BNC
PLENUM FAN
with Backward Curved Wheels
Kruvent Industries (M) Sdn Bhd certifies that the BNC Series shown herein is 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.
BNC Series
Plenum Fans – Backward curved wheels

Kruger Plenum Fans are designed for air handling application where the fan wheel operates without housing, inside a plenum. This results in saving of space normally occupied by the fan housing, transition and diffusers. The fan wheel pressurizes the entire plenum in which the fan is installed. This allows air ducts to be directly connected from any direction to the plenum. The compact size of the plenum fan makes it an excellent selection for retrofit and replacement application and for variable air volume systems.

There are three types of BNC Series, i.e. BNC-R (regular type), BNC-P (high pressure ratio type), BNC-Q (high volume ratio type).

NOMENCLATURE

MODEL:BNC-R 450 / D I

- Fan operation class -- I, II & III
- Drive mode --‘D’ - Direct Driven
  ‘B’ - Belt Driven
- Fan model
- Fan type -- P, R, Q

TYPE / OPERATING LIMIT

Each fan type has its maximum operating speed and power due to its mechanical design.

The operating limit of BNC series is set according to the requirement of class I, II and III limit as defined in AMCA standard 99.

The BNC series is available in Direct Driven and Belt Driven, Type D, B as follow:

Direct Driven ‘D’
This type is supplied with no belts nor pulley and therefore minimal maintenance is required. It is a compact, space saving design with motor directly connected to wheel. This construction is mainly for cleanroom, with or without VFD, since there is an absence of belt residue which may contaminate the airstreams.

- Fan Size : 315 to 1,800
- Volume : 3,000 to 300,000 m$^3$/h
- Total Pressure : up to 4,500 Pa

Belt Driven ‘B’
No bearings in the fan inlet to affect performance. Separate base for motor mounting is required.

- Fan Size : 315 to 1,800
- Volume : 3,000 to 300,000 m$^3$/h
- Total Pressure : up to 4,500 Pa

Drawings and dimension data of belt driven are available upon request.

TECHNICAL SPECIFICATION

Wheel
The wheels of BNC series have backward curved blades manufactured in mild steel with polyester powder coating finish.

Shaft
Shafts are manufactured from C45 carbon steel using an automatic process for positioning and cutting of the keyways. All dimensional tolerances of the shaft are fully checked to ensure a precision fit. All shafts are then coated with an anti-corrosion varnish after assembly.
Bearing

Bearings used are either deep groove ball bearings with an adapter sleeve, or spherical roller bearings sealed at both sides for different duty application.

The bearings are lubricated for life and maintenance-free. If re-lubrication is necessary, it is recommended to use lithium base grease suitable for all temperatures within the operational limits.

Balancing Quality

All wheels are statically and dynamically balanced to ISO1940 and AMCA 204 – G2.5 standard.

All fans after assembly are trim-balanced to ISO1940 and AMCA 204 - G2.5 standard.

Other standard rather than G2.5 is available upon request.

ACCESSORIES

Inlet Guard

Inlet guards may be a requirement in some industrial safety regulations. These are available upon request.

Motor Selection

The power curves shown on each performance graph represents the absorbed power at the shaft of the fan measured in kW.

To determine the power of the motor to be installed, a correction factor should be applied to compensate for the transmission loss.

For conversion to horsepower (HP), use multiplying factor 1.34.
PERFORMANCE

The performance data shown on each diagram is derived from tests conducted in accordance with AMCA Standard 210 Fig 15 Installation type A (free inlet and free outlet condition).

Ratings refer to standard air density with the total pressure as a function of the air volume, using logarithmic scale.

It is essential that, the same installation type and test standards are used at all times, when comparing fan performance.

According to ISO 12759/AMCA 205, BNC series can be classify as FEG 80 based on fan peak efficiency. The following is the explanation of FEG classification:

1. Fan size is the impeller diameter in mm.
2. The fan peak efficiency shall be calculated from the fan (total) pressure.
3. If this method is used for a direct driven fan, the fan efficiency is the impeller efficiency.
4. The FEG label for a given fan size is assigned when the fan peak efficiency is equal or lower than the efficiency at the grade upper limit and higher than efficiency at the grade upper limit of the next lower grade for the fan size.
5. For any fan sizes larger than 1016 mm, the values of the grade upper limits are the same as for a size of 1016 mm.
6. No labels are considered for the fans with the fan peak total efficiency below FEG50.
7. The values of efficiencies are calculated for fan sizes in the preferred R40 Series.
8. Not all fan sizes in preferred numbers shown.

Fan Efficiency Grades (FEG) for Fans without Drives (SI) – ISO 12759/AMCA 205
NOISE

The noise levels shown on each diagram refer to the sound power, "A-weighted" values and the data are obtained at the outlet side from tests conducted in accordance to AMCA Standard 300. The noise levels are determined as follow:

- **Sound power level - ("A" scale):** \( L_w (A) \) as catalogue
- **Octave band spectrum:** \( L_w = L_w(A) + L_w \text{ rel. dB} \) [refer to Kruger for more details]
- **Sound pressure level:**
  - **a) free field**
    \[ L_p(A) = L_w(A) - (20 \log_{10} d) -11 \]
  - **b) room conditions**
    \[ L_p(A) = L_w(A) - (20 \log_{10} d) -7 \]

where \( d \) = distance of fan (m)
Example of Selection

Air Volume  \( Q=5000\text{m}^3/\text{h} \)
Outlet Velocity  \( V=8.8\text{m/s} \)
Dynamic Pressure  \( P_d=48\text{Pa} \)
Total Pressure  \( P_t=900\text{Pa} \)
Fan Speed  \( N=2200\text{rpm} \)
Absorbed Power  \( W=1.7\text{kW} \)
Total Efficiency  \( \eta=72\% \)
Sound Power Level  \( L_w(A)=92.5\text{dB(A)} \)
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw0 A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759 / AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw0 A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759 / AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759 / AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/ AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12756 / AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwa A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
BNC-R 450

FEG 80

- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).

Power rating kW does not include transmission losses.

Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.

Values shown are for outlet Lw(A) sound power levels for Installation Type A: free inlet, free outlet.

The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.

Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759 / AMCA 205.

Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw0 A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759 / AMCA 205.
- Please consult Kruger for fan selection of class III.
### BNC-R 500

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<tbody>
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<td>Type</td>
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<td>DIII</td>
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<tr>
<td>M.RPM</td>
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<td>3650</td>
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</tbody>
</table>

\[ \gamma = 1.2 \text{ kg/m}^3 \]

- **FEG 80**

- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw0 A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw(A) sound power levels for installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/ AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw (A) sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw (A) sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759 / AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw (A) sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of Class III.
### BNC-P 630

#### FEG 80

<table>
<thead>
<tr>
<th>Op Limit</th>
<th>Cl. I</th>
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<th>Cl. III</th>
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</thead>
<tbody>
<tr>
<td>Type</td>
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<td>DIII</td>
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<td>M.kW</td>
<td>7.4</td>
<td>16</td>
<td>33</td>
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<tr>
<td>M.RPM</td>
<td>1700</td>
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\[ \gamma = 1.2 \text{ kg/m}^3 \]

#### Table:

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<th>Q [m³/s]</th>
<th>5000</th>
<th>10000</th>
<th>3000</th>
<th>50000</th>
<th>100000</th>
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<tr>
<td>N [rpm]</td>
<td>700</td>
<td>800</td>
<td>950</td>
<td>1150</td>
<td>1250</td>
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</table>

\[ \eta [%] \]

- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw (A) sound power levels for Installation Type A, free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759 / AMCA 205.
- Please consult Kruger for fan selection of class III.
<table>
<thead>
<tr>
<th>Type</th>
<th>Cl. I</th>
<th>Cl. II</th>
<th>Cl. III</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.kW</td>
<td>9</td>
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<tr>
<td>M.RPM</td>
<td>1720</td>
<td>2230</td>
<td>2800</td>
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</table>

\[ \gamma = 1.2 \text{ kg/m}^3 \]

<table>
<thead>
<tr>
<th>BNC-R 630</th>
</tr>
</thead>
</table>

- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw (A) sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/ AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwa A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759 / AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwa sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw0 A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation Type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet A sound power levels for installations Type A, free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759 / AMCA 205.
- Please consult Kruger for fan selection of class III.
### Performance Certifications

- **FEG 80**

- **BNC-R 800**

### Key Specifications

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<th>Type</th>
<th>Cl. I</th>
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<td>M.kW</td>
<td>14.6</td>
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<tr>
<td>M.RPM</td>
<td>1370</td>
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<td>2220</td>
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- **\( \gamma = 1.2 \text{ kg/m}^3 \)**

### Diagram Details

#### FEG 80

- **Pt [Pa]**
- **\( \eta [\%] \)**
- **kW**

#### Key Notes

- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
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<thead>
<tr>
<th>Type</th>
<th>Op Limit</th>
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<th>Cl. III</th>
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<td></td>
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<td>kW</td>
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<td>2350</td>
<td>79.4</td>
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- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/ AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw0 A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/ AMCA 205.
- Please consult Kruger for fan selection of class III.
Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).

Power rating kW does not include transmission losses.

Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.

Values shown are for outlet Lw0 A sound power levels for Installation Type A: free inlet, free outlet.

The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.

Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759 / AMCA 205.

Please consult Kruger for fan selection of class III.
### Table: Performance Characteristics

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<tr>
<th>Type</th>
<th>Cl. I M.kW</th>
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<tr>
<th>M.RPM</th>
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<th>Cl. II</th>
<th>Cl. III</th>
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**γ = 1.2 kg/m³**

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**BNC-Q 900**

**FEG 80**

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- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw0 A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/ AMCA 205.
- Please consult Kruger for fan selection of class III.
Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).

Power rating kW does not include transmission losses.

Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.

Values shown are for outlet Lw(A) sound power levels for Installation Type A: free inlet, free outlet.

The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.

Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.

Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw (A) sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/ AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw(A) sound power levels for installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).

Power rating kW does not include transmission losses.

Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.

Values shown are for outlet Lw0 A sound power levels for Installation Type A: free inlet, free outlet.

The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.

Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.

Please consult Kruger for fan selection of class III.
### Performance Data

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<tr>
<th>Type</th>
<th>Cl. I</th>
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<th>Cl. III</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.kW</td>
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<td>135</td>
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<tr>
<td>M.RPM</td>
<td>850</td>
<td>1100</td>
<td>1400</td>
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**γ = 1.2 kg/m³**

- **Op Limit**
- **Cl. I**
- **Cl. II**
- **Cl. III**

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**BNC-P 1250**

**FEG 80**

- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw (A) sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759 / AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).

Power rating kW does not include transmission losses.

Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.

Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.

The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.

Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.

Please consult Kruger for fan selection of class III.
**BNC-R 1400**

**FEG 80**

<table>
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<th>Cl. I</th>
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<td>187</td>
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<tr>
<td>M.RPM</td>
<td>770</td>
<td>1000</td>
<td>1270</td>
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</tbody>
</table>

\[ \gamma = 1.2 \text{ kg/m}^3 \]

- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw0 A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/ AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw(A) sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/ AMCA 205.
- Please consult Kruger for fan selection of class III.
### BNC-R 1600

#### Performance Table

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<th>Op Limit</th>
<th>Cl. I</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
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<td>DIII</td>
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<tr>
<td>M.kW</td>
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<td>244</td>
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<tr>
<td>M.RPM</td>
<td>680</td>
<td>880</td>
<td>1110</td>
</tr>
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</table>

\[ \gamma = 1.2 \text{ kg/m}^3 \]

<table>
<thead>
<tr>
<th>Power [kW]</th>
<th>N [rpm]</th>
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<td>11</td>
<td>400</td>
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<td>18.5</td>
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</tr>
<tr>
<td>45</td>
<td>950</td>
</tr>
<tr>
<td>66</td>
<td>1110</td>
</tr>
</tbody>
</table>

| Efficiency [%] | 46 | 56 | 67 | 76 | 66 | 47 | 29 |

- **FEG 80**

- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lw (A) sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
### BNC-Q 1600

<table>
<thead>
<tr>
<th>Op Limit</th>
<th>Cl. I</th>
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<th>Cl. III</th>
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<tbody>
<tr>
<td>Type</td>
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<td>DII</td>
<td>DIII</td>
</tr>
<tr>
<td>M.kW</td>
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<td>306</td>
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<tr>
<td>M.RPM</td>
<td>700</td>
<td>900</td>
<td>1150</td>
</tr>
</tbody>
</table>

**γ = 1.2 kg/m³**

- **Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).**
- **Power rating kW does not include transmission losses.**
- **Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.**
- **Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.**
- **The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.**
- **Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/ AMCA 205.**
- **Please consult Kruger for fan selection of class III.**
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759/AMCA 205.
- Please consult Kruger for fan selection of class III.
- Performance certified is for installation type A – free inlet, free outlet. Performance ratings do not include the effects of appurtenances (accessories).
- Power rating kW does not include transmission losses.
- Outlet Velocity of Model BNC is calculated in accordance with the fan outlet area as defined in AMCA 210 Annex H, Figure H.4.
- Values shown are for outlet Lwo A sound power levels for Installation Type A: free inlet, free outlet.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.
- Fan Efficiency Grade (FEG) is based on peak total efficiency in accordance with ISO 12759 / AMCA 205.
- Please consult Kruger for fan selection of class III.
## BNC 'D'

### BNC 315~630'D'

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<th>C</th>
<th>D</th>
<th>E</th>
<th>(n \times q)</th>
<th>L</th>
<th>Fan Type</th>
<th>Frame Size</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>Fan Type</th>
<th>Wt (Kg) w/o</th>
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<td>588</td>
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All Dimensions in mm
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All Dimensions in mm
**BNC 1120~1800'D'**

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<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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<th>L</th>
<th>Fan Type</th>
<th>Frame Size</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>Fan Type</th>
<th>Wt (Kg) w/o</th>
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All Dimensions in mm
### Operational Limits - BNC-P

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<tr>
<th>Diameter mm</th>
<th>315</th>
<th>355</th>
<th>400</th>
<th>450</th>
<th>500</th>
<th>560</th>
<th>630</th>
<th>710</th>
<th>800</th>
<th>900</th>
<th>1000</th>
<th>1120</th>
<th>1250</th>
<th>1400</th>
<th>1600</th>
<th>1800</th>
</tr>
</thead>
<tbody>
<tr>
<td>J = PD^2/4  kgm^2</td>
<td>0.13</td>
<td>0.22</td>
<td>0.34</td>
<td>0.62</td>
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<td>5.27</td>
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### Operational Limits - BNC-R

<table>
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<th>Diameter mm</th>
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<th>400</th>
<th>450</th>
<th>500</th>
<th>560</th>
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<th>1000</th>
<th>1120</th>
<th>1250</th>
<th>1400</th>
<th>1600</th>
<th>1800</th>
</tr>
</thead>
<tbody>
<tr>
<td>J = PD^2/4  kgm^2</td>
<td>0.13</td>
<td>0.23</td>
<td>0.36</td>
<td>0.64</td>
<td>1.12</td>
<td>1.95</td>
<td>3.11</td>
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<td>82.0</td>
<td>140.0</td>
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### Operational Limits - BNC-Q

<table>
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<th>400</th>
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<th>560</th>
<th>630</th>
<th>710</th>
<th>800</th>
<th>900</th>
<th>1000</th>
<th>1120</th>
<th>1250</th>
<th>1400</th>
<th>1600</th>
<th>1800</th>
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</thead>
<tbody>
<tr>
<td>J = PD^2/4  kgm^2</td>
<td>0.14</td>
<td>0.24</td>
<td>0.37</td>
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<td>78.1</td>
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<td>434.0</td>
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**Note:** The table includes columns for Maximum Absorbed Power, Maximum Fan Speed, Temperature Range/ Min. -20°C, and Wheel Diameter. The units for Maximum Absorbed Power and Fan Speed are kilowatts (kW) and revolutions per minute (rpm), respectively. The temperature range is given in °C, with a minimum of -20°C and a maximum of 55°C.
The company is always improving and developing its products, therefore the company reserves the right of making changes to the illustrated products.

Certified dimension can be provided upon request.

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