



# Axial Aerofoil Fans

## Overview

CFW began developing fan ranges in 1966. Various axial aerofoil fan ranges have been designed to address specific market needs, namely efficiency, first cost, noise, and ability to operate at high temperatures.



Our flagship range is the HDA impeller which offers high efficiencies, lowest noise levels, and can be used in industrial applications requiring a robust solution, as well as HVAC applications requiring a high end solution. These impellers are available in right and left hand configurations and can therefore be combined in series for two stage high pressure applications. This heavy duty range of aluminium impellers is cast, machined and assembled at our Cape Town factory. The range includes 13 sizes from  $\varnothing 315$  to  $\varnothing 2000$ mm.



$\varnothing 1600$ mm HDA Belled Axial



Vane Axial Fans

Vane Axial Fans offer the highest efficiency and are used in industrial and mining applications where large volumes of air are required at moderate to high pressures. They are also an excellent choice in specialised HVAC and clean room applications.



LDA Long Cased Axial

The LDA and LDP impellers were developed for light duty applications, such as the HVAC sector, where first cost is an important consideration. The LDA impeller range with pressure die cast aluminium blades includes six sizes from  $\varnothing 400$  to  $\varnothing 1250$ mm, and the LDP impeller range with glass reinforced nylon blades includes five sizes from  $\varnothing 400$  to  $\varnothing 1120$ mm.



LDP Long Cased Axial

We also manufacture bi-directional (reversible) HDR aluminium impellers in 10 sizes from  $\varnothing 800$  to  $\varnothing 2000$ mm, for use in drying and curing kilns, as well as specialised fans for emergency high temperature smoke removal from buildings.



HDR Impeller

The above impeller ranges can also be supplied in bifurcated casings, or fitted to belt driven fans when the electric motor must be kept out of the gas stream, as well as fitted to plate mounted axial fans.

Upstream or downstream guide vanes can be fitted to increase the fan static pressure developed by the fans.



Powered Emergency Smoke Exhaust Fans



Bifurcated Axial



Belt Drive Axial



Plate Mounted Fan

Flameproof (Zone 1) or Sparkproof (Zone 2) construction is supplied with appropriately specified motors for fans to be deployed in hazardous areas.

The ranges shown in this catalogue are standard pre-engineered fans which can be selected using our **Fan Selection Software**. All impeller types have manually adjustable blade pitch angles, as well as a choice of the number of blades, to optimise fan performance for a specific duty.

**Aerodynamic Performance Testing**

Fans are tested to **ISO 5801** test standard in our research and development laboratory.

**Quality**

CFW is an **ISO9001 Quality Management System** accredited company.

If and when required, Quality Control Plans (QCP's) are compiled and executed to customer specification.

**Applicable Standards.**

- ISO 5801** Industrial fans - Performance testing using standardised airways
- ISO 5802** Industrial fans - Performance testing in situ
- ISO 12499** Industrial fans - Mechanical safety of fans - Guarding
- EN14461** Industrial fans - Safety requirements
- ISO 14694** Industrial fans - Specification for balance quality and vibration levels
- ISO 10816-1** Mechanical vibration - Evaluation of machine vibration by measurement of non-rotating parts - Part 1 - General Guidelines
- ISO 10816-3** Mechanical vibration - Evaluation of machine vibration by measurement of non-rotating parts - Part 3 - Industrial machines with nominal power above 15kW and nominal speeds between 120r/min and 15000r/min when measured in situ
- ISO 1940** Balance quality of rigid bodies
- ISO13349** Fans - Vocabulary and definitions of categories
- ISO13348** Fans - Tolerances, methods of conversion and technical data presentation
- EN 14986** Design of fans working in potentially explosive atmospher
- ISO 12759** Fans - Efficiency classification for fans



**General Specification**

**Bearings (belt driven fans):** Bearing selection is based on a L<sub>10</sub> life of 100 000 hours. Bearing, grease, and seal type is selected specific to the application in which the equipment will operate.

**Fan Speed Limits (HDA)**

<b>Fan Diameter (mm)</b>	560	630	1120	1250	1600	2000
<b>Maximum Speed (RPM)</b>	3550	2880	1780	1440	1180	880

**Materials & Methods of Construction:** Casings are rolled, flanged and punched on our automatic spinning machine. Components are fully welded and hot dip galvanised to SANS 121 (ISO 1461) after manufacture. Standard fans are manufactured to ISO 13348 AN3 manufacturing tolerances. When required, equipment is manufactured to AN1 and AN2 manufacturing tolerance.

**Alternative Protective Finishes:**

Standard CFW Blue: -

- Blast clean to ISO-SA2.5 (40 – 70µm)
- Single coat Sigmafast two component high build zinc phosphate polyurethane primer/finish (80 - 120µm)

High Temperature Application: -

- Blast clean to ISO-SA2.5 (40 - 70µm)
- Prime Coat – Sigmarine 28 (40 - 75µm)
- Top Coat – Sigmatherm 350 (25 - 30µm)

In addition to the above, various other specialised finishes can be applied, including marine specification epoxy, acid resistant epoxy, as well as special coatings to customer specification.



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**Balancing:** Balancing of rotating parts is carried out in accordance to ISO 14694 & ISO 1940-1 to well within balance quality grade G6.3, applicable to fan application category BV-3.

**Vibration:** Vibration levels are tested at our works to the following limits. For those applications where variable frequency drives are used for control, CFW offers coast down vibration level testing to ensure smooth operation across the full speed spectrum of the equipment.

**Vibration Level Limits**

Fan Application Category	Rigidly Mounted mm/s		Flexibly Mounted mm/s	
	Peak	r.m.s.	Peak	r.m.s.
<b>BV-1</b>	12.7	9.0	15.2	11.2
<b>BV-2</b>	5.1	3.5	7.6	5.6
<b>BV-3</b>	3.8	2.8	5.1	3.5
<b>BV-4</b>	2.5	1.8	3.8	2.8
<b>BV-5</b>	2.0	1.4	2.5	1.8

**Fan Application Categories**

Application	Examples	Limits of driver Power (kW)	Fan application Category BV
Residential	Ceiling fans, attic fans, window AC	≤ 0.15 > 0.15	BV-1 BV-2
HVAC & agricultural	Building ventilation and air conditioning, commercial systems.	≤ 3.7 > 3.7	BV-2 BV-3
Industrial process, power generation	Baghouse, scrubber, mine, conveying, boilers, combustion air, pollution control, wind tunnels.	≤ 300 > 300	BV-3 See ISO 10816-3
Transportation & marine	Locomotives, trucks, automobiles.	≤ 15 > 15	BV-3 BV-4
Transit/tunnel	Subway emergency ventilation, tunnel fans, garage ventilation, tunnel jet fans.	≤ 75 > 75 None	BV-3 BV-4 BV-4
Petrochemical process	Hazardous gases, process fans.	≤ 37 > 37	BV-3 BV-4
Computer chip manufacture	Clean rooms.	None	BV-5

**Motors:** A wide range of electric motors is outsourced to suit customer requirements. In special applications fans can be fitted with compressed air driven motors, or internal combustion engines.

**Temperature Limitations:**

Fan Type	Minimum Temperature (°C)	Maximum Temperature (°C)
Standard Direct Driven Cased Axial Fans	-29	+40
Standard Direct Driven Plate Axial Fans	-29	+40
Standard Belt Drive Axial Fans	-10	+70
Bifurcated Axial Fans	-29	+200

Powered Emergency Smoke Exhaust Fans are designed to handle temperatures of 400°C for two hours emergency duty.



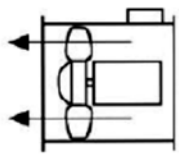
**Factory Testing:** CFW has dedicated factory test bays which incorporate reinforced concrete inertia test beds. All fans undergo a rigorous testing procedure before despatch. This documented inspection includes but is not limited to the following:

- Balancing
- Vibration
- Bearing temperature monitored over time period
- Protective coatings
- Guarding
- Safety caution decals
- Documentation pack (where applicable):
  - Material certificates
  - All component manufacturing RCS
  - Welding RCS
  - Protective finish RCS

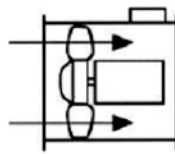
- Bearing locking RCS
- Bearing temperature RCS
- Motor certificates
- NDT Reports
- Balancing printout
- Vibration monitoring RCS
- Quality control plan

**Forms of Running.**

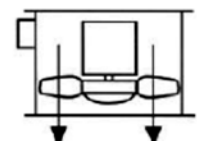
As standard the motor is downstream (Form B). This gives the lowest sound levels and the maximum cooling of the motor is achieved. If arrangement A is used the noise level from the selection charts should be increased by 5dBA.



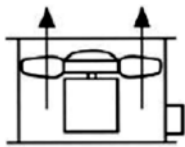
Form A



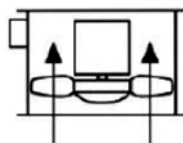
Form B



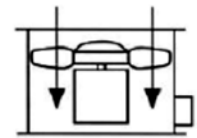
Form AD



Form AU



Form BU



Form BD

**Performance Curves & Installation Types**

These fans have been fully tested in accordance with the International Test Standard ISO 5801 under ideal laboratory conditions.

Site installed fans may therefore vary in performance from those stated in this catalogue.

The performance charts are based on the standard installation type D: ducted inlet and ducted outlet.

The engineer should check which installation type the performance charts are based on. When a fan is utilised in an installation type different from that stated, the fan performance will vary from published values.

The fan arrangement is with the motor downstream i.e. form B.

**Accessories**

Standard accessories include: -

- Flexible connectors
- Matching flanges
- Anti-vibration mountings
- Inlet screens
- Inlet bells
- Inspection doors
- Split casings
- Casing drain sockets
- Backdraught dampers
- Discharge evase's
- Spark proof construction
- Vibration & temperature sensors
- Noise attenuators
- Spare parts for critical machinery

	TYPE A Free inlet Free outlet		TYPE C Ducted inlet Free outlet
	TYPE B Free inlet Ducted outlet		TYPE D Ducted inlet Ducted outlet

Installation types



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