



## Custom Engineered Centrifugal Fans

ALPHAIR's line of custom engineered centrifugal fans is ideally suited for applications that involve moving air at higher pressures, or air that is made up of hot gases (up to 1000° F/540° C), corrosive gases or abrasive (dust laden) gases.

### Cyclone

Each *CYCLONE* fan is customized to the specific set of operating criteria of each individual application. Construction materials include: carbon steels, stainless steels, aluminum, FRP and other special corrosion and heat resistant alloys. Each fan combines the ideal mix of ruggedness, reliability, efficiency, maintainability and economy that are the hallmarks of every ALPHAIR fan.

### Rotors

ALPHAIR offers six centrifugal wheel designs, in sizes ranging from 24" to 120" wheel diameters. Single and double width designs are rated to handle up to 1,000,000 cfm and static pressures up to 130 inWg.



#### AIRFOIL TYPE AFS

##### Characteristics:

- Double skin non-overloading airfoil blades.
- Up to 85% maximum static efficiency.
- Dust loads under 1 grain/scf (2.3 g/nm<sup>3</sup>).

##### Typical Applications:

- Boiler FD/ID fans.
- Mine and tunnel ventilation.



#### RADIAL TIPPED TYPE RTS

##### Characteristics:

- Forward curved radial tipped blades.
- Up to 74% maximum static efficiency.
- Dust loads under 25 grain/scf (57 g/nm<sup>3</sup>).

##### Typical Applications:

- Gas re-circulation fans, pelletizing plant fans.
- Sintering plant fans, cement kiln ID fans.
- Process streams with high dust loads.



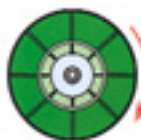
#### BACKWARD CURVED TYPE BCS

##### Characteristics:

- Backward curved non-overloading blades.
- Up to 82% maximum static efficiency.
- Dust loads under 6 grain/scf (14 g/nm<sup>3</sup>).

##### Typical Applications:

- Mechanical draft and process air fans.
- Flue gas desulfurization plants.
- Bag house exhaust fans.



#### RADIAL SHROUDED TYPE RAS

##### Characteristics:

- Shrouded flat radial bladed design.
- Up to 70% maximum static efficiency.
- Suited to high pressures and high tip speeds.
- Dust loads under 40 grain/scf (92 g/nm<sup>3</sup>).

##### Typical Applications:

- Metals/iron processing fans.
- High pressure fans, seal air fans.



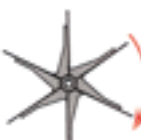
#### BACKWARD INCLINED TYPE BIS

##### Characteristics:

- Backward inclined non-overloading flat blades.
- Up to 78% maximum static efficiency.
- Dust loads under 9 grain/scf (21 g/nm<sup>3</sup>).

##### Typical Applications:

- Incineration plant fans.
- Baghouse exhaust fans.



#### RADIAL OPEN TYPE RAO

##### Characteristics:

- Open radial design.
- Up to 62% maximum static efficiency.
- Dust loads under 100 grain/scf (230 g/nm<sup>3</sup>).

##### Typical Applications:

- Coal dust conveying fans.
- Cement processing fans.
- General exhaust fans.



## Housing and Inlet Boxes

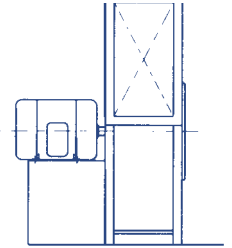
- Housing and inlet boxes designed for peak fan pressure at old start up conditions. Designed to meet a minimum deflection criteria of 1:450 inches.
- All plate welded construction, in a variety of materials from carbon steels and stainless alloys to FRP.
- Structural steel bracing, stitch welded to outside of housing.
- Bolted and gasketed splits for removal of wheel and shaft assembly.
- Drains located at low point of housing and inlet boxes.
- Access doors or ports provided on housing and inlet boxes where applicable.



## Pedestals

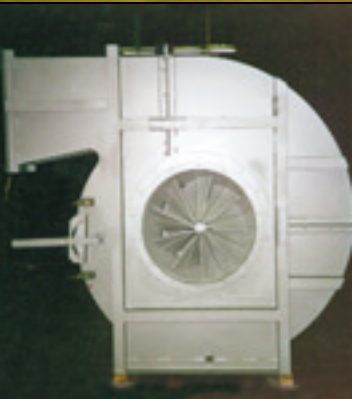
ALPHAIR offers six variations of the standard AMCA arrangements. These subtle variations are denoted as follows:

- Integral steel pedestals.
- Integral steel pedestals with channel sub-base.
- Semi-isolated integral steel pedestals (for high temperature applications).
- Independent steel pedestals mounted on concrete piers.
- Integral steel pedestals with centre-line supported housing.
- Independent steel pedestal mounted on concrete piers. centre-line supported housing.



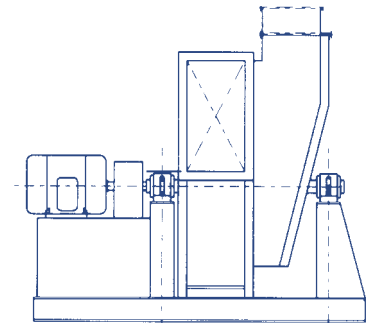
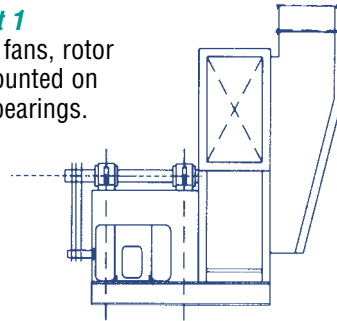
### Arrangement 4

Rotor mounted directly on motor shaft.



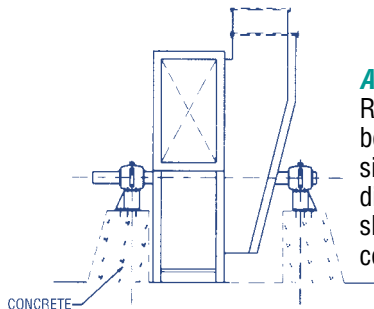
### Arrangement 1

V-belt driven fans, rotor cantilever-mounted on anti-friction bearings.



### Arrangement 7

Rotor mounted between bearings located on either side of the fan. Drive and drive-side bearing supported on unitary pedestal. Drive is direct connected to fan shaft through a flexible coupling.

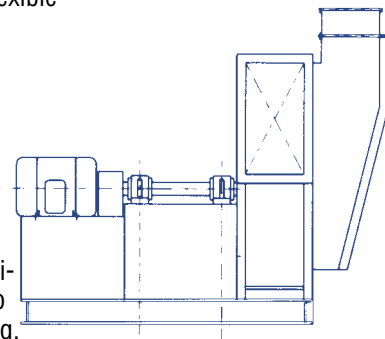


### Arrangement 3

Rotor mounted between bearings located on either side of the fan. Fan drive is direct connected to fan shaft through a flexible coupling.

### Arrangement 8

Direct driven fan, rotor cantilever mounted on anti-friction bearings. Drive and bearings mounted on unitary pedestal. Drive is connected to fan shaft through a flexible coupling.



## Bearings

- SKF anti-friction self-aligning ball or spherical roller bearings. Grease or oil bath lubricated as required. Minimum  $L_{10}$  life of 60,000 hours.
- Where high radial and axial loads require, Dodge or equivalent sleeve oil bearings are used.
- Bearing accessories include thermocouples, RTDs, vibration probes and circulating oil lubrication.

## Couplings

- Where applicable, flexible gear type couplings are provided.
- Other flexible couplings are provided as specified, including steel grid, disc pack and flexible rubber element.
- All couplings are selected with a minimum 2.5 service factor.

## Shaft

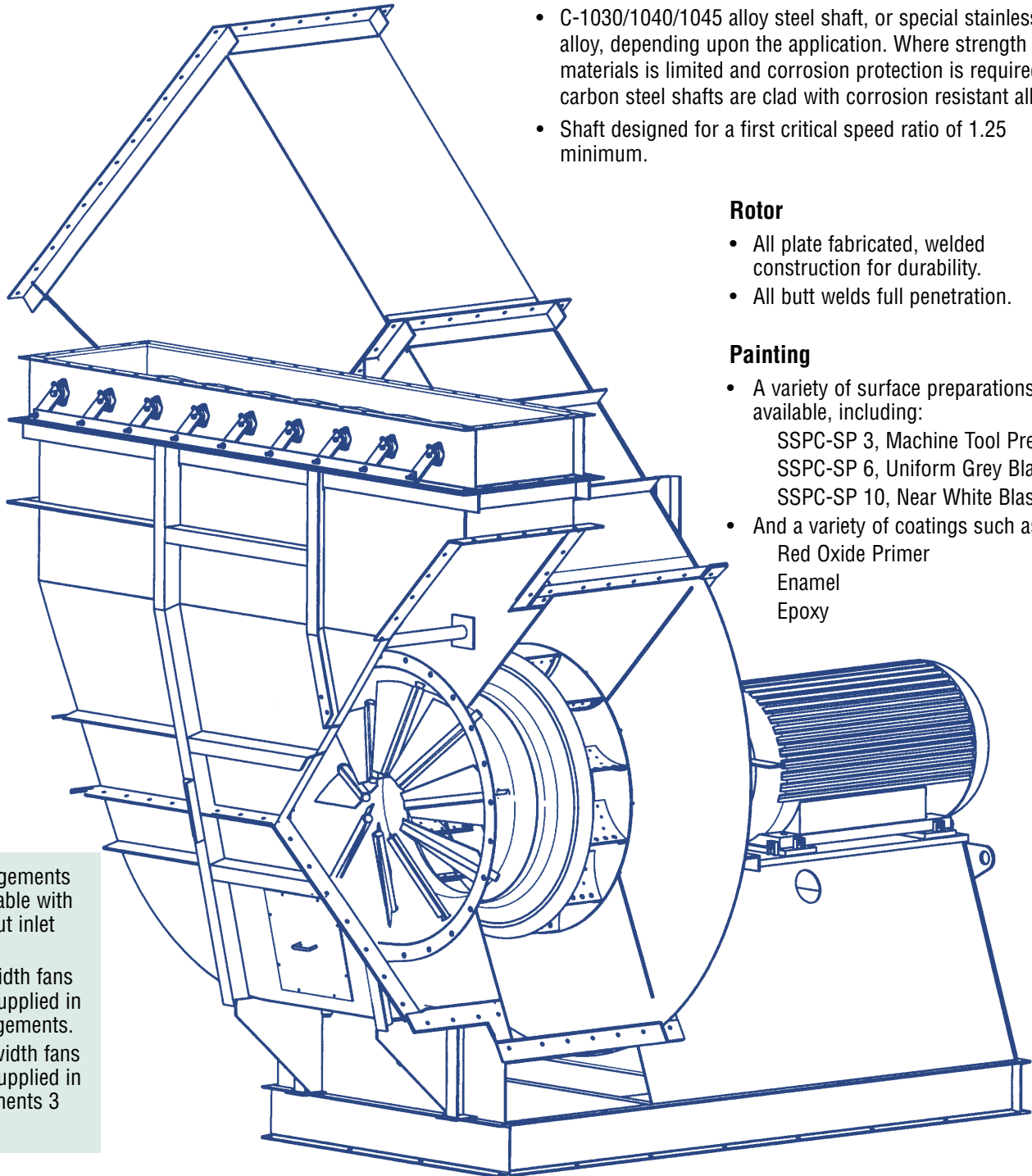
- C-1030/1040/1045 alloy steel shaft, or special stainless alloy, depending upon the application. Where strength of materials is limited and corrosion protection is required, carbon steel shafts are clad with corrosion resistant alloys.
- Shaft designed for a first critical speed ratio of 1.25 minimum.

## Rotor

- All plate fabricated, welded construction for durability.
- All butt welds full penetration.

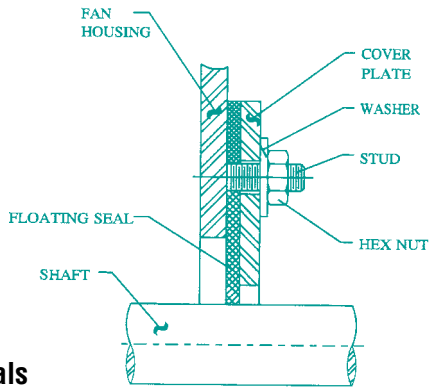
## Painting

- A variety of surface preparations are available, including:
  - SSPC-SP 3, Machine Tool Prep.
  - SSPC-SP 6, Uniform Grey Blast
  - SSPC-SP 10, Near White Blast
- And a variety of coatings such as;
  - Red Oxide Primer
  - Enamel
  - Epoxy



All arrangements are available with or without inlet boxes. Single width fans can be supplied in all arrangements. Double width fans can be supplied in arrangements 3 and 7.

### SINGLE DISC SEAL

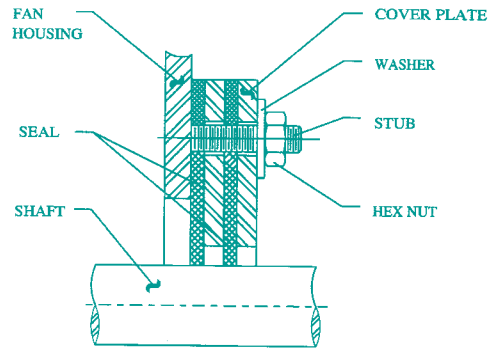


### Shaft Seals

#### SINGLE AND MULTIDISC LABYRINTH SEALS

- Standard shaft seal is a single disc.
- Suitable where minor amounts of gas leakage, in or out of the fan, are permissible.
- Multidisc designs used when a higher degree of sealing is required.
- Disc materials include Garlock, Durlon and other materials as specified by customer.

### MULTIDISC LABYRINTH SEAL

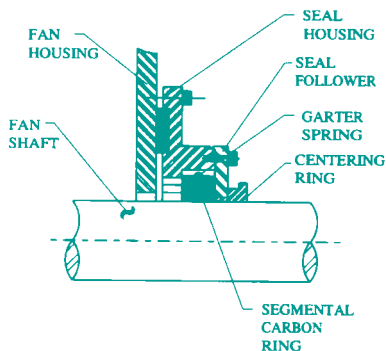


#### MECHANICAL RING SEALS

- Used where gas leakage must be kept to a minimum.
- Segmented Teflon or carbon rings are contained in a machined housing fabricated from carbon steel or corrosion resistant stainless alloys.
- Rings are spring-loaded to provide positive contact with shaft surface and to maintain axial alignment.

Additional seals, including stuffing box seals are available for special applications.

### CARBON RING SEAL



### Wear Protection

- In higher dust load applications, where excessive wear is a problem, ALPHAIR offers a variety of wear protection options.

### Housing Protection

- Comprised of Q&T 400 or chromium-carbide coated plate.
- Housing scroll fully lined, housing side plates partially lined with cheek plates.
- Wear plates are fully replaceable, installed in plug welded, studded or bolted segments.
- Inlet boxes and inlet cones may also be lined, depending upon the severity of the application.
- All joints and corners are seal pass welded to prevent channeling of dust stream.

### Rotor Protection

- Rotor blades may be full width or half width lined with Q&T 400 or chromium carbide welded plates. Wear plates are plug-welded, bolted or Huck-bolted to fan blades.
- Airfoil bladed rotors (AFS) are protected using nose caps. Q&T 400 plate covers the nose of the blade.
- In extreme applications, backplate and centreplate liners may be required.
- Wearplates are typically fully replaceable.

## Flow Volume Control and Isolation

ALPHAIR offers a variety of flow volume control and isolation devices.

### VARIABLE INLET VANES (VIVs)

- Three designs of VIV are available.
- Suitable for fan volume control.

#### INTERNAL VIV

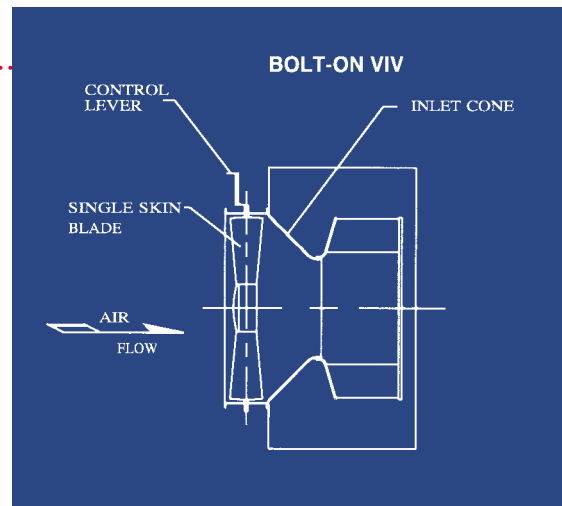
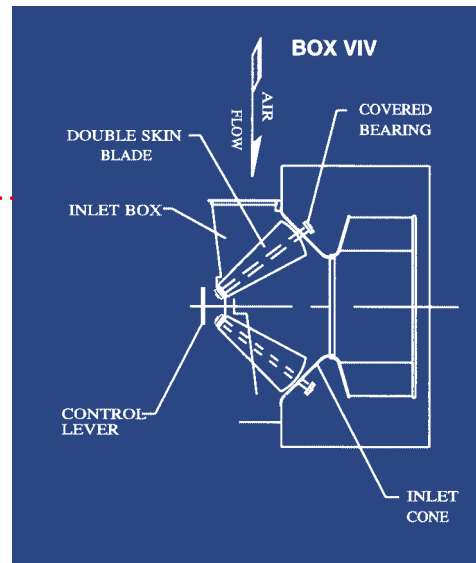
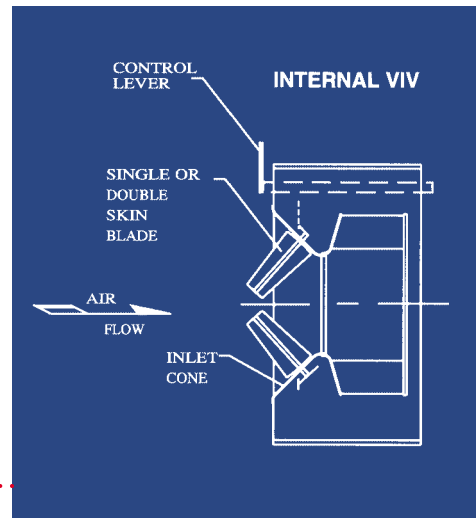
- Lowest cost VIV.
- Vanes cantilevered off two bearings or bushings mounted on the inlet cone.
- Suitable for clean gas streams only.
- Available on all designs except arrangement 3, due to larger fan shaft clearance requirements.

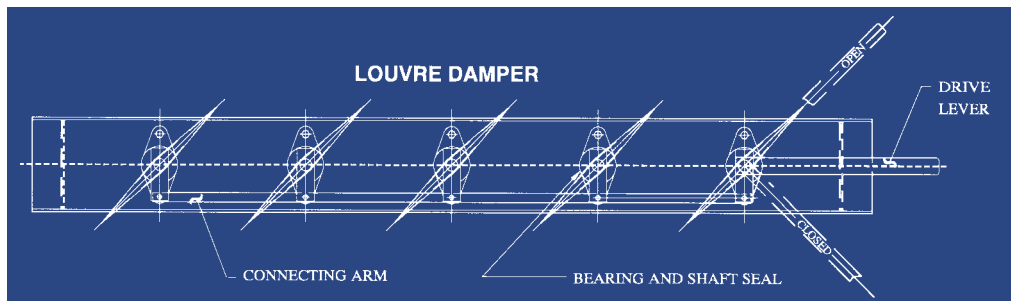
#### BOX VIV

- Vanes supported between two bearings for greater support and control.
- Used on larger single and double width fans where internal VIV's are not suitable.
- Linkages are located outside of fan housing.
- Internal bearings are sealed and covered for hot and dusty fan applications.
- Box VIV has larger face area as vanes span the inlet box, allowing for reduced gas velocity and lower losses.

#### BOLT-ON VIV

- For Arrangements 1 & 8 without inlet boxes, operating at pressures up to 20 inWg (500 mm wg).
- Vanes cantilever mounted in a channel frame, bolted to fan inlet.
- Linkages located outside of gas stream.
- Losses are lower than internal VIV.
- For pressures higher than 20 inWg, a centre hub is required.



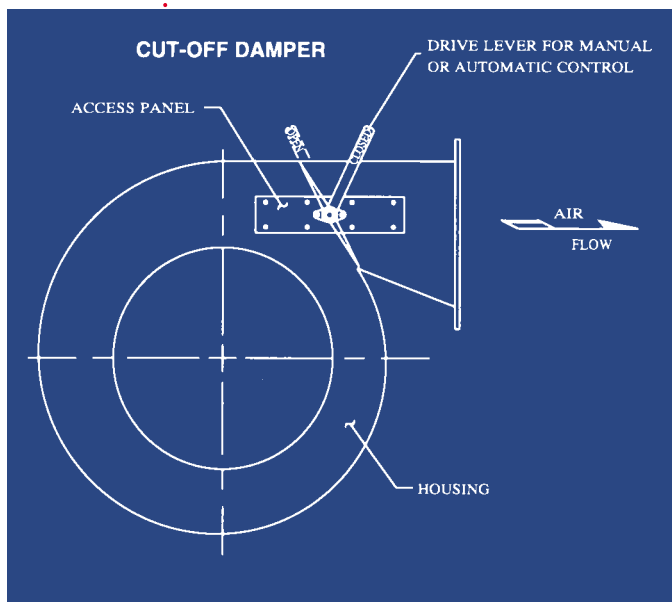


### LOUVRE DAMPERS

- Inlet Louvre Dampers (ILD) suitable for fans with inlet boxes, for isolation and control. Streamlined double skin, parallel operating blades.
- Outlet Louvre Dampers (OLD), mounted on fan or evasé discharge. Parallel or opposed bladed operation for fan isolation.
- Grease lubricated anti-friction bearings used on applications up to 500°F (260°C).
- For higher temperatures, oil impregnated carbon bearings are used.

### CUT-OFF DAMPER

- Used to control flow on narrow blowers.
- Single bladed damper located in the cut-off throat of the fan housing.
- Damper blade is supported between two grease lubricated bearings, located on either side of the fan housing.
- Interconnecting drive linkages provided on all double inlet fans for single point operation.



### ALPHAIR

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