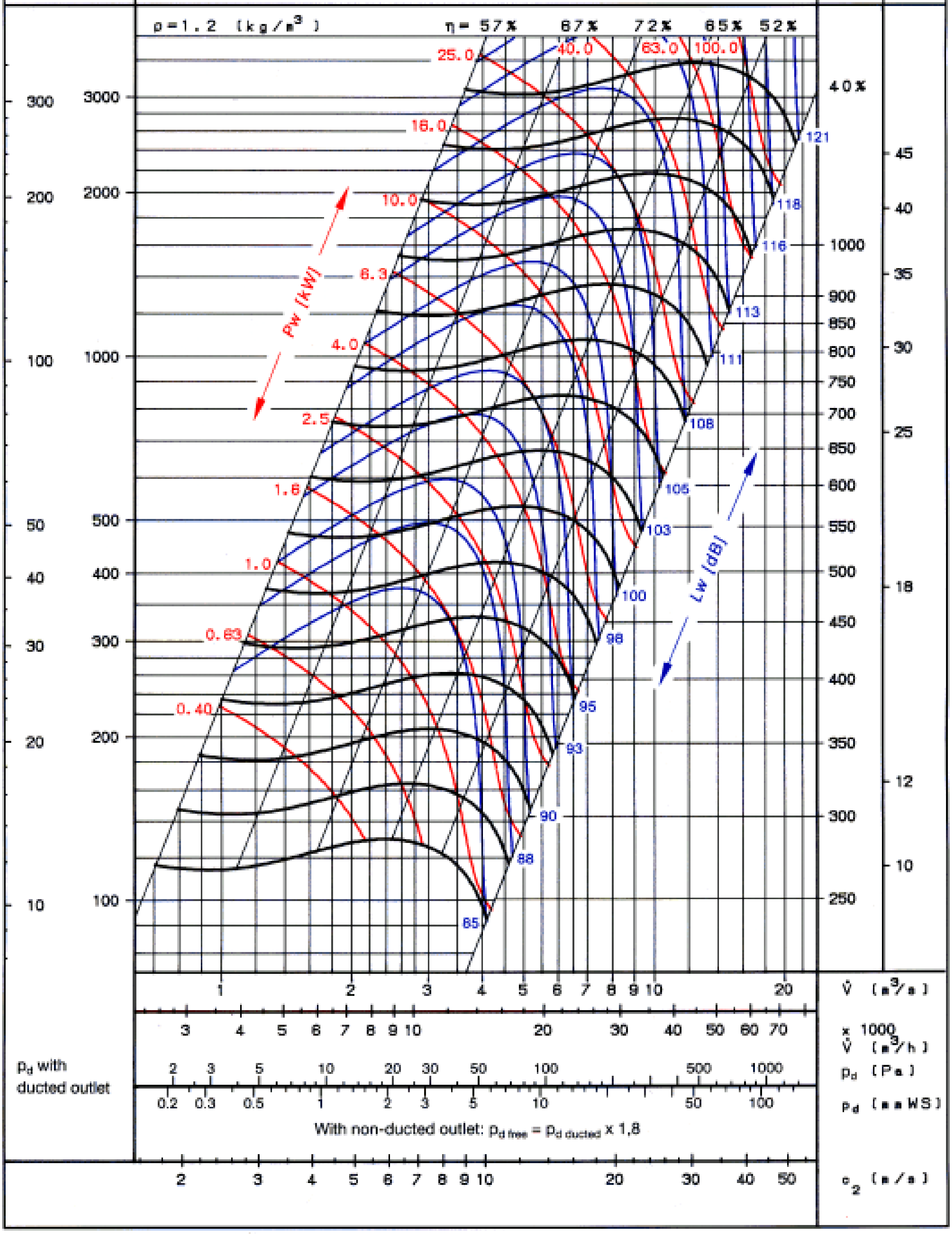


F - R			T-TG-LK		
n_{max}	= 1700	[min^{-1}]	n_{max}	= 1700	[min^{-1}]
Pw_{max}	= 7.0	[kW]	Pw_{max}	= 11.0	[kW]
ΔPt_{max}	= 2000	[Pa]	ΔPt_{max}	= 2000	[Pa]
z	= 8		z	= 8	
J	= 1.44	[kgm^2]	J	= 1.44	[kgm^2]

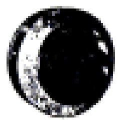


comefri	F - R - T - TG - LK	TLE 710

F - R			T-TG-LK		
n_{max}	= 850	[min^{-1}]	n_{max}	= 850	[min^{-1}]
Pw_{max}	= 11.0	[kW]	Pw_{max}	= 14.0	[kW]
ΔPt_{max}	= 1700	[Pa]	ΔPt_{max}	= 1700	[Pa]
z	= 42		z	= 42	
J	= 1.92	[kgm^2]	J	= 1.92	[kgm^2]

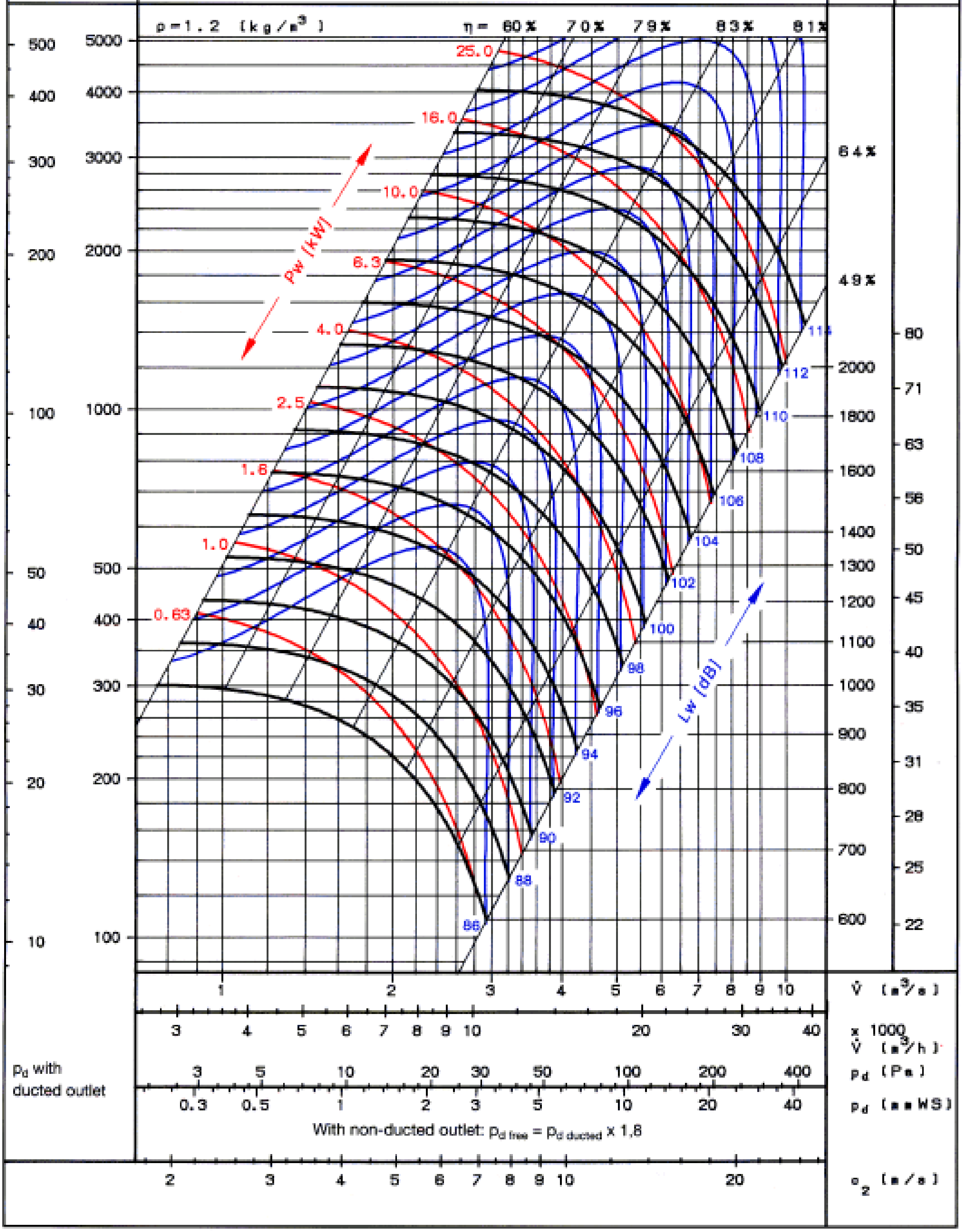


comefri | **F - R - T - TG - LK** | **THLE 710**

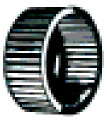


F - R
n_{max} = 1650 [min^{-1}]
Pw_{max} = 11.0 [kW]
ΔPt_{max} = 2200 [Pa]
z = 8
J = 2.36 [kgm^2]

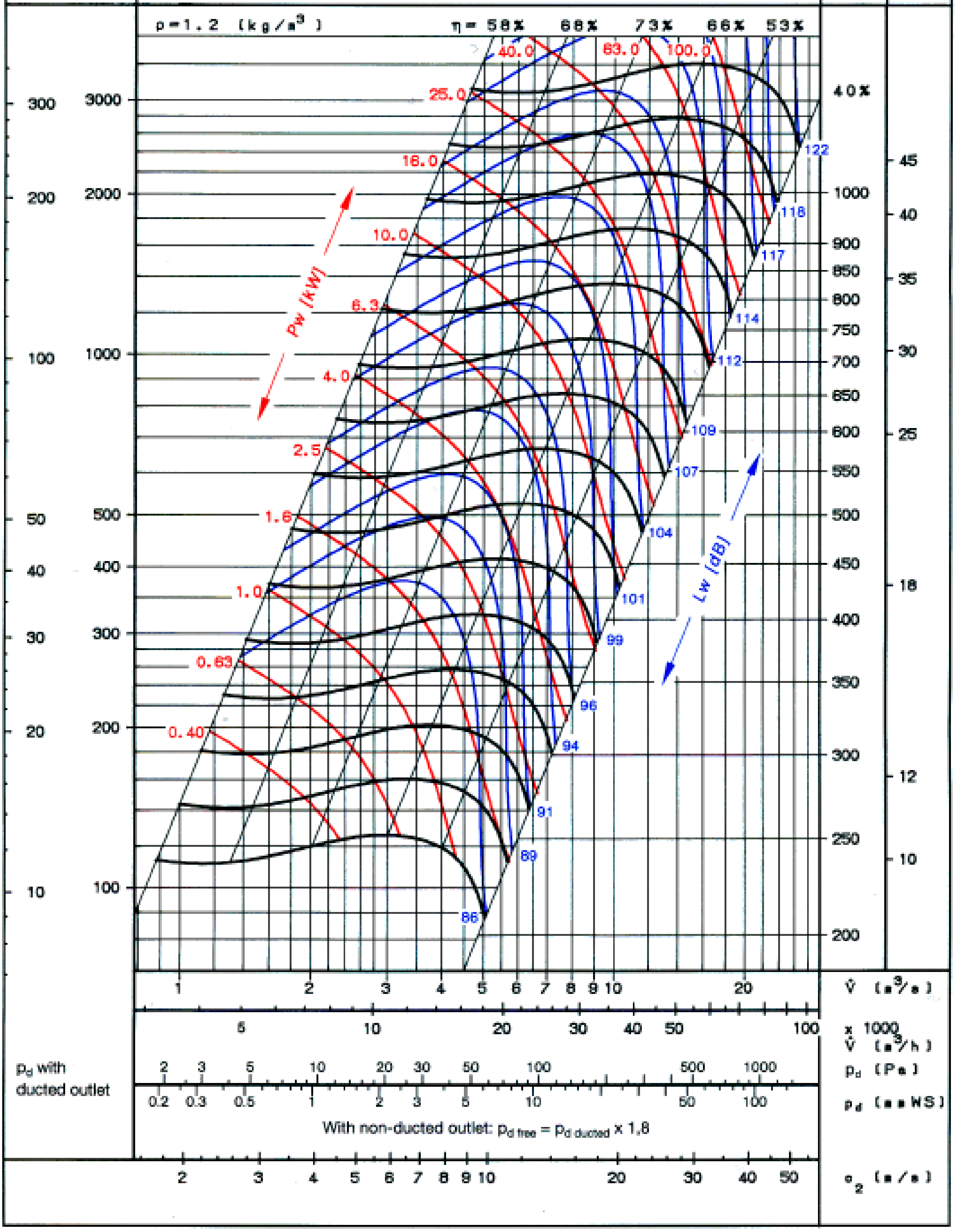
T - TG - LK
n_{max} = 1650 [min^{-1}]
Pw_{max} = 18.0 [kW]
ΔPt_{max} = 2200 [Pa]
z = 8
J = 2.36 [kgm^2]



comefri	T - TG - LK	TLE 800



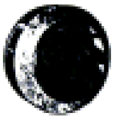
n_{max} = 750 [min^{-1}]
Pw_{max} = 20.0 [kW]
ΔPt_{max} = 1600 [Pa]
z = 38
J = 3.01 [kgm^2]



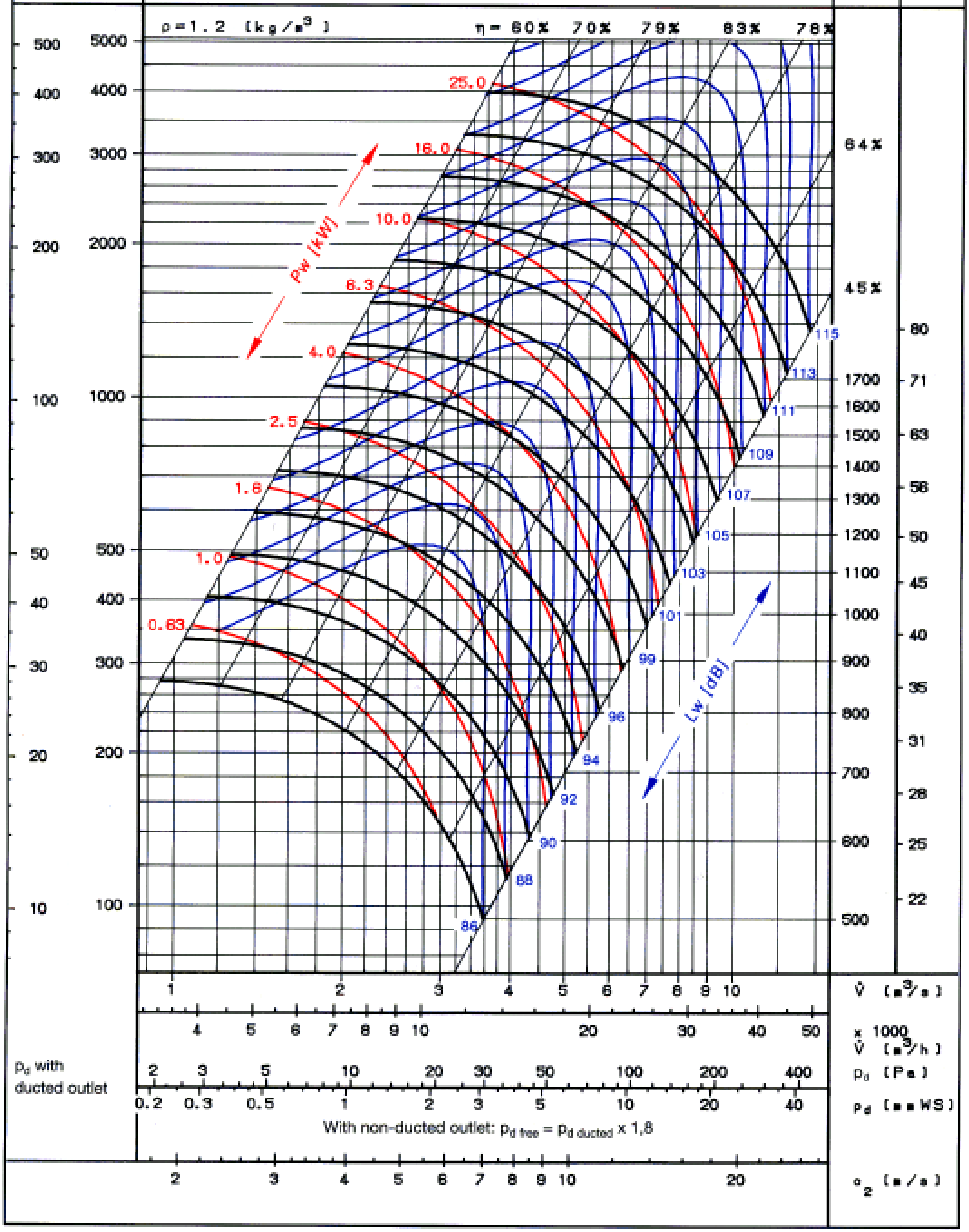
comefri

T - TG - LK

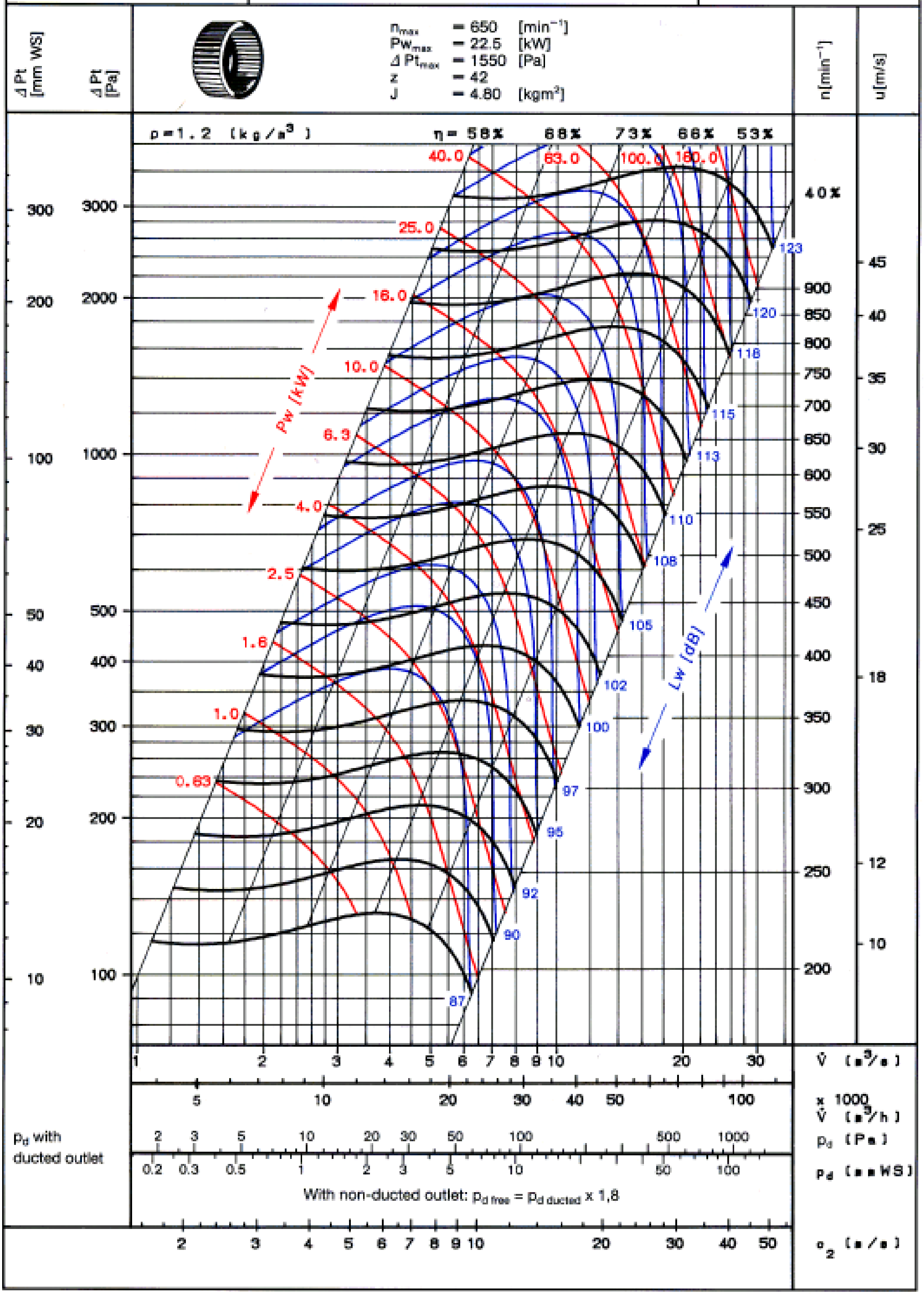
THLE 800



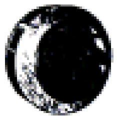
n_{max} = 1500 [min^{-1}]
Pw_{max} = 18.0 [kW]
ΔPt_{max} = 2500 [Pa]
z = 8
J = 4.47 [kgm^2]



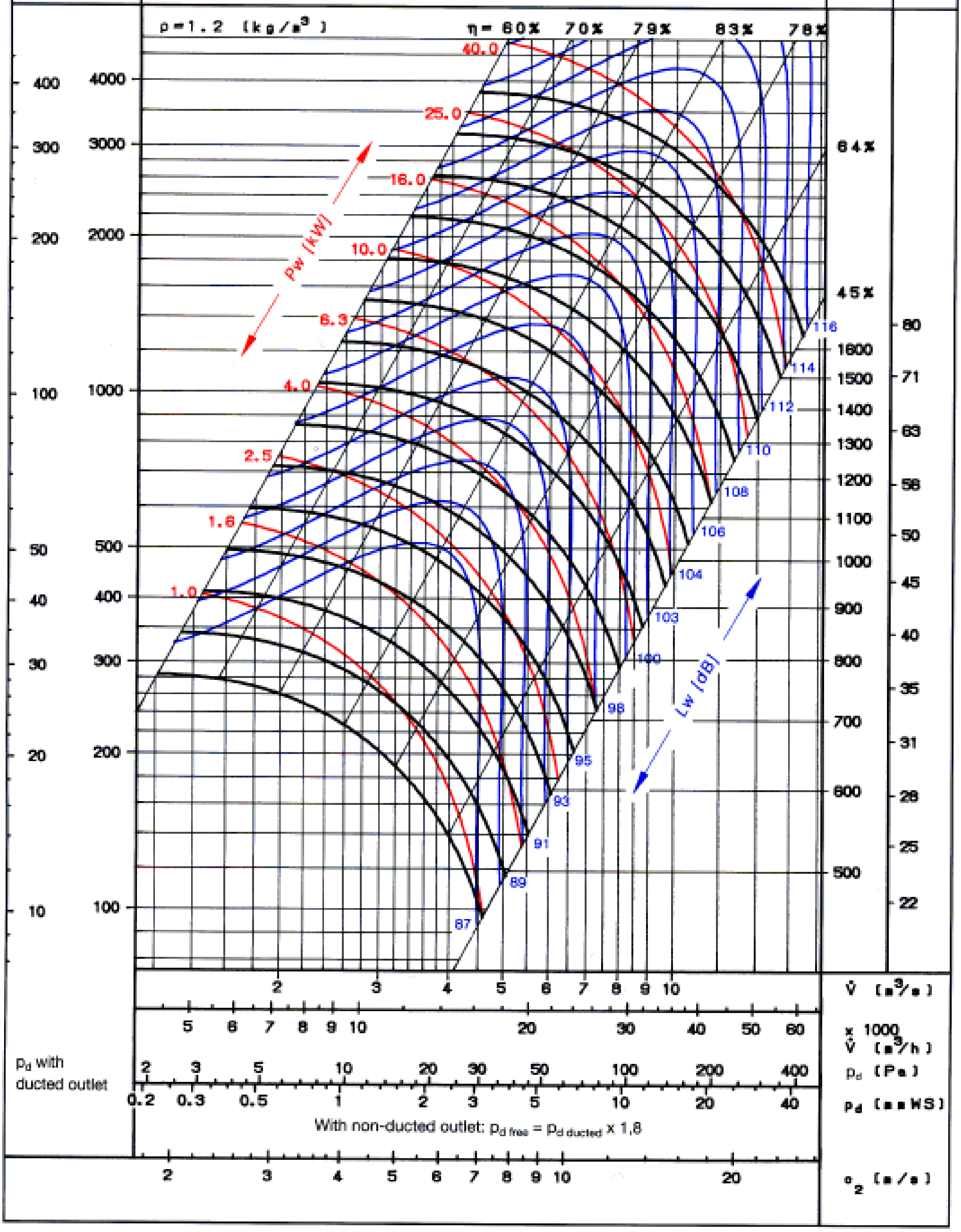
comefri	T - TG - LK	TLE 900



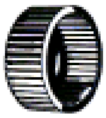
comefri | **T - TG - LK** | **THLE 900**



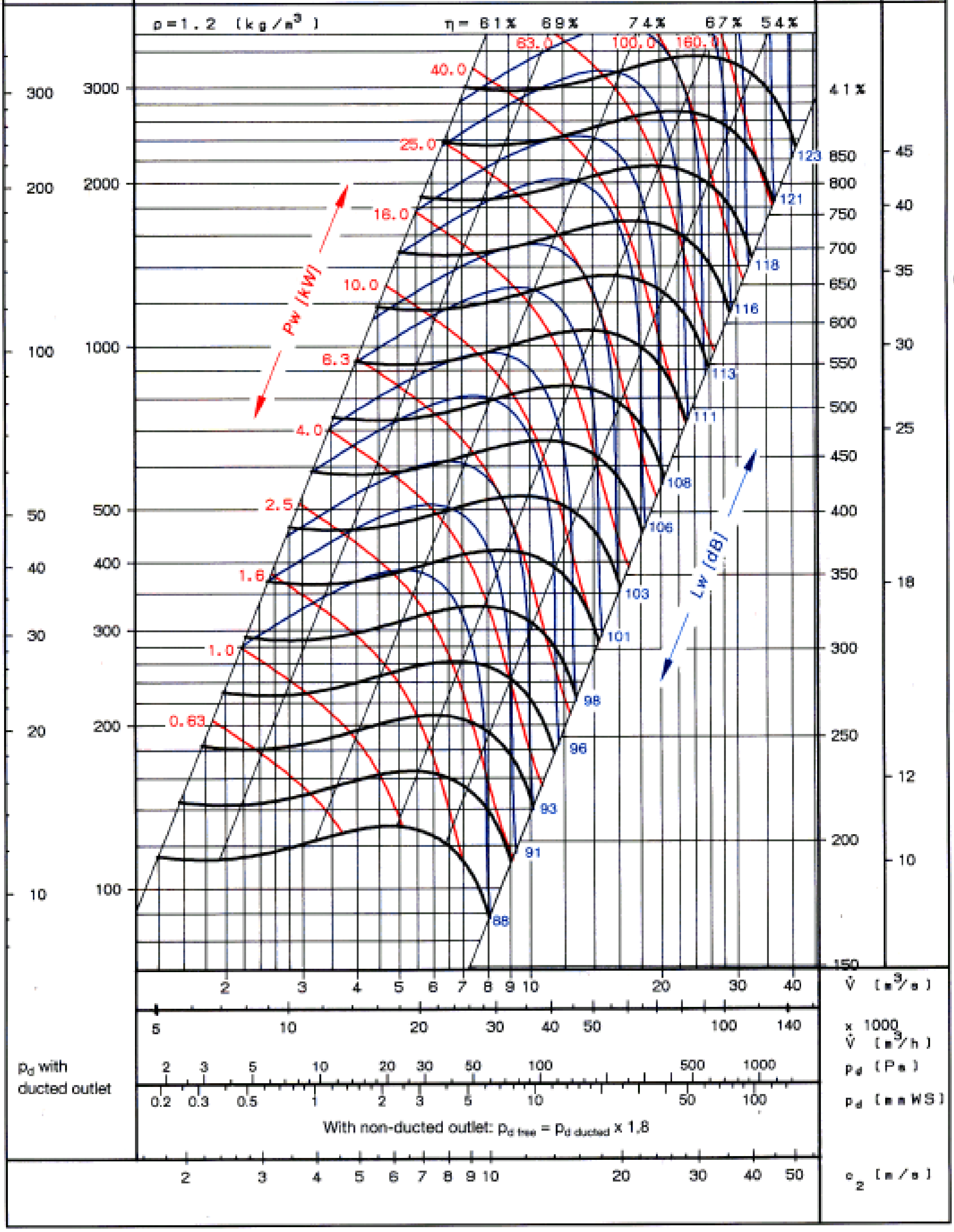
n_{max} = 1450 [min^{-1}]
Pw_{max} = 30.0 [kW]
ΔPt_{max} = 2800 [Pa]
z = 8
J = 8.06 [kgm^2]



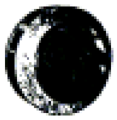
comefri	T - TG - LK	TLE 1000



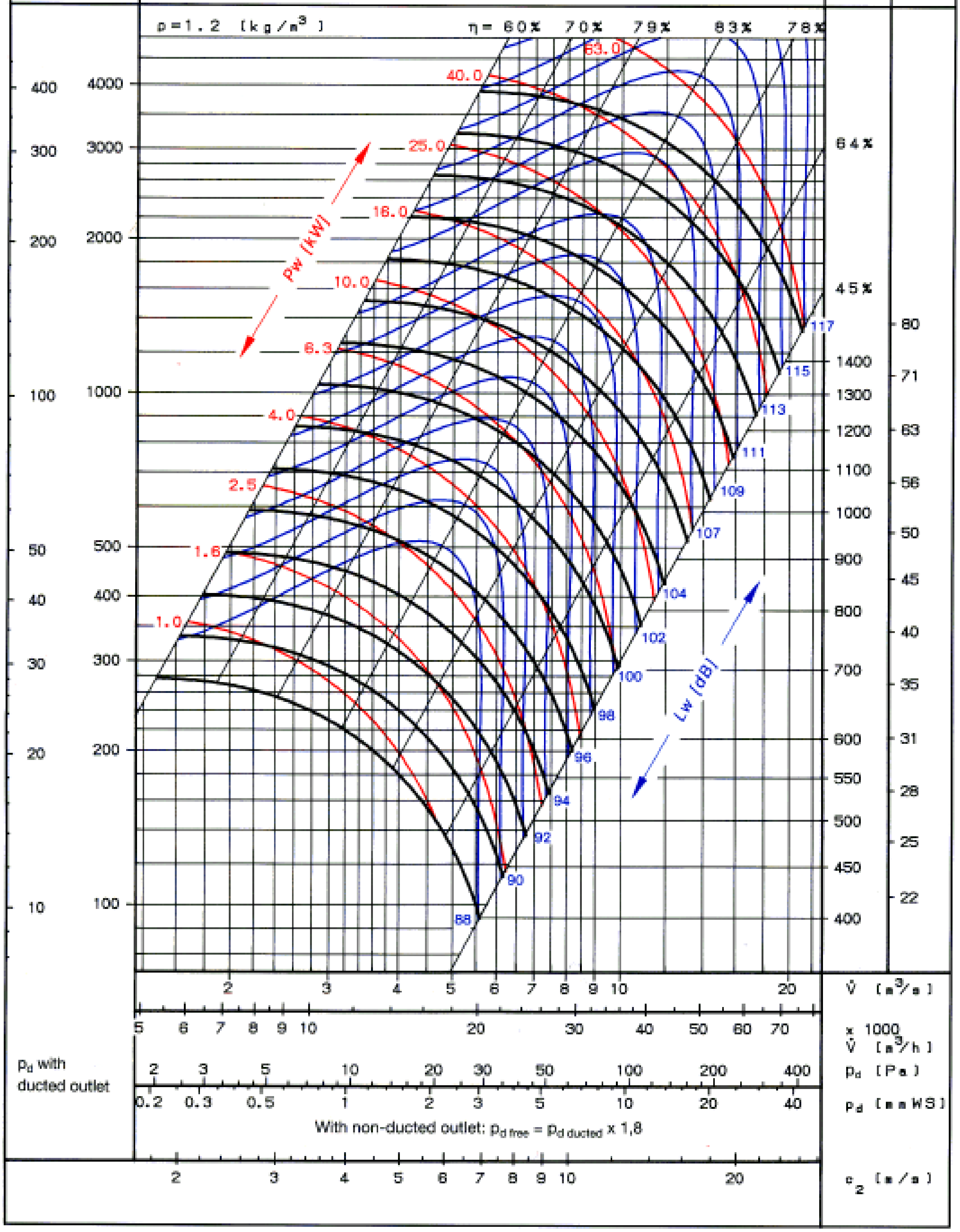
n_{max} = 600 [min^{-1}]
Pw_{max} = 30.0 [kW]
ΔPt_{max} = 1600 [Pa]
z = 48
J = 7.52 [kgm^2]



comefri	T - TG - LK	THLE 1000



n_{max} = 1250 [min^{-1}]
Pw_{max} = 35.0 [kW]
ΔPt_{max} = 2600 [Pa]
z = 8
J = 12.45 [kgm²]



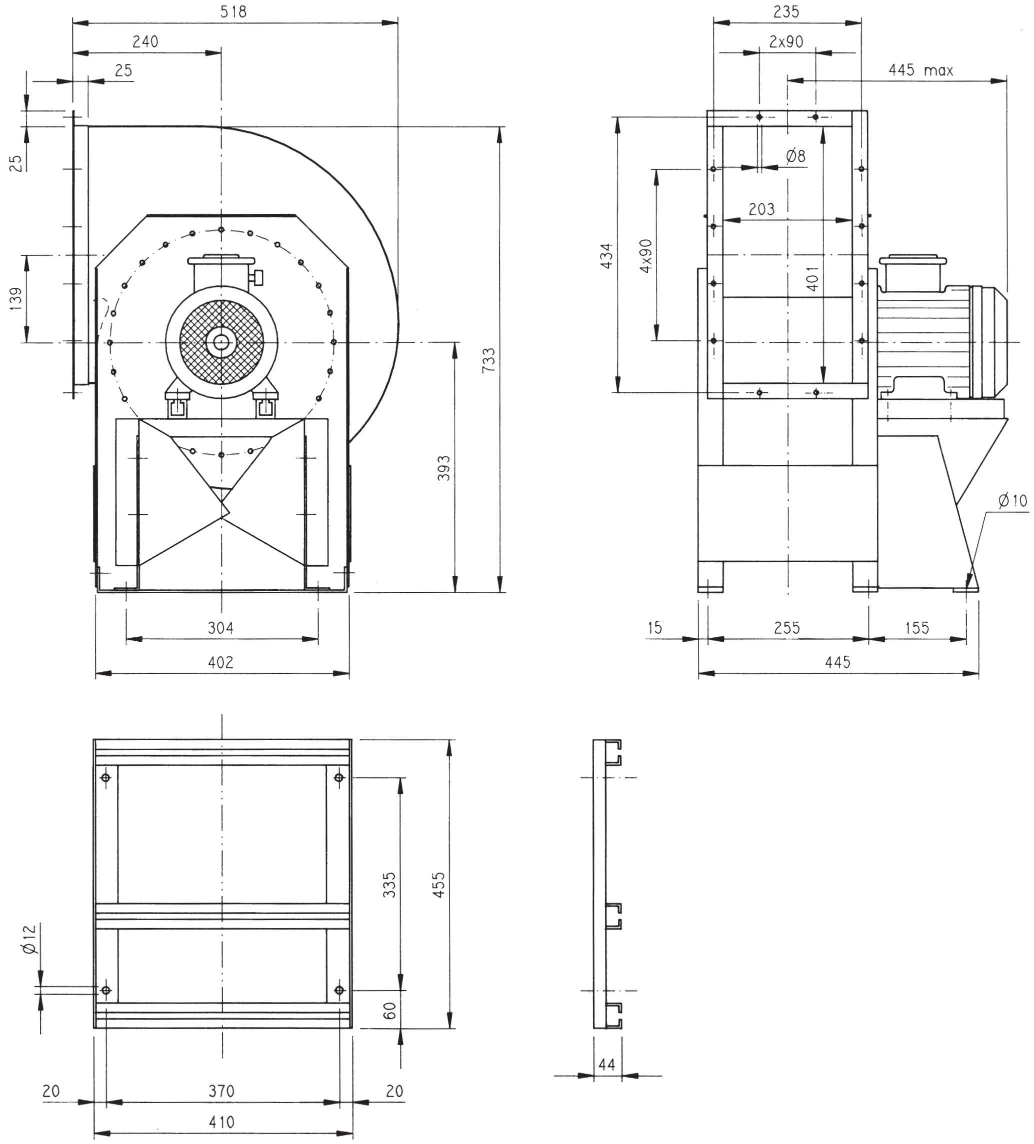
20. DIMENSIONS FOR DIRECT DRIVEN SERIES OF FANS

Series:

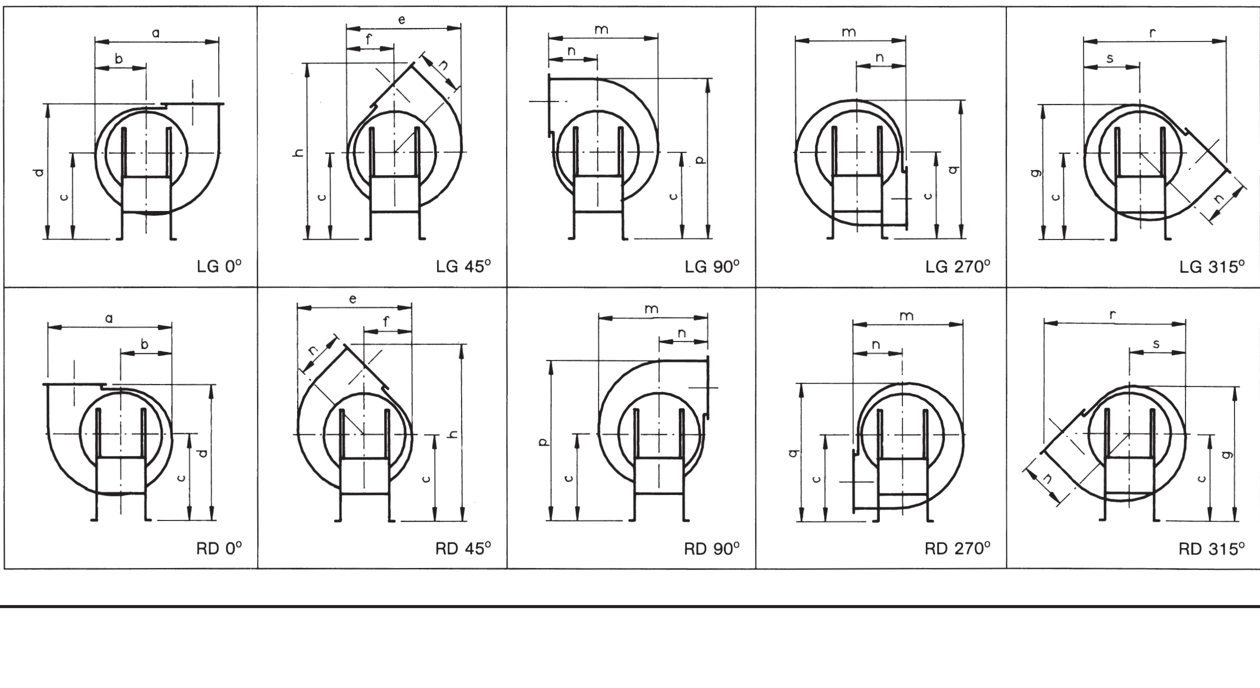
- TLE 315 ÷ 630 MK
- THLE 315 ÷ 1000 MK
- TLE 315 ÷ 630 MF
- THLE 315 ÷ 630 MF
- TLE 200 ÷ 630 RMF
- THLE 200 ÷ 1000 RMF
- TLE 200 ÷ 630 RMFV
- THLE 200 ÷ 1000 RMFV

comefri

TLE/THLE 315 MK

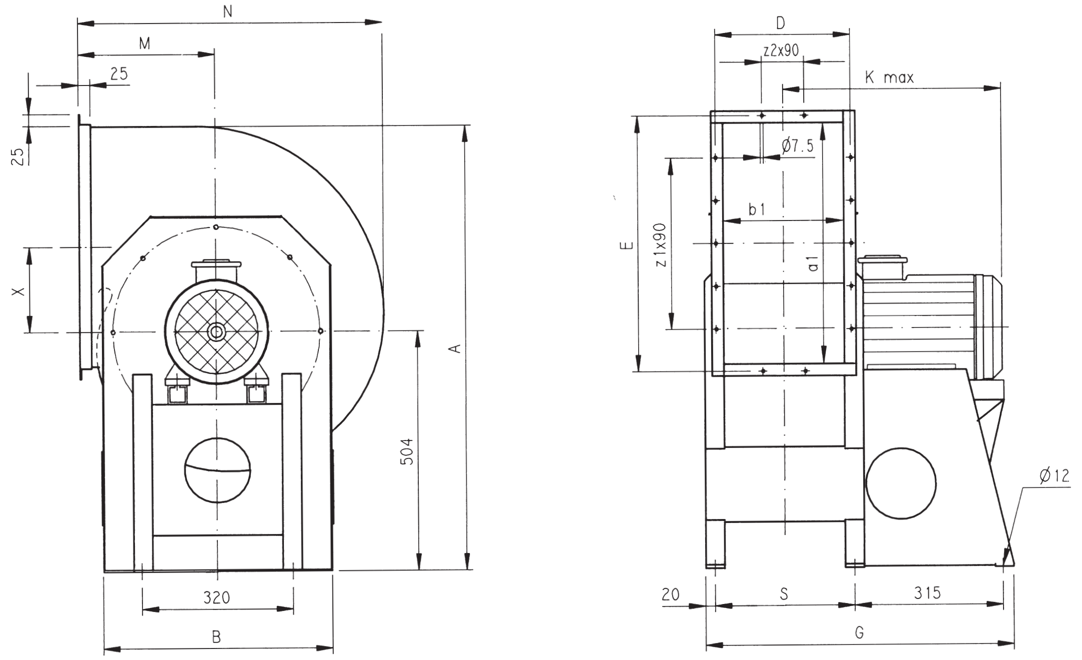


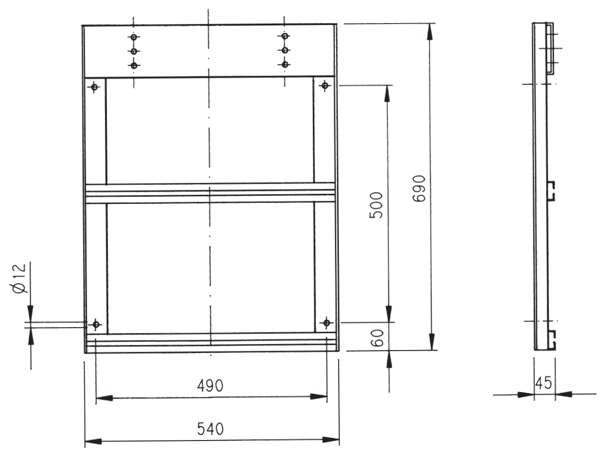
	a	b	c	d	e	f	g	h	m	n	p	q	r	s
315	575	233	393	633	520	213	609	820	518	240	735	626	68	254



comefri

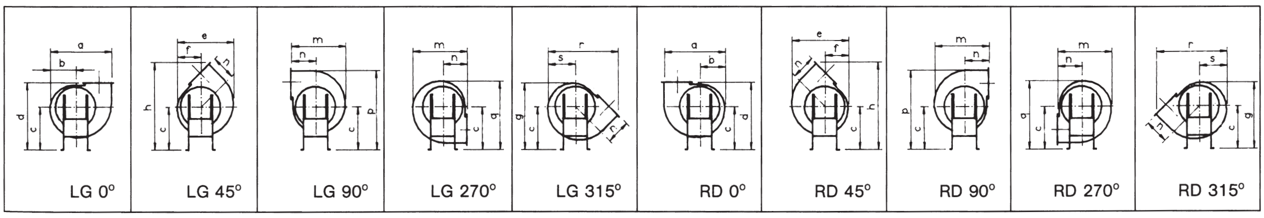
TLE/THLE 315 MK





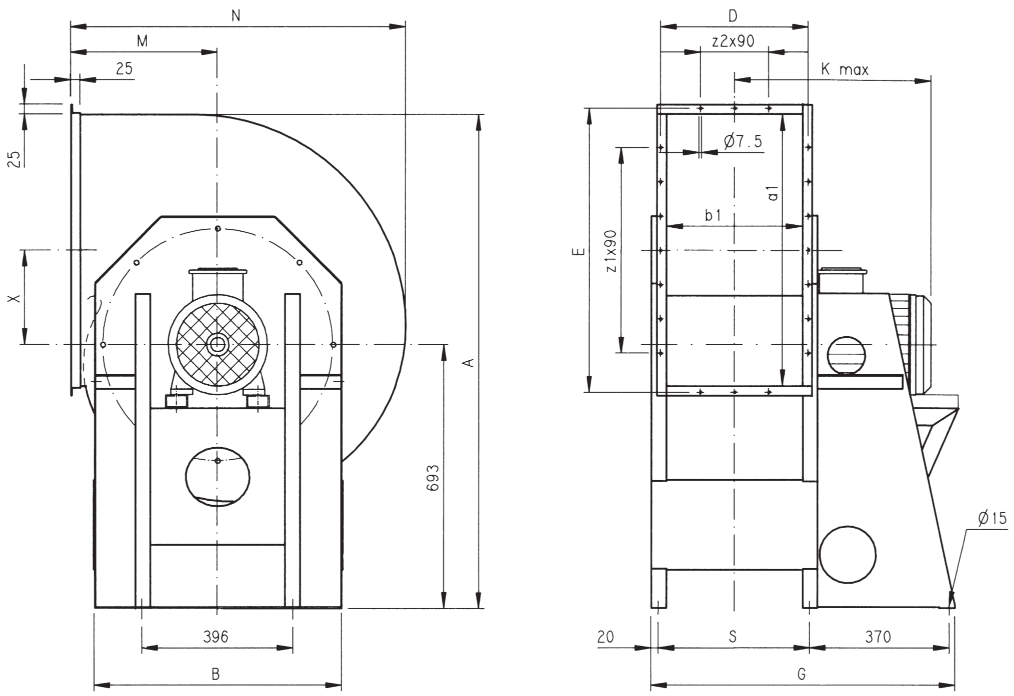
	A	B	D	E	G	K_{max}	M	N	S	X	a1	b1	z1	z2
355	889	441	259	483	627	520	265	586	272	158	453	229	4	2
400	937	486	286	537	654	535	294	649	299	179	507	256	5	2
450	991	536	318	599	687	550	326	726	332	202	569	288	6	3

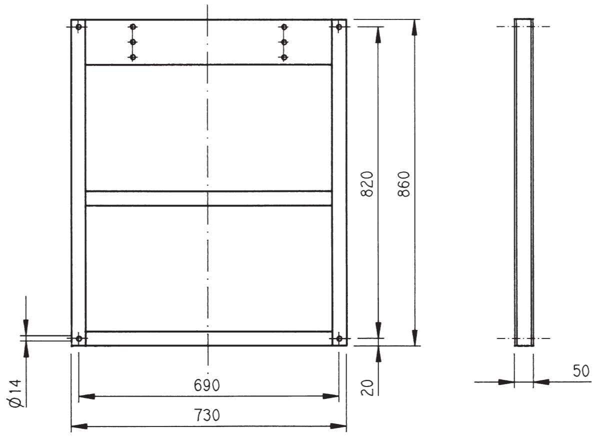
	a	b	c	d	e	f	g	h	m	n	p	q	r	s
355	647	262	504	769	590	245	747	979	586	265	889	766	760	286
400	728	295	504	798	665	274	779	1034	649	294	937	799	834	322
450	819	332	504	830	742	308	814	1092	726	326	991	836	950	362



comefri

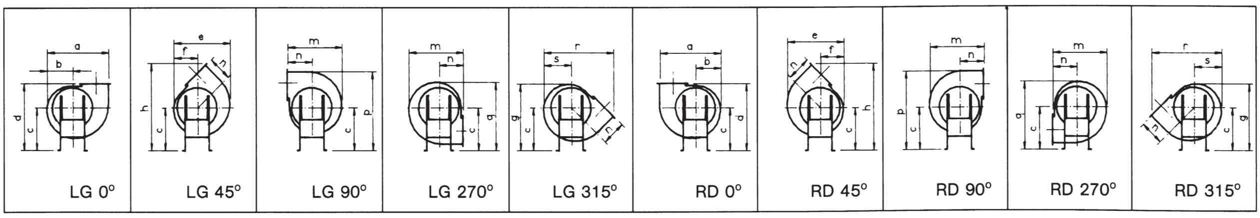
TLE/THLE 500÷ 630 MK



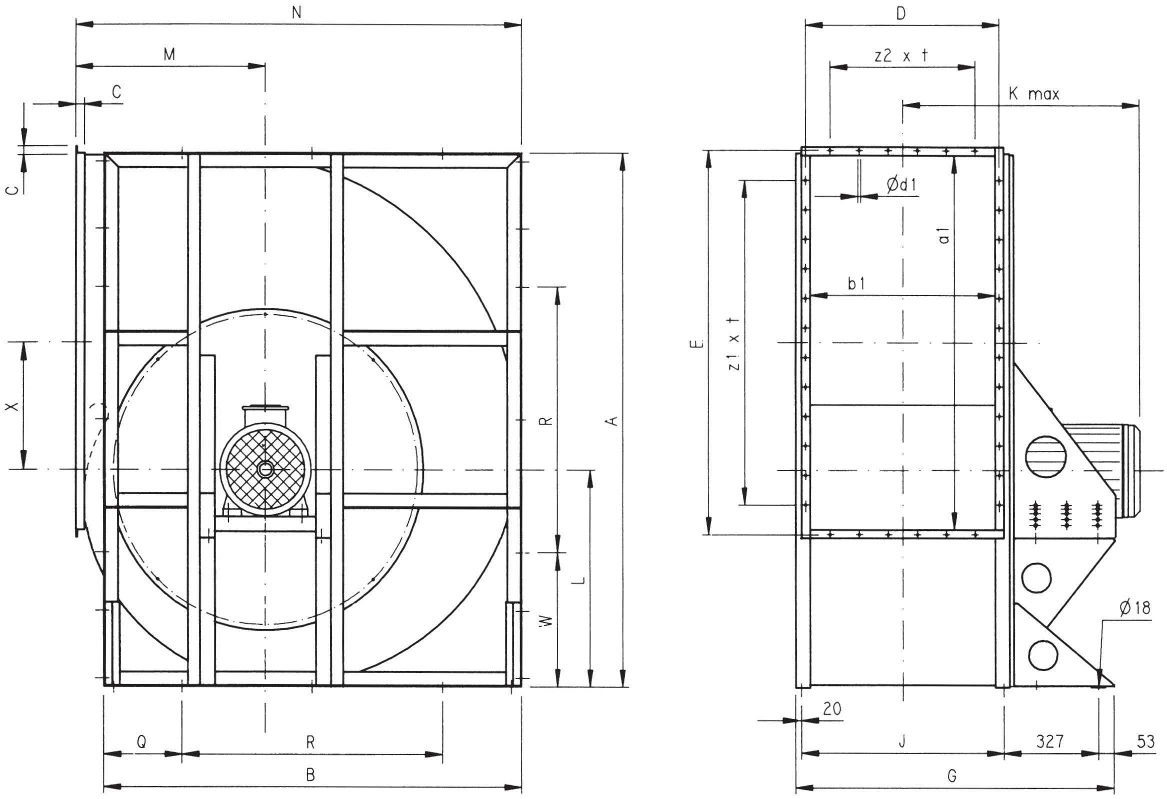


	A	B	D	E	G	K_{max}	M	N	S	X	a1	b1	z1	z2
500	1233	596	352	668	780	700	357	800	362	221	638	322	6	3
560	1298	656	391	745	820	720	395	891	401	248	715	361	7	3
630	1374	726	434	831	860	740	439	997	444	280	801	404	8	4

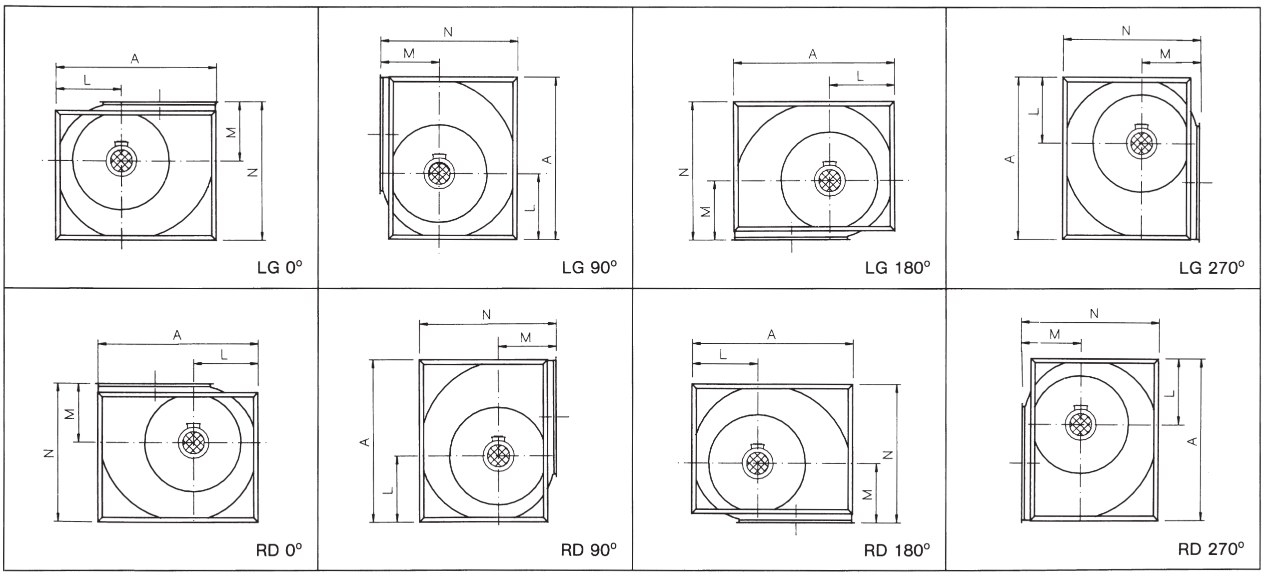
	a	b	c	d	e	f	g	h	m	n	p	q	r	s
500	908	368	693	1050	825	338	1036	1342	795	352	1233	1061	1051	402
560	1017	412	693	1088	930	384	1077	1415	887	390	1298	1105	1173	451
630	1144	463	693	1132	1047	432	1125	1500	993	434	1374	1156	1314	508

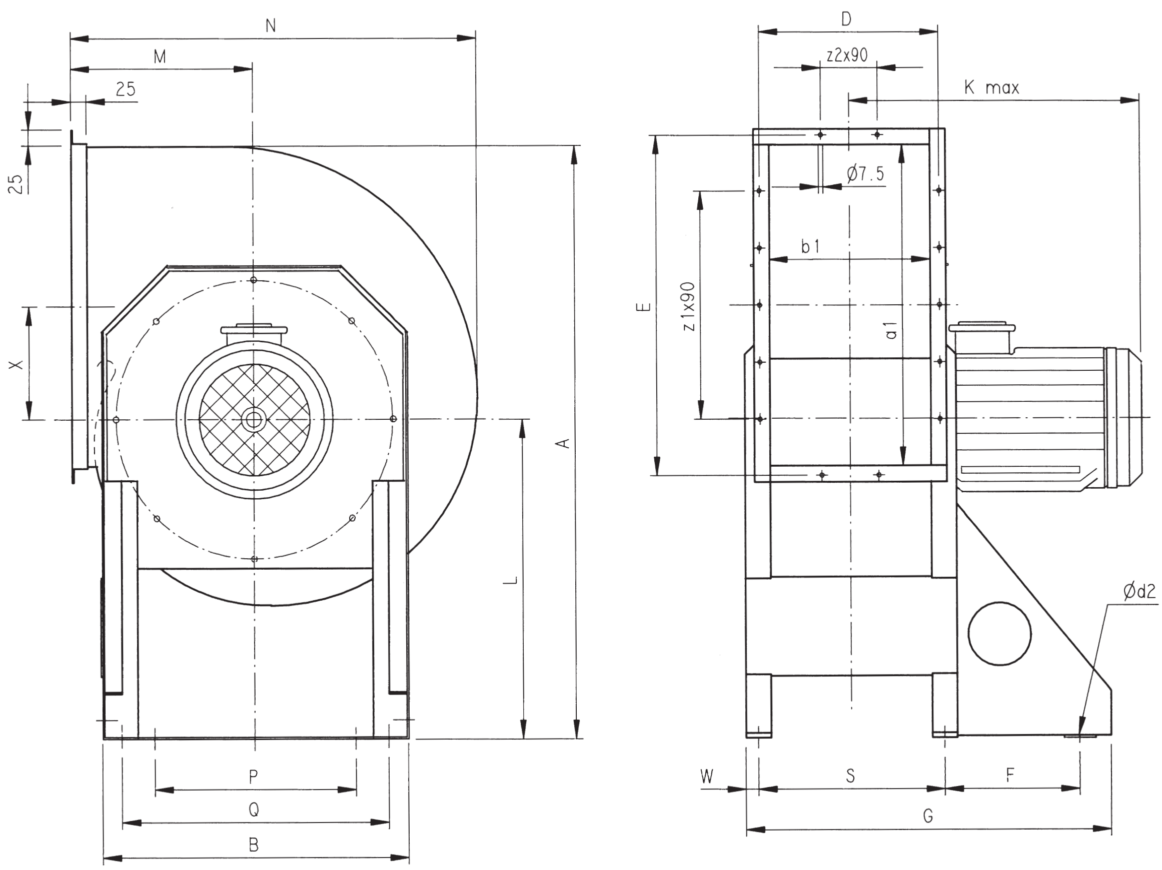


THLE 710÷1000 MK



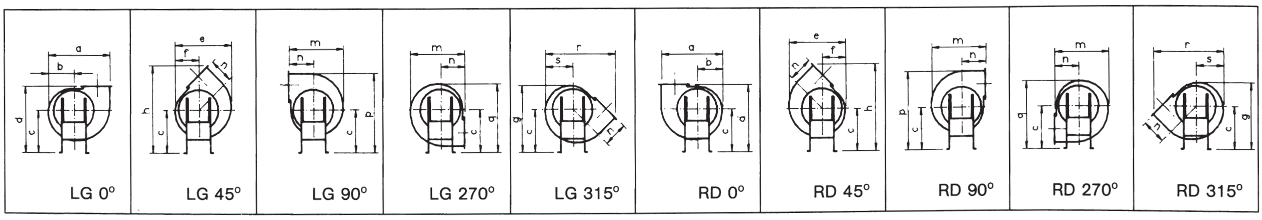
	A	B	C	D	E	G	J	K_{max}	L	M	N	Q	R	W	X	a1	b1	d1	z1	z2	t
710	1303	1049	25	483	928	931	516	847	531	490	1125	176	630	336	318	898	453	7.5	9	4	90
800	1467	1174	25	537	1037	985	570	874	597	545	1261	199	710	379	361	1007	507	7.5	11	5	90
900	1648	1313	30	599	1164	1047	632	905	670	609	1414	223	800	424	407	1130	569	10	11	5	100
1000	1809	1444	30	668	1301	1116	701	940	735	662	1546	239	900	455	435	1267	638	10	12	6	100





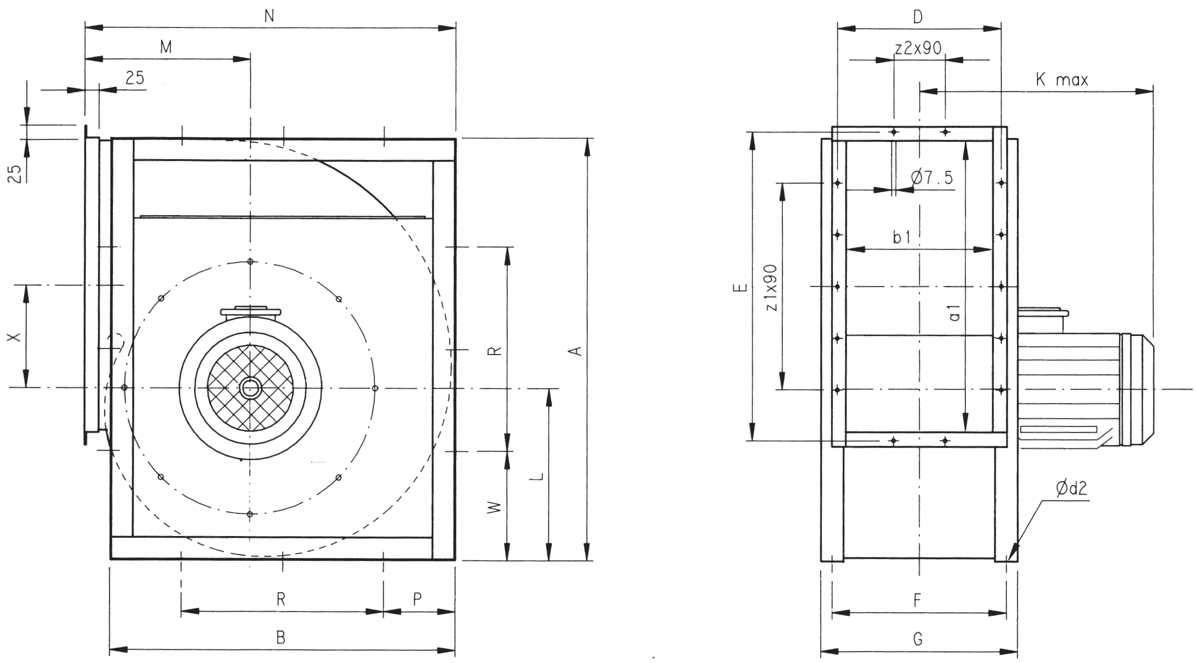
	A	B	D	E	F	G	K_{max}	L	M	N	P	Q	S	W	X	a1	b1	d2	z1	z2
315	736	402	235	434	167	464	450	393	240	518	304	330	257	15	139	404	205	10	4	2
355	889	441	259	483	219	550	530	504	265	586	320	369	261	20	158	453	229	12	4	2
400	937	486	286	537	219	577	545	504	294	649	320	414	288	20	179	507	256	12	5	2
450	991	536	318	599	219	609	565	504	326	726	320	464	320	20	202	569	288	12	6	3
500	1233	586	352	668	219	643	720	693	357	800	400	514	354	20	221	638	322	12	6	3
560	1298	656	391	745	219	682	740	693	395	891	400	584	393	20	248	715	361	12	7	3
630	1374	726	434	831	219	725	765	693	439	997	400	654	436	20	280	801	404	12	8	4

	a	b	c	d	e	f	g	h	m	n	p	q	r	s
315	575	233	393	633	523	215	610	820	518	240	733	626	680	254
355	647	262	504	769	590	245	747	979	586	265	889	766	760	286
400	728	295	504	798	665	274	779	1034	649	294	937	799	834	322
450	819	332	504	830	742	308	814	1092	726	326	991	836	950	362
500	908	368	693	1050	825	338	1036	1342	800	357	1233	1061	1051	402
560	1017	412	693	1088	930	384	1077	1415	891	395	1298	1105	1175	451
630	1144	463	693	1132	1047	432	1125	1500	997	439	1374	1156	1314	508

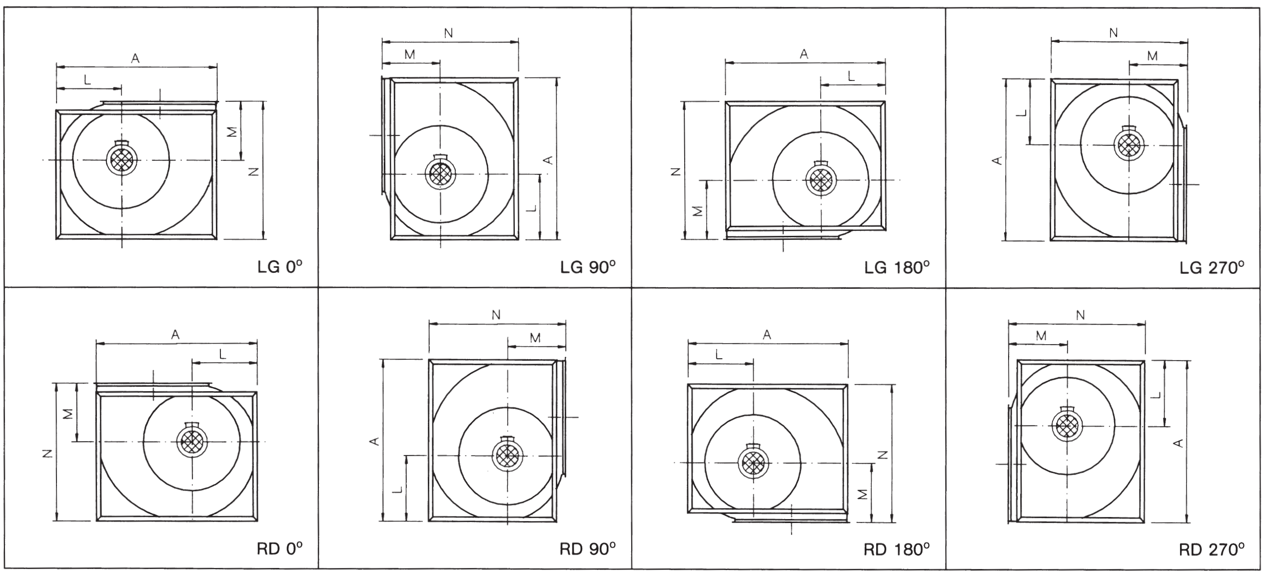


comefri

TLE/THLE 200÷630 RMF

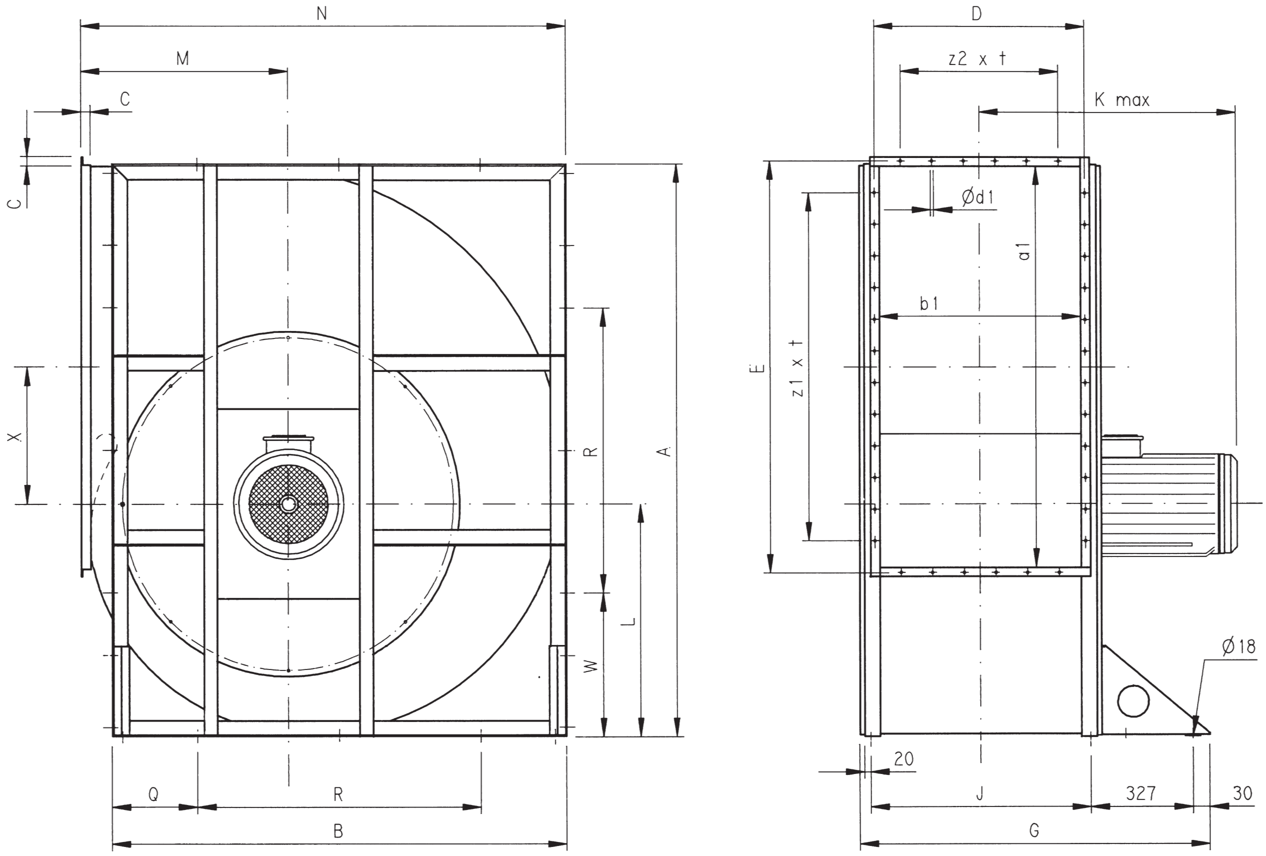


	A	B	D	E	F	G	K_{max}	L	M	N	P	R	W	X	a1	b1	d2	z1	z2
200	372	312	161	286	157	182	340	150	168	348	45	224	73	89	256	131	7.5	2	1
225	416	348	176	318	172	197	420	169	184	386	62	224	96	100	288	146	7.5	3	1
250	460	384	194	352	190	215	430	188	199	424	80	224	118	109	322	164	7.5	3	1
280	518	432	213	391	214	244	440	211	219	471	77	280	119	123	361	183	10	3	1
315	578	480	235	434	237	267	450	235	240	523	101	280	149	139	404	205	10	4	2
355	654	542	259	483	270	310	530	266	265	583	94	355	150	158	453	229	10	4	2
400	736	606	286	537	298	338	545	300	294	655	126	355	191	179	507	256	10	5	2
450	828	674	318	599	330	370	565	336	326	730	112	450	189	202	569	288	12	6	3
500	918	744	352	668	365	405	720	374	357	805	147	450	234	221	638	322	12	6	3
560	1030	838	391	745	414	464	740	419	395	897	169	500	265	248	715	361	15	7	3
630	1158	936	434	831	457	507	765	471	439	1003	188	560	299	280	801	404	15	8	4

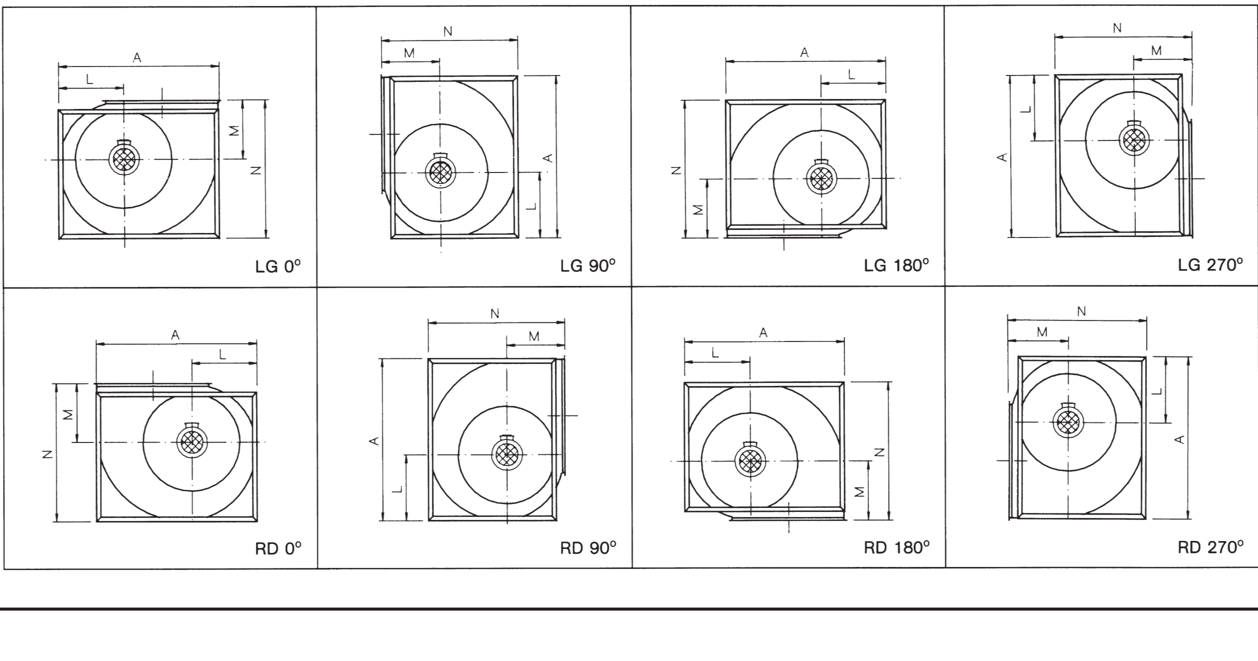


comefri

THLE 710÷1000 RMF

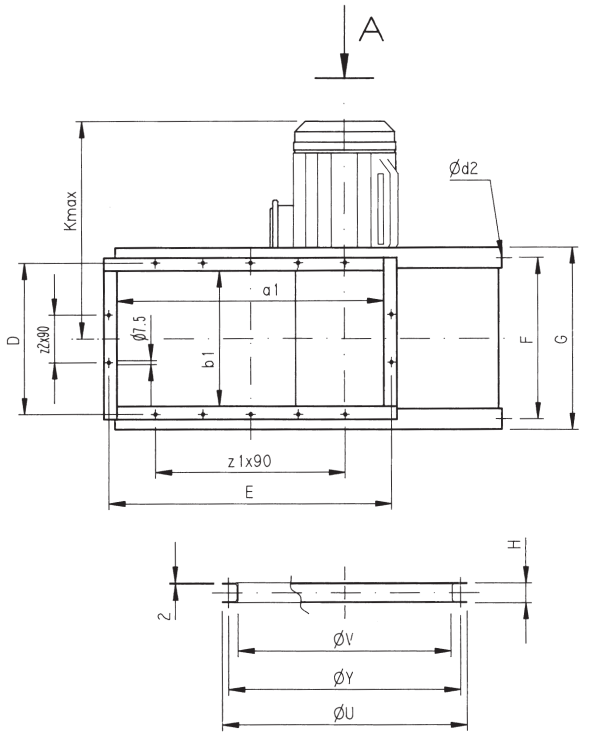


	A	B	C	D	E	G	J	K_{max}	L	M	N	Q	R	W	X	a1	b1	d1	z1	z2	t
710	1303	1049	25	483	928	931	516	847	531	490	1125	176	630	336	318	898	453	7.5	9	4	90
800	1467	1174	25	537	1037	985	570	874	597	545	1261	199	710	379	361	1007	507	7.5	11	5	90
900	1648	1313	30	599	1164	1047	632	905	670	609	1414	223	800	424	407	1130	569	10	11	5	100
1000	1809	1444	30	668	1301	1116	701	940	735	662	1546	239	900	455	435	1267	638	10	12	6	100

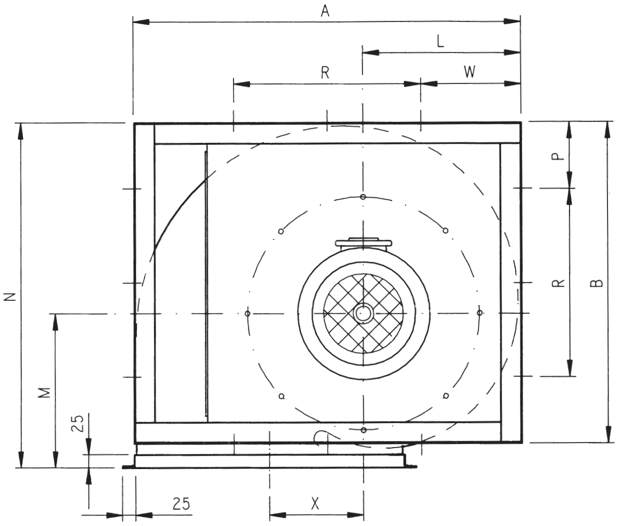


comefri

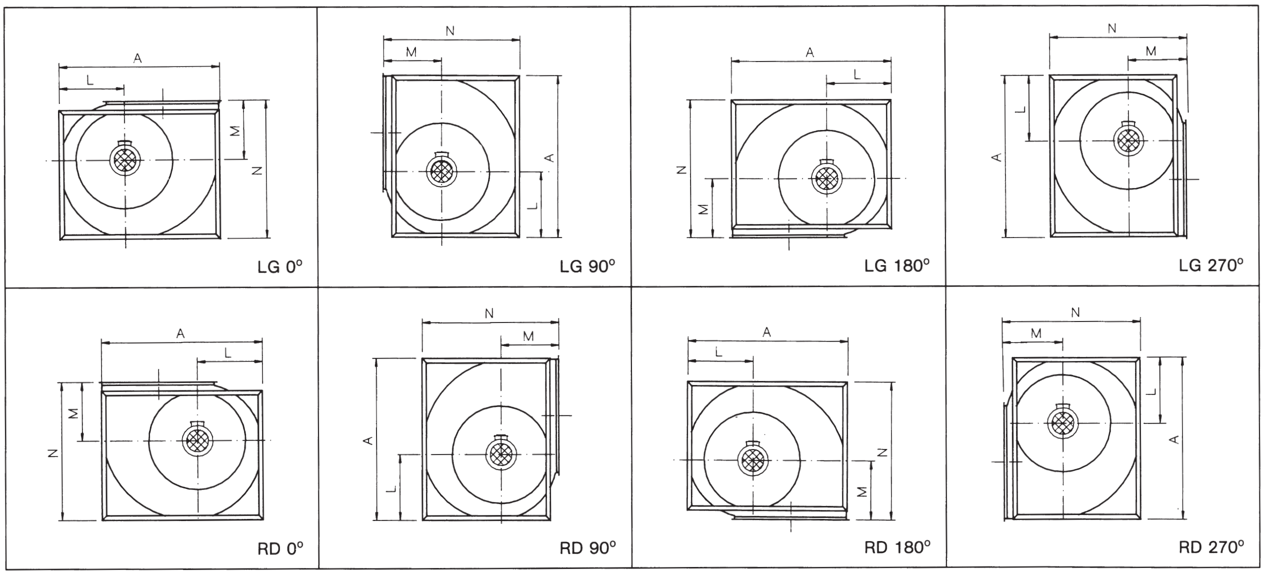
TLE/THLE 200÷630 RMFV



Sicht A

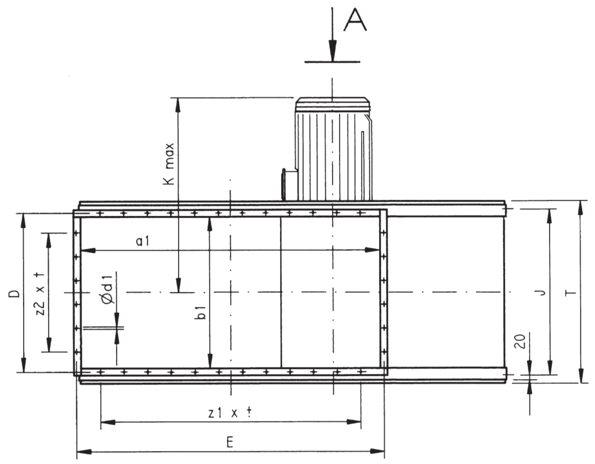


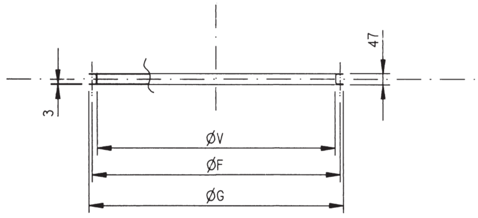
	A	B	D	E	F	G	H	K_{max}	L	M	N	P	R	U	V	X	Y	W	a1	b1	d2	z1	z2
200	372	312	161	286	157	182	23	340	150	168	348	45	224	250	205	89	232	73	256	131	7.5	2	1
225	416	348	176	318	172	197	23	420	169	184	386	62	224	279	229	100	257	96	288	146	7.5	3	1
250	460	384	194	352	190	215	23	430	188	199	424	80	224	306	256	109	283	118	322	164	7.5	3	1
280	518	432	213	391	214	244	28	440	211	219	471	77	280	348	288	123	320	119	361	183	10	3	1
315	578	480	235	434	237	267	28	450	235	240	523	101	280	382	322	139	355	149	404	205	10	4	2
355	654	542	259	483	270	310	37.5	530	266	265	584	94	355	421	361	158	395	150	453	229	10	4	2
400	736	606	286	537	298	338	37.5	545	300	294	655	126	355	464	404	179	440	191	507	256	10	5	2
450	828	674	318	599	330	370	37.5	565	336	326	726	112	450	513	453	202	490	189	569	288	12	6	3
500	918	744	352	668	365	405	37.5	720	374	357	806	147	450	567	507	221	540	234	638	322	12	6	3
560	1030	838	391	745	414	464	47	740	419	395	898	169	500	639	569	248	610	265	715	361	15	7	3
630	1158	936	434	831	457	507	47	765	471	439	1005	188	560	708	638	280	680	299	801	404	15	8	4

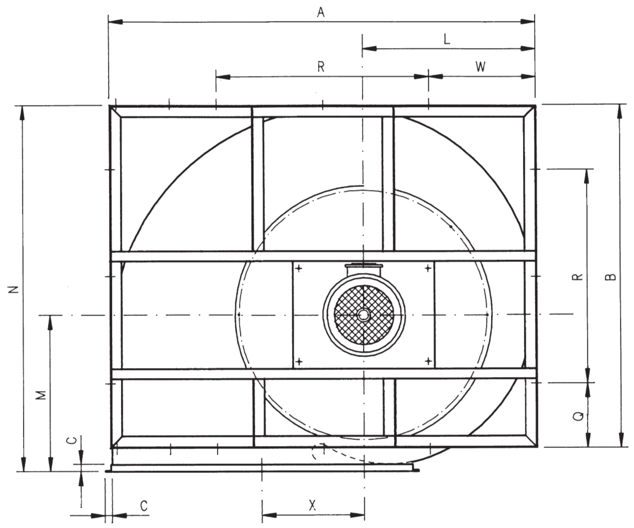


comefri

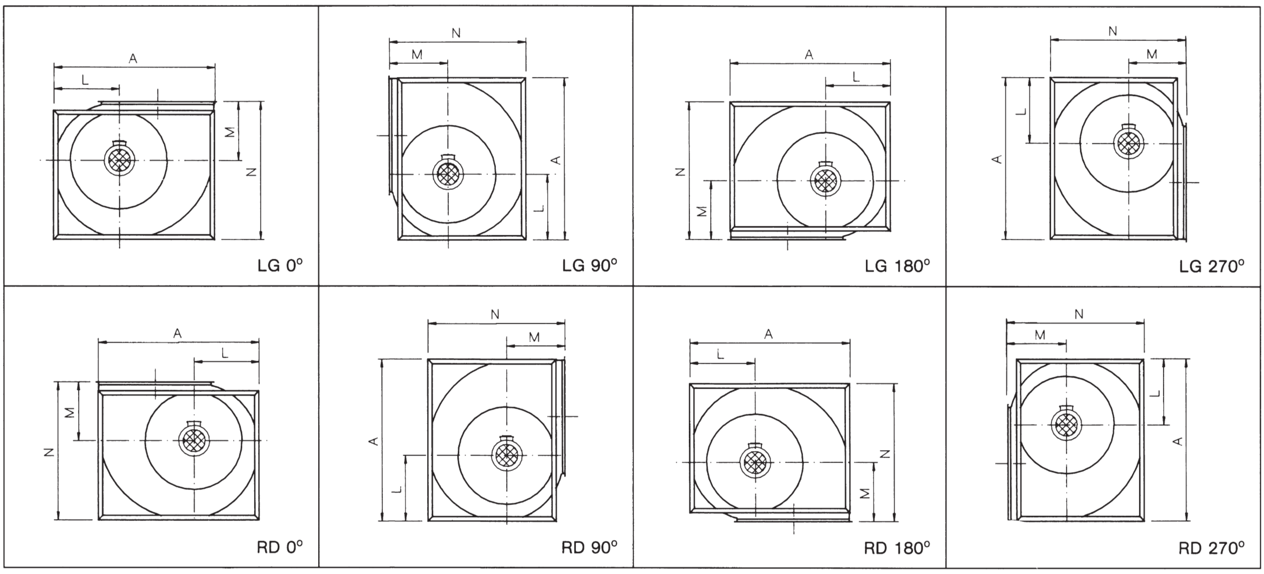
THLE 710÷1000 RMFV







	A	B	C	D	E	F	G	J	K_{max}	L	M	N	Q	R	T	V	W	X	a1	b1	d1	z1	z2	t
710	1303	1049	25	483	928	755	785	516	847	531	490	1125	176	630	586	715	336	318	898	453	7.5	9	4	90
800	1467	1174	25	537	1037	845	871	570	874	597	545	1261	199	710	640	801	379	361	1007	507	7.5	11	5	90
900	1648	1313	30	599	1164	945	968	632	905	670	609	1414	223	800	702	898	424	407	1130	569	10	11	5	100
1000	1809	1444	30	668	1301	1050	1077	701	940	735	662	1546	239	900	771	1007	455	435	1267	638	10	12	6	100



21. PERFORMANCE CURVES - DIRECT DRIVEN

Series:

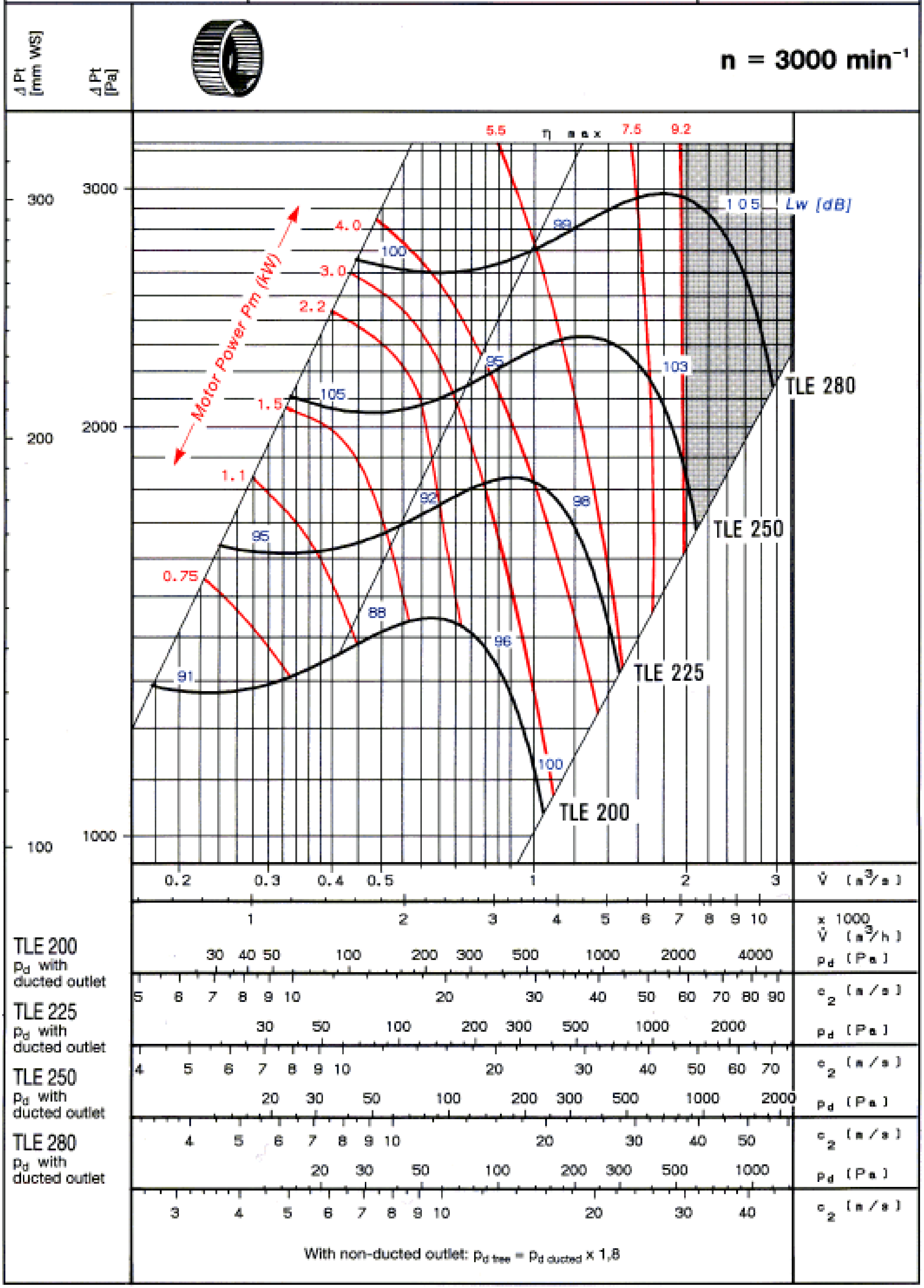
- TLE 200 ÷ 280 RMF, RMFV
  2 poles
- TLE 200 ÷ 280 RMF, RMFV
  4 poles
- TLE 315 ÷ 450 MK, MF, RMF, RMFV
  4 poles
- TLE 315 ÷ 560 MK, MF, RMF, RMFV
  6 poles
- TLE 450 ÷ 630 MK, MF, RMF, RMFV
  8 poles

- THLE 200 ÷ 280 RMF, RMFV
  2 poles
- THLE 315 ÷ 450 MK, MF, RMF, RMFV
  2 poles
- THLE 500 ÷ 630 MF
  4 poles
- THLE 500 ÷ 710 MK, RMF, RMFV
  4 poles
- THLE 710 ÷ 1000 MK, RMF, RMFV
  6 poles

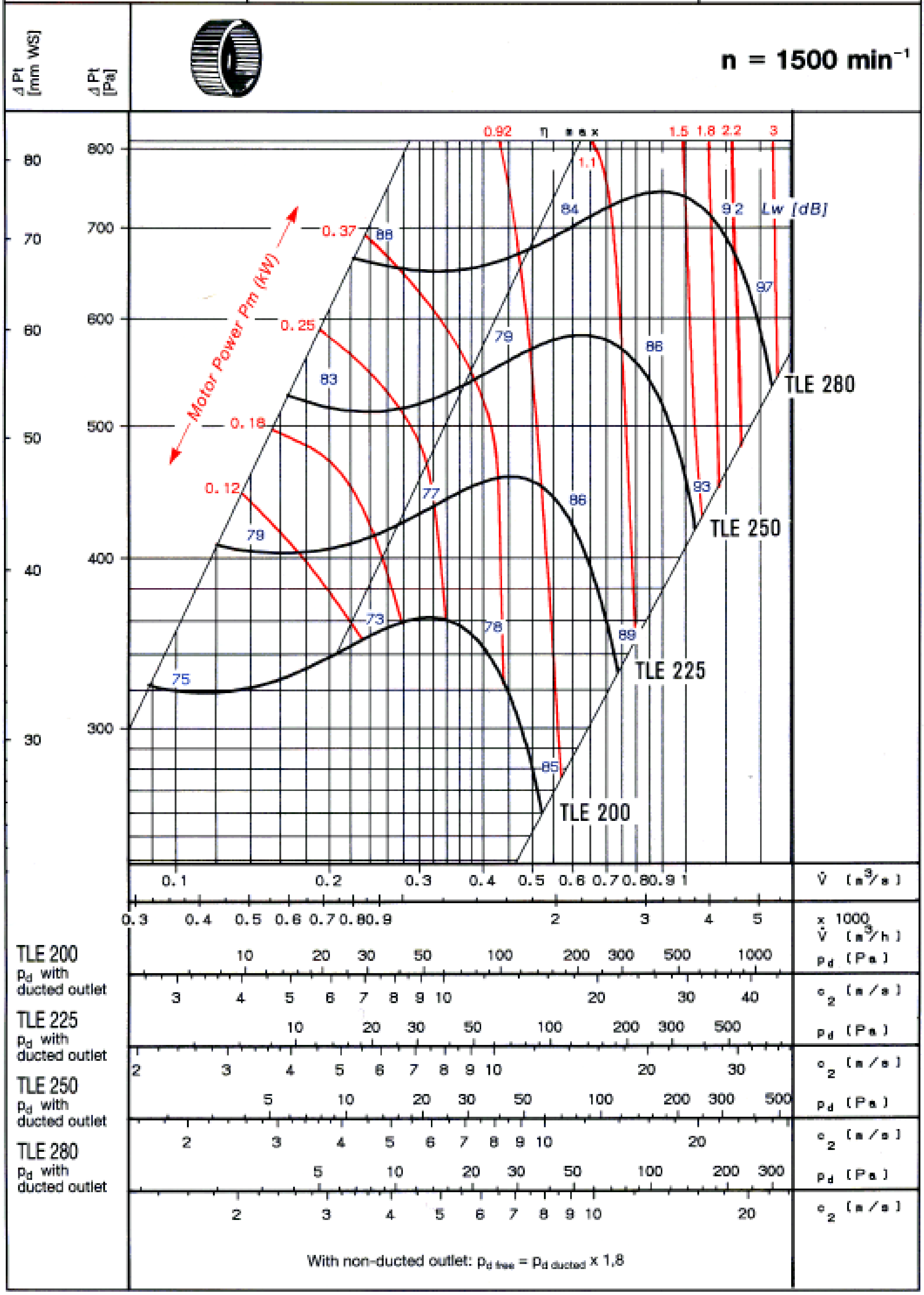
Note: The motor power Pm indicated in the following diagrams is already incremented by 10%.

comefri	RMF - RMFV	TLE 200 ÷ 280

$n = 3000\ min^{-1}$

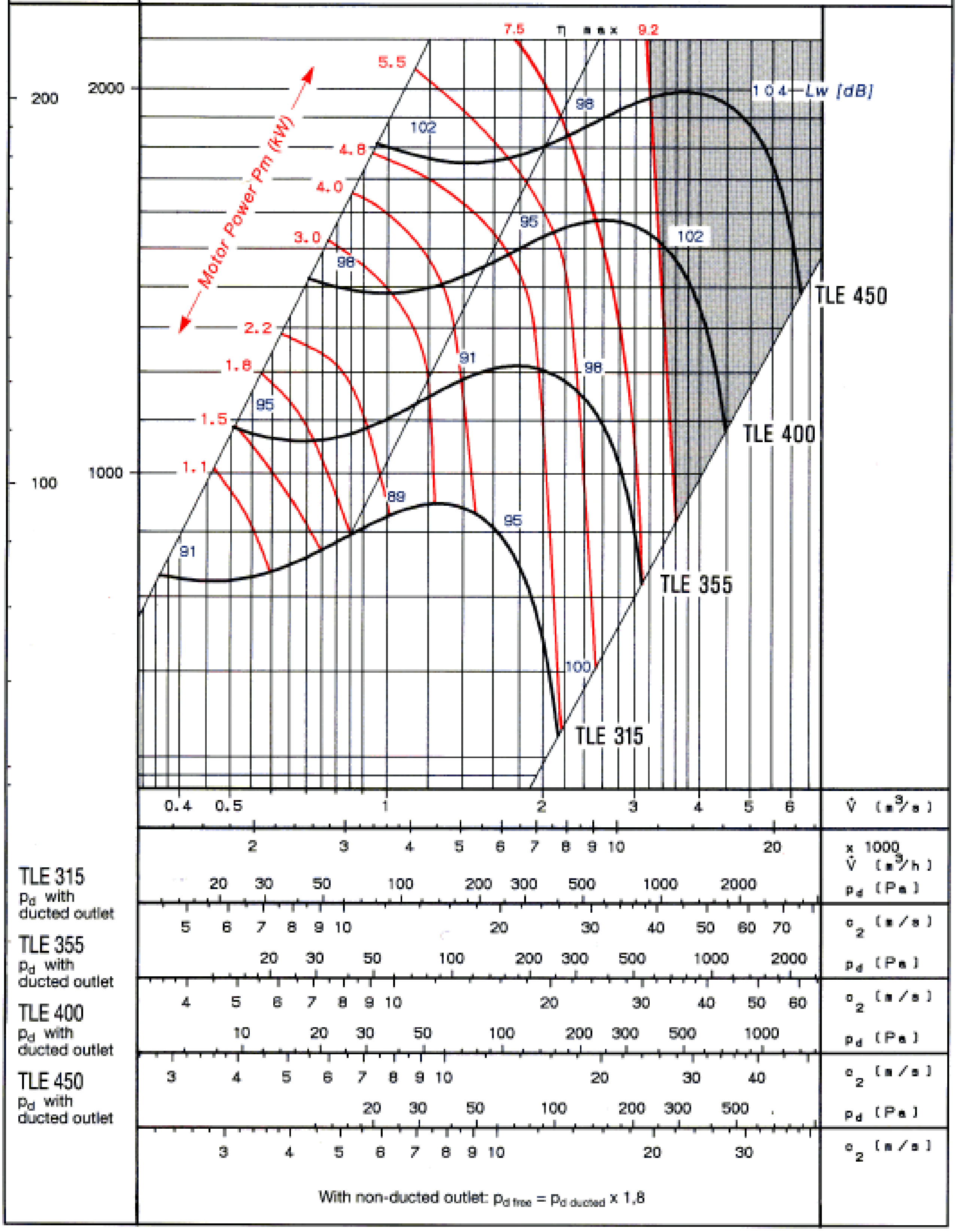


comefri	RMF - RMFV	TLE 200 ÷ 280

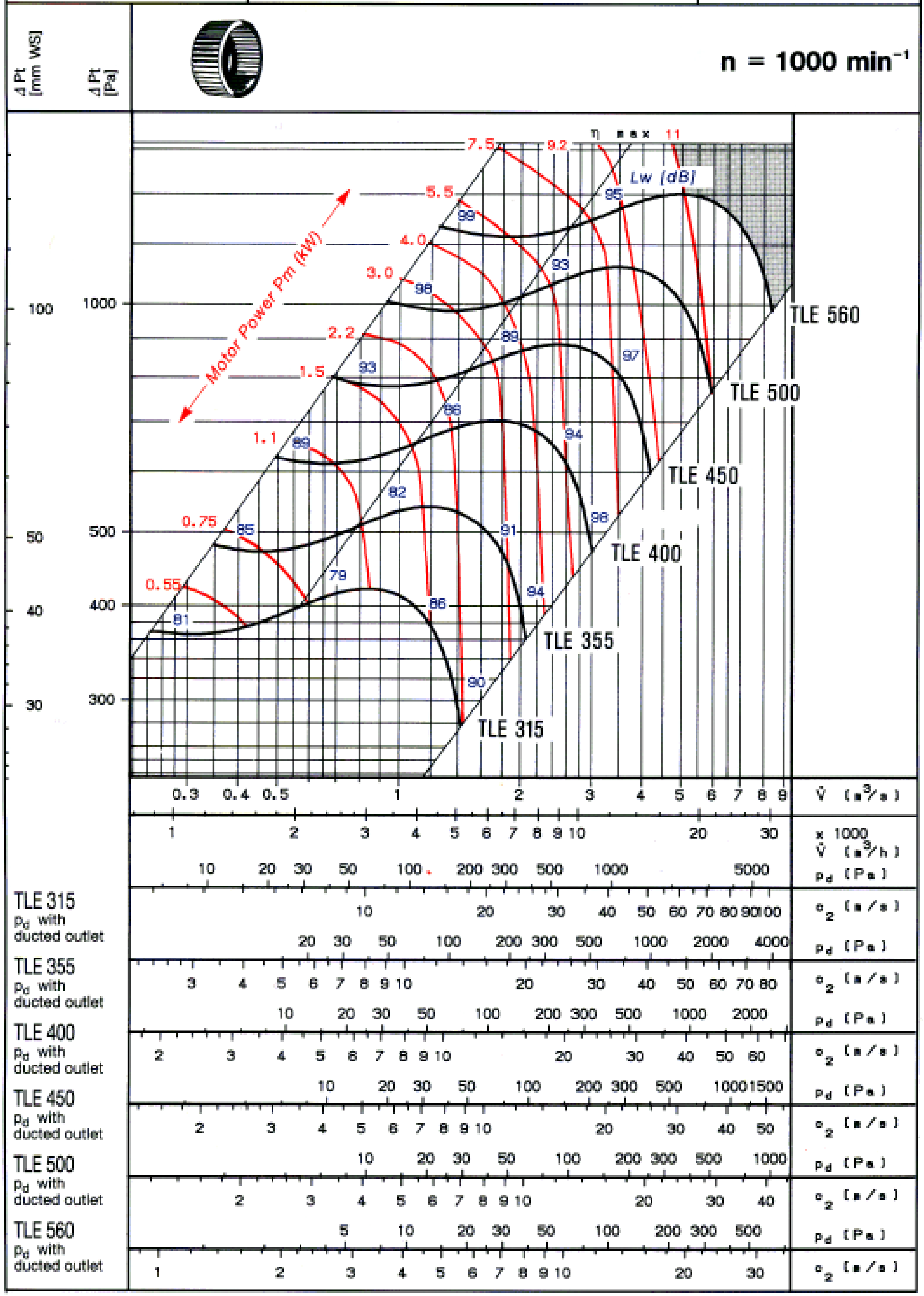


comefri	MK - MF - RMF - RMFV	TLE 315 ÷ 450

n = 1500 min^{-1}



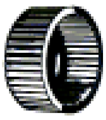
comefri	MK - MF - RMF - RMFV	TLE 315 ÷ 560



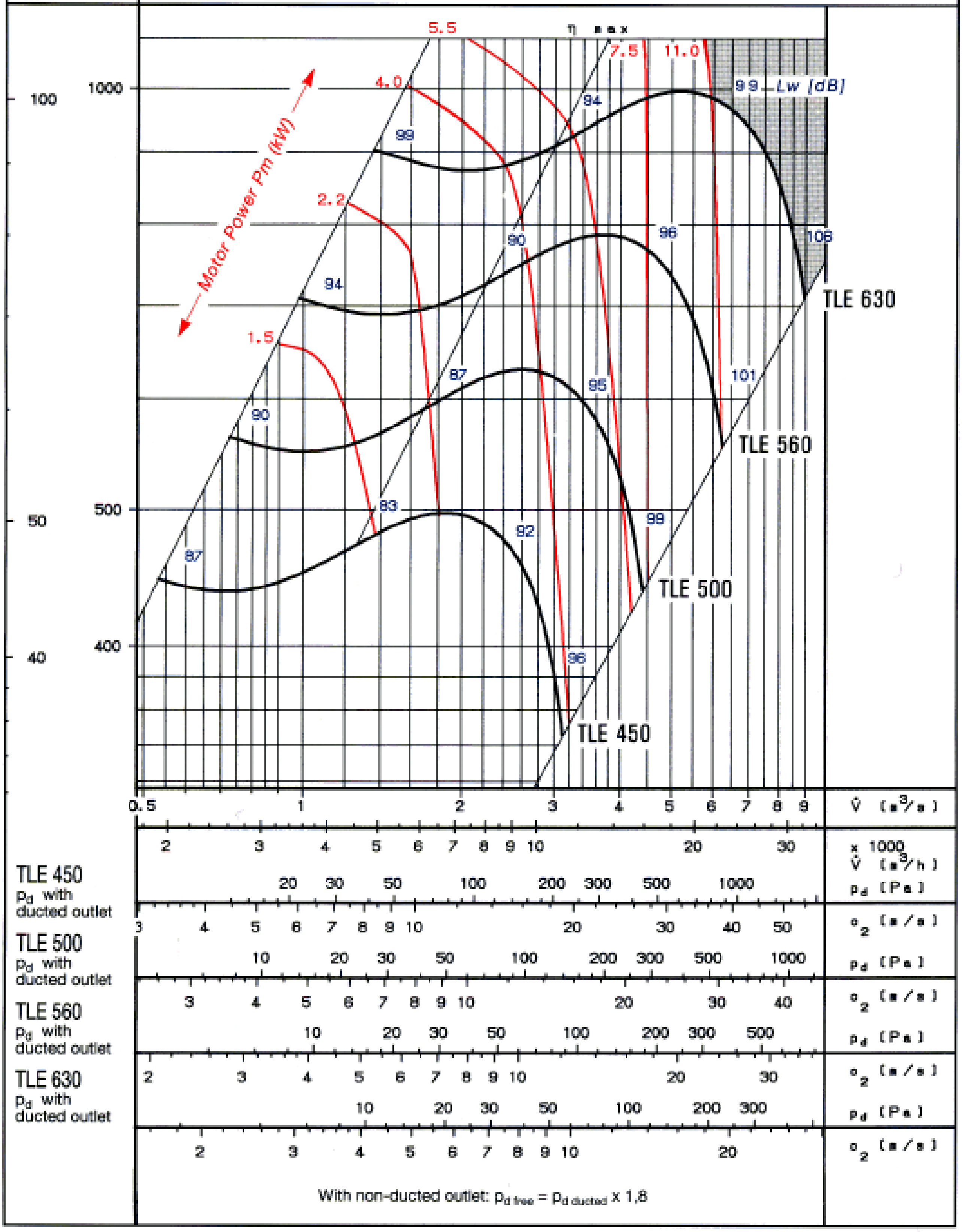
comefri

MK - MF - RMF - RMFV

TLE 450 ÷ 630



n = 750 min^{-1}

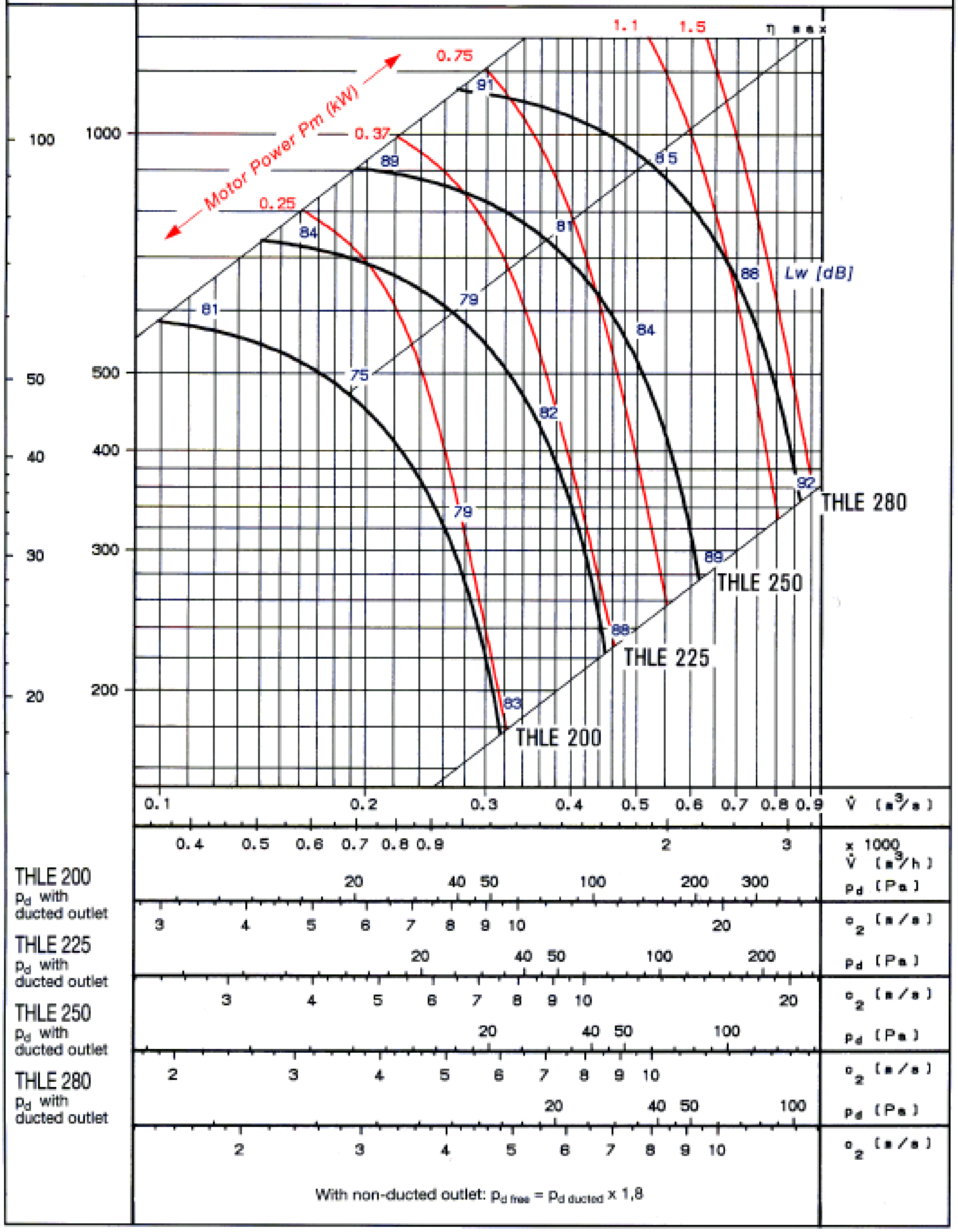


comefri

RMF - RMFV

THLE 200 ÷ 280

n = 3000 min^{-1}

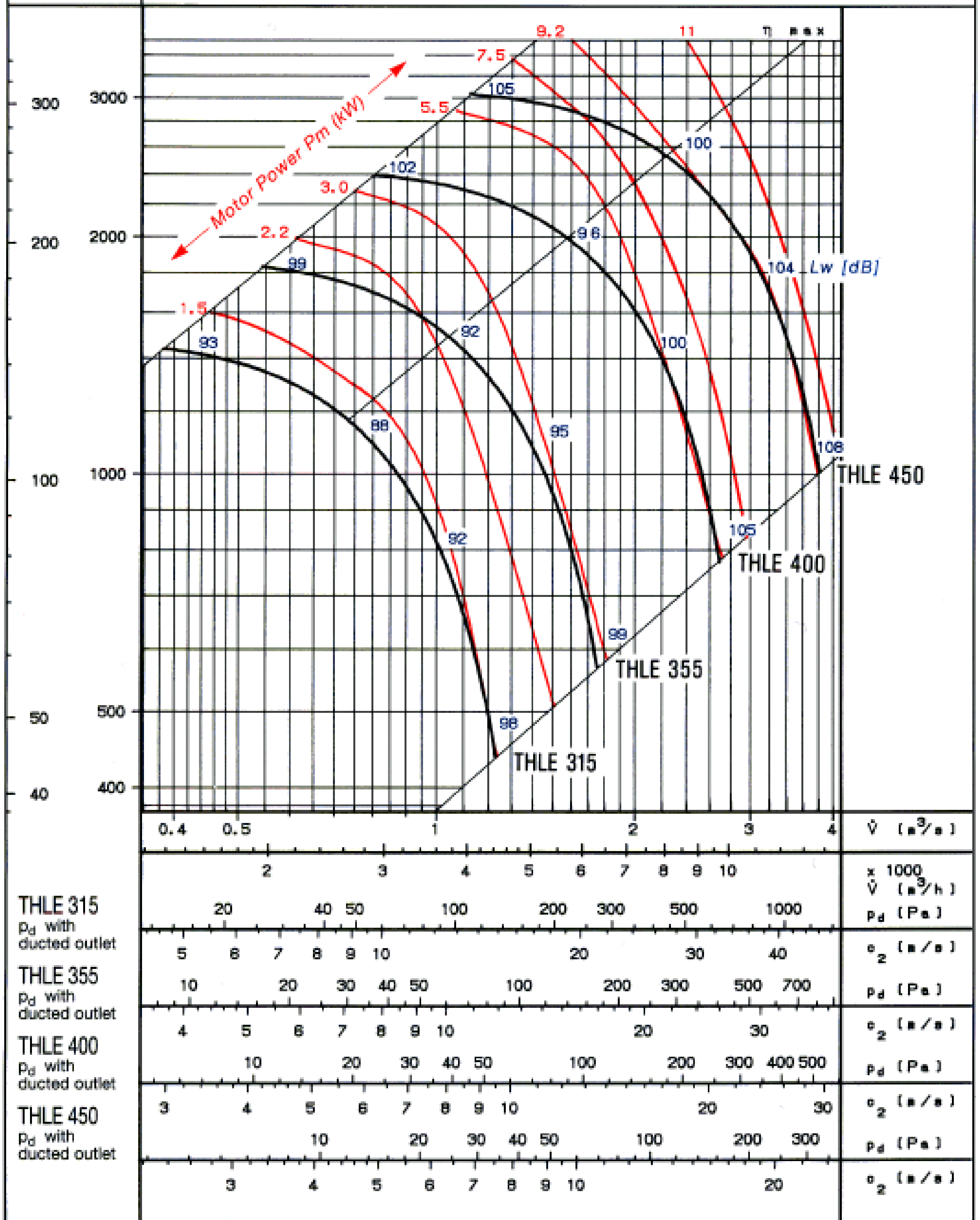


comefri

MK - MF - RMF - RMFV

THLE 315 ÷ 450

n = 3000 min⁻¹



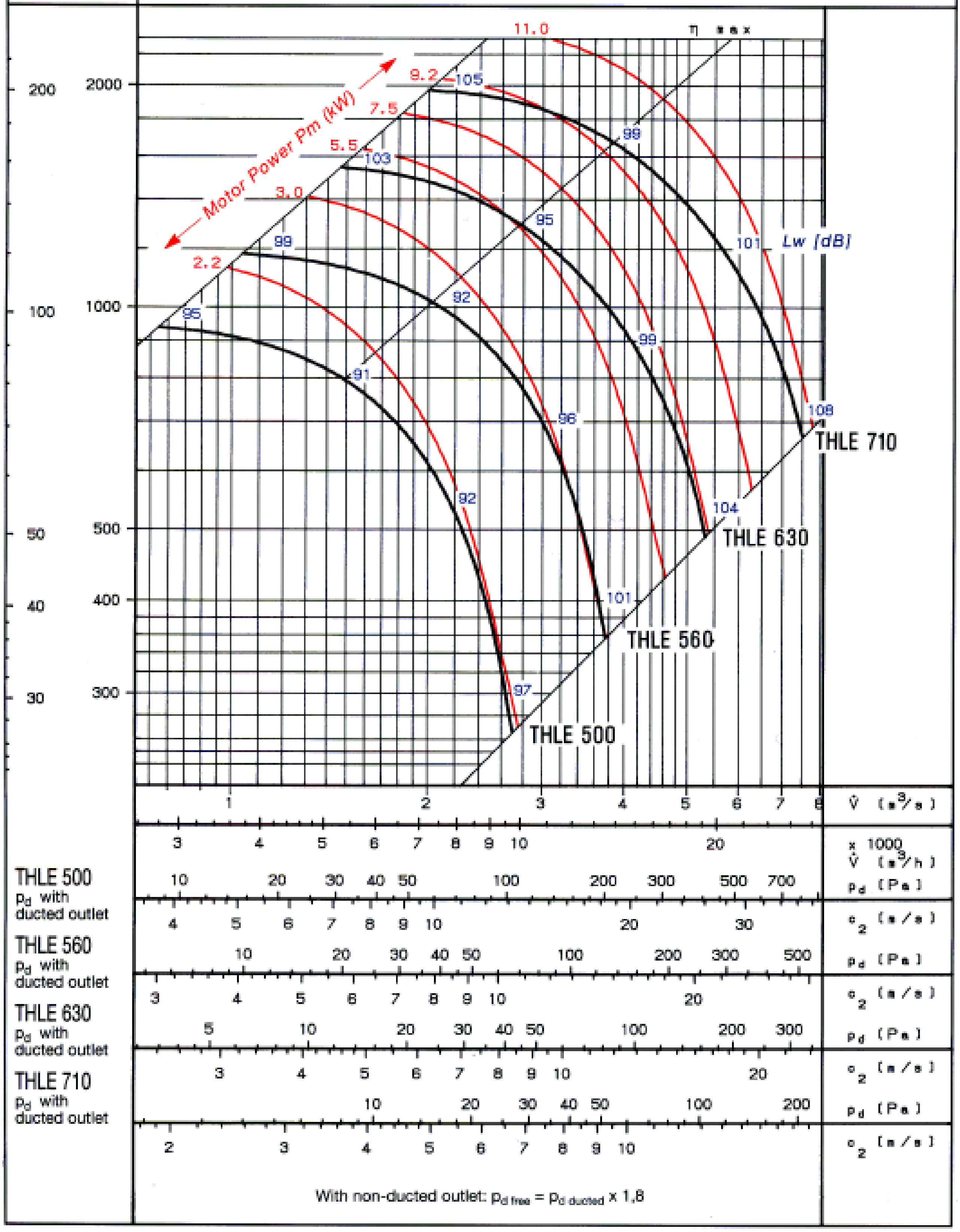
With non-ducted outlet: $p_{d\,free} = p_{d\,ducted} \times 1{,}8$

comefri

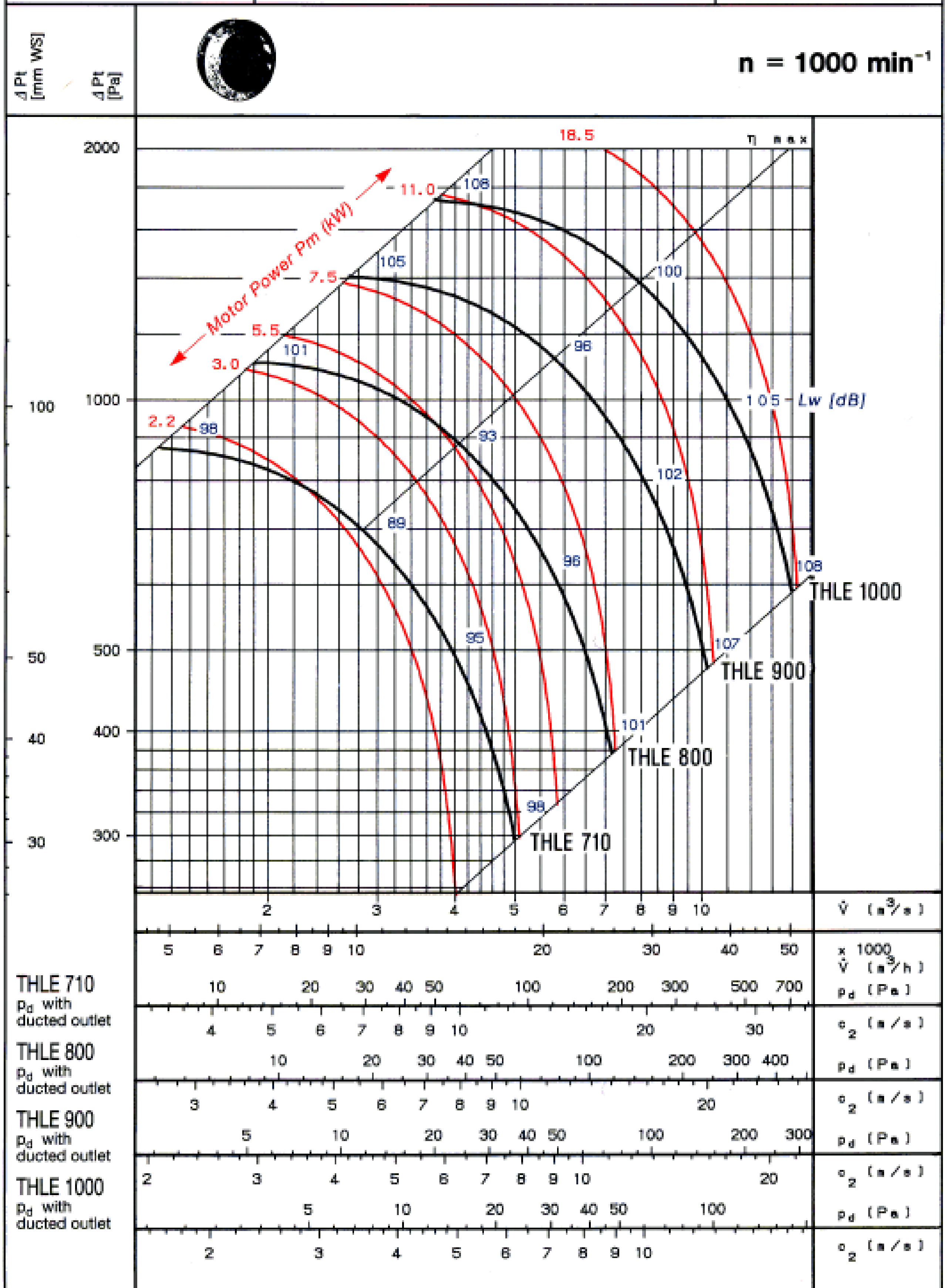
MK - MF - RMF - RMFV

THLE 500 ÷ 710

n = 1500 min^{-1}



comefri	MK - RMF - RMFV	THLE 710 ÷ 1000

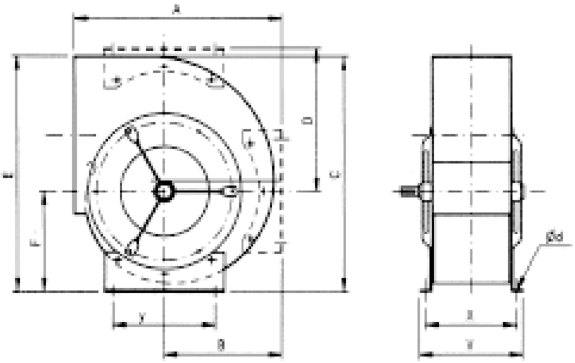


With non-ducted outlet: $p_{d\ free} = p_{d\ ducted} \times 1{,}8$

22 ACCESSORIES:

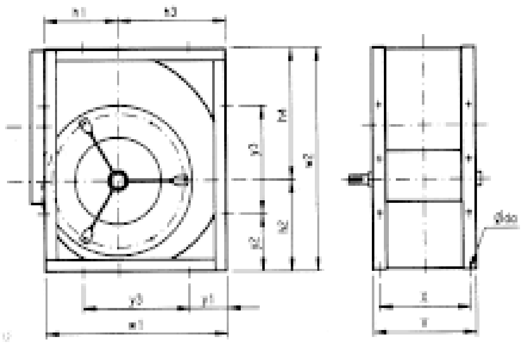
- Feet
- Frame
- Inlet flange
- Outlet flange
- Flexible connections
- Drain plug
- Inspection door
- Outlet-Inlet guard
- Belt guard
- Shaft guard / Cooling wheel guard
- Anti-vibration mounts
- Motor base mount
- Base frame
- Inlet vane control

Feet - F



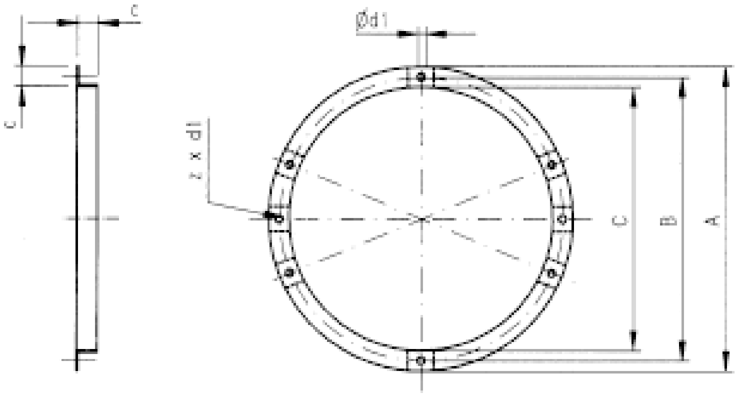
Type	Size	A	B	C	D	E	F	v	x	d	y
F 200	200	348	184	394	245	396	181	182	157	7.5	224
	225	384	204	441	274	442	197	197	172	7.5	224
	250	422	227	489	299	482	210	215	190	7.5	224
F 280	280	467	252	536	328	537	233	244	214	7.5	280
	315	516	280	600	367	600	258	267	237	7.5	280
F 355	355	621	320	673	411	659	274	310	270	7.5	355
	400	649	359	757	462	735	302	338	298	10	355
F 450	450	729	407	850	518	823	336	370	330	12	450
	500	800	448	936	568	915	375	405	365	12	450
F 560	560	892	502	1046	634	1021	416	464	414	15	500
	630	1005	571	1170	707	1149	468	507	457	15	560
F 710	710	1122	636	1318	797	1297	531	556	516	18	630

Frame - R



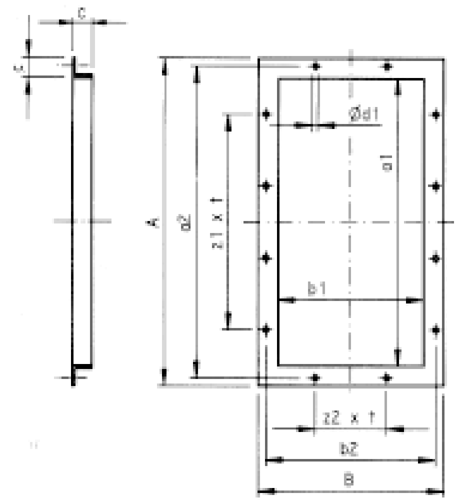
Size	d_a	h_1	h_2	h_3	h_4	v	w_1	w_2	x	y_1	y_2	y_3
R 200	7.5	133	158	180	220	182	312	372	157	45	73	224
R 225	7.5	146	169	202	246	197	348	416	172	62	96	224
R 250	7.5	160	188	225	273	215	384	460	190	80	118	224
R 280	10	181	211	252	307	244	432	518	214	77	119	280
R 315	10	198	235	283	343	267	480	578	237	101	149	280
R 355	10	225	266	318	389	310	542	654	270	94	150	355
R 400	10	245	300	361	436	338	606	736	298	126	191	355
R 450	12	270	336	404	491	370	674	828	330	112	189	450
R 500	12	295	374	448	544	405	744	918	365	147	234	450
R 560	15	335	419	502	611	464	838	1038	414	169	265	500
R 630	15	371	471	564	686	507	936	1158	457	188	299	560
R 710	18	412	531	636	772	556	1048	1304	516	209	336	630

Inlet flange - Z



	200	225	250	280	315	355	400	450	500	560	630	710	800	900	1000
A	250	279	306	346	382	421	464	513	567	639	708	785	871	968	1077
B	232	257	283	320	355	395	440	490	540	610	680	755	845	945	1058
C	200	229	256	286	322	361	404	453	507	569	638	715	801	898	1007
c	25	25	25	30	30	30	30	30	30	35	35	35	35	35	35
$z \times d_1$	6	6	6	6	6	8	8	8	8	8	8	8	8	8	8
$\varnothing d_1$	7.5	7.5	7.5	10	10	10	10	12	12	15	15	15	15	15	15

Outlet flange - A



	200	225	250	280	315	355	400	450	500	560	630	710	800	900	1000
A	306	338	372	411	454	503	557	619	688	765	851	948	1057	1190	1327
B	181	196	214	233	255	279	306	338	372	411	454	503	557	629	698
C	25	25	25	25	25	25	25	25	25	25	25	25	25	30	30
a1	256	288	322	361	404	453	507	569	638	715	801	898	1007	1130	1267
b1	131	146	164	183	205	229	256	288	322	361	404	453	507	569	638
a2	286	318	352	391	434	483	537	599	668	745	831	928	1037	1164	1301
b2	161	176	194	213	235	259	286	318	352	391	434	483	537	599	668
z1	2	3	3	3	4	4	5	6	6	7	8	9	11	11	12
z2	1	1	1	1	2	2	2	3	3	3	4	4	5	5	6
t	90	90	90	90	90	90	90	90	90	90	90	90	90	100	100
$\varnothing d_1$	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	10	10

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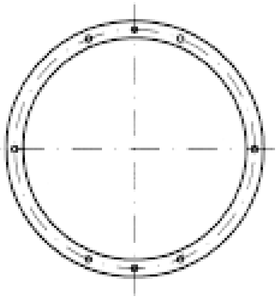
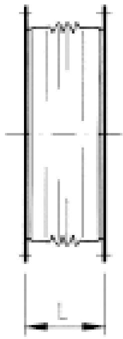
Flexible inlet connection- ZEL



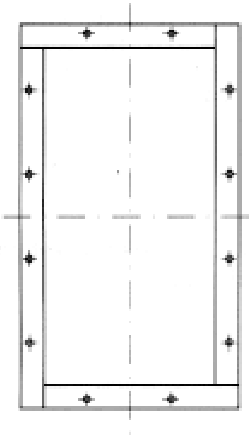


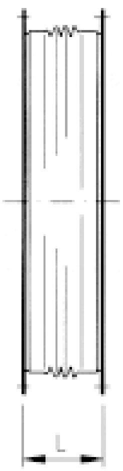
The flexible inlet connection, in standard execution, is manufactured in PVC (up to 80° C). Special executions reaching 200° C can be provided in reinforced fibreglass or in accordance with the customer's specifications.

The length, denoted by "L", true for all fan sizes is 155 mm.

All further dimensions are determined according to the various fan size dimensions.

Flexible outlet connection- AEL



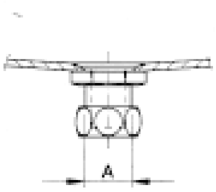


The flexible outlet connection, in standard execution, is manufactured in PVC (up to 80°C). Special executions reaching 200° C can be provided in reinforced fibreglass or in accordance with the client's specifications.

The length, denoted by "L", true for all fan sizes is 155 mm.

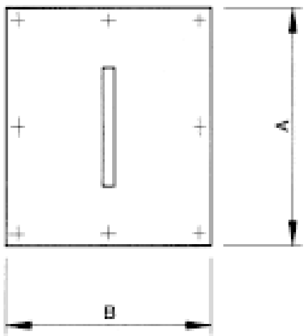
All further connection dimensions are determined according to the given fan size dimensions

Drain plug - K



The drain plug positioning depends, in general, on the lowest point of the fan housing or according to the client's specification.

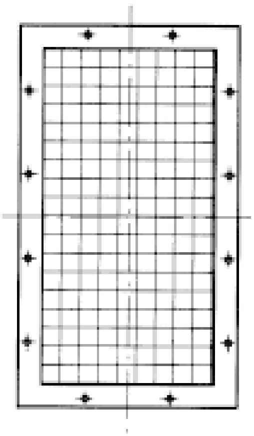
Inspection door - I



	A	B
TLE/THLE 200 ÷ 280	150	120
TLE/THLE 315 ÷ 560	190	170
TLE/THLE 630 ÷ 1000	240	220

The inspection door can only be opened with appropriate tools.

Outlet guard - AS

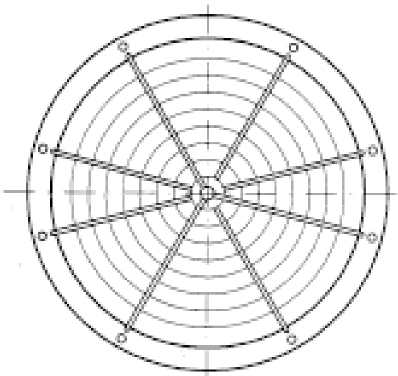


Connection dimensions correspond to the dimensions of a given fan size.

1) A< 710 mm grill size 10 x 10
2) A> 710 mm grill size 40 x 40

The above have been established in accordance with the latest safety regulations.

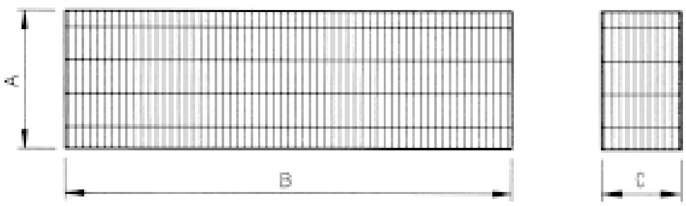
Inlet guard - ZS



Connection dimensions correspond to the dimensions of a given fan size.

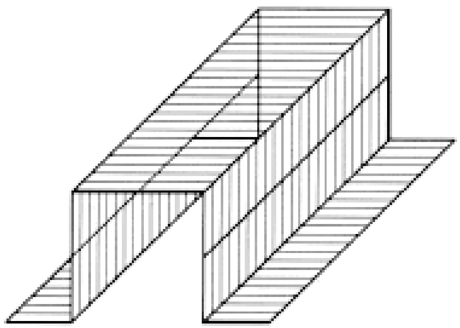
Grill sizes have been established in accordance with the latest safety regulations.

Belt guard - RIS



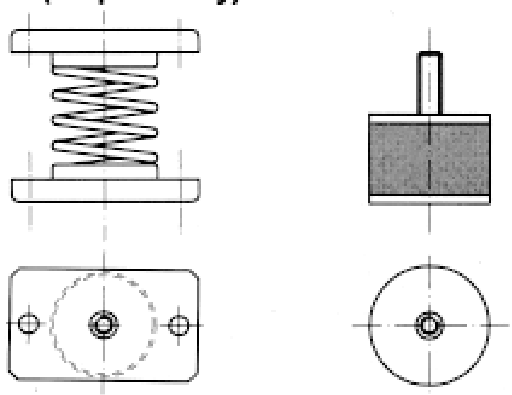
The 8 mm x 60 mm meshed belt guard is manufactured in galvanized steel.
The dimensions denoted "A", "B" and "C" depend upon the corresponding pulley diameters, the number of belts and the motor size.
Upon request corresponding inspection doors can be provided.

Shaft guard - cooling wheel guard- KUS



The 8 mm x 60 mm meshed shaft guard and cooling wheel guard is manufactured in galvanized steel.
The dimensions denoted "A", "B" and "C" result from the corresponding dimensions of the bearing block, the cooling wheel or other belt drive components.

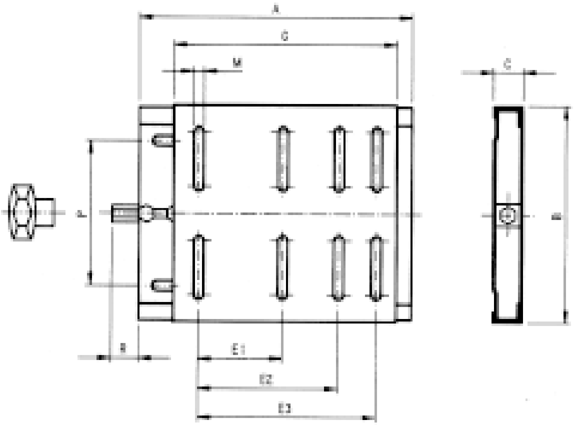
Anti-vibration mounts - DAM & DAG (respectively)



DAM **DAG**

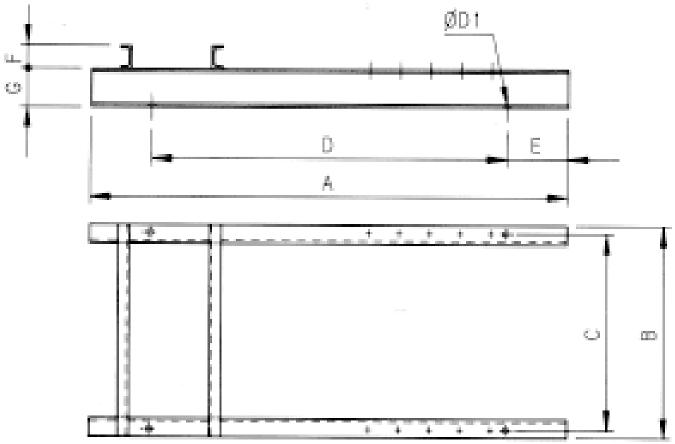
Due to the fan's rigid construction and high balance level at two levels a good absorption of the vibrations can be obtained. In addition, anti-vibration mounts are available in rubber or in a spring form.
Flexible inlet and outlet connections must be used to avoid vibrations from being transferred to the system.

Standard Motor base mount - SM



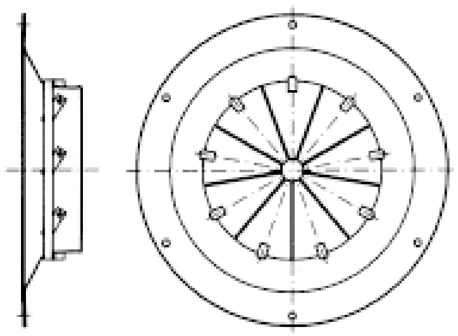
Typ	Mot.	A	B	C	E_1	E_2	E_3	G	M	P	R	Weight (kg)
SM 1	90-112	307	213	–	140	160	190	225	10.5	108	30	4.1
SM 2	100-112 132	340	290	–	160	190	216	286	12.5	165	30	7.9
SM 3		430	290	–	160	190	216	256	12.5	165	30	8.9
SM 4	160-180	438	370	40	–	254	279	369	12.5	248	30	12
SM 5		490	370	40	–	254	279	369	12.5	248	30	12.7
SM 6	200-225	585	450	50	–	318	356	468	17	300	30	23
SM 7	250	600	470	65	–	–	406	490	22	320	30	28.1

Standard Baseframe - GR (for TLE / THLE series 200 - 1000 T, TG)



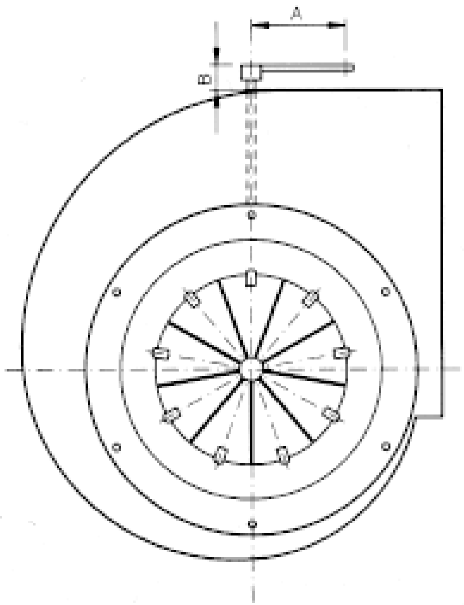
Size	A	B	C	D	E	F	G	ØD1	Weight (kg)
200	700	182	157	610	45	30	40	10	4.2
225	700	197	172	486	62	30	40	10	4.8
250	900	215	190	740	80	30	40	10	5.2
280	900	244	214	746	77	30	40	10	6.2
315	1050	267	237	848	101	30	50	12	6.7
355	1150	310	270	962	94	40	50	12	9.6
400	1150	338	298	898	126	40	50	12	10.4
450	1400	370	330	924	112	40	60	12	12.4
500	1400	405	365	1106	147	50	60	15	13.7
560	1600	464	414	1262	169	50	60	15	18.7
630	1600	507	457	1224	188	50	60	15	20.3
710	1800	556	516	1382	209	60	100	18	57
800	2150	611	571	1686	232	60	100	18	65
900	2350	673	633	1838	256	60	100	18	71
1000	2500	742	702	1956	272	60	100	18	78

Inlet vane control - DRD



The inlet vane control connection dimensions are determined according to the dimensions of a given fan size.

The movement control can be provided with a manual, pneumatic or electric device.

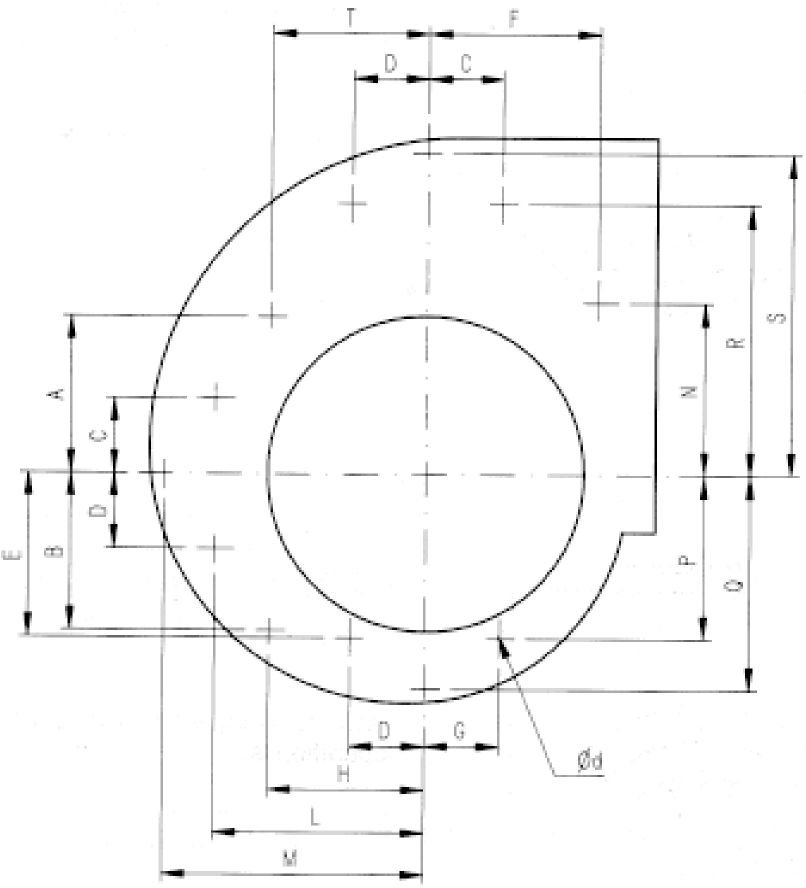


Size	A	B
315-400	185	80
450-630	235	80
710-1000	285	80

Maximum torque required for inlet vane control operation is:

Size	Mt [Nm]
315	3
355	4
400	5
450	6
500	6
560	6
630	9
710	9
800	13
900	18
1000	20

23. FIXING HOLE POSITIONS



Size	A	B	C	D	E	F	G	H	L	M	N	P	Q	R	S	T	d
200	110	91	40	40	126	110	40	110	129	163	155	126	134	190	202	94	B6.3
225	110	107	40	40	142	110	40	110	149	185	184	142	152	219	229	114	B6.3
250	110	120	40	40	155	110	40	110	172	208	209	155	171	244	256	137	B6.3
280	–	–	113	113	150	–	71	–	169	223	–	170	191	245	287	–	B8
315	–	–	113	113	175	–	71	–	197	263	–	195	215	284	323	–	B8
355	–	–	156	156	158	197.5	156	–	204	295	197.5	158	241	295	364	–	B8
400	–	–	156	156	186	220	156	–	243	336	220	186	275	346	411	–	B8
450	–	–	213	213	168	245	213	–	271	379	245	168	311	350	466	–	M10
500	–	–	213	213	207	270	213	–	280	423	270	207	349	400	519	–	M10
560	–	–	235	235	276	305	235	–	362	472	305	276	389	494	581	–	M12
630	–	–	235	235	328	340	235	–	431	535	340	328	441	567	656	–	M12
710	–	–	265	265	371	377.5	265	–	476	601	377.5	371	496	637	737	–	M12
800	–	–	–	–	–	422.5	–	–	–	681	422.5	–	562	–	835	–	–
900	–	–	–	–	–	472.5	–	–	–	770	472.5	–	635	–	943	–	–
1000	525	–	–	–	–	525	–	–	–	849	525	–	700	–	1093	324	–

24. WEIGHTS

Fan weight (kg) ca.

	TLE	TLE... R	TLE... T	TLE... TG	TLE... LK[1]	THLE	THLE... R	THLE... T	THLE... TG	THLE... LK[1]
200	5	7	–	9	–	7	9	–	10	–
225	6	8	–	10	–	8	10	–	12	–
250	7	10	–	12	–	9	11	–	13	–
280	10	13	–	15	–	13	16	–	18	–
315	13	17	–	19	43	16	20	–	22	46
355	18	25	–	27	65	22	29	–	31	70
400	21	28	–	31	68	27	35	–	38	74
450	27	36	–	39	75	36	45	–	49	84
500	35	44	–	48	112	45	65	–	69	122
560	44	60	–	65	124	57	73	–	78	135
630	54	72	–	77	134	69	87	–	92	149
710	–	–	121	128	205	–	–	142	149	222
800	–	–	147	154	228	–	–	178	185	258
900	–	–	173	181	268	–	–	227	235	316
1000	–	–	206	214	292	–	–	275	283	356

(1) Weight with base frame without motor

25. CUSTOM-MADE DESIGNS

Custom-made designs can be tailored to meet particular customer specifications, such as:

- split fan housings
- stainless steel construction
- special painting
- Ex - execution
- hot galvanization
- aluminium finishing
- sound insulation
- chemical resistant

We reserve the right to modify fan designs or dimensions in order to enhance our products.

26. COMPLETED ORDER EXAMPLE

Single inlet centrifugal fans TLE / THLE

Single inlet, radial impeller with backwards curved continuously welded blades, primed and finished, statically and dynamically balanced, minimum quality level Q=6,3, positioned over the shaft. Solid bearing support with regreasable roller bearings are mounted on a solid pedestal outside of the airflow or for direct drive fan as motor support.

Fan type	TLE / THLE	
Discharge position		
Setting		
Air flow	V =	m³/h
Total pressure	Δ pt =	Pa
Airflow temperature	t =	°C
Absorbed shaft power	Pw =	KW
Efficiency	η =	%
Speed	n =	min^{-1}
Maximum allowable speed	n_{max} =	min^{-1}
Sound pressure level	Lw =	[dB]

Accessories and special executions (at additional cost):

Inlet flange or flexible inlet connection
Outlet flange or flexible outlet connection
Inlet or outlet guard
Guard
Cooling wheel
Inspection door
Drain plug
Inlet vane control
Inlet box
EX- anti-spark execution
Complete belt drive
Anti-vibration mounts
Split housing
Base frame
Special coating or finish

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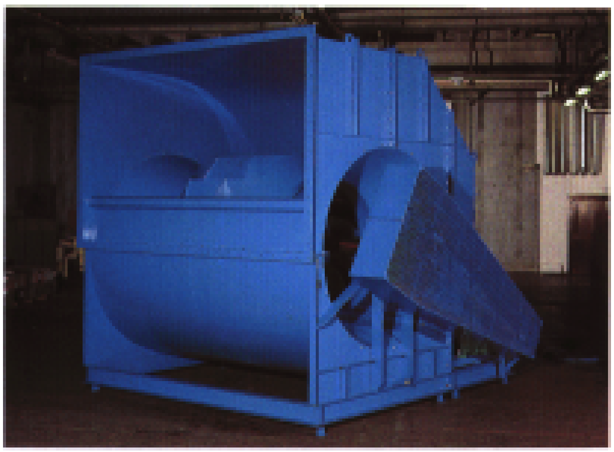
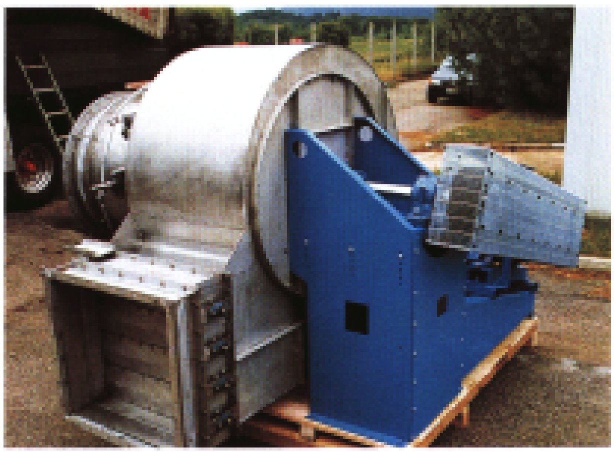
EXAMPLES OF COMEFRI'S INDUSTRIAL FANS

BCZ 25/2000 double inlet radial fan
Airflow: 310 000 m^3/h - Total pressure 1922 Pa
Speed: 590 rpm
Absorbed shaft power: 206 kW
Motor: 250 kW - 4 pole



BCE 25/1000 Single inlet radial fan
Stainless steel AISI 316
Airflow: 58 700 m^3/h - Total pressure 4020 Pa
Speed: 1780 rpm
Absorbed shaft power: 40,4 kW
Motor: 90 kW - 4 pole
Operating temperature: 300°C



AVH 1250 direct coupled axial fan with silencer
Airflow: 126 000 m^3/h - Total pressure 1962 Pa
Absorbed shaft power: 82 kW
Motor: 90 kW - 4 pole

BCZ 15/560 radial fan with inlet boxes
Airflow: 16 000 m^3/h - Total pressure 1864 Pa
Speed: 1990 rpm
Absorbed shaft power: 9,8 kW
Operating temperature: 350°C

Comefri SpA

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Cat. C-0019 nov 2005