

Centrifugal Fans

- backward curved impellers
- double inlet
- belt driven

Air in Motion.
Wolter Fans.

M08.HRZ-B



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General information

This range of **Wolter** fans is the result of many years of research and development. The efficiency of all the fans is guaranteed through specific volume figures at maximum pressure differentials. Excellent performance and minimal noise levels are the features of this new fan range.

These centrifugal fans are designed for the conveyance of clean air and non-aggressive steam and gases at a temperature range from -30°C to +80°C (22°F to 176°F)

Type: HRZ / HRZ-B (backward curved).

Computer design allows for interchange-ability of components which ultimately provides an economy product.

Component dimensions are in accordance with DIN 323 section R 20 which means that the nominal size corresponds with the outside diameter of the impeller.













Fan casings

The machine folded scroll is made of galvanized sheet metal. Predrilled holes are located in the side plates to fix mounting frames. It provides for easy installation.

The outlet flanges are in accordance with international standards DIN 24193 sheet 2.

Versions of casing

High performance centrifugal fan with folded galvanized scroll as standard:

| Version | HRZ (NON-AMCA Certified) | HRZ-B | Size Range | Description |
|---------|---|---|--------------|--|
| 00 |  | - | 315 ... 450 | without accessories |
| 01 |  | - | 315 ... 450 | with standard outlet flange |
| 02 |  | - | 315 ... 450 | without outlet flange, with removable feet |
| 03 |  | - | 315 ... 450 | with standard outlet flange and removable feet |
| 04 |  |  | 315 ... 630 | without outlet flange, with galvanized rectangular frame |
| 05 |  |  | 315 ... 630 | with standard outlet flange, with galvanized rectangular frame |
| 06 |  |  | 710 ... 1600 | without outlet flange, with welded rectangular frame |
| 07 |  |  | 710 ... 1600 | with standard outlet flange with welded rectangular frame |

Impellers

The torsion-resistant impellers guarantee a high standard of technology regarding volume flows and processing. The impellers with the shaft are statically and dynamically balanced on precision machines according to quality standard Q 2.5 of VDI 2060.

The backward curved impeller of the **HRZ / HRZ-B** range are made of steel with powder coated.

All impeller series guarantee highest peripheral speed. The aero dynamical design stands for the precision of these modern high efficiency impellers.

For chemical resistance applications, both fan casing and impeller can be finished with special epoxy protection coating or fully manufactured in GRP (FRP) material.

Shaped inlets

The aerodynamically shaped inlets are bolted in and guarantee a perfect inlet stream onto the impeller.

Inlets for the type **HRZ / HRZ-B** are made of steel with powder coated.

Shafts

All precision shafts are trued and have a smooth finish. Both shaft ends have as a standard feature diameters complying with DIN 748, sheet 1 and a groove (DIN 6885, sheet 1) with locking spring. A wax coating provides protection against corrosion of this precision engineered shaft.

Bearings

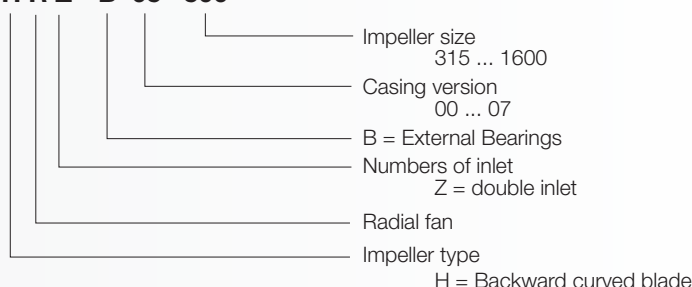
The low noise precision ball bearings are designed for a theoretical life of at least 40.000 working hours. Limiting values for speed and power are indicated on the characteristic curves and should not be exceeded. Long term quality is safeguarded when general assembly and service guidelines for V-belt drives are adhered to.



Dongguan Wolter Chemco Ventilation Ltd. certifies that the Series HRZ-B 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 AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

Fan type code

H R Z - B 05 500



HRZ / HRZ-B 315 to 630 of version 00 to 05

The grooved ball bearings in the harmonic strut housings are completely sealed and maintenance free. Unavoidable alignment errors in the sheet metal casing are compensated by the spherical outer ring. The insulating rubber rings absorbing vibration and structure-born noise are temperature and chemical resistant and electrical conductors. The rugged sealing rings and the inner rings of the bearings are galvanized. The flexible bearing cage is made from polyamide.

The bearing is attached to the shaft by means of an eccentric tension ring. In order to guarantee the bearing seat is free from play and to avoid corrosion of the tension ring it is sealed with a liquid synthetic.

HRZ / HRZ-B 710 to 1600 of version 06 to 07

The grooved ball bearings in the rugged cast-iron casings are completely sealed and maintenance free. Unavoidable alignment errors are compensated by the spherical outer ring. The one-piece bearing housing conforms to DIN 626 Part 213 (ISO 3228) and allows full utilization of the carrying capacity of the mounted regulating bearing.

All housings are equipped with lubricating bore holes for the possibility of secondary lubrication. As protection the lubricating bore holes are closed with a synthetic stopper.

For corrosion reasons the rugged sealing rings and the bearing inner ring are galvanized. The flexible bearing cage is made of polyamide.

The bearing is attached to the shaft by means of an eccentric tension ring. In order to guarantee the bearing fit is free from play and to avoid corrosion of the tension ring it is sealed with a liquid synthetic.

Sound levels

In order to make possible an assessment of sound projection adequate to the human ear the A-assessed description of sound levels has been chosen. The ascertaining of the sound power level follows the reverberant room method according to AMCA 300.

The sound power levels shown on each performance curve, LwiA, refer to the overall sound power "A-Weighted" levels. The computed sound power levels were converted into A-Weighted levels using adjustments to the octave band spectrum as follows:

| Centre Frequency Hz | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|-----------------------------|-------|-------|------|------|------|------|------|------|
| A-Weighted Adjustment dB(A) | -26.2 | -16.1 | -8.6 | -3.2 | 0 | +1.2 | +1.0 | -1.1 |

The overall sound pressure levels, LpiA, can be calculated from the overall sound power levels as follows:

1) Free Field Conditions: $L_{piA} = L_{wiA} - (20 \log_{10} d) - 11$

2) Room Conditions: $L_{piA} = L_{wiA} - (20 \log_{10} d) - 7$

Where: d = distance from fan in meters.

Performance curves

The performance curves have been established using the outlet test method in the test chamber according to AMCA 210 installation B (free inlet, ducted outlet).

The curves indicate as a function of the volume flow:

- the total pressure increase Δp_{tot} for constant speed (heavy black lines)
- constant lines of shaft power P_w (red Lines)
- constant lines of sound power level LwiA (blue lines)

All values relate to an air density:

$\rho_1 = 1,2 \text{ kg/m}^3 \text{ at } 20^\circ\text{C}$

The dynamic pressure p_{d2} and the flow speed c_2 respectively stated in the diagrams refer to the flange cross section of the outlet connection pieces.

Motor power

The powers (P_w) provided on the performance curve are the internal powers required by the ventilator and do not include the mechanical losses. To compute the total required shaft input power, the internal power must be divided by the mechanical efficiency:

$$P_s = P_w / \eta_m$$

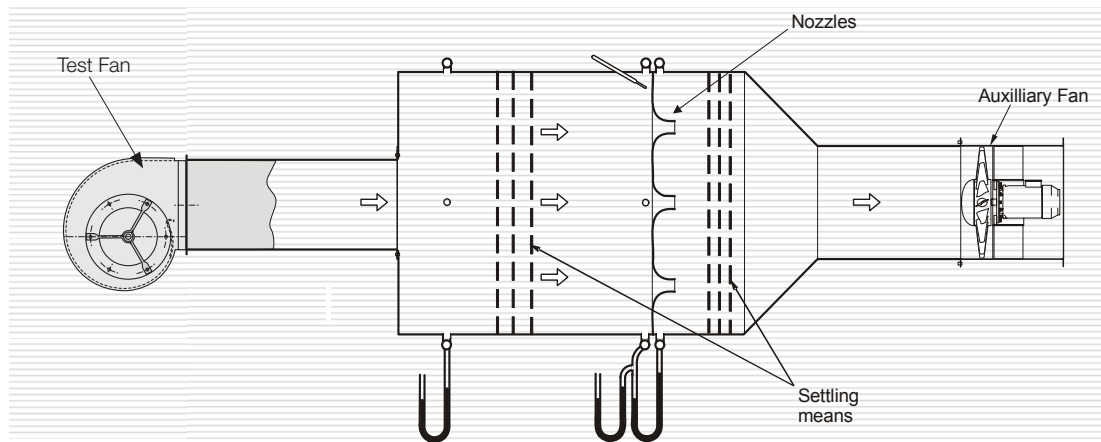
where: P_s = total required shaft input power

η_m = mechanical efficiency

The mechanical efficiency is provided as follow:

| Way of ventilator driving | η_m |
|--------------------------------|----------|
| Electric motor directly driven | 1 |
| Coupling directly driven | 0,98 |
| V-belt driven | 0,95 |

The performance curves provided in this catalogue were measured according to AMCA 210 (ISO 5801) in a test chamber.
The sketch below shows the principle set up of the test chamber.



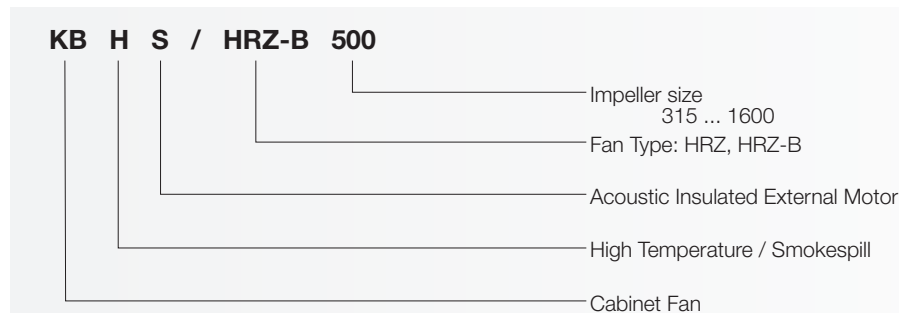
AMCA 210 Figure 12
ISO 5801 Figure 73b

Smoke spill operation

The HRZ / HRZ-B range of backward curve centrifugal fans are designed and tested to operate at standard temperatures as well as at elevated temperatures of maximum up to 600deg/C for 240 minutes inclusive of F600 (600deg/120mins), F400 (400deg/120mins) and F300 (300deg/60mins) according to EN 12101-3:2015.

Design Features

Cabinets with belt-driven fans can be fitted with double-inlet fans & related accessories



Cabinet

- Frames made of extruded aluminium profiles, joined together by either plastic or aluminium corners
- Side panels made of galvanised sheet metal with optional epoxy coating
- Panels are insulated to ensure low noise levels
- Optional access door on service side
- Weatherproof version with aluminium side plates and weather-hood available
- For smoke spill operation, cabinet with externally located motor/s can be designed with or without acoustic insulation for the motors as well.

Installation and maintance

- Interchangeable side panels allow easy installation
- Low-maintenance operation
- Electrical connection via waterproof terminal box

The following ancillary equipment is available.

Flexible connection

The flexible connection consists of two galvanised flanges, assembled with gas-tight canvas. Please note that the dimensions of inlet and outlet flexible connectors for a respective cabinet fan can differ.

Inlet and outlet flanges

Galvanised matching flanges for inlet and outlet sides are available.

AMCA - FEG rating

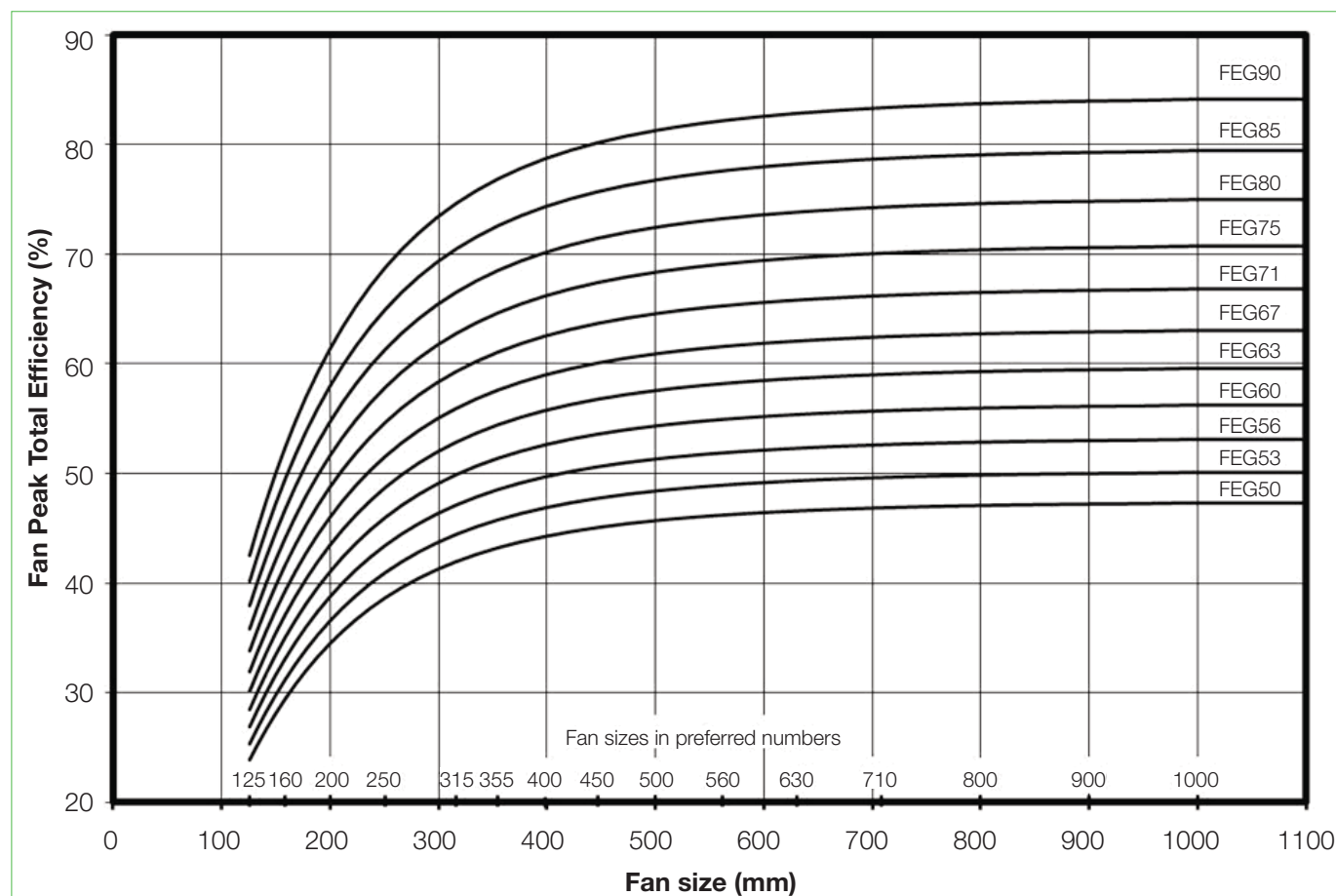
Fan Efficiency Grade: HRZ-B



Certified FEGs are determined in accordance with AMCA 205-12 Energy Efficiency Classification for fans. In conjunction with AMCA 211-13 (Rev. 2015) Certified Ratings Program, Product Rating Manual for Fan Air Performance. This classification is based on fan peak (optimum) total efficiency for a given fan speed, fan size and application category. For the purpose of energy classification, the peak efficiency can be determined at a speed not higher than the maximum design speed of the fan.

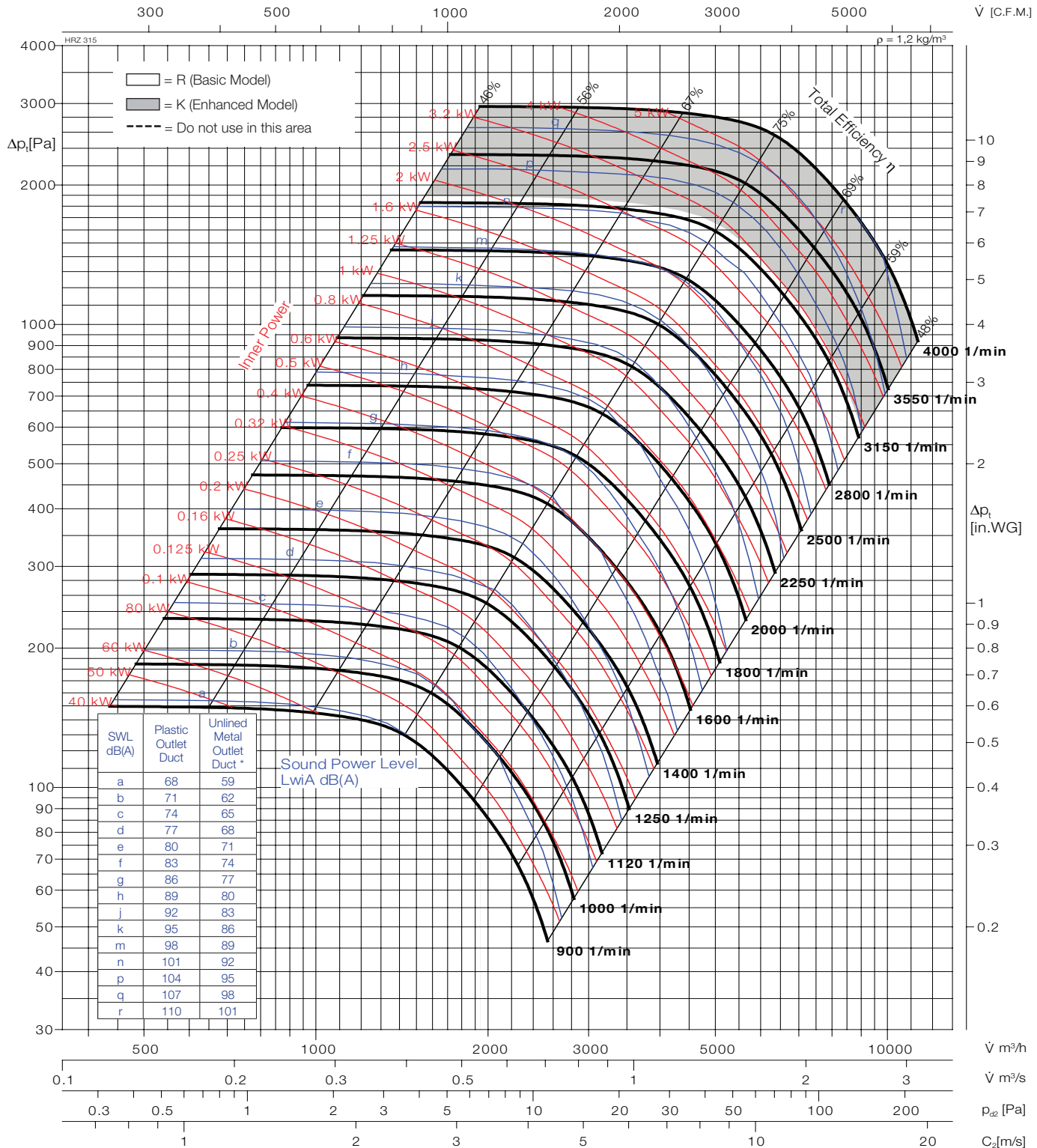
The AMCA Certified Ratings Seal applies to the Fan Efficiency Grade (FEG) for HRZ-B series Centrifugal Fan model HRZ-B 315 to HRZ-B 1600 as shown in the table below.

| Fan Model No. | Max. Fan Speed (rpm) | Fan Outlet Area (m2) | Fan Efficiency Grade (FEG) | Fan Model No. | Max. Fan Speed (rpm) | Fan Outlet Area (m2) | Fan Efficiency Grade (FEG) |
|---------------|----------------------|----------------------|----------------------------|---------------|----------------------|----------------------|----------------------------|
| HRZ-B 315 | 4000 | 0,1632 | 85 | HRZ-B 800 | 1600 | 1,0140 | 85 |
| HRZ-B 355 | 3800 | 0,2052 | 85 | HRZ-B 900 | 1400 | 1,2769 | 85 |
| HRZ-B 400 | 3200 | 0,2570 | 85 | HRZ-B 1000 | 1300 | 1,6053 | 85 |
| HRZ-B 450 | 2800 | 0,3238 | 85 | HRZ-B 1120 | 1300 | 2.0051 | 85 |
| HRZ-B 500 | 2800 | 0,4070 | 85 | HRZ-B 1250 | 1200 | 2.4901 | 85 |
| HRZ-B 560 | 2600 | 0,5112 | 80 | HRZ-B 1400 | 1000 | 3.0415 | 85 |
| HRZ-B 630 | 2200 | 0,6416 | 80 | HRZ-B 1600 | 900 | 4.0804 | 85 |
| HRZ-B 710 | 2000 | 0,8064 | 85 | | | | |



Fan test laboratory AMCA 210/99
Fig.12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwA sound power levels for installation Type B: free inlet, ducted outlet.



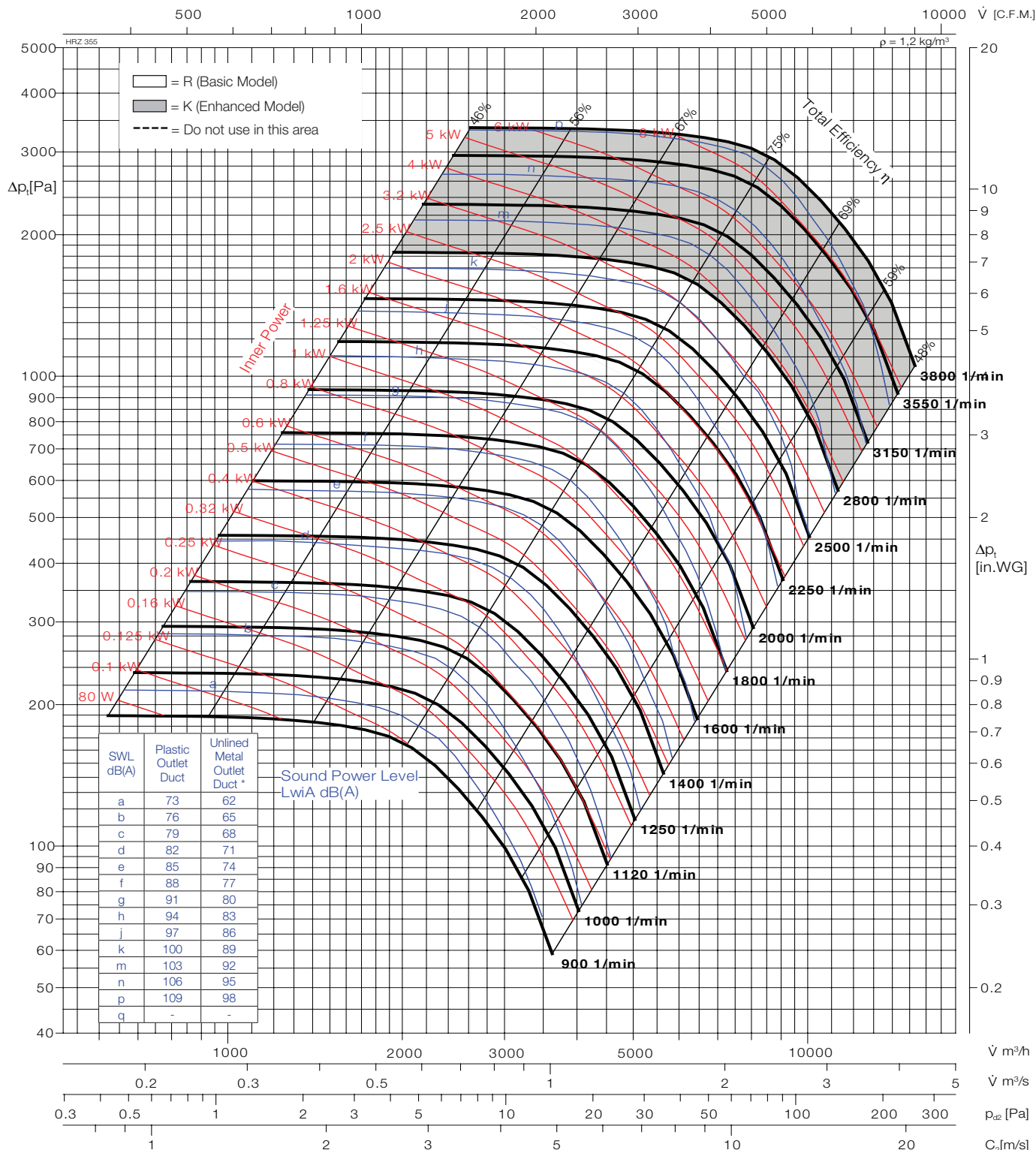
| Typ | Art.Nr. | ■ [kg] | Typ | Art.Nr. | ■ [kg] |
|--------------|---------|--------|-----|---------|--------|
| HRZ-B 03 315 | 541405 | 32,6 | | | |
| HRZ-B 05 315 | 541407 | 42,6 | | | |
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|-------------------|-------------------------------|
| Wheel diameter | D = 319 mm |
| Number of blades | z = 16 |
| Moment of inertia | J = 0,5211 kgm² |
| Wheel weight | G = 7,3 kg |
| Speed limit | n _{max} = 4000 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig. 12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwA sound power levels for installation Type B: free inlet, ducted outlet.



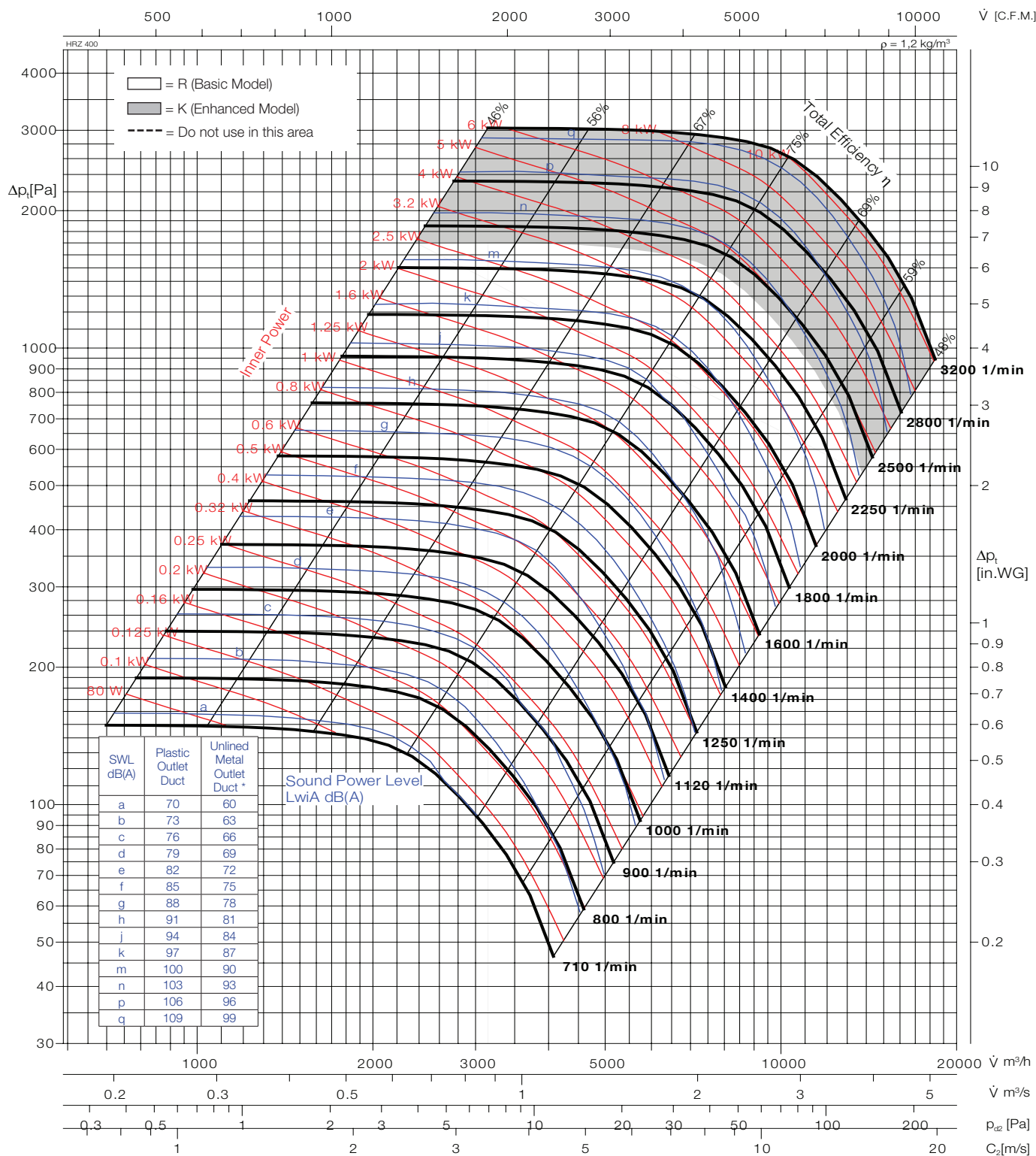
| Typ | Art.Nr. | █ [kg] | Typ | Art.Nr. | █ [kg] |
|--------------|---------|--------|-----|---------|--------|
| HRZ-B 03 355 | 541453 | 42,7 | | | |
| HRZ-B 05 355 | 541455 | 54,7 | | | |
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| | | |
|-------------------|--------------------------|-------------------------|
| Wheel diameter | D = | 359 mm |
| Number of blades | z = | 16 |
| Moment of inertia | J = | 0,8204 kgm ² |
| Wheel weight | G = | 9,1 kg |
| Speed limit | n_{max} = | 3800 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

*Fan test laboratory AMCA 210/99
Fig.12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.*

Power rating (kW) does not include transmission losses, Performance ratings do not include the effects of appurtenances (accessories). The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for inlet LwA sound power levels for installation Type B: free inlet, ducted outlet.



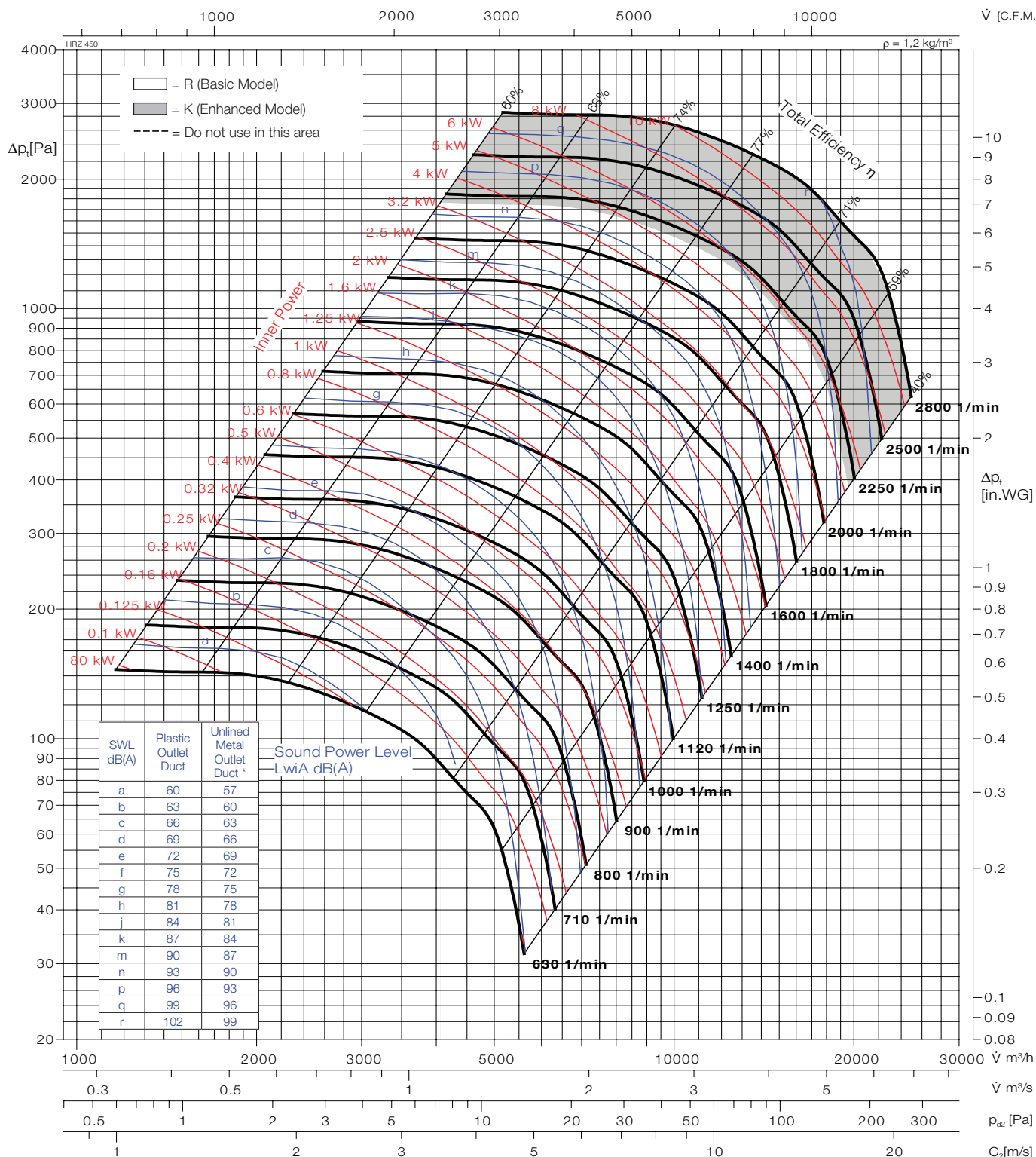
| Typ | Art.Nr. | ☼ [kg] | Typ | Art.Nr. | ☼ [kg] |
|--------------|---------|--------|-----|---------|--------|
| HRZ-B 03 400 | 541503 | 50,6 | | | |
| HRZ-B 05 400 | 541505 | 63,6 | | | |
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| | |
|-------------------|-----------------------------------|
| Wheel diameter | D = 404 mm |
| Number of blades | z = 16 |
| Moment of inertia | J = 1,549 kgm ² |
| Wheel weight | G = 13,6 kg |
| Speed limit | n = 3200 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig. 12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwiA sound power levels for installation Type B: free inlet, ducted outlet.



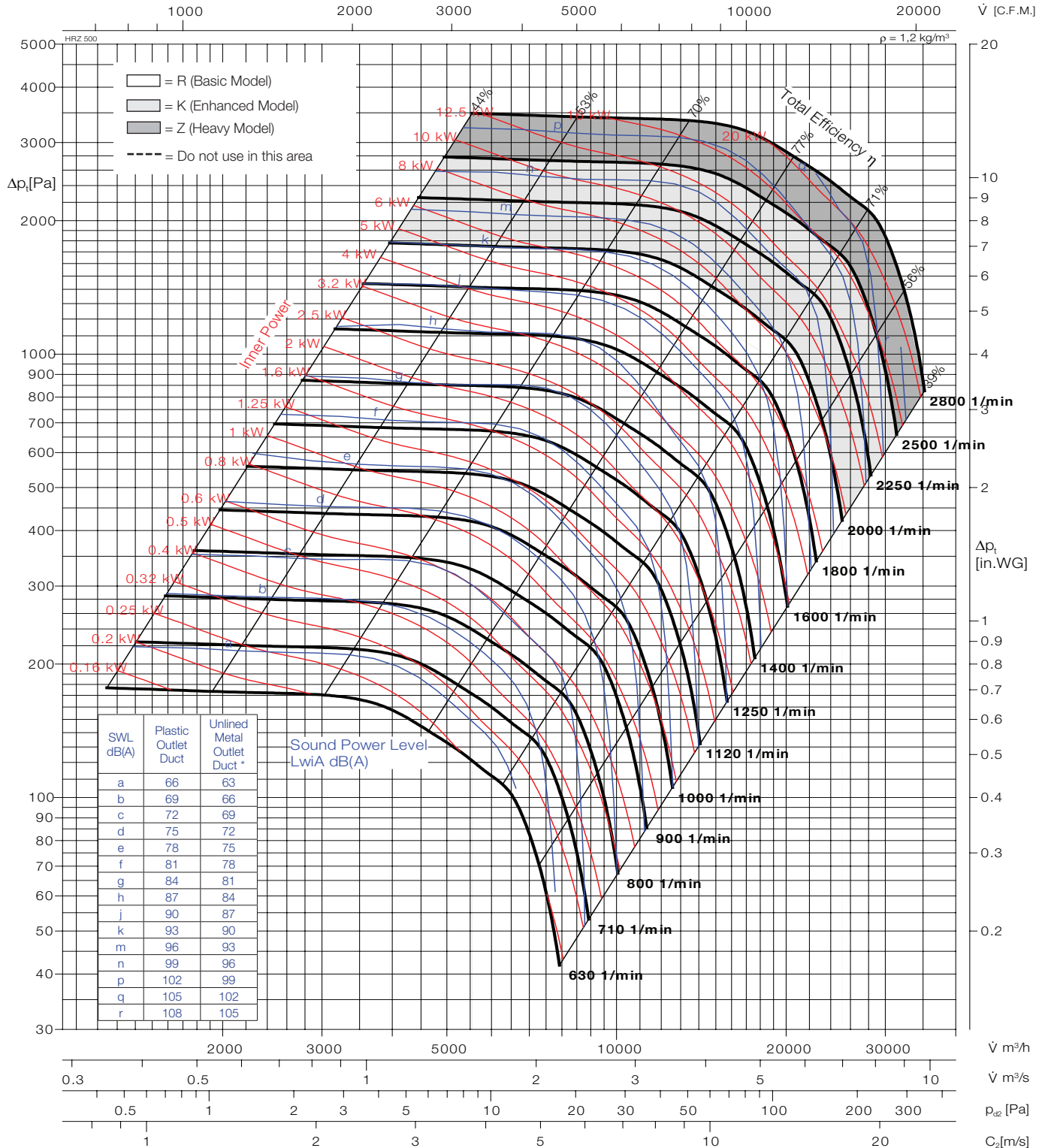
| Typ | Art.Nr. | ■ [kg] | Typ | Art.Nr. | ■ [kg] |
|--------------|---------|--------|-----|---------|--------|
| HRZ-B 05 450 | 541555 | 67,5 | | | |
| HRZ-B 07 450 | 541557 | 82,5 | | | |
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|-------------------|-------------------------------------|
| Wheel diameter | D = 454 mm |
| Number of blades | z = 16 |
| Moment of inertia | J = 2,692 kgm ² |
| Wheel weight | G = 18,7 kg |
| Speed limit | n_{max} = 2800 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig.12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwA sound power levels for installation Type B: free inlet, ducted outlet.



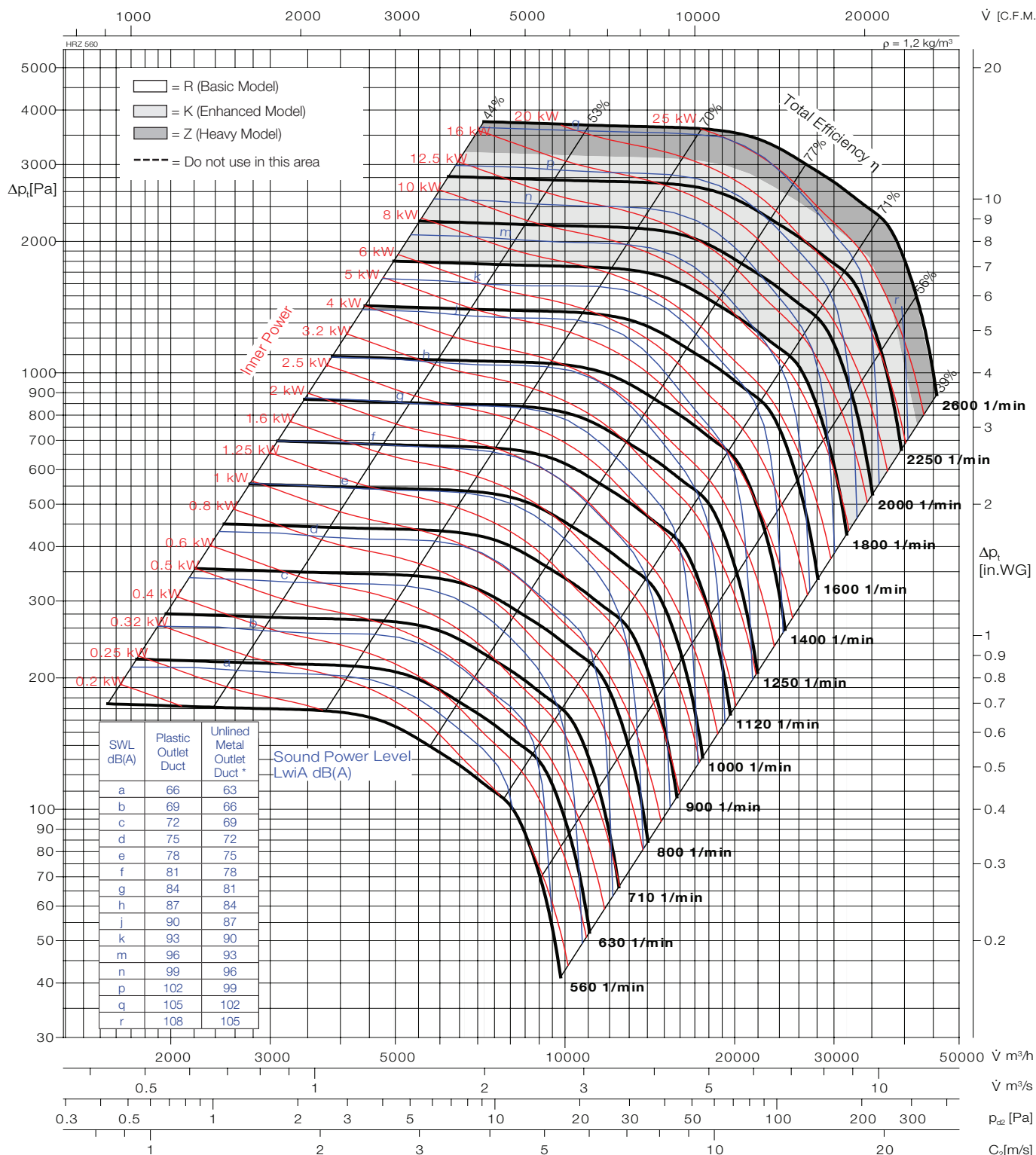
| Typ | Art.Nr. | ■ [kg] | Typ | Art.Nr. | ■ [kg] |
|--------------|---------|--------|-----|---------|--------|
| HRZ-B 05 500 | 541605 | 84,2 | | | |
| HRZ-B 07 500 | 541607 | 104,2 | | | |
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| | | | |
|-------------------|--------------------------|-------|-------|
| Wheel diameter | D = | 510 | mm |
| Number of blades | z = | 16 | |
| Moment of inertia | J = | 4,522 | kgm² |
| Wheel weight | G = | 24,9 | kg |
| Speed limit | n_{max} = | 2800 | 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig. 12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwA sound power levels for installation Type B: free inlet, ducted outlet.



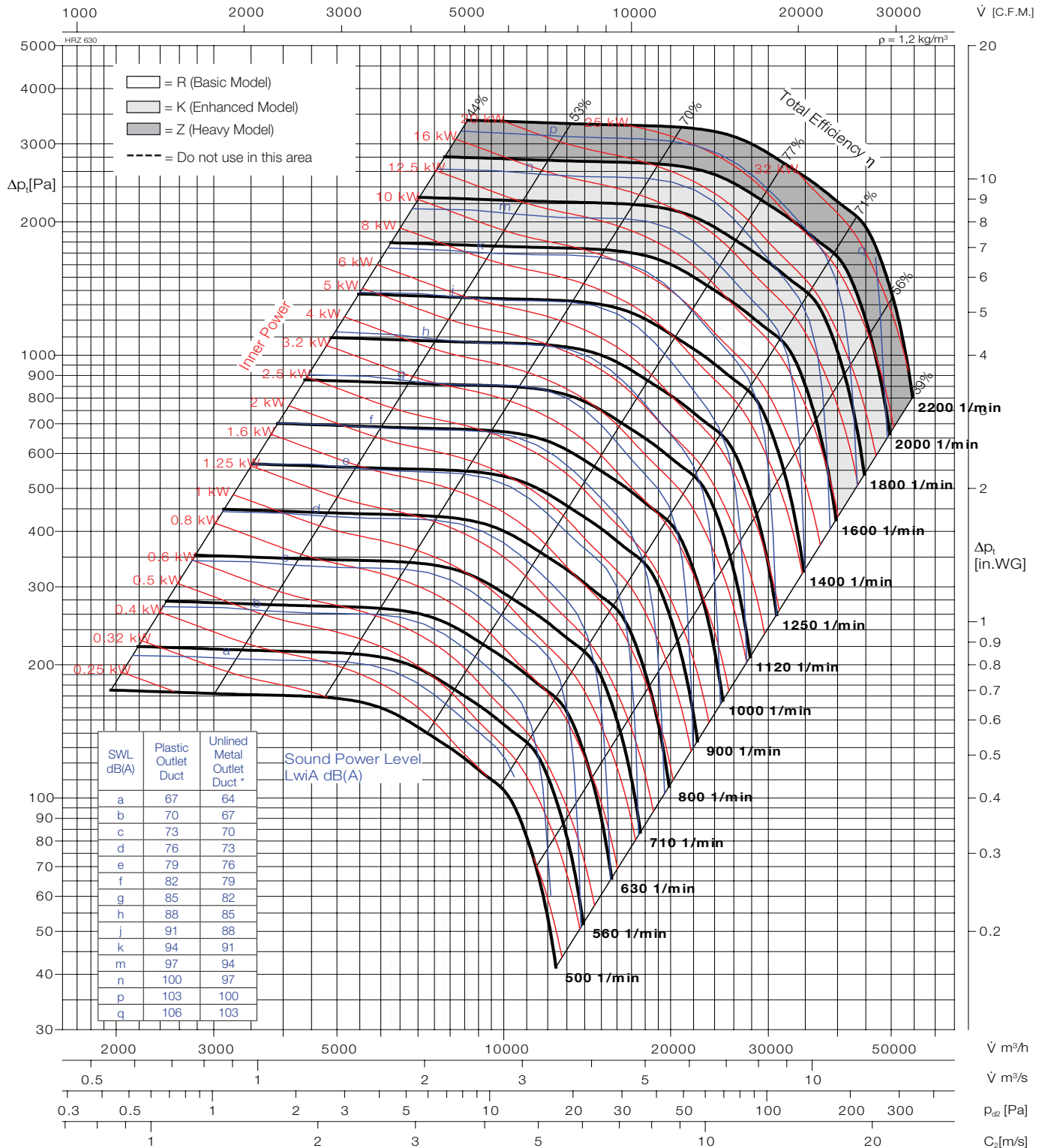
| Typ | Art.Nr. | ■ [kg] | Typ | Art.Nr. | ■ [kg] |
|--------------|---------|--------|-----|---------|--------|
| HRZ-B 05 560 | 541655 | 142 | | | |
| HRZ-B 07 560 | 541657 | 171 | | | |
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| | | |
|-------------------|--------------------------|------------|
| Wheel diameter | D = | 570 mm |
| Number of blades | z = | 16 |
| Moment of inertia | J = | 8,499 kgm² |
| Wheel weight | G = | 37,4 kg |
| Speed limit | n_{max} = | 2600 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig.12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwA sound power levels for installation Type B: free inlet, ducted outlet.



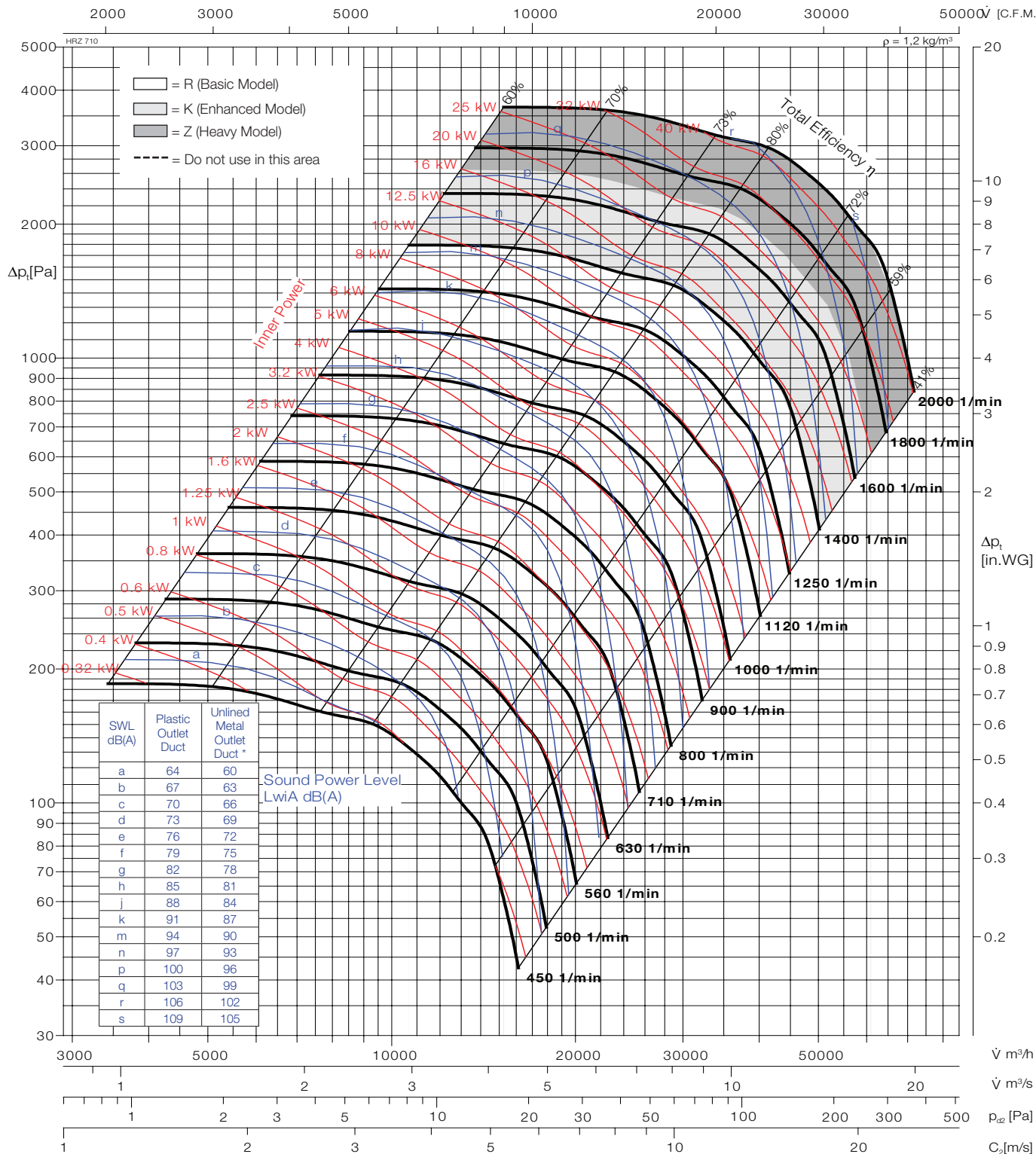
| Typ | Art.Nr. | ■ [kg] | Typ | Art.Nr. | ■ [kg] |
|--------------|---------|--------|-----|---------|--------|
| HRZ-B 05 630 | 541705 | 168 | | | |
| HRZ-B 07 630 | 541707 | 197 | | | |
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|-------------------|-------------------------------------|
| Wheel diameter | D = 640 mm |
| Number of blades | z = 16 |
| Moment of inertia | J = 14,36 kgm² |
| Wheel weight | G = 50,2 kg |
| Speed limit | n_{max} = 2200 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig. 12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwA sound power levels for installation Type B: free inlet, ducted outlet.



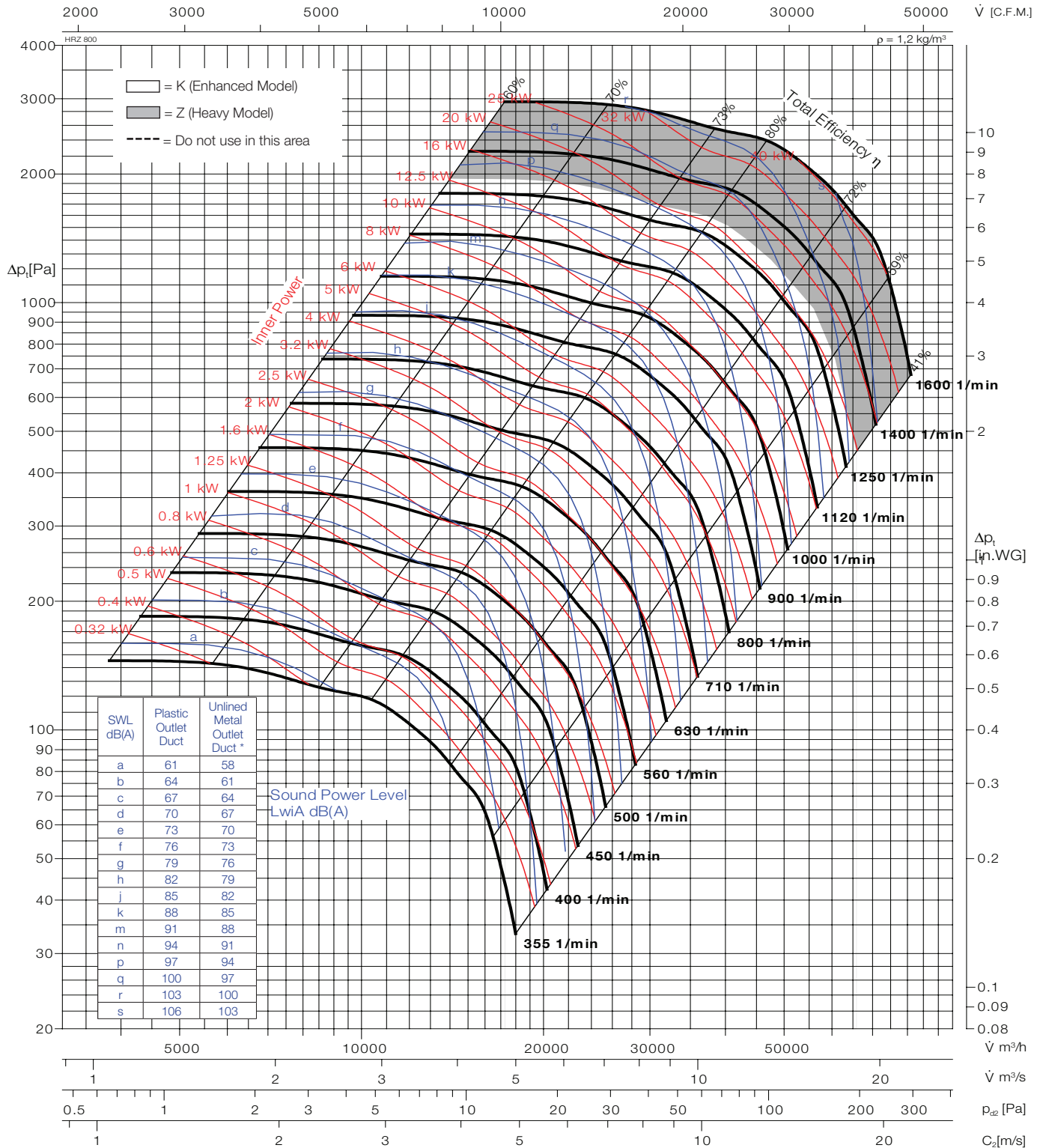
| Typ | Art.Nr. | ■ [kg] | Typ | Art.Nr. | ■ [kg] |
|--------------|---------|--------|-----|---------|--------|
| HRZ-B 05 710 | 541755 | 223 | | | |
| HRZ-B 07 710 | 541757 | 271 | | | |
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| | |
|-------------------|-------------------------------------|
| Wheel diameter | D = 720 mm |
| Number of blades | z = 16 |
| Moment of inertia | J = 22,71 kgm² |
| Wheel weight | G = 62,9 kg |
| Speed limit | n_{max} = 2000 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig.12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwA sound power levels for installation Type B: free inlet, ducted outlet.



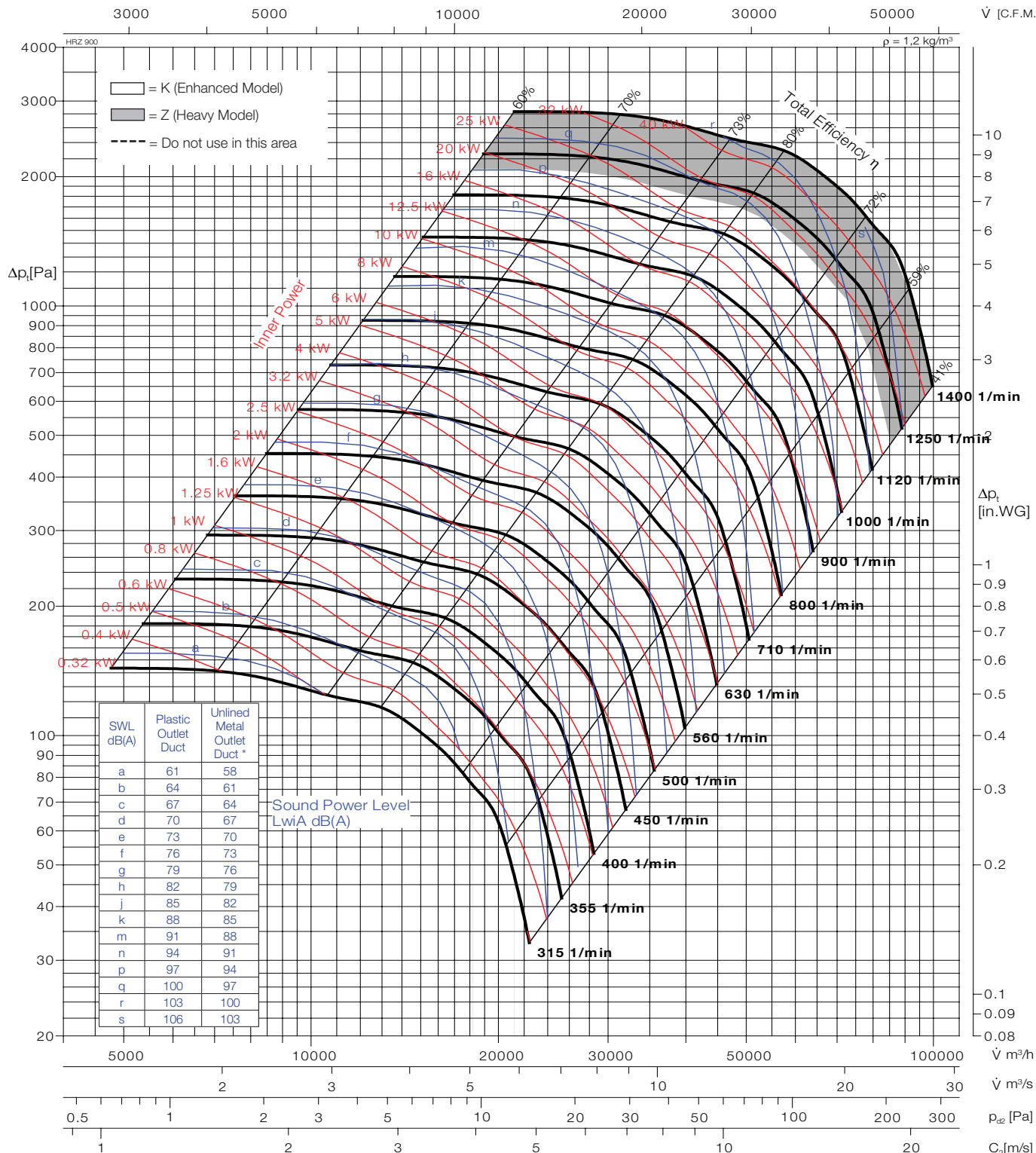
| Typ | Art.Nr. | Weight [kg] | Typ | Art.Nr. | Weight [kg] |
|--------------|---------|-------------|-----|---------|-------------|
| HRZ-B 07 800 | 541807 | 300 | | | |
| | | | | | |
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| | |
|-------------------|-------------------------------|
| Wheel diameter | D = 808 mm |
| Number of blades | z = 16 |
| Moment of inertia | J = 36,78 kgm² |
| Wheel weight | G = 80,8 kg |
| Speed limit | n _{max} = 1600 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig. 12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
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have been calculated per AMCA International Standard 301. Values shown are for inlet
LwA sound power levels for installation Type B: free inlet, ducted outlet.



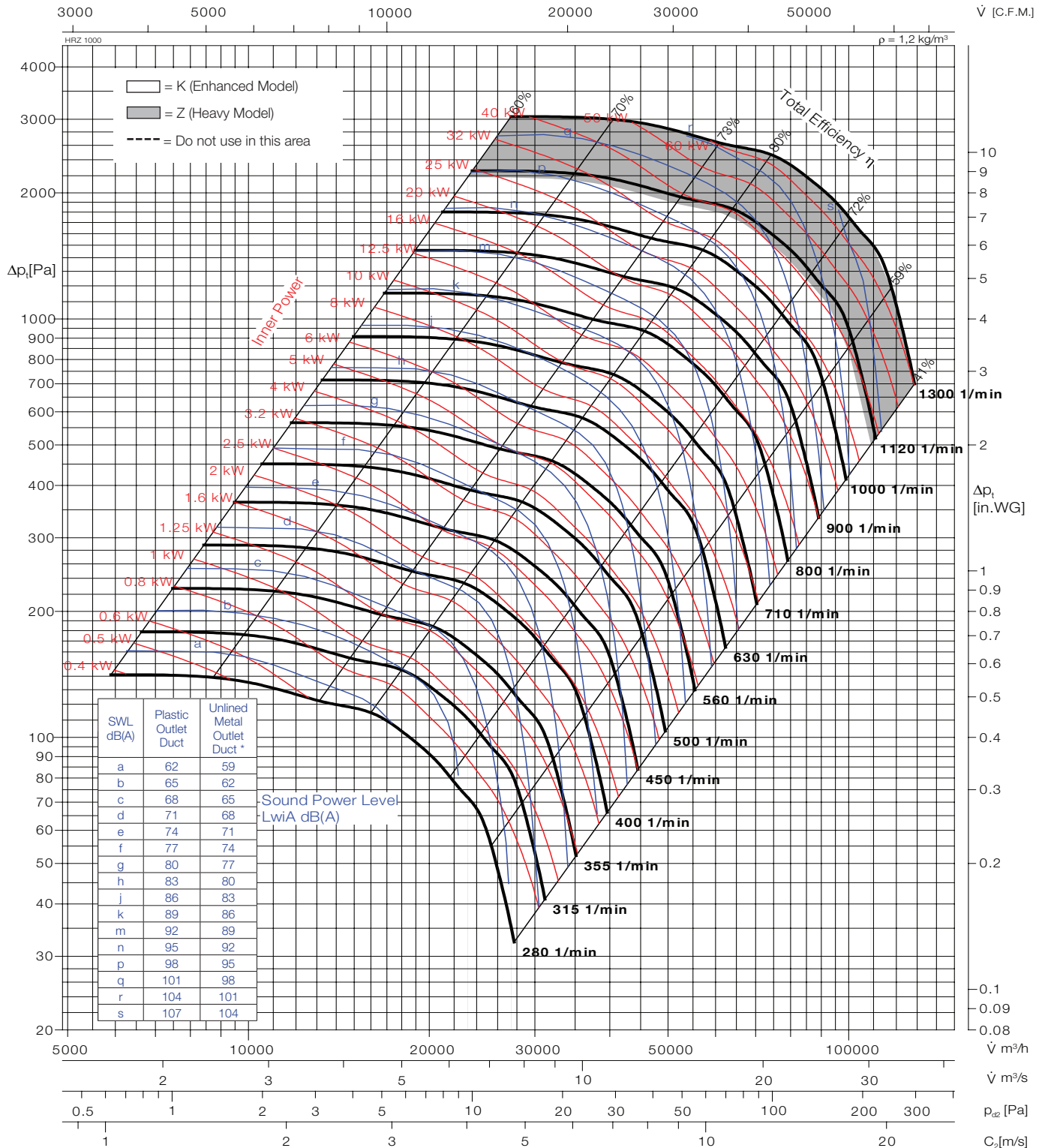
| Typ | Art.Nr. | ■ [kg] | Typ | Art.Nr. | ■ [kg] |
|--------------|---------|--------|-----|---------|--------|
| HRZ-B 07 900 | 541857 | 481,5 | | | |
| | | | | | |
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| | | | |
|-------------------|--------------------------|-------|------------------|
| Wheel diameter | D = | 905 | mm |
| Number of blades | z = | 16 | |
| Moment of inertia | J = | 63,69 | kgm ² |
| Wheel weight | G = | 111 | kg |
| Speed limit | n_{max} = | 1400 | 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig.12, 140000 cmh Test Chamber.
Performance certified for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwA sound power levels for installation Type B: free inlet, ducted outlet.



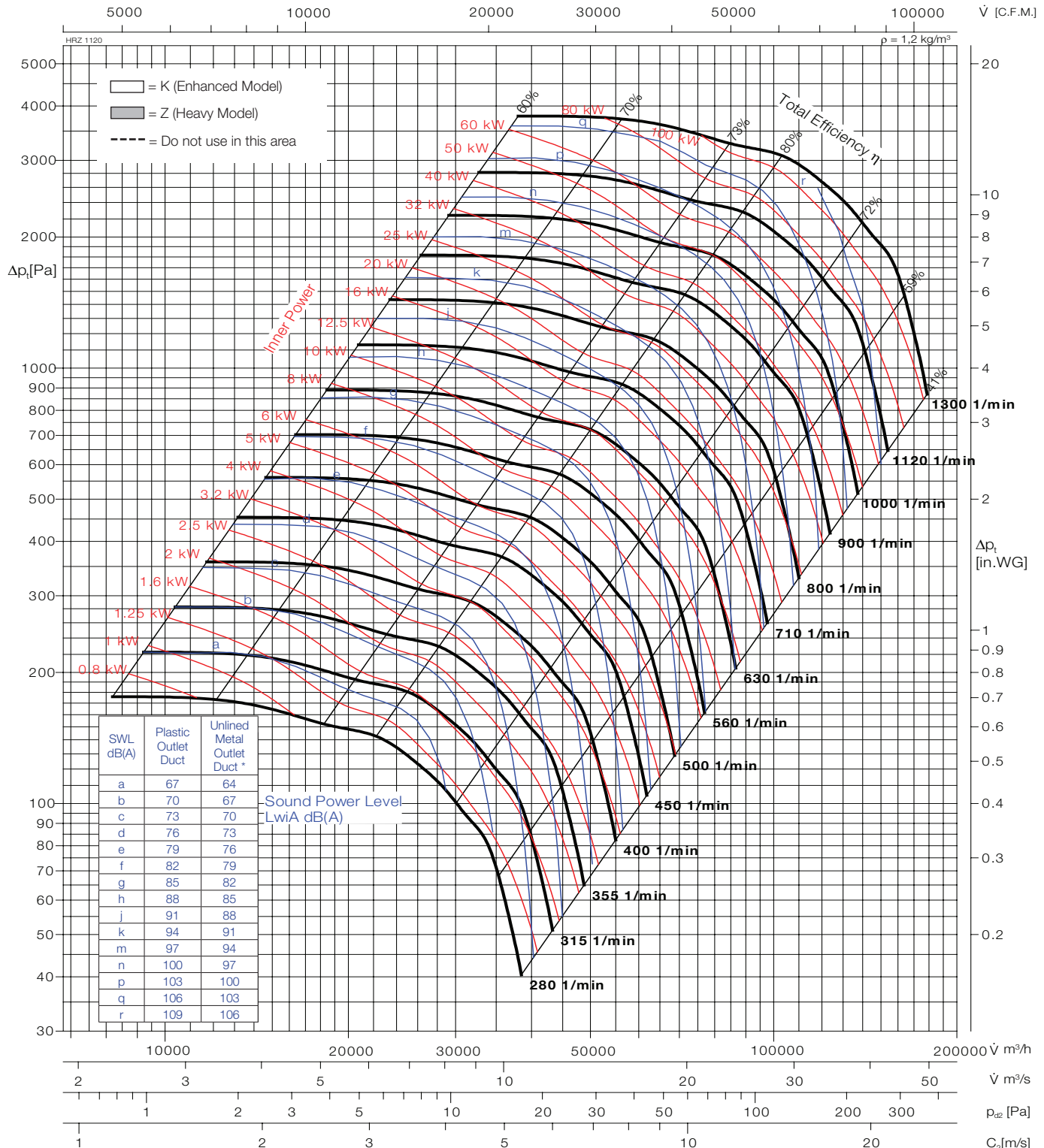
| Typ | Art.Nr. | ■ [kg] | Typ | Art.Nr. | ■ [kg] |
|---------------|---------|--------|-----|---------|--------|
| HRZ-B 07 1000 | 541907 | 530 | | | |
| | | | | | |
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| | |
|-------------------|-------------------------------------|
| Wheel diameter | D = 1010 mm |
| Number of blades | z = 16 |
| Moment of inertia | J = 101,5 kgm² |
| Wheel weight | G = 142 kg |
| Speed limit | n_{max} = 1300 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig. 12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwiA sound power levels for installation Type B: free inlet, ducted outlet.



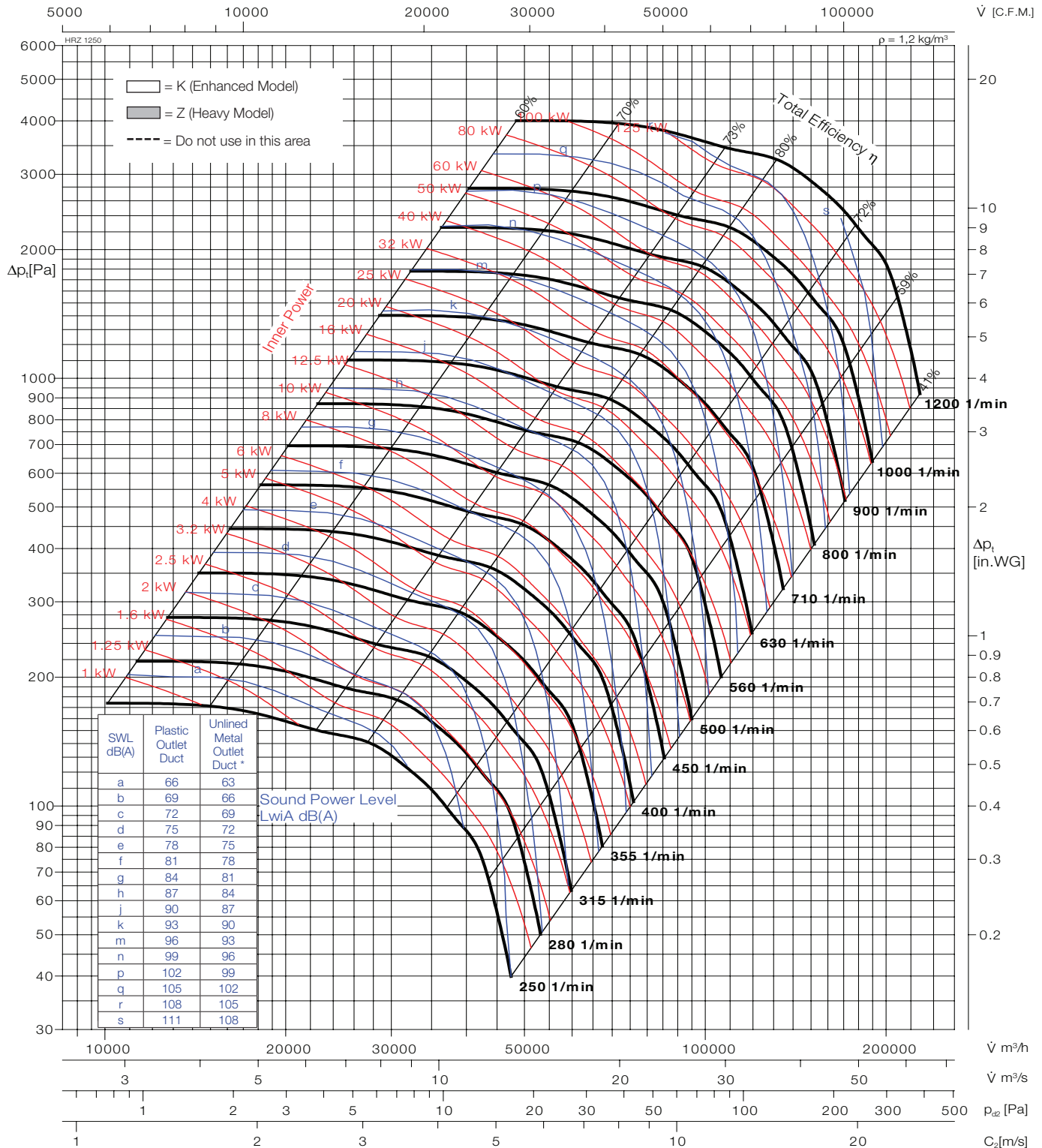
| Typ | Art.Nr. | Wt. [kg] | Typ | Art.Nr. | Wt. [kg] |
|---------------|---------|----------|-----|---------|----------|
| HRZ-B 07 1120 | 541917 | - | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| | |
|-------------------|-------------------------------------|
| Wheel diameter | D = 1127 mm |
| Number of blades | z = 16 |
| Moment of inertia | J = 162,4 kgm² |
| Wheel weight | G = 183 kg |
| Speed limit | n_{max} = 1300 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig.12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwA sound power levels for installation Type B: free inlet, ducted outlet.



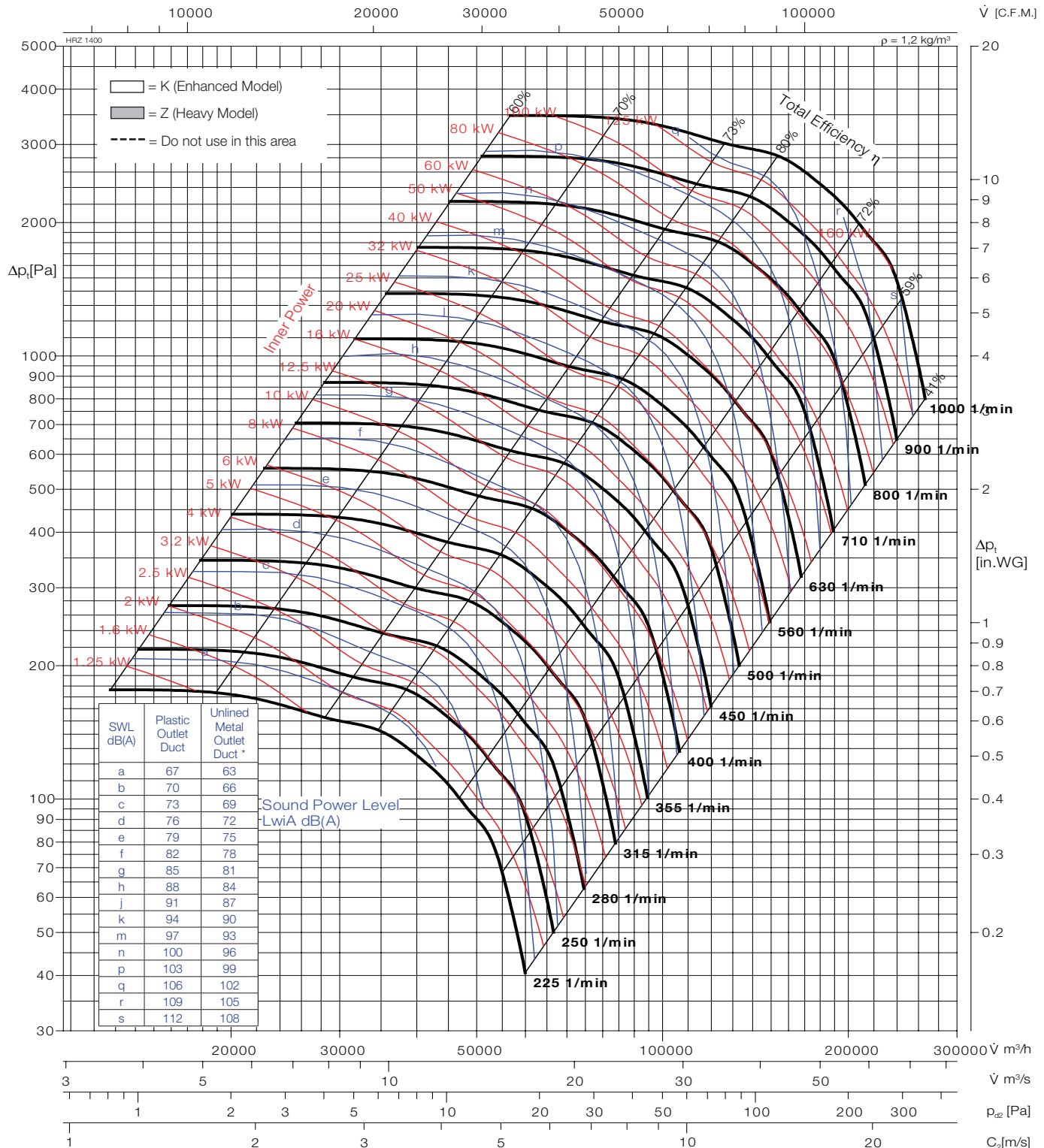
| Typ | Art.Nr. | ■ [kg] | Typ | Art.Nr. | ■ [kg] |
|---------------|---------|--------|-----|---------|--------|
| HRZ-B 07 1250 | 541927 | - | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| | |
|-------------------|-------------------------------------|
| Wheel diameter | D = 1255 mm |
| Number of blades | z = 16 |
| Moment of inertia | J = 258,9 kgm² |
| Wheel weight | G = 235 kg |
| Speed limit | n_{max} = 1200 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig. 12, 140000 cmh Test Chamber.
Performance certified for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwiA sound power levels for installation Type B: free inlet, ducted outlet.



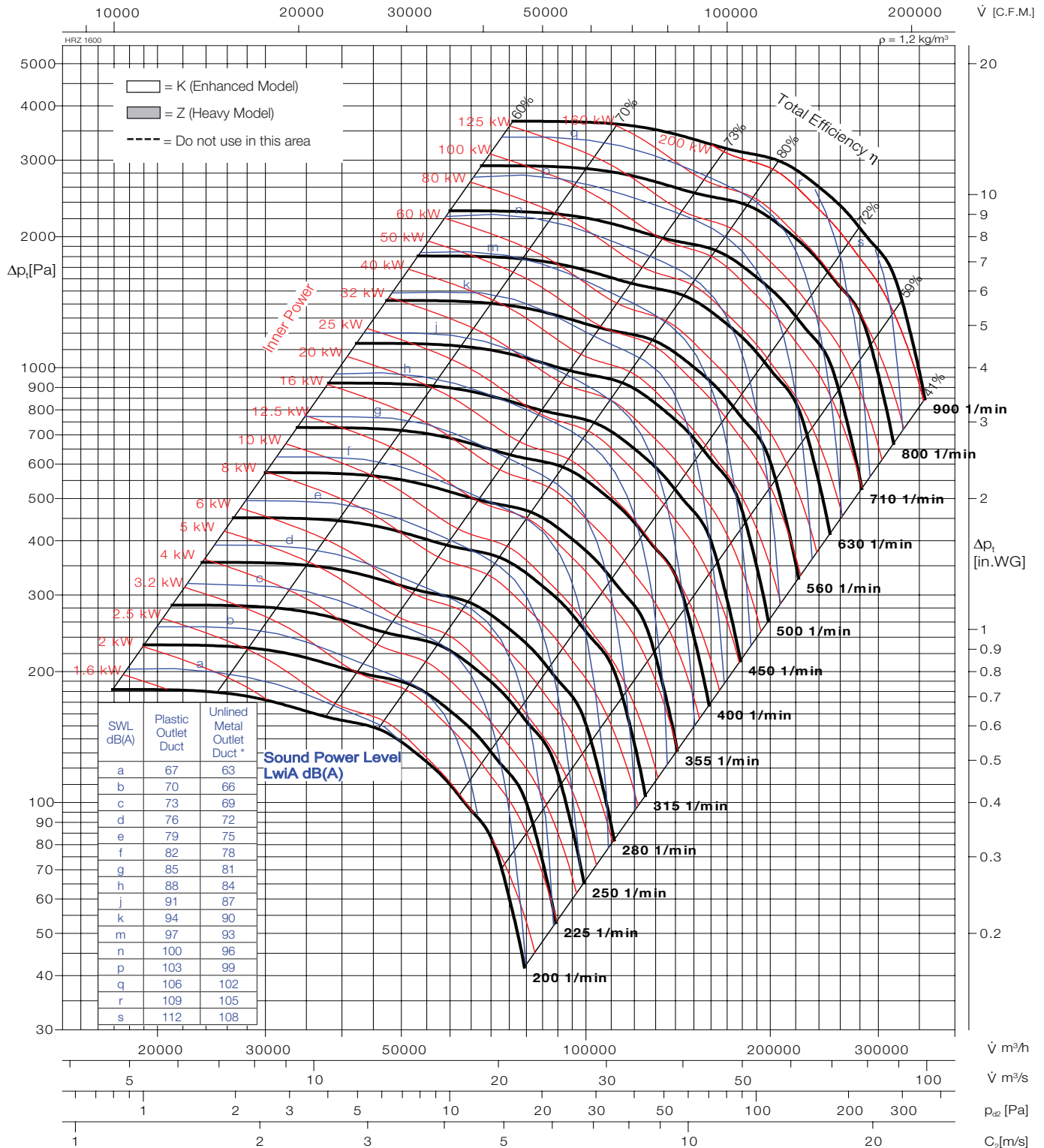
| Typ | Art.Nr. | ■ [kg] | Typ | Art.Nr. | ■ [kg] |
|---------------|---------|--------|-----|---------|--------|
| HRZ-B 07 1400 | 541947 | - | | | |
| | | | | | |
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| | | | | | |

| | |
|-------------------|-------------------------------------|
| Wheel diameter | D = 1405 mm |
| Number of blades | z = 16 |
| Moment of inertia | J = 417,3 kgm² |
| Wheel weight | G = 302 kg |
| Speed limit | n_{max} = 1000 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

Fan test laboratory AMCA 210/99
Fig.12, 140000 cmh Test Chamber.
Performance certified is for installation
type B-Free inlet, Ducted outlet.

Power rating (kW) does not include transmission losses, Performance ratings do not
include the effects of appurtenances (accessories). The A-weighted sound ratings shown
have been calculated per AMCA International Standard 301. Values shown are for inlet
LwA sound power levels for installation Type B: free inlet, ducted outlet.



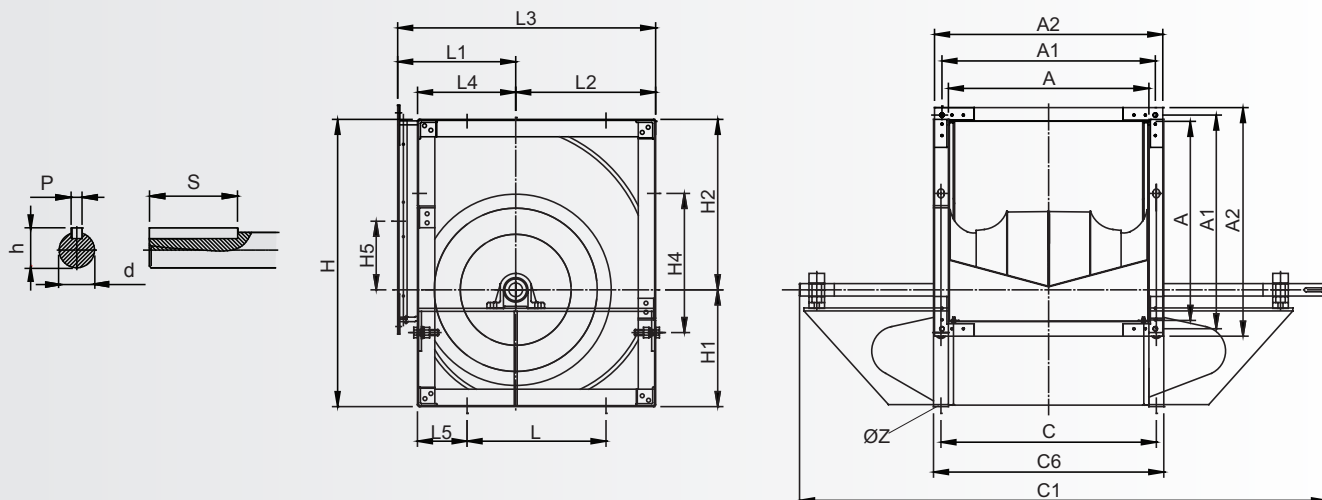
| Typ | Art.Nr. | ■ [kg] | Typ | Art.Nr. | ■ [kg] |
|---------------|---------|--------|-----|---------|--------|
| HRZ-B 07 1600 | 541957 | - | | | |
| | | | | | |
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| | | | | | |

| | |
|-------------------|------------------------------------|
| Wheel diameter | D = 1605 mm |
| Number of blades | z = 16 |
| Moment of inertia | J = 716,6 kgm² |
| Wheel weight | G = 397 kg |
| Speed limit | n_{max} = 900 1/min |

* Sound power level with unlined metal outlet duct were obtained from the test in the reverberant room. Data are not licensed by AMCA.

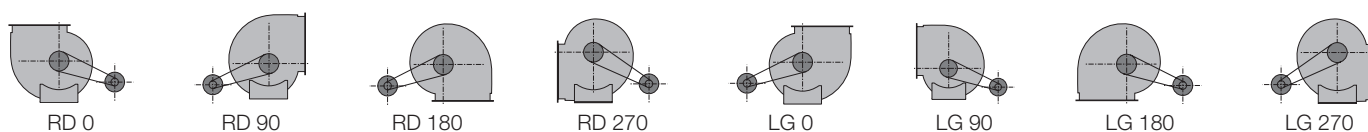


HRZ-B 05



| Size | A | A1 | A2 | C | C1 | C6 | d | H | H1 | H2 | H4 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| - | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 315 | 404 | 434 | 460 | 434 | 1062 | 421 | 25 | 578 | 235 | 343 | 280 |
| 355 | 453 | 493 | 509 | 493 | 1157 | 464 | 30 | 655 | 266 | 389 | 355 |
| 400 | 507 | 547 | 563 | 547 | 1263 | 533 | 30 | 736 | 301 | 436 | 355 |
| 450 | 569 | 599 | 625 | 609 | 1382 | 649 | 35 | 827 | 336 | 491 | 530 |
| 500 | 638 | 668 | 694 | 678 | 1500 | 718 | 35 | 918 | 375 | 543 | 530 |
| 560 | 715 | 745 | 771 | 765 | 1643 | 815 | 40 | 1030 | 420 | 610 | 530 |
| 630 | 801 | 831 | 857 | 851 | 1810 | 901 | 45 | 1157 | 472 | 685 | 530 |

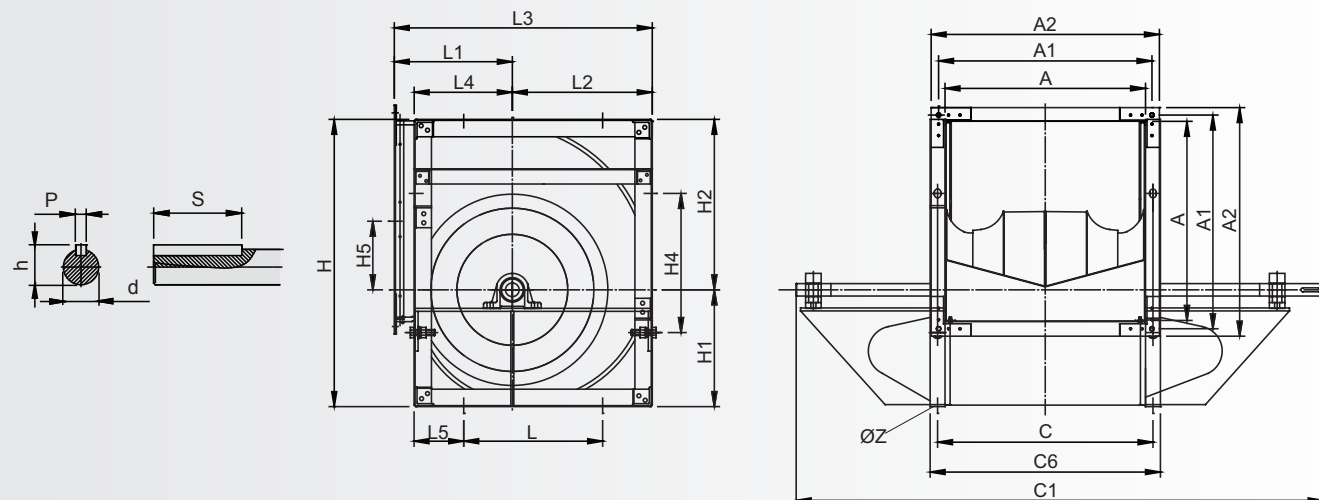
| Size | H5 | h | L | L1 | L2 | L3 | L4 | L5 | n | p | ØZ |
|------|------|------|------|------|------|------|------|------|------|------|------|
| - | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 315 | 138 | 28 | 280 | 236 | 282 | 518 | 198 | 100 | 88 | 8 | 13 |
| 355 | 156 | 33 | 355 | 261 | 317 | 578 | 231 | 97 | 84 | 8 | 13 |
| 400 | 178 | 33 | 355 | 290 | 361 | 651 | 252 | 129 | 86 | 8 | 13 |
| 450 | 202 | 38 | 530 | 322 | 404 | 726 | 277 | 76 | 98 | 10 | 13 |
| 500 | 219 | 38 | 530 | 352 | 448 | 800 | 302 | 110 | 98 | 10 | 13 |
| 560 | 245 | 43 | 530 | 390 | 503 | 893 | 342 | 158 | 92 | 12 | 13 |
| 630 | 278 | 48 | 530 | 434 | 565 | 999 | 381 | 208 | 95 | 14 | 13 |



RD = clockwise

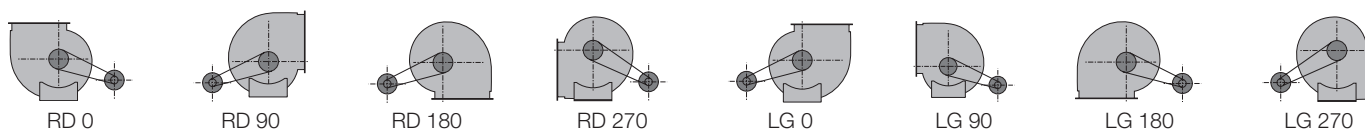
LG = anti-clockwise

The direction of rotation is defined by vue on the side of drive.

**HRZ-B 07**

| Size | A | A1 | A2 | C | C1 | C6 | d | H | H1 | H2 | H4 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| - | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 710 | 898 | 928 | 954 | 948 | 2000 | 998 | 60 | 1303 | 527 | 765 | 630 |
| 800 | 1007 | 1037 | 1063 | 1057 | 2101 | 1107 | 60 | 1468 | 595 | 862 | 710 |
| 900 | 1130 | 1160 | 1186 | 1180 | 2368 | 1250 | 60 | 1648 | 666 | 971 | 800 |
| 1000 | 1267 | 1297 | 1323 | 1317 | 2629 | 1387 | 60 | 1810 | 733 | 1066 | 900 |
| 1120 | 1416 | 1446 | 1472 | 1466 | 2721 | 1536 | 70 | 2027 | 821 | 1206 | 1000 |
| 1250 | 1578 | 1608 | 1634 | 1628 | 3021 | 1698 | 70 | 2263 | 916 | 1347 | 1120 |
| 1400 | 1744 | 1774 | 1800 | 1794 | 3366 | 1884 | 70 | 2534 | 1026 | 1328 | 1250 |
| 1600 | 2020 | 2050 | 2076 | 2070 | 3854 | 2160 | 80 | 2896 | 1173 | 1723 | 1400 |

| Size | H5 | h | L | L1 | L2 | L3 | L4 | L5 | n | p | ØZ |
|------|------|------|------|------|------|------|------|------|------|------|------|
| - | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 710 | 316 | 64,4 | 630 | 485 | 636 | 1121 | 422 | 214 | 146 | 18 | 17 |
| 800 | 359 | 64,4 | 710 | 535 | 715 | 1250 | 466 | 236 | 172 | 18 | 17 |
| 900 | 406 | 64,4 | 800 | 604 | 804 | 1408 | 515 | 260 | 160 | 18 | 17 |
| 1000 | 433 | 64,4 | 900 | 657 | 884 | 1541 | 578 | 281 | 157 | 18 | 17 |
| 1120 | 498 | 74,9 | 1000 | 739 | 997 | 1736 | 647 | 322 | - | 20 | 17 |
| 1250 | 556 | 74,9 | 1120 | 837 | 1112 | 1949 | 712 | 352 | - | 20 | 17 |
| 1400 | 623 | 74,9 | 1250 | 938 | 1246 | 2184 | 809 | 402 | - | 20 | 17 |
| 1600 | 712 | 85,4 | 1400 | 1072 | 1424 | 2496 | 925 | 474 | - | 22 | 17 |



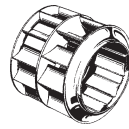
RD = clockwise

LG = anti-clockwise

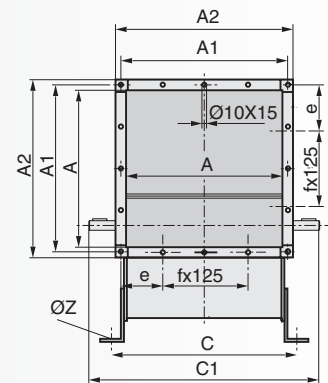
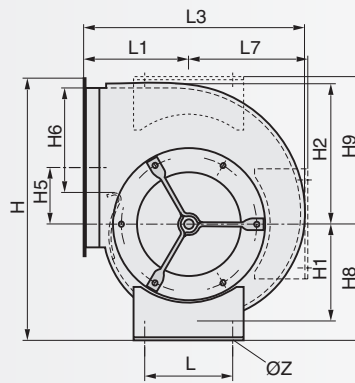
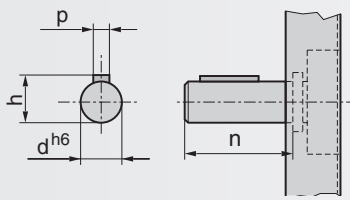
The direction of rotation is defined by vue on the side of drive.

Dimensions

HRZ



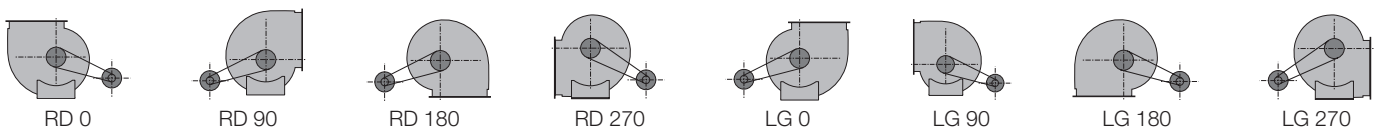
HRZ 03



| Size | A | A1 | A2 | C | C1 | d | e | f | H | H1 | H2 | H5 |
|------|------|------|------|------|------|------|-------|------|------|------|------|------|
| - | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 315 | 404 | 434 | 460 | 434 | 565 | 25 | 150,5 | 50 | 635 | 241 | 350 | 138 |
| 355 | 453 | 483 | 509 | 494 | 655 | 30 | 50,5 | 60 | 692 | 271 | 393 | 156 |
| 400 | 507 | 537 | 563 | 544 | 710 | 30 | 75,5 | 60 | 768 | 304 | 441 | 180 |
| 450 | 569 | 599 | 625 | 604 | 780 | 35 | 105,5 | 65 | 879 | 341 | 495 | 204 |

| Size | H6 | H8 | H9 | h | L | L1 | L3 | L7 | n | p | ØZ |
|------|------|------|------|------|------|------|------|------|------|------|------|
| - | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 315 | 246 | 268 | 377 | 28 | 280 | 251 | 540 | 290 | 55 | 8 | 13 |
| 355 | 279 | 281 | 418 | 33 | 355 | 276 | 601 | 327 | 69 | 8 | 13 |
| 400 | 315 | 309 | 469 | 33 | 355 | 306 | 670 | 366 | 74 | 8 | 13 |
| 450 | 354 | 346 | 528 | 38 | 450 | 337 | 746 | 415 | 76 | 10 | 13 |

HRZ are not licensed by AMCA International.



RD = clockwise

LG = anti-clockwise

The direction of rotation is defined by vue on the side of drive.

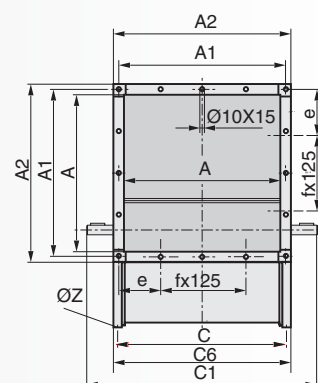
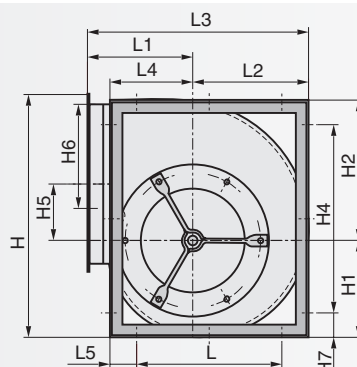
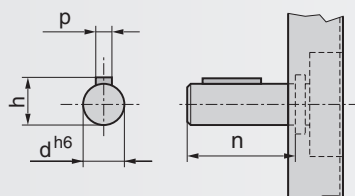
We reserve the right to alter measurements without notice in case of technical improvements.

Dimensions

HRZ



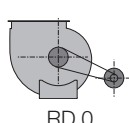
HRZ 05



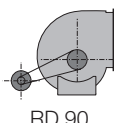
| Size | A | A1 | A2 | C | C1 | C6 | d | e | f | H | H1 | H2 | H4 |
|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|
| - | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 315 | 404 | 434 | 460 | 434 | 640 | 421 | 25 | 217 | - | 578 | 235 | 343 | 280 |
| 355 | 453 | 493 | 509 | 493 | 700 | 464 | 30 | 241,5 | - | 655 | 266 | 389 | 355 |
| 400 | 507 | 547 | 563 | 547 | 760 | 533 | 30 | 168,5 | 100 | 736 | 301 | 436 | 355 |
| 450 | 569 | 599 | 625 | 609 | 845 | 649 | 35 | 199,5 | 100 | 827 | 336 | 491 | 530 |
| 500 | 638 | 668 | 694 | 678 | 915 | 718 | 35 | 209 | 125 | 918 | 375 | 543 | 530 |
| 560 | 715 | 745 | 771 | 765 | 1000 | 815 | 40 | 247,5 | 125 | 1030 | 420 | 610 | 530 |
| 630 | 801 | 831 | 857 | 851 | 1090 | 901 | 45 | 265,5 | 150 | 1157 | 472 | 685 | 530 |

| Size | H5 | H6 | H7 | h | L | L1 | L2 | L3 | L4 | L5 | n | p | ØZ |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| - | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 315 | 138 | 202 | 149 | 28 | 280 | 236 | 282 | 518 | 198 | 100 | 88 | 8 | 13 |
| 355 | 156 | 227 | 150 | 33 | 355 | 261 | 317 | 578 | 231 | 97 | 84 | 8 | 13 |
| 400 | 178 | 254 | 190 | 33 | 355 | 290 | 361 | 651 | 252 | 129 | 86 | 8 | 13 |
| 450 | 202 | 285 | 149 | 38 | 530 | 322 | 404 | 726 | 277 | 76 | 98 | 10 | 13 |
| 500 | 219 | 319 | 194 | 38 | 530 | 352 | 448 | 800 | 302 | 110 | 98 | 10 | 13 |
| 560 | 245 | 358 | 250 | 43 | 530 | 390 | 503 | 893 | 342 | 158 | 92 | 12 | 13 |
| 630 | 278 | 400 | 314 | 48 | 530 | 434 | 565 | 999 | 381 | 208 | 95 | 14 | 13 |

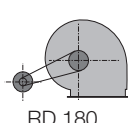
HRZ are not licensed by AMCA International.



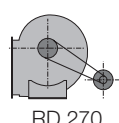
RD 0



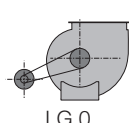
RD 90



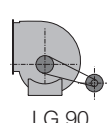
RD 180



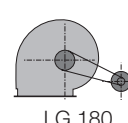
RD 270



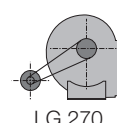
LG 0



LG 90



LG 180



LG 270

RD = clockwise

LG = anti-clockwise

The direction of rotation is defined by vue on the side of drive.

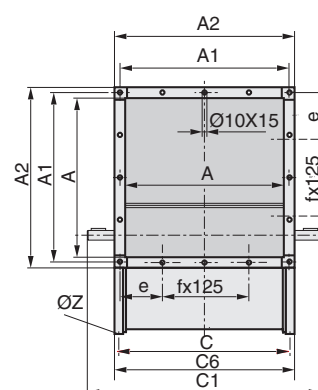
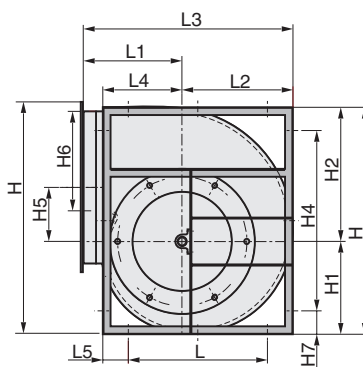
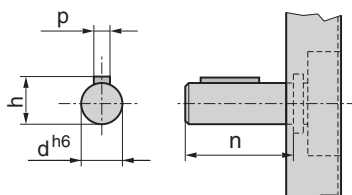
We reserve the right to alter measurements without notice in case of technical improvements.

Dimensions

HRZ



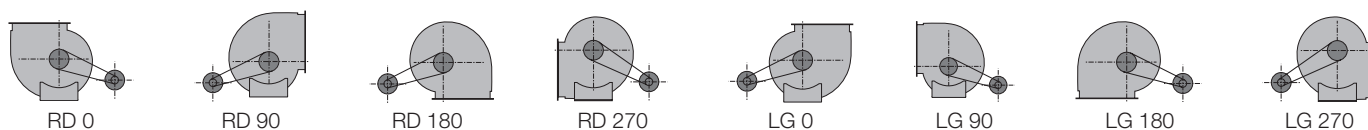
HRZ 07



| Size | A | A1 | A2 | C | C1 | C6 | d | e | f | H | H1 | H2 | H4 |
|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|
| - | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 710 | 898 | 928 | 954 | 948 | 1290 | 998 | 60 | 264 | 200 | 1303 | 527 | 765 | 630 |
| 800 | 1007 | 1037 | 1063 | 1057 | 1450 | 1107 | 60 | 268,5 | 250 | 1468 | 595 | 862 | 710 |
| 900 | 1130 | 1160 | 1186 | 1180 | 1570 | 1250 | 60 | 280 | 300 | 1648 | 666 | 971 | 800 |
| 1000 | 1267 | 1297 | 1323 | 1317 | 1700 | 1387 | 60 | 298,5 | 350 | 1810 | 733 | 1066 | 900 |
| 1120 | 1416 | 1446 | 1472 | 1466 | 1860 | 1536 | 70 | - | - | 2027 | 821 | 1206 | 1000 |
| 1250 | 1578 | 1608 | 1634 | 1628 | 2020 | 1698 | 70 | - | - | 2263 | 916 | 1347 | 1120 |
| 1400 | 1744 | 1774 | 1800 | 1794 | 2190 | 1884 | 70 | - | - | 2534 | 1026 | 1328 | 1250 |
| 1600 | 2020 | 2050 | 2076 | 2070 | 2460 | 2160 | 80 | - | - | 2896 | 1173 | 1723 | 1400 |

| Size | H5 | H6 | H7 | h | L | L1 | L2 | L3 | L4 | L5 | n | p | ØZ |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| - | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 710 | 316 | - | 337 | 64,4 | 630 | 485 | 636 | 1121 | 422 | 214 | 146 | 18 | 17 |
| 800 | 359 | - | 379 | 64,4 | 710 | 535 | 715 | 1250 | 466 | 236 | 172 | 18 | 17 |
| 900 | 406 | - | 424 | 64,4 | 800 | 604 | 804 | 1408 | 515 | 260 | 160 | 18 | 17 |
| 1000 | 433 | - | 455 | 64,4 | 900 | 657 | 884 | 1541 | 578 | 281 | 157 | 18 | 17 |
| 1120 | 498 | - | 514 | 74,9 | 1000 | 739 | 997 | 1736 | 647 | 322 | - | 20 | 17 |
| 1250 | 556 | - | 572 | 74,9 | 1120 | 837 | 1112 | 1949 | 712 | 352 | - | 20 | 17 |
| 1400 | 623 | - | 642 | 74,9 | 1250 | 938 | 1246 | 2184 | 809 | 402 | - | 20 | 17 |
| 1600 | 712 | - | 748 | 85,4 | 1400 | 1072 | 1424 | 2496 | 925 | 474 | - | 22 | 17 |

HRZ are not licensed by AMCA International.



RD = clockwise

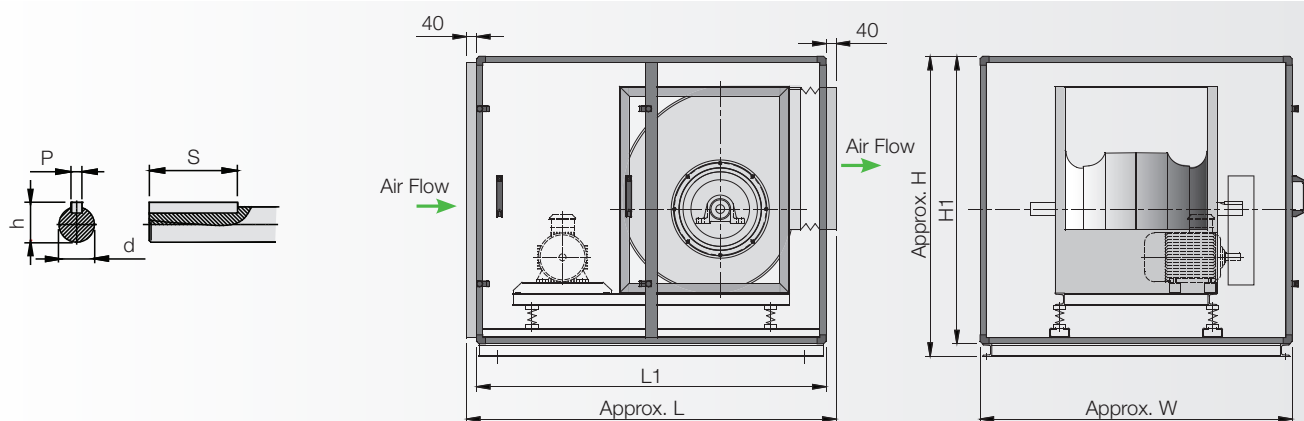
LG = anti-clockwise

The direction of rotation is defined by vue on the side of drive.

We reserve the right to alter measurements without notice in case of technical improvements.

Dimensions

KB / HRZ, KB / HRZ-B

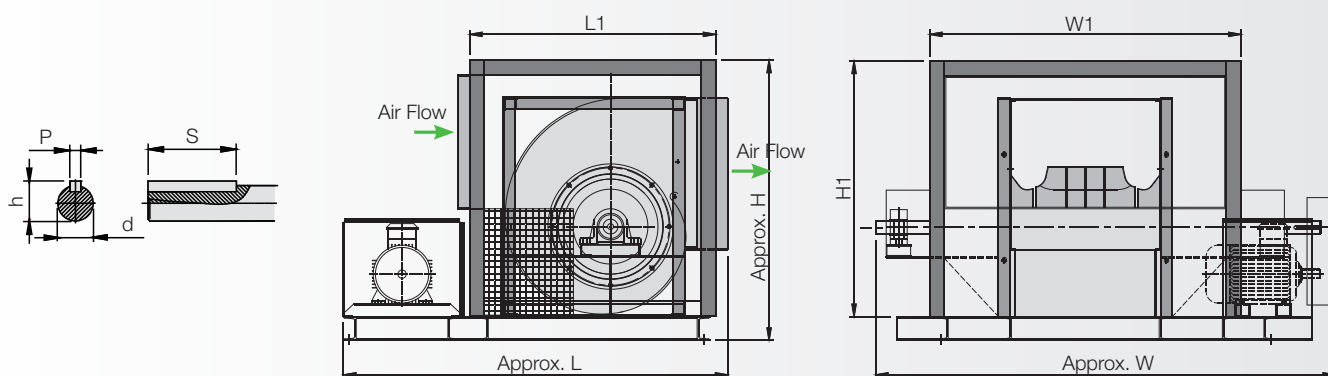


| Model KB / HRZ, HRZ-B | d [mm] | h [mm] | H [mm] | H1 [mm] | Max. L [mm] | Max. L1 [mm] | P [mm] | S [mm] | W [mm] | W1 [mm] |
|--------------------------|-----------|-----------|-----------|------------|----------------|-----------------|-----------|-----------|-----------|------------|
| 315 | 25 | 28 | 870 | 820 | 1120 | 1040 | 8 | 50 | 860 | - |
| 355 | 30 | 33 | 950 | 900 | 1280 | 1200 | 8 | 50 | 970 | - |
| 400 | 30 | 33 | 1040 | 990 | 1350 | 1270 | 8 | 50 | 1070 | - |
| 450 | 35 | 38 | 1140 | 1090 | 1460 | 1380 | 10 | 70 | 1180 | - |
| 500 | 35 | 38 | 1240 | 1190 | 1530 | 1450 | 10 | 70 | 1310 | - |
| 560 | 40 | 43 | 1430 | 1350 | 1740 | 1660 | 12 | 70 | 1430 | - |
| 630 | 45 | 48 | 1570 | 1490 | 1890 | 1810 | 14 | 70 | 1590 | - |
| 710 | 60 | 64,4 | 1730 | 1650 | 2020 | 1940 | 18 | 100 | 1770 | - |
| 800 | 60 | 64,4 | 1910 | 1830 | 2140 | 2060 | 18 | 100 | 1970 | - |
| 900 | 60 | 64,4 | 2250 | 2150 | 2300 | 2220 | 18 | 100 | 2080 | - |
| 1000 | 60 | 64,4 | 2430 | 2330 | 2540 | 2460 | 18 | 100 | 2140 | - |
| 1120 | 70 | 74,9 | 2620 | 2500 | 2730 | 2650 | 20 | 150 | 2800 | - |
| 1250 | 70 | 74,9 | 2870 | 2750 | 2930 | 2850 | 20 | 150 | 3000 | - |
| 1400 | 70 | 74,9 | 3070 | 2950 | 3130 | 3050 | 20 | 150 | 3300 | - |
| 1600 | 80 | 85,4 | 3320 | 3200 | 3330 | 3250 | 22 | 200 | 3700 | - |

NB: Dimension above for the fan with LG / RD 90 Deg and 270 Deg.
Pressure loss on cabinet not included.

Dimensions

KBH / HRZ-B



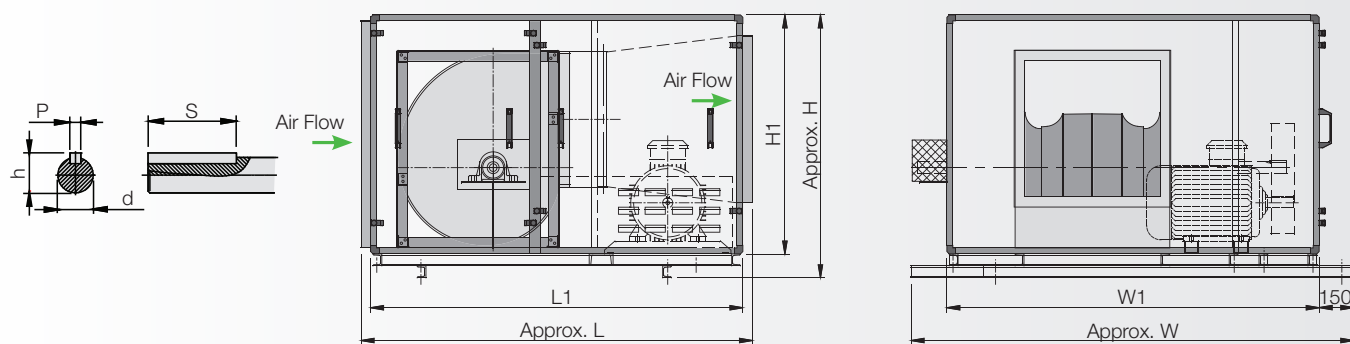
| Model KBH / HRZ, HRZ-B | d [mm] | H [mm] | H1 [mm] | L [mm] | L1 [mm] | P [mm] | S [mm] | h [mm] | W [mm] | W1 [mm] |
|---------------------------|-----------|-----------|------------|-----------|------------|-----------|-----------|-----------|-----------|------------|
| 315 | 40 | 790 | 740 | 1170 | 700 | 12 | 70 | 43,3 | 1320 | 830 |
| 355 | 45 | 880 | 800 | 1230 | 760 | 14 | 70 | 48,8 | 1430 | 940 |
| 400 | 45 | 943 | 860 | 1296 | 830 | 14 | 70 | 48,8 | 1524 | 1050 |
| 450 | 50 | 1060 | 980 | 1370 | 900 | 14 | 90 | 53,8 | 1730 | 1150 |
| 500 | 50 | 1130 | 1050 | 1450 | 980 | 14 | 90 | 53,8 | 1850 | 1270 |
| 560 | 60 | 1320 | 1240 | 1680 | 1080 | 18 | 100 | 64,4 | 2010 | 1480 |
| 630 | 60 | 1440 | 1360 | 1870 | 1270 | 18 | 100 | 64,4 | 2160 | 1630 |
| 710 | 70 | 1600 | 1500 | 2000 | 1400 | 20 | 150 | 74,9 | 2490 | 1800 |
| 800 | 70 | 1770 | 1670 | 2130 | 1530 | 20 | 150 | 74,9 | 2690 | 2000 |
| 900 | 70 | 1950 | 1850 | 2280 | 1680 | 20 | 150 | 74,9 | 2930 | 2250 |
| 1000 | 80 | 2100 | 2000 | 2410 | 1810 | 22 | 200 | 85,4 | 3170 | 2480 |
| 1120 | 80 | 2150 | 2033 | 2740 | 2000 | 22 | 200 | 85,4 | 3400 | 3100 |
| 1250 | 80 | 2400 | 2285 | 2940 | 2200 | 22 | 200 | 85,4 | 3630 | 3330 |
| 1400 | 95 | 2550 | 2445 | 3240 | 2400 | 25 | 200 | 100,4 | 3900 | 3600 |
| 1600 | 95 | 2750 | 2616 | 3440 | 2600 | 25 | 200 | 100,4 | 4130 | 3830 |

NB: Dimension above for the fan with LG / RD 90 Deg and 270 Deg.
Pressure loss on cabinet not included.

For smoke spill applications the model of fan used is type HRZ / HRZ-B (backward curve impeller). Impellers and inlet cones are manufactured from mild steel and suitably reinforced for high temperatures applications.

Dimensions

KBHS / HRZ, KBHS / HRZ-B



| Model KBHS / HRZ | d [mm] | h [mm] | H [mm] | H1 [mm] | L [mm] | L1 [mm] | P [mm] | S [mm] | W [mm] | W1 [mm] |
|---------------------|-----------|-----------|-----------|------------|-----------|------------|-----------|-----------|-----------|------------|
| 315 | 40 | 43,3 | 850 | 750 | 1330 | 1350 | 12 | 70 | 1480 | 1180 |
| 355 | 45 | 48,8 | 900 | 800 | 1430 | 1450 | 14 | 70 | 1590 | 1290 |
| 400 | 45 | 48,8 | 1000 | 900 | 1480 | 1500 | 14 | 70 | 1700 | 1400 |
| 450 | 50 | 53,8 | 1100 | 1000 | 1580 | 1600 | 14 | 90 | 1800 | 1500 |
| 500 | 50 | 53,8 | 1200 | 1100 | 1680 | 1650 | 14 | 90 | 1920 | 1620 |
| 560 | 60 | 64,4 | 1410 | 1250 | 1880 | 1800 | 18 | 100 | 2130 | 1830 |
| 630 | 60 | 64,4 | 1510 | 1350 | 2080 | 2000 | 18 | 100 | 2280 | 1980 |
| 710 | 70 | 74,9 | 1660 | 1500 | 2230 | 2150 | 20 | 150 | 2450 | 2150 |
| 800 | 70 | 74,9 | 1860 | 1700 | 2330 | 2250 | 20 | 150 | 2650 | 2350 |
| 900 | 70 | 74,9 | 2050 | 1850 | 2480 | 2400 | 20 | 150 | 2900 | 2600 |
| 1000 | 80 | 85,4 | 2250 | 2050 | 2630 | 2550 | 22 | 200 | 3130 | 2830 |
| 1120 | 80 | 85,4 | 2600 | 2400 | 3030 | 2950 | 22 | 200 | 3400 | 3100 |
| 1250 | 80 | 85,4 | 3030 | 2830 | 3430 | 3350 | 22 | 200 | 3630 | 3330 |
| 1400 | 95 | 100,4 | 3550 | 3350 | 3930 | 3750 | 25 | 200 | 3900 | 3600 |
| 1600 | 95 | 100,4 | 4200 | 4000 | 4380 | 4300 | 25 | 200 | 4130 | 3830 |

NB: Dimension above for the fan with LG / RD 90 Deg and 270 Deg.

Pressure loss on cabinet not included.

For smoke spill applications the model of fan used is type HRZ / HRZ-B (backward curve impeller). Impellers and inlet cones are manufactured from mild steel and suitably reinforced for high temperatures applications.

Fan Laws - Proportional Laws

Here are some usefull information and fan laws:

Speed change - constant size

- Volume flow \approx rotational speed

$$\frac{\dot{V}_2}{\dot{V}_1} = \frac{n_2}{n_1}$$

- Pressure (all) \approx (rotational speed)²

$$\frac{\Delta p_1}{\Delta p_2} = \left(\frac{n_1}{n_2} \right)^2 = \left(\frac{\dot{V}_1}{\dot{V}_2} \right)^2$$

- Power absorbed \approx (rotational speed)³

$$\frac{P_1}{P_2} = \left(\frac{n_1}{n_2} \right)^3 = \left(\frac{\dot{V}_1}{\dot{V}_2} \right)^3$$

Density change - constant speed - constant size

- Volume flow no change

$$\dot{V} = \text{constant}$$

- Pressure \approx Density

$$\frac{\Delta p_1}{\Delta p_2} = \frac{\rho_1}{\rho_2} = \frac{T_2}{T_1}$$

- Power absorbed \approx Density

$$\frac{P_1}{P_2} = \frac{\rho_1}{\rho_2} = \frac{T_2}{T_1}$$

Size change - constant speed (for geometrically similar fans only)

- Volume flow \approx (impeller Diameter)³

$$\frac{\dot{V}_2}{\dot{V}_1} = \left(\frac{D_2}{D_1} \right)^3$$

- Pressure \approx (impeller Diameter)²

$$\frac{\Delta p_1}{\Delta p_2} = \left(\frac{D_1}{D_2} \right)^2$$

- Power absorbed \approx (impeller Diameter)⁵

$$\frac{P_1}{P_2} = \left(\frac{D_1}{D_2} \right)^5$$

Pressure

- Dynamic Pressure [Pa]

$$p_d = \frac{\rho}{2} \cdot v^2$$

whereby:

ρ = air density in [kg/m³]
 v = air velocity in [m/s]

- Total pressure

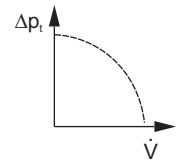
$$p_t = p_{st} + p_d$$

Absorbed power - calculation in duty point

$$P_L [\text{kW}] = \frac{\dot{V} [\text{m}^3/\text{s}] \cdot \Delta p_t [\text{Pa}]}{A_2 \cdot 1000}$$

1. Characteristic Fan Curve

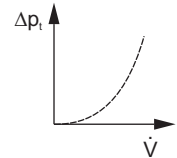
This is the characteristic curve, which is determined on a test bed experimentally for every type of fan. This shows that the fan can in principle only operate on its characteristic curve, i.e. the operating point of a fan always lies on its characteristic curve.



2. Characteristic Curve of the Plant

(Resistance Parabola)

Each plant has its own characteristic curve (resistance parabola), which by advance calculation can be determined more or less exact, so that the path of the characteristic curve can be drawn with sufficient accuracy.



3. Coordination between Fan and Plant

The operating point of the fan always lies at the intersection of characteristic fan curve and characteristic plant curve (resistance parabola). From this results the actually moved volume flow, and the actual pressure difference to be overcome by the fan;

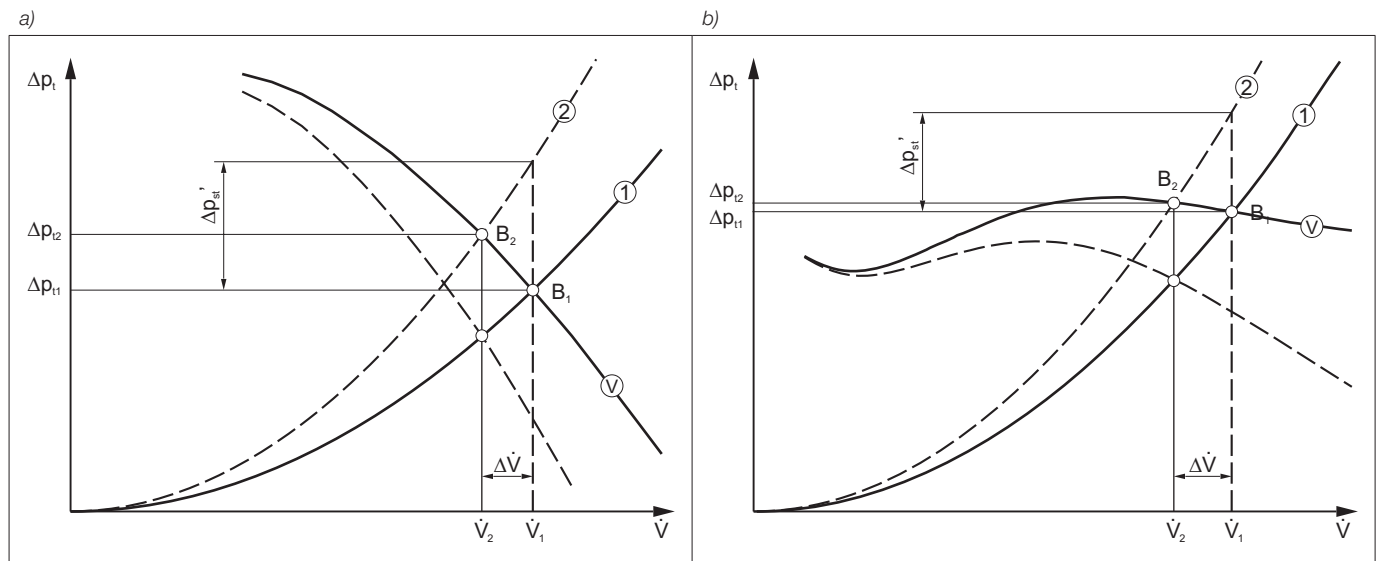
among others the characteristic fan curve V ($n = \text{const.}$) is given, also the characteristic plant curve 1, so that the operating point B_1 with \dot{V}_1 and p_{t1} results.

Figure a) shows the conditions for a centrifugal fan wheel with backward curved blading and figure b) the conditions for a centrifugal fan wheel with forward curved blading. If the volume flow is to be throttled by $\Delta \dot{V}$ to \dot{V}_2 without reducing the fan Speed, it is generally customary to fit an additional resistance in form of a throttle valve, orifice or similar into the plant.

Figs. a) and b) show that a pressure loss of the size Δp_{st} must be fitted into the plant in order to reduce the volume flow to \dot{V}_2 . The resistance parabola 1 of the plant thus changes into 2 so that the operating point B_2 follows.

This shows that a fan with forward curved blading can be throttled more economically as one with backward curved blading.

A throttling of the fan speed is to prefer to any other method for sound reasons.



These fans are produced on modern machines and equipment. The rotors (impellers with shaft) are carefully balanced. Each fan is controlled and tested before it leaves the factory.

Before operating the fan, please check the following things

Check for transportation damages

Is the fan deformed? (Bulges, casing warped)

Does the impeller rotate without noise from the bearings, and without touching the inlet ring?

Check for foreign substances

Are there any foreign substances in the impeller or in the casing? If affirmative, it must be removed

Check for corrosion damages

The fans are supplied in very good galvanized finish. If stored for a longer period under humid and aggressive ambient conditions, zinc oxidizes. This has to be removed immediately (also inside the fan).

Assembly and mounting

The fan has to be mounted on the base or vibration dampers, with feet, square frame or base frame, in a way that it is not warped.

The shaft has to be horizontal.

Turn rotor (impeller with shaft) by hand. In case the impeller touches the inlet ring, loosen the inlet ring and refix it in a way that there is a uniform gap between inlet ring and impeller.

The fans are normally driven by a narrow belt drive. The instructions of the manufacturer of the belt drive have to be respected.

The bearings are temperature resistant from -30 degree C up to +85 degree C.

Depending on the location and way, how the fan is installed, different kinds of protection guards or devices could be necessary. DIN instructions or other instructions of local authorities or unions have to be respected.

The speed n_{max} indicated on the type plate may not be exceeded!

Operation

Switch on the fan for a short moment to check whether the direction of rotation is correct (See arrows at the fan casing).

If incorrect, change the direction of rotation by changing the wiring. (Respect the instructions of power supply companies).

Maintenance

The fans are maintenance free, only a control regarding contamination (fat, dust, etc.) has to be carried out.

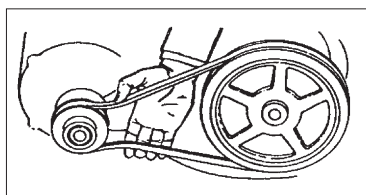
The bearings are sealed for life with lithium base grease, suitable for approx. 20.000 operating hours. If the fan is operated more than 20.000 hours, or in case the bearings are damaged, they have to be exchanged (if bearings with rubber sealing, also this sealing has to be exchanged - a bearing chart is attached).

The bearings are equipped with a locking ring. To remove the bearing, this locking ring has to be loosened and the casing of the bearing has to be opened - then the bearing can be taken off from the cleaned and degreased shaft.

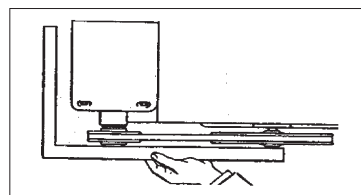
Important for a constantly good performance of the fan is a clean impeller.

Belt tension

Regular control of belt tension is very important. In any case, the belt tension has to be controlled after the first 100 operating hours, and then every 1000 operating hours or at least once a year. The belt tension is controlled by "pressing the belt with the fingers" (See drawing 1). A good tension is achieved by a total bending of approx. 2-3 cm. Used belts have to be replaced by belts of the same type. Control at the same time the fixation of the belt disc at the axis and the alignment of the belt. (See drawing 2)



(Drawing 1) Belt tension bending of approx. 2-3 cm.



(Drawing 2) alignment of the belt disc.

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