

ADA

DOUBLE INLET
CENTRIFUGAL FAN
WITH AIRFOIL WHEELS

ADA Series

DOUBLE INLET CENTRIFUGAL FAN with Airfoil Wheels



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ADA Series

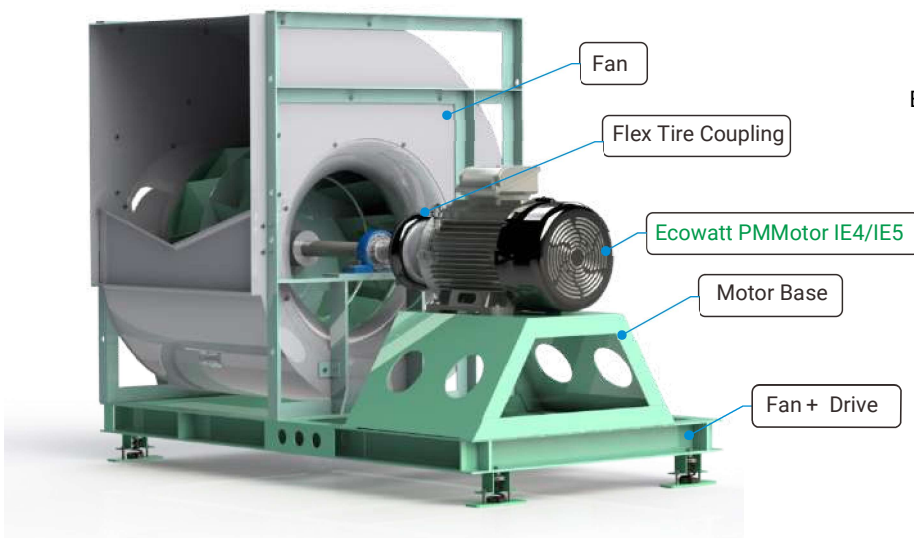
Double Inlet Centrifugal Fans – Airfoil wheels

The ADA series is DIDW centrifugal fans with high efficiency non-overloading backward curved impellers. The fans are suitable for supply or extract applications in commercial, process and industrial HVAC systems. Sizes of this series are in accordance with AMCA standard 99, section 5, R20.

ADA Series – Direct Coupling

Product Description

- Centrifugal fans ADA series, double inlet, direct drive through coupling with built-on AC or PM motor.
- Designed in accordance with AMCA Drive Arrangement 7 or ISO Drive Arrangement 17.
- High energy saving particularly long operating hours with Kruger’s Ecowatt system (PM Motor + Drive + Controls).
- Fan and drive unit attached to a common rigid and stable steel base frame as standard with option for stainless steel base frame.
- Full range of ADA 315mm to 1400mm wheel with all fan classes.
- Optimal aerodynamics due to the large free cross section and minimal flow restriction into the impeller.
- Reliable, flexible and adaptable flex coupling for trouble free operation and installation.
- Speed regulation with Kruger approved inverter drive working together with piezometer ring for either constant airflow or constant pressure operation.
- Fully assembled fan trim balanced to ISO 14694:2003 & AMCA 204, G2.5 Standard. G1.0 Standard is available upon request.
- Not available on twin wheel.



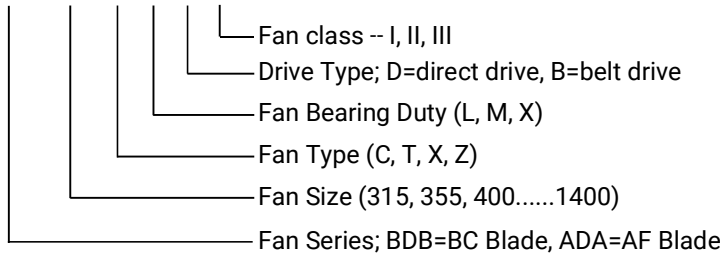
Best Total System Efficiency

$$\eta = \text{Fan\%} \times \text{PM Motor \%} \times \text{VFD\%}$$

$$= 84\% \times 96\% \times 98\% = 79\%$$

Nomenclature

MODEL: ADA 450 C M / D I



	Model 315 to 710		Model 800 to 1400
Type S-C	I		
Type T	II		I
Type X	III		II
Type Z			III

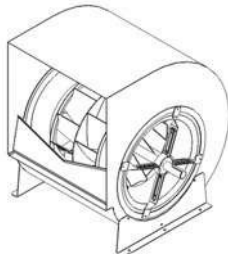
Table 1

Type / Operating Limit

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

The operating limit of ADA series - fan type is design to meet the requirement of class I, II and III limit as defined in AMCA standard 99, section 14, Fig 1.

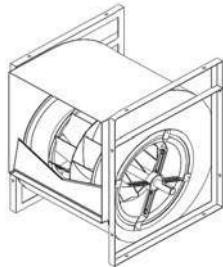
The ADA series is available in type S, C, T, X or Z.
S type is not available for direct coupling.



Type S

This type is supplied with mounting feet and can be mounted in three different orientations. The construction is mainly for OEM application which only subject to testing and approval.

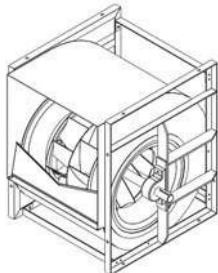
Fan Size: 315 to 710
Volume: 1900 to 50000 m3/h
Total Pressure: up to 2000 Pa



Type C

This type has a frame fitted on both sides of the fan which gives Better strength and rigidity. It allows mounting in four different orientations.

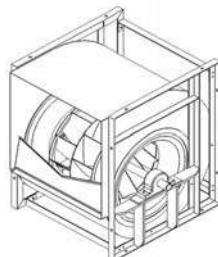
Fan Size: 315 to 710
Volume: 1900 to 50000 m3/h
Total Pressure: up to 2000 Pa



Type T

This type has a welded frame giving increased stiffness and rigidity for higher operating performance.

Fan Size: 315 to 1400
Volume: 1900 to 190 000 m3/h
Total Pressure: up to 2500 Pa

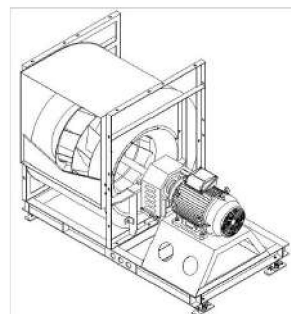
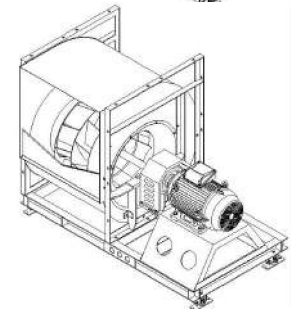
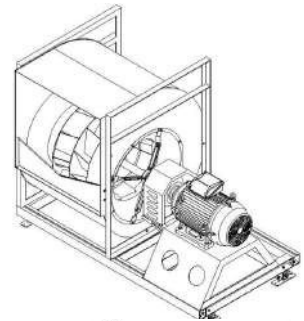


Type X/Z

The structure is similar to type T but utilizes enhanced bearings to support higher dynamic load necessary for the increased performance.

Fan Size: 315 to 1400
Volume: 1900 to 260 000 m3/h
Total Pressure: up to 3200 Pa

Type Z is non-standard, for more information, please consult your nearest Kruger Office for details.



Kruger Motor

- Reliable Induction Motor with Energy efficiency classes IE1/IE2/IE3.
- Premium Efficiency Permanent Magnet Motor IE4/IE5 are also available as standard.
- Design Standards BS 4999, BS 5000, IEC 60034, IEC 60072.
- Rated voltage 380-415 Hz/50Hz \pm 10%.
- Stator Insulation; Class F Insulation; Class B Temperature Rise.
- Horizontal foot mounting or flange mounting: B3; B5, B14, B34; B35; V1.
- Standard Ambient Temperature: -20°C to 40°C; RH: <90% RH (non-condensation); Altitude < 1000m above sea level.



Best Efficiency 96%

Kruger Drive

- High Performance Inverter Drive with advanced vector control technology.
- Energy saving by PID function for Demand Controlled Ventilation.
- Easy control by Analog signal 0-10V, 4-20mA and RS485 Modbus RTU.
- Various drives both AC induction motor and permanent magnet synchronous motor.
- IP54 protection rating, independent duct design (IP20) also available.
- Safety by STO (safe Torque Off) and fire overdrive function.
- Wide range of output power 2.2kW – 220kW.



Best Efficiency 96%

Kruger Demand Controlled Ventilation

- Automatic close loop PID control by TDP-PI Ventilation controller
 - Constant Airflow control (with piezometer ring)
 - Constant Differential pressure control

Controller will maintain Pressure or Airflow set value by changing fan speed automatically as per actual load demand.

- Manual speed control by REB-Ecowatt
 - Adjust Fan speed by your hand with potentiometer 10k ohm



Flex Couplings

- High quality standard SKF flex couplings are used.
- Designed to accommodate misalignment and shock loads and damper vibration levels.
- Easy to install and maintenance free.
- Natural rubber compounds for application ranging from -50°C to +50°C.
- Couplings selection based on service factor as recommended by manufacturer.
- Other types of coupling are available upon request and approve by factory.



Why Choose Kruger Ecowatt Direct Coupling System?

- Ecowatt is high efficiency product family that utilizes a Super Premium Efficiency Motor in combination with demand-controlled ventilation to control fan performance as per actual load demand.
- Highly efficient backward curved with FEG rating from 85-90 with direct coupling reduces frictional losses and optimizes transmission and improves energy costs.
- Direct electrical energy transmission to the impeller increases the overall fan system efficiency.
- In addition, zero belt wears and break on belt improves reliability and productive run time and unnecessary maintenance.
- Overall, it means saving in total cost and long-term energy cost, extended service life and versatility in application.



Typical applications:

- Air handling unit installations in commercial or industrial settings running on 24/7 and a low energy input is required.
- Air handling unit installations where high static pressure and high airflow in a zero-contaminant environment is required.
- Examples are AHU installations for electronics, semiconductors, pharmaceutical, life sciences, OT rooms, food industries and other manufacturing industries that requires clean/contaminant free clean rooms.
- Air handling unit installations where conventional belt driven high energy input system is to be refurbished.

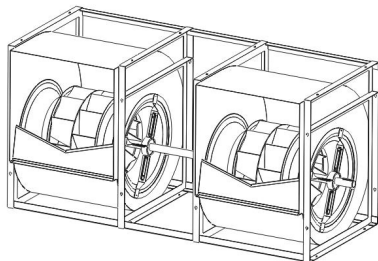
ADA Twin Fan

ADA series are also available in twin fan version, with two double inlet fans mounted on the same shaft. To select for twin fans, use the curves of single fan with the following factors: -

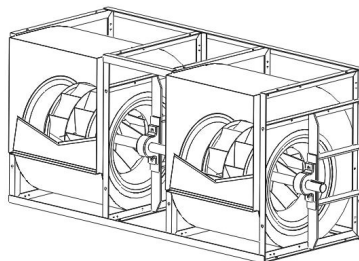
Volume	x 2
Absorbed Power	x 2.15
Speed	x 1.05
Noise	+ 3 dB

This series is available in type S2, C2 or T2

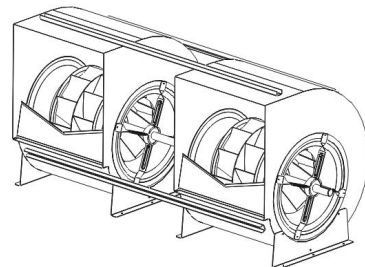
Performance of Twin fans are not AMCA licensed



Type S2
Size: 315 to 500
5000 to 50000m³/h

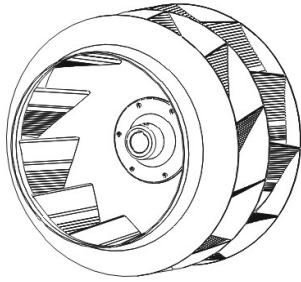


Type C2
Size: 315 to 500
5000 to 50000m³/h



Type T2
Size: 355 to 630
10000 to 80000m³/h

TECHNICAL SPECIFICATION



Wheel

The wheel of BDB series is made of cold rolled sheet steel backward curved blades with polyester powder coating finish. Alternative construction material in aluminum and stainless steel are available upon request. Check with Kruger for the limits of operation of these materials.

Housing

For all sizes except 1250 and above, the housing is manufactured in galvanized sheet steel with the housing fixed to the side plates in "pittsburg lock" form system.

Housings for 1250 and 1400 are manufactured in mild steel finished with polyester powder coating.

Fully welded housings are available upon request. Stainless steel housing is also available upon request.

Frame

The frame is manufactured with galvanized angular bars for type "C". For type "T" and "X", they are manufactured with sections of steel and finished with polyester powder coating. Stainless steel frame is available upon request.

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 and then coated with an anti-corrosion varnish after assembly. Stainless steel shaft is available upon request.

Bearing

Bearings used are either deep grooved ball bearing type with an adapter sleeve or spherical roller bearing type sealed at both sides for different duty application classified below:

		Mounted in a rubber housing		Mounted on cast iron supports with grease point	
Fan Type	S		C		
Bearing Duty	SM Medium Duty		CM Medium Duty		
	eg. Model: ADA 450	CM		TX Extra Heavy	XX Extra Heavy
		— Fan Bearing Duty (L, M, X) — Fan Type (S, C, T, X, Z) — Fan Size (315, 355, 400...1400)			

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

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.

Clean room application fans with balancing grade of G1.0 are available upon request.

ACCESSORIES

Casing Drain

This option is available when fans are exposed to the atmosphere or operating in high humidity condition.

Outlet Flanges

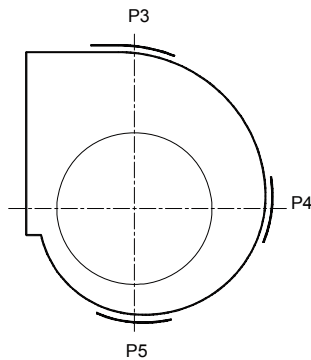
Outlet flanges are available upon request.

Inspection Doors

The inspection door can be supplied upon request. It can be supplied in one of the three positions (P3, P4 & P5).

Guards

Inlet guards, discharge guards and non-drive end shaft guards are available on request.

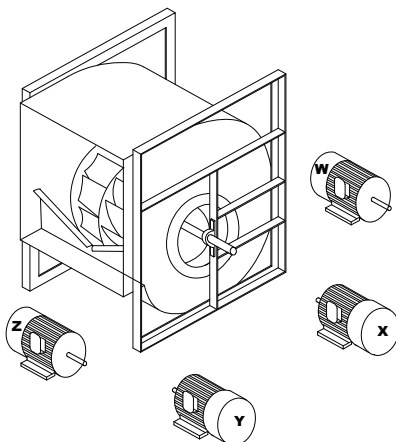
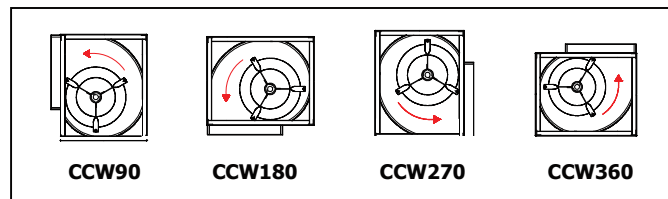
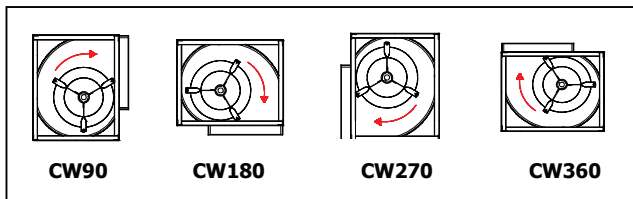


Fan Rotation and Discharge

The rotation and discharge of the fan is in accordance with AMCA standard 99, section 11. The direction of rotation is determined from the drive side of the fan:

CW - clockwise rotation

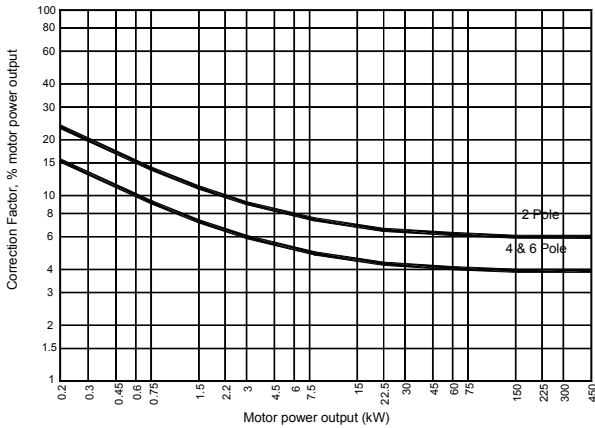
CCW - counter-clockwise rotation



Motor Position

The position of the motor for belt drive centrifugal fan is in accordance with AMCA standard 99, section 12

Location of motor is determined by facing the drive side of fan and designated by letters W, X, Y, or Z.



Motor Selection

The power curves shown on each performance graph represent 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 transmission losses.

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

Inlet Vane Control

The inlet vane control enables energy saving that varies according to the vane control methods compared to traditional volume control methods.

Fig.1 shows the volume reduction corresponding to the vane position.

- with vane fully open (Pos 90°) the volume will be 3% less than the catalogue performance.
- with vane fully closed (Pos 0°) the volume will be reduced by 75%.

Performance of Inlet vane control is not AMCA licensed.

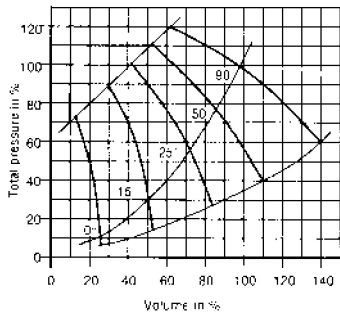
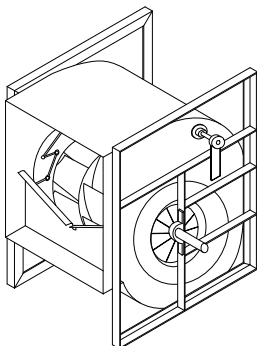


Fig. 1

IVC orientation and accessories

The standard orientation and lever position for the IVC is indicated in Fig.2. When ordering a complete fan with IVC and accessories, please specify as follow:

Fan orientation e.g. CCW270
 lever position e.g. Pos. 45°

Example : Fan Model – CCW270/P45

Orientation	90	180	270	360
	225° 	315° 	45° 	135°
IVC Level Position	315° 	45° 	135° 	225°

Fig. 2 - IVC Orientation and Level Position

Dynamic Pressure

Both dynamic pressure and outlet air velocity values shown on each graph are calculated base on the full discharge area, i.e. ducted outlet condition.

With free outlet condition the velocity pressure is higher. To determine this new value multiply the velocity pressure of the ducted outlet obtained from the fan curve by the following correction factor "K".

$$K = 1.67$$

Fan performance calculated with this correction factor is not licensed by AMCA.

Performance

The performance data shown on each graph is derived from tests conducted in accordance to AMCA Standard 210 – Fig 12 – installation type B (free inlet and ducted outlet condition).

Ratings refer to the 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.

Noise

The noise levels shown on each graph refer to the "A-weighted" sound power values and the data on the inlet side has been measured in accordance with AMCA Standard 300 diag. 2 - configuration "B". The noise levels of fans 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
 $= L_w(A) - (20\log_{10}d) - 11$
 - b) room conditions
 $= L_w(A) - (20\log_{10}d) - 8$where d = distance from fan (m)