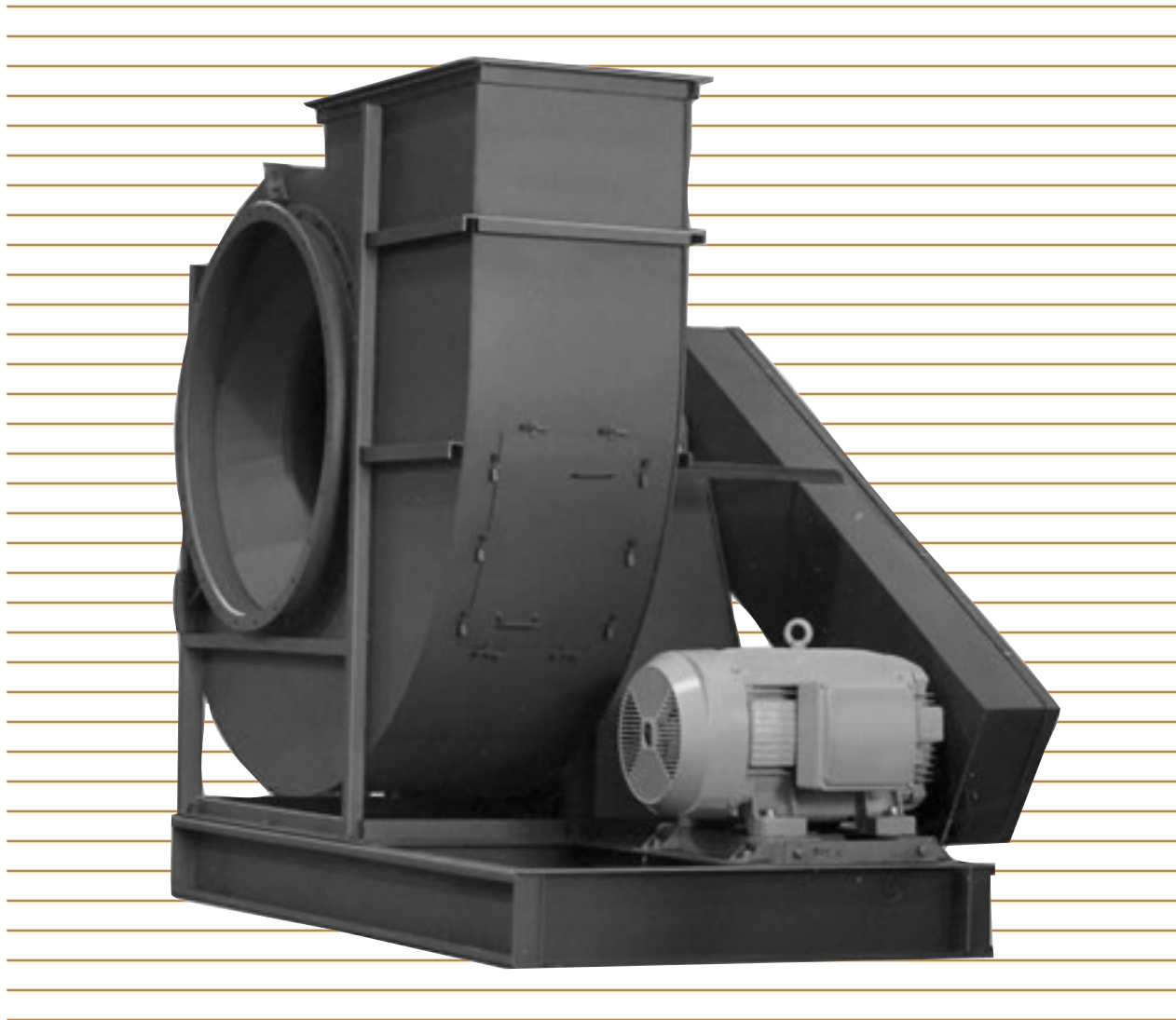


# Series 8800 Radial Tip Fans

## Design 8812



## Series 8800 Radial Tip Fans

The Design 8812 Radial Tip fan is a reliable, highly efficient, heavy duty, rugged fan suitable for a wide range of industrial applications. The Northern Blower Radial Tip is capable of moving large volumes at moderate to high static pressures. It is designed to handle clean or dirty airstreams including hot gasses and fumes, process exhaust, induced draft, and light concentrations of particle matter. This bulletin contains information on the most basic Radial Tip fans offered by Northern Blower. Consult your Northern Blower sales representative for assistance with custom Radial Tip fan selections.

### Industrial supply and exhaust applications

Induced Draft	Baghouses
Boilers	Cyclones
Incinerators	Precipitators
Kilns	Scrubbers
Furnaces	Dryers
Ovens	

Design Features	2
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The ratings shown for the Series 8800, Design 8812 Radial Tip Fan are based on tests and procedures performed in accordance with AMCA publication 210.

**Flanged Outlet**

Punched flange to facilitate the bolting of duct connections to the fan outlet.

**Radial Tip Wheel**

Superior combination of efficient operation and rugged, dependable service.

**Bearings**

Heavy duty split pillow-block spherical roller bearings sized for generous B-10 life.

**Shaft**

Turned ground and polished or fully machined to close tolerance for smooth operation.

**Shaft Seal**

Used to reduce leakage through the shaft hole in the housing.

**Heavy Duty Structural Bearing Pedestal**

**Housing**

Rugged heavy gauge all welded steel housing with substantial framing sections for maximum rigidity. Standard features include flanged outlet, housing drain, shaft seal and gasketed housing split for wheel removal.

**Balancing**

Wheel and shaft assemblies are interference fit and dynamically balanced to ISO 1940 specifications for smooth operation.



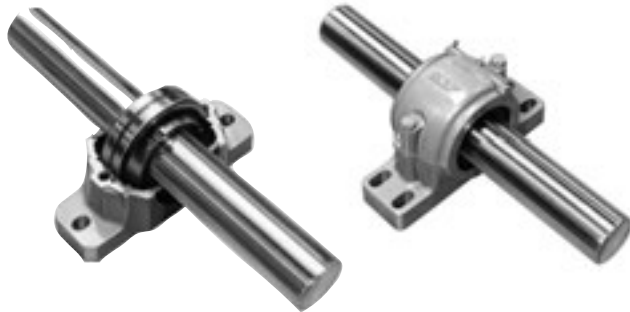
## Shafts and Bearings

### Shafts

Selected to have suitable strength and operate well below the first critical speed for each operating condition. Wheels are interference fit on the shaft to ensure that solid contact is maintained at elevated temperatures.

### Bearings

Anti-friction, grease lubricated, roller type split housing, manufactured to internationally adopted standards by companies having worldwide acceptance and support services. Bearings are selected for continuous operation with a generous bearing life.



## Capacities

Catalogued up to 100,000 CFM. Available to 250,000 CFM.

## Pressures

Catalogued up to 30" WG. Available to 35" WG.

## Temperatures

The high temperature operating limit is 300°F without a cooling wheel, and 800°F with a cooling wheel and standard shaft seal.

## Arrangements and Configurations

This catalogue primarily refers to arrangement 1 fans (see page 19 for AMCA fan arrangements). Northern Blower Radial Tip fans are also available in arrangements 3, 7, and 8 as well as double inlet double width configurations.

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## Design 8812 Radial Tip Wheel

The Northern Blower Radial Tip wheel is designed for high operating efficiency. Blades are formed from heavy gauge high strength low alloy steel. Continuously welded steel construction is standard. Catalogued from 27" to 60" diameters. Available in larger sizes for custom applications.



### Vibration Isolation Base

Rigid steel frame to provide a common mounting platform for fan and motor. May be ordered with spring isolators and motor slide base.



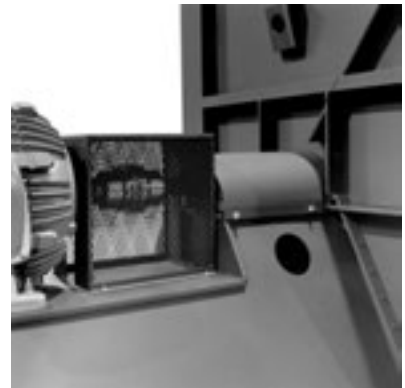
### Inlet Box/ Inlet Box Damper

An Inlet Box provides smooth aerodynamic airflow into the fan inlet. The Inlet Box is designed as a bolt-on accessory to the fan. Inlet Dampers also are available in conjunction with the Inlet Box for efficient air volume control.



### Coupling/ Shaft and Bearing Guard

The coupling guard encloses the coupling from the face of the motor to the outboard bearing. The shaft and bearing guard encloses the shaft and bearings from the inboard bearing to just beyond the outboard bearing.



### Raised Access Door

Access door raised 6" beyond scroll surface to provide room for insulation on exterior of fan housing. Insulated door plug surface is flush with inside of housing scroll.



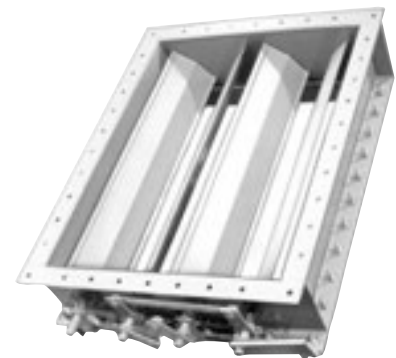
### Quick Release Access Door

Access door mounted flush to the fan scroll and secured with quick release handles. Hinged door available as option.



### Outlet Damper

Outlet Dampers are the least expensive air volume control device but are less efficient than an Inlet Box with an Inlet Damper. Northern Blower Outlet Dampers have punched flanges on both ends to allow for convenient fan and duct connections. Opposed blade designs are available for operating temperatures to 800°F.



### Cooling Wheel

Split aluminum wheel mounted between the inboard bearing and the fan housing. Protects the inboard bearing from shaft conveyed heat and housing radiated heat. Supplied with protective guard as standard. Required for high temperature application; see Page 6.



### Belt Guard

Enclosed on all sides for safe operation and vented to prevent overheating. Tachometer holes, hinged cover, and safety colour coatings also available.



### Additional Accessories

- Protective Coatings
- Special Metals
- High Temperature Construction
- Extended Grease Fittings
- Insulation Clips
- Mounted Drive Package
- Blade and Housing Liners
- Abrasion Resistant

### Series 8800

Due to the wide variety of radial tip fans available from Northern Blower, we are unable to publish all information in one bulletin. Further information on custom fans is available from your Northern Blower representative.

Series 8800 design numbers designate the use of evasés and inlet boxes.

Series 8800 Designs		
Design	Evasé	Inlet Box
8810	No	No
8811	No	Yes
8812	Yes	No
8813	Yes	Yes



# Fan Selection at Elevated Temperature and Altitude

## Fan Selection Table

Ratings shown in the Performance Tables are based on standard air density of .075 pounds per cubic foot at the fan Inlet. Standard air is dry air at 70°F and 29.92" Hg barometric pressure. When air density varies from standard, due to temperature or altitude changes, the Air Density Correction Factor from Table 2 is applied. Refer to the sample selection that follows.

Note that data in the selection tables is based on a fan with evasé and does not include the effects of accessories such as inlet dampers, inlet boxes, outlet dampers, or other components in the air stream.

## High Temperature

High temperature operating limits are 300°F without a cooling wheel and 800°F with a cooling wheel and shaft seal. For selection, both fan performance and physical operating limits must be corrected. Refer to the sample selection on the following page.

Table 2

Air Temp °F	Air Density Correction Factor						
	Elevation (Feet) above Sea Level						
	0	500	1000	2000	3000	4000	5000
-40°	.79	.81	.82	.85	.88	.92	.95
0°	.87	.88	.90	.93	.97	1.00	1.04
40°	.94	.96	.98	1.01	1.05	1.09	1.13
70°	1.00	1.02	1.04	1.08	1.12	1.16	1.20
100°	1.06	1.08	1.10	1.14	1.18	1.22	1.27
140°	1.13	1.15	1.17	1.22	1.26	1.31	1.36
180°	1.21	1.23	1.25	1.30	1.35	1.40	1.45
200°	1.25	1.27	1.29	1.34	1.39	1.44	1.50
250°	1.34	1.36	1.39	1.44	1.49	1.55	1.61
300°	1.43	1.46	1.49	1.54	1.60	1.66	1.72
350°	1.53	1.56	1.58	1.64	1.71	1.77	1.84
400°	1.62	1.65	1.68	1.75	1.81	1.88	1.95
450°	1.72	1.75	1.78	1.85	1.92	1.99	2.06
500°	1.81	1.84	1.88	1.95	2.02	2.10	2.18
600°	2.00	2.04	2.07	2.15	2.23	2.32	2.40
700°	2.19	2.23	2.27	2.35	2.44	2.53	2.63
800°	2.38	2.42	2.46	2.56	2.65	2.75	2.86

Table 1

Wheel & Shaft Maximum Speeds at 70°F		
Size	Shaft	Wheel
2700	2971	3336
3000	2674	2968
3300	2431	2671
3650	2198	2395
4025	1993	2148
4450	1803	2003
4900	1637	1733
5425	1479	1547
5712	1404	1461
6000	1337	1384

Table 3

Safe Speed Deration Factors		
Temp °F	Alloy Steel Wheel	Steel Shaft
-50 to 150	1.0	1.0
200	.97	1.0
300	.96	1.0
400	.95	.99
500	.94	.97
600	.92	.96
700	.87	.95
800	.68	.94

**Sample Selection of a Belt Drive Fan**

Select a fan for the operating conditions of 20,000 CFM at 10" SP, 500°F and 1000 feet elevation.

- 1) Multiply the Operating SP by the Air Density Correction Factor (Table 2) to obtain Equivalent SP:

$$\text{Equivalent SP} = \text{Operating SP} \times \text{Air Density Corr. Factor} = 10" \times 1.88 = 18.8"$$

- 2) From the Performance Tables, select the fan size. For 20,000 CFM at 18.8" SP an efficient selection would be a size 3300 fan. Interpolating from the Performance Table given on page 10, the selected fan performance is 2006 RPM and 77.9 BHP at standard temperature and pressure.

- 3) Divide the Equivalent BHP by the Air Density Correction Factor to obtain the Operating BHP:

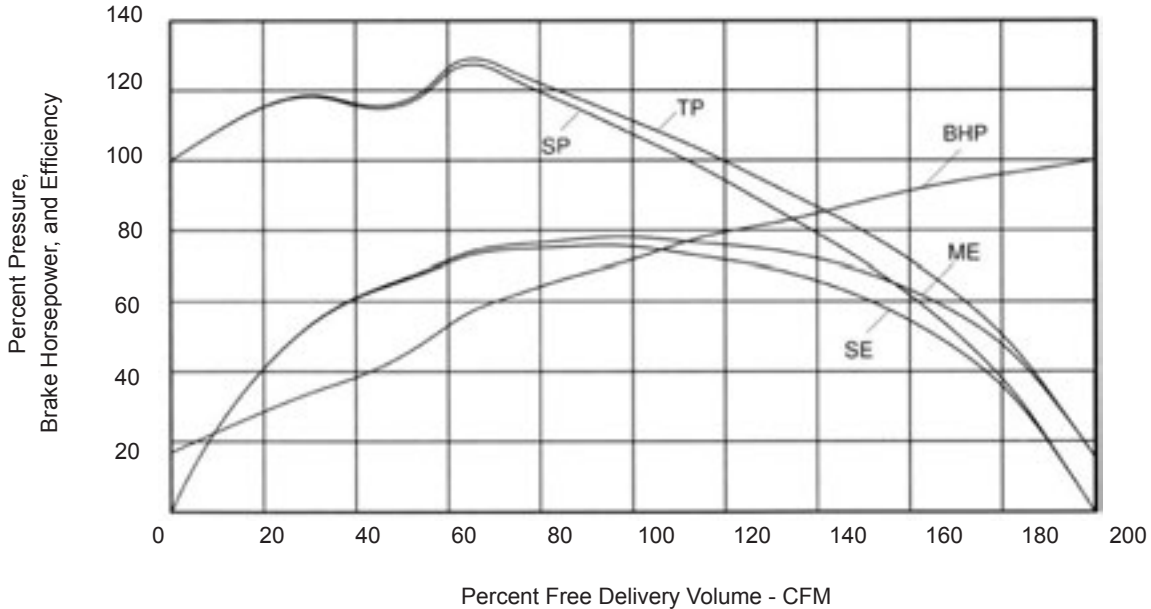
$$\begin{aligned} \text{Operating BHP} &= \frac{\text{Equivalent BHP}}{\text{Air Density Correction Factor}} \\ &= \frac{77.9}{1.88} = 41.4 \text{ BHP} \end{aligned}$$

- 4) Multiply the Wheel & Shaft Maximum Speed at 70°F values (Table 1) by the Wheel & Shaft Safe Speed Deration Factors (Table 3). Fan size 3300, the maximum speed at 500°F is:

$$\begin{aligned} \text{Wheel} &= 2671 \times 0.94 = 2511 \text{ RPM} \\ \text{Shaft} &= 2431 \times 0.97 = 2358 \text{ RPM} \end{aligned}$$

Since the fan selection speed of 2006 RPM is below **both** the maximum allowable wheel and shaft speeds, the fan is a suitable selection.

**Design 8812 Performance Curve**





Size

2700 sisw

Design 8812 Radial Tip Fans

Wheel Diameter = 27.00 in.
Outlet Area = 4.21 sq. ft. inside
Maximum Speed = 2971 RPM
Tip Speed, fpm = 7.07 x RPM

Table with 15 columns (Volume, O.Vel, 11"SP, 12"SP, 13"SP, 14"SP, 15"SP, 16"SP, 17"SP, 18"SP, 19"SP, 20"SP, 21"SP, 22"SP, 23"SP, 24"SP, 25"SP, 26"SP, 27"SP, 28"SP, 29"SP, 30"SP) and 20 rows of performance data.

Power rating (BHP) does not include drive losses. Performance ratings do not include the effects of appurtenances in the airstream. Performance shown is for installation type B-Free inlet, Ducted outlet.

















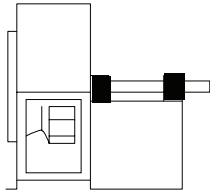






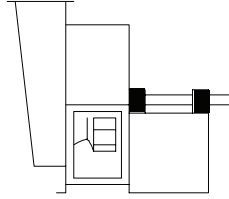
SW - Single Width  
SI - Single Inlet

DW - Double Width  
DI - Double Inlet



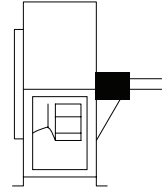
1 SWSI

For belt drive or direct connection. Impeller overhung. Two bearings on base.



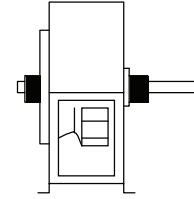
1 SWSI c/w BOX

For belt drive or direct connection. Impeller overhung. Two bearings on base. Inlet box may be self-supporting.



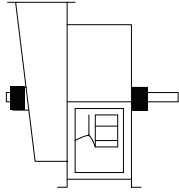
2 SWSI

For belt drive or direct connection. Impeller overhung. Bearings in bracket supported by fan housing.



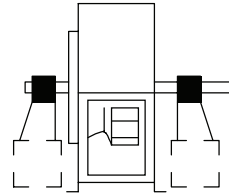
3 SWSI

For belt drive or direct connection. One bearing on each side and supported by fan housing.



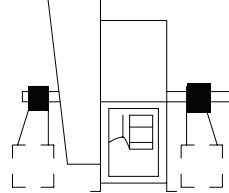
3 SWSI c/w BOX

For belt drive or direct connection. One bearing on each side and supported by fan housing and inlet box. Shaft extending through inlet box.



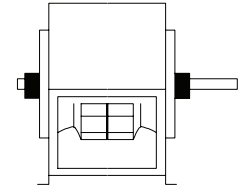
3 SWSI c/w IND. PED.

For belt drive or direct connection. Housing is self-supporting. One bearing on each side supported by independent pedestals.



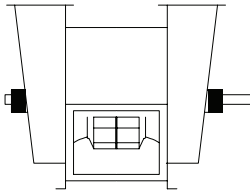
3 SWSI c/w BOX & IND. PED.

For belt drive or direct connection. Housing is self-supporting. One bearing on each side and supported by independent pedestals with shaft extending through inlet box.



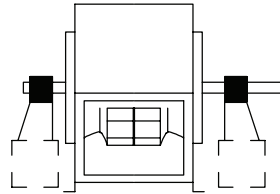
3 DWDI

For belt drive or direct connection. One bearing on each side and supported by fan housing.



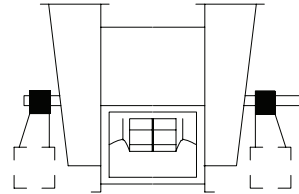
3 DWDI c/w BOXES

For belt drive or direct connection. One bearing on each side and supported by inlet boxes. Shaft extending through inlet boxes.



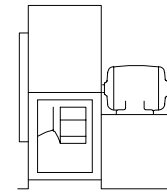
3 DWDI c/w IND. PED.

For belt drive or direct connection. Housing is self-supporting. One bearing on each side and supported by independent pedestals.



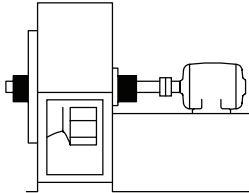
3 DWDI c/w BOXES & IND. PED

For belt drive or direct connection. Housing is self-supporting. One bearing on each side supported by independent pedestals with shaft extending through inlet box.



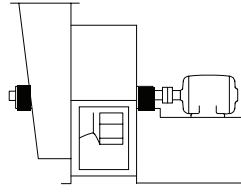
4 SWSI

For direct drive. Impeller overhung on prime mover shaft. No bearings on fan. Prime mover base mounted or integrally directly connected.



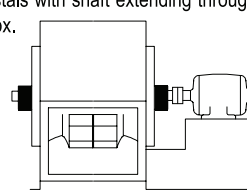
7 SWSI

For belt drive or direct connection. Arrangement 3 plus base for prime mover.



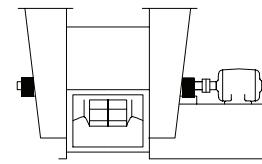
7 SWSI c/w BOX

For belt drive or direct connection. Arrangement 3 plus base for prime mover. Shaft extending through inlet box.



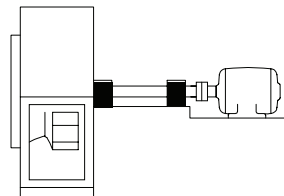
7 DWDI

For belt drive or direct connection. Arrangement 3 plus base for prime mover.



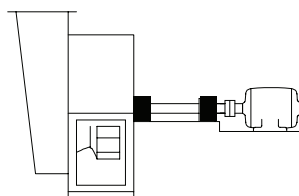
7 DWDI c/w BOXES

For belt drive or direct connection. Arrangement 3 plus base for prime mover. Shaft extending through inlet box.



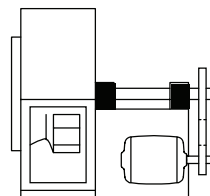
8 SWSI

For belt drive or direct connection. Arrangement 1 plus extended base for prime mover.



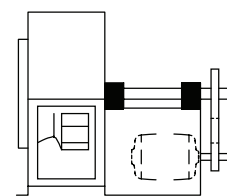
8 SWSI c/w BOX

For belt drive or direct connection. Arrangement 1 plus extended base for prime mover.



9 SWSI

For belt drive. Impeller overhung, two bearings, with prime mover outside base.



10 SWSI

For belt drive. Impeller overhung, two bearings, with prime mover inside base.










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