

Centrifugal Fans Model USF

- Commercial & Industrial Applications
- Single-Width



BUILDING VALUE IN AIR.

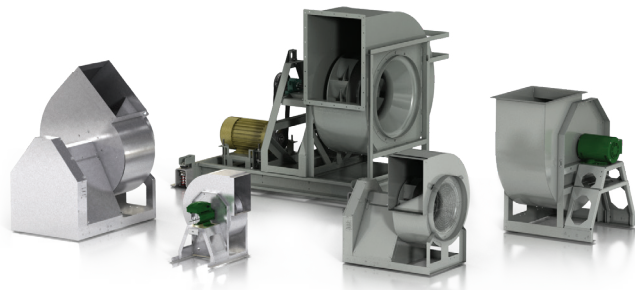


December
2022

Greenheck's single-width centrifugal fans are designed to provide efficient and reliable operation for commercial and industrial applications. Our products are manufactured with state-of-the-art laser, forming, spinning and welding equipment, and undergo quality control testing to ensure a trouble-free start-up.

Benefits of Greenheck Centrifugal Products

- AMCA licensed performance and UL Listed
- Ease of selection using Greenheck's eCAPS® or CAPS® software selection tools
- Tiered product portfolio offering the best value fan for any given application
- AutoCAD® and Revit® models available for download
- Quick Build and Fast Pass expedited shipping programs
- Factory tested prior to shipment



Certifications

Air Performance	AMCA	Sizes	Wheel
A1, A2	Sound and Air	18 - 73	AF
B1, B6	Sound and Air	4 - 73	BI
B2, B7	Air	4 - 24	BI
B3	Air	4 - 18	BI
B4	Air	27 - 49	BI
B5	Air	6 - 10	BI
F1, F3	Air	9 - 24	FC
F2	Air	6 - 10	FC



Certified data may be found in Greenheck's Computer Aided Product Selection program (CAPS)



UL/cUL 705 Listed Power Ventilator
UL/cUL File E40001

UL/cUL 762 Power Ventilators for Restaurant Exhaust Appliances
UL/cUL File MH11745

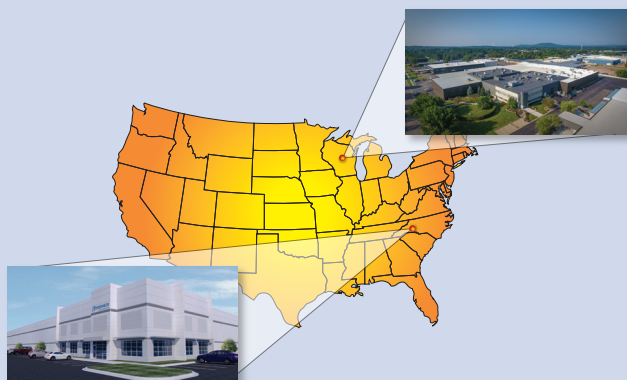
UL/cUL Power Ventilator for Smoke Control Systems
UL/cUL File MH17511

Manufactured in the USA

Model USF fans are built in one of two manufacturing locations, Schofield, WI and Shelby, NC. Multiple manufacturing locations enable us to build fans and get them to you, our customer, faster.

Quick Build Availability

Select model USF fan configurations are available in as little as 5 days on our Quick Build program.



Greenheck's centrifugal products are designed to handle a variety of commercial and industrial applications:

- General supply, return or exhaust systems
- Emergency smoke exhaust (buildings, car parks, etc.)
- Restaurant grease exhaust
- Stairwell pressurization
- Process heat exhaust
- Filter houses and dust collectors
- Built-up or custom air handlers
- Spark-resistant fume exhaust
- Corrosive fume exhaust
- Grain drying

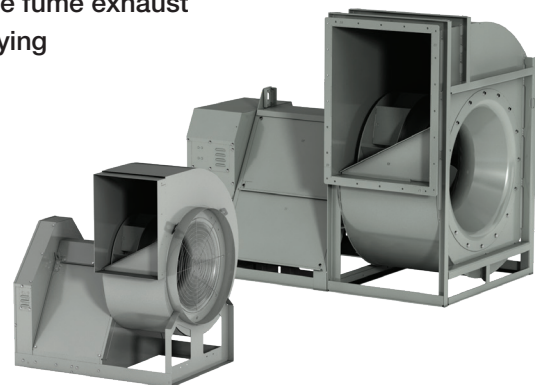
Emergency Smoke (UL/cUL Listed):

Atriums, libraries, multistory buildings

Select Greenheck centrifugal fans are UL/cUL Listed for Power Ventilators for Smoke Control Systems. Fans can be installed for dual application use or as a dedicated emergency system, with the primary function of the fan being general air movement, but built to withstand operation seen in emergency smoke situations. The UL Listing indicates the model is designed and tested to exhaust heat and smoke in an emergency situation.

The emergency high temperature option is suitable for the following temperatures:

Operating Temperature	Time Duration
500°F (260°C)	4 hours
572°F (300°C)	2 hours
752°F (400°C)	2 hours
1000°F (538°C)	15 minutes



UL/cUL 705 Listed Power Ventilator
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UL/cUL 762 Power Ventilators for Restaurant Exhaust Appliances
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High Temperature Process Exhaust:

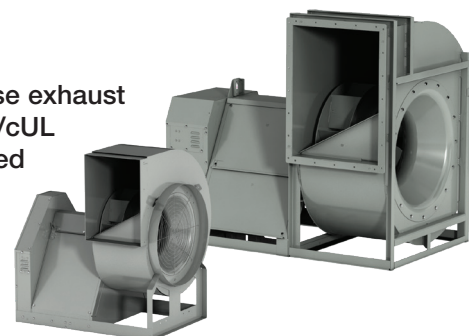
Kilns, Dryers, Furnaces

Designed for applications involving elevated temperatures above 250°F (121°C) continuously for extended periods of time. Material and arrangement choices are limited to components suitable for this application and located to minimize effects. Fans manufactured with a high temperature process package include high temperature shaft seal, heat slinger, high temperature fan bearing grease, and high temperature coating on steel fans. Heat slinger dissipates heat being transferred down the fan shaft preventing bearing grease evaporation. Applications up to 1000°F can be handled with the use of stainless steel materials.

Restaurant Grease Exhaust (UL/cUL 762 Listed):



Restaurants

The centrifugal scroll fans are designed for high pressure restaurant grease exhaust applications. Either Permalock™ or welded housing are available with UL/cUL Listing of Power Ventilators for Restaurant Exhaust Appliances. The welded housing is suitable for indoor or outdoor mounting locations, whereas the Permalock™ housing is suitable for outdoor kitchen ventilation installations. Listing tests exceed duct temperatures of 400°F (204°C) continuous operation. UL/cUL 762 selections require a drain connection and access door for cleaning.



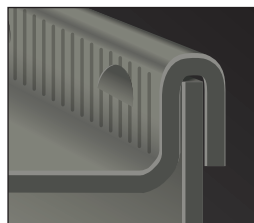
Wheels

Greenheck centrifugal fans have multiple wheel options. All wheels are statically and dynamically balanced to grade G6.3 per ANSI S2.19.

	Backward-Inclined (BI)	Airfoil (AF)	Forward-Curved (FC)
Wheel Type			
Application	General purpose, clean air or severe environments	Clean air or fume exhaust	Clean air
Temperature	Up to 1000°F (538°C)	Up to 500°F (260°C)	Up to 180°F (82°C)
Construction	Steel Aluminum 316 Stainless Steel	Steel Aluminum	Steel Aluminum

Permalock™ Housings

Permalock™ housings use a mechanically fastened seam instead of welding. This airtight and watertight housing construction uses the same structural support as all welded housings. Permalock™ construction is an excellent value engineering option for applications up to 8.5 in. wg (2.1 kPa).



Welded Housings

Optional on Class 0, I, II and standard on larger fan sizes, centrifugal fans are manufactured with heavy-gauge, welded housing construction. All welded construction is common for industrial applications and is suitable for pressures up to 22 in. wg (5.5 kPa).



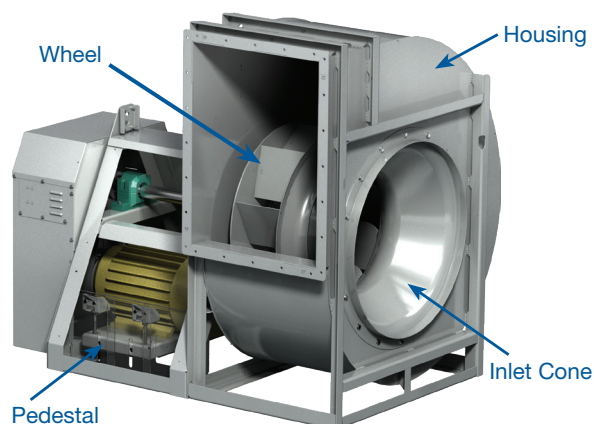
Alternative Materials

Greenheck offers centrifugal fans in aluminum or stainless steel construction as an alternative to coated steel. Aluminum construction provides advantages for applications with high moisture and various chemicals. Aluminum also reduces the weight of the fan if there are structural concerns. Stainless steel (316L) construction is used for environments subject to continuous high heat up to 1000°F (538°C) or severe corrosives. Both aluminum or stainless steel construction can be applied to the entire fan (housing, wheel, inlet cone and drive frame) or the airstream components (housing, wheel and inlet cone) only.

Spark-Resistant Construction

Greenheck centrifugal fans are available with spark-resistant designs suitable for applications that involve flammable particles, fumes or vapors. Spark-resistant construction options adhere to guidelines defined within AMCA Standard 99-0401-86.

Spark A	All parts in contact with the airstream are constructed of nonferrous material (usually aluminum).
Spark B	The fan wheel is constructed of a nonferrous material (usually aluminum). A nonferrous (aluminum) rub ring surrounds the fan shaft where it passes through the fan housing.
Spark C	The inlet cone is constructed of nonferrous material (usually aluminum). A nonferrous (aluminum) rub ring surrounds the fan shaft where it passes through the fan housing.



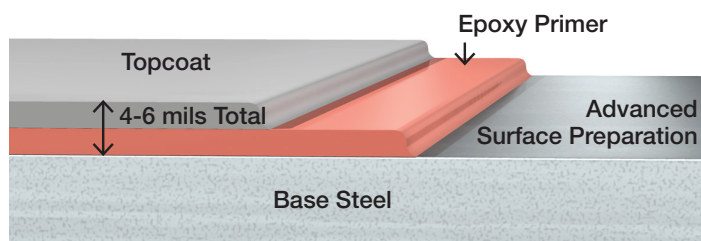
Protective Coatings

Greenheck offers a wide variety of protective coatings suitable for corrosive applications. All coatings are electrostatically-applied baked powders that offer a durable, long lasting finish. For more information on our complete offering of coatings, visit www.greenheck.com and navigate to Resources/Library/Application-Articles. Search for [Straight Talk on Protective and Aesthetic Coatings for Commercial/Industrial Fans](#).

Chemical Resistance Ratings						
Chemical	Bleach	Sulfuric Acid (10%)	HCl (10%)	MEK	Chlorine (0.1%)	NaOH (20%)
Permatector	0	1	2	2	0	—
Hi-Pro Polyester	0	0	0	1	0	—
Hi-Pro-Z	0	0	0	1	0	1
RATING DESCRIPTIONS	0 - No effect 1 - Slight change in gloss or color 2 - Surface etching, severe staining, but film integrity remains 3 - Significant pitting, cratering, swelling, or erosion with obvious surface deterioration					

Two-Coat Advantage

For corrosive environments, use Greenheck's Hi-Pro-Z two-coat coating technology. Test data demonstrates our two-coat paint system offers four times the corrosion resistance of other coatings commonly available within the fan industry.



Performance Tested

When selecting a powder coating finish for heavy-gauge welded steel fans, critical information such as environment, moisture, exposure, abrasives, and chemicals should be considered.

Powder coatings are the best choice for most extreme applications. Major advantages over most vendor-applied liquid coatings include:

- Superior finish with uniform coverage and thickness
- A better coating provides better protection
- The process is environmentally friendly
- Unequaled value

				Environments						
				CLEAN AIR	COASTAL	CHEMICAL*	EXTREME WEATHER	ABRASIVE PARTICLES	SUN-UV	
One Coat Process	Coatings	Color	Coating Specifications							
	Permatector™ Standard coating for steel products in both indoor and outdoor applications	Concrete Grey RAL 7023	Thickness: 2.0 - 3.0 mils Polyester urethane powder coating	X						X
Two Coat Process	Hi-Pro Polyester Formulated for exterior durability, color and gloss retention. Excellent for chemical applications.		Thickness: 2.0 - 3.0 mils High performance polyester urethane powder coating	X		X				X
	Hi-Pro-Z Two-coat powder paint coating is resistant to saltwater, chemical fumes and moisture in corrosive environments		Thickness: 4.0 - 6.0 mils Hi-Pro Polyester topcoat with epoxy basecoat	X	X	X	X	X	X	X

Note: Hi-Pro-Z is not available on aluminum.

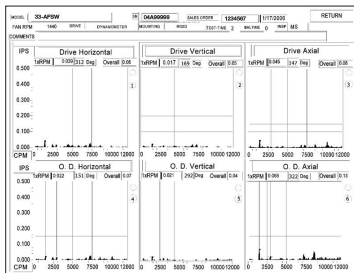
*Chemical Resistant Rating Above

Vibration Analysis

All centrifugal wheels undergo a computerized balance analysis to a grade of G6.3. In addition, centrifugal products offer an optional complete mechanical vibration test after assembly. Our custom data acquisition system uses tri-axial accelerometers to measure the vibration in three planes at the design operating speed. A permanent record for each fan's performance is kept on file and is available upon request.

The standard "filter-in" vibration levels attained meet the requirements of Fan Application BV-3 as defined in AMCA Standard 204-05 "Balance Quality and Vibration Levels for Fans". Consult factory if more stringent vibration levels are necessary.

Drive Type	Filter-In Vibration Limit (Rigidly Mounted)
Belt	0.15 in/sec-pk
Direct Arrg. 4	0.08 in/sec-pk
Direct Arrg. 8	0.15 in/sec-pk



Copies of these signatures are kept on file and are available upon request.



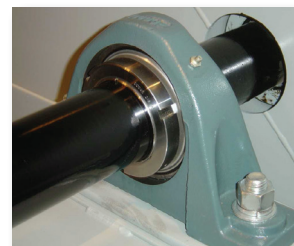
Premium Bearings

Belt drive centrifugal products are manufactured with "Air Handling Quality" self-aligning ball or roller pillow block bearings. All bearings include zerk fittings for relubrication and are selected for a basic rating fatigue life of L_{10} in excess of 40,000 hours (L_{50} at 200,000 hrs.) at the maximum RPM for the selected pressure class.

L_{10} life implies 90% reliability or 10% failure rate after the stated hours.

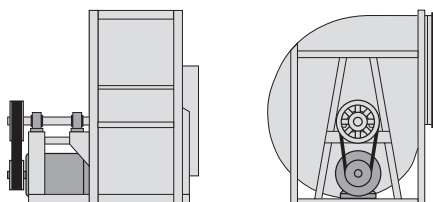
L_{50} life implies 50% reliability or 50% failure rate after the stated hours.

The USF offers multiple levels of bearing sets allowing for the proper balance between service intervals and initial cost. Estimated bearing life can be supplied once a fan is fully configured.



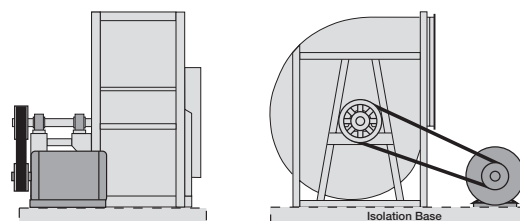
Arrangement 10 — Belt Drive

- Recommended as first choice configuration for belt drive applications
- Most compact belt drive arrangement
- Bearings are mounted out of the airstream
- Motor is mounted beneath the drive frame
- Available with a weatherhood to cover motor, drives and bearings
- Moderate dirt and heat tolerance



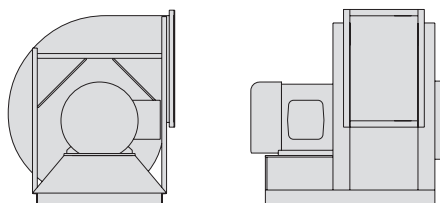
Arrangement 1 — Belt Drive

- Bearings are mounted out of the airstream
- Unlimited motor size
- Requires an isolation base (by factory) or structural pad to mount the fan and motor
- Available with motor cover
- Suitable for high temperatures or contaminated air



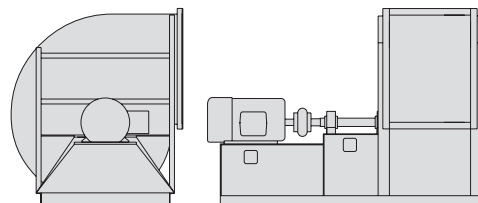
Arrangement 4 — Direct Drive

- Available with partial width wheel and housing modifications for specific performance
- Recommended for higher horsepower applications in lieu of belt drive
- Limited to standard motor speeds, but are available with variable frequency drive compatible motors
- Provides compact design with low maintenance
- Available with motor cover



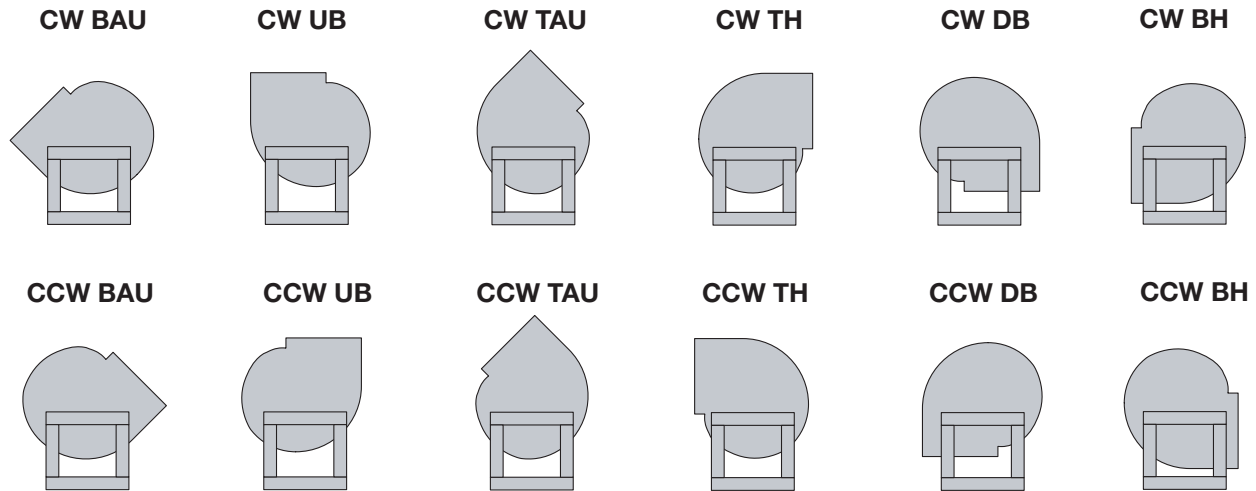
Arrangement 8 — Direct Drive

- Available with partial width wheel and housing modifications for specific performance
- Recommended for higher horsepower applications in lieu of belt drive
- Limited to standard motor speeds, but are available with variable frequency drive compatible motors
- Bearings located out of the airstream
- Suitable for high temperatures or contaminated air
- Available with motor cover, belt guard



Discharge Positions and Rotatable Housings

Rotation and discharge is always determined from the drive side of the fan.

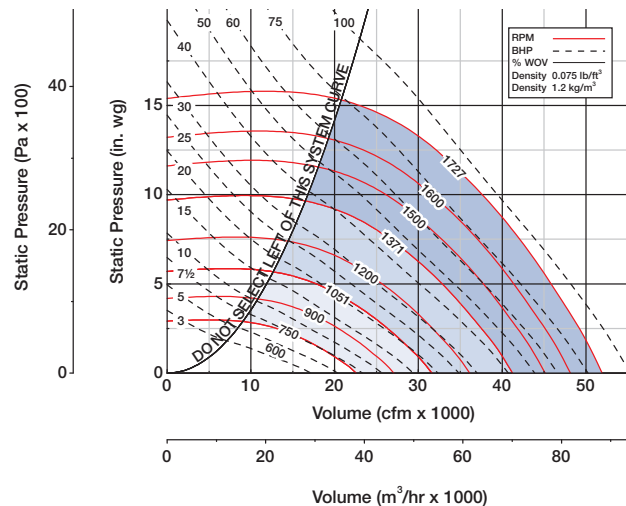


Class of Construction

AMCA defines fan class based on minimum outlet velocities and pressures a fan must be capable to produce. Fan classes are designated as 0, I, II, or III. As the fan class increases, the outlet velocity and pressure requirements increase as defined in AMCA Standard 99. As the outlet velocity and pressures increase, the fan construction (material gauge, shaft diameter, motor size, etc.) must also change to physically accommodate the faster RPMs required.

Centrifugal products are available in Class 0, I, II, or III, with Class 0 having the lowest maximum fan RPM and Class III having the highest maximum fan RPM.

A typical fan curve is shown with shaded class limits. For specific certified fan data, please consult Greenheck's Computer Aided Product Selection program, CAPS®.



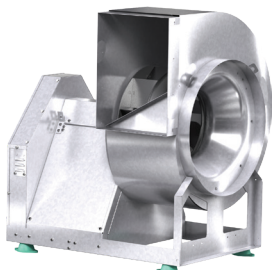
Class	Class	Class	Class
0	I	II	III

Vibration Isolators and Isolation Bases

Greenheck offers a complete package of vibration isolators, isolation bases and inertia bases to simplify field assembly and reduce transmitted vibrations.

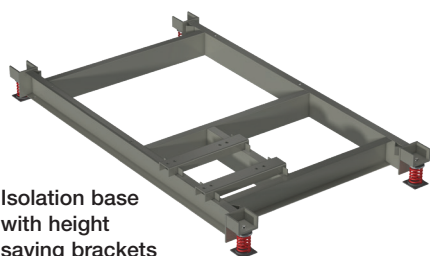
Refer to the catalog on www.greenheck.com/Resources/Library/Literature. Search for [Mounting Bases and Vibration Isolation](#).

Mounting Types



Direct Mount

No base required, isolators are attached directly to equipment. Direct isolation can be used if equipment is unitary and rigid without the use of additional support. This option is not available on arrangement 1 or 8 USF fans.



Isolation Base

Isolation bases consist of formed steel members welded into a rigid one-piece base. A motor slide base is included where applicable. Bases are required for all arrangement 1 and 8 fans with mounted motors. Isolation bases are available without isolators, with rubber mounts or with spring mounts. All formed steel bases with spring mounts incorporate height saving brackets.

Isolator Types

Rubber Mount

Neoprene mountings consist of a steel top plate and base plate completely embedded in colored (oil-resistant) neoprene for easy identification of capacity. Neoprene mountings are furnished with a tapped hole in the center. This enables the equipment to be bolted securely to the rubber mount.



Neoprene

Free-Standing Open Spring Mount

Free-standing spring isolators are unhoused laterally stable steel springs. These isolators are for indoor use only. Free-standing open spring mounted isolators provide a minimum horizontal stiffness of 0.8 times the rated vertical stiffness and provide an additional 50% overload capacity. They are equipped with a top-mounted adjusting bolt and an acoustical non-skid base. Springs are color-coded or identified to indicate load capacity.



Free Standing

Restrained Spring Mount

Restrained spring isolators consist of laterally stable, free-standing springs assembled into a steel housing. These assemblies are designed for vertical and horizontal motion restraint. Springs provide 50% overload capacity and are color-coded or identified to indicate load capacity. Restrained spring mounts are recommended for equipment subject to wind-loading or large torquing forces. They are also used for equipment subject to large weight changes such as swing-out fans.



Restrained

Access Door

Bolted or hinged access doors provide access for cleaning or inspection.

Backdraft Damper

Backdraft dampers are available in galvanized or aluminum construction and include counterweights for tight closure when the fan is de-energized.

Belt Guard

Belt guards are designed to allow easy access to the belts and pulleys for service. All belt guards include tachometer openings to monitor the fan speed as well as an access panel for testing belt tension. Belt guards meet OSHA guidelines.

Disconnect Switch

Greenheck offers a wide selection of NEMA rated fusible or non-fusible disconnect switches. Switches can be factory mounted or shipped loose for field installation.

Drain

A one-inch (25 mm) threaded drain connection is located at the bottom of the fan housing to drain water that may accumulate. A simple, nonthreaded hole is also available as an economy option.

Extended Lubrication Lines

Single-width fans are available with flexible nylon or copper tubing extending from the bearings to conveniently located grease fittings mounted on the fan pedestal (or on the exterior of the weatherhood if a weatherhood is supplied).

Grease Containment

Grease trap is designed to collect grease residue to avoid drainage onto roof surface. Grease traps ship loose for field installation.

Heat Slinger

The heat slinger is an aluminum cooling disc mounted on the fan shaft between the inboard bearing and the blower housing to dissipate heat conducted along the fan shaft.

Inlet Companion Flange

Punched companion inlet flanges are available on single-width fans.

Inlet and Outlet Flanges

Optional inlet flanges on single-width fans are pre-punched and welded to the inlet collar. Punched outlet flanges are standard on fan sizes 33-73.

Inlet and Outlet Guards

Removable inlet and outlet guards provide

protection for personnel and equipment in non-ducted installations. Inlet and outlet guards meet OSHA guidelines.

Motor Cover (Arrg. 1, 4, or 8)

A weatherproof motor cover shields the motor components from dust, dirt and moisture for outdoor installations.

Shaft Guard (Arrg. 1 or 8)

Shaft guards are designed to cover shafts and bearings. Extended lube lines are optional for bearing lubrication without removal of the guard. Shaft guards meet OSHA guidelines.

Shaft Seal

A shaft seal helps contain the airstream inside the fan for operation at high temperatures or for exhausting contaminated air.

Stainless Steel Shaft

Stainless steel fan shafts are available for applications where standard carbon steel shafts may exhibit excessive corrosion or heat stress.

Sure-Aire™

Noninvasive flow monitoring system capable of capturing accuracy within 3% and available with or without electronics. Clean air applications only.

Weatherhood (Arrg. 10)

Vented steel weatherhoods protect the motor and drive components from rain, moisture, dust, and dirt. Weatherhoods meet OSHA guidelines and are easily removed for service access.

Vari-Green® Motor

Greenheck's electronically commutated (EC) Vari-Green motor combines motor technology, controllability and energy efficiency into a single, low-maintenance unit.

Volume Control:

Volume Control Damper

Control dampers are available in galvanized or aluminum. Actuator options include manual quadrant or electric.

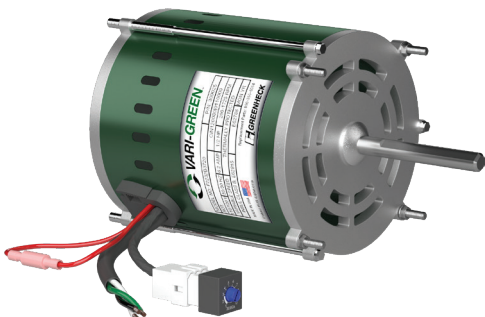


VFD and Rated Motor

Variable frequency drives (VFDs) change the frequency of the input power to the motor, which results in changing the motor's speed. Changing the speed of the fan provides the greatest potential for energy savings at partial loads.

Vari-Green® Motor

Electronically commutated (EC) Vari-Green® (VG) motor combines technology, controllability, and energy efficiency into a single, low-maintenance package that is changing the way the industry designs, specifies and operates air movement equipment.

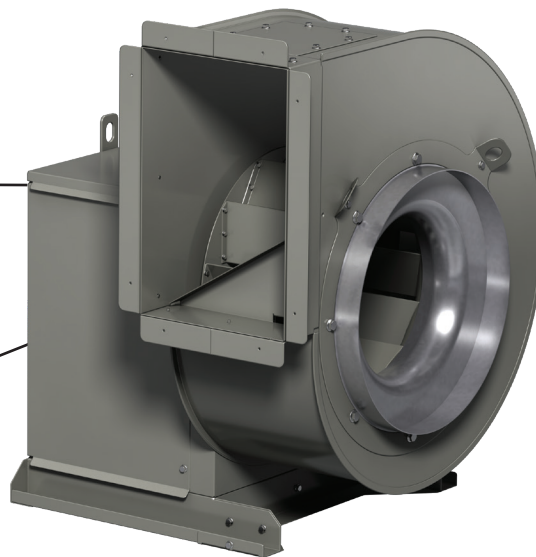


Single-phase VG motors are available in sizes ranging from 1/4 to 1 hp.



Three-phase VG motors are available in sizes ranging from 1 to 10 hp in both 1200 and 1800 rpm.

Single and three-phase induction motors are available in many configurations. A VFD control box with VG HOA interface is available from the factory as ship loose or mounted and wired up to 30 hp.



Vari-Green Controls

Available on all control packages (both VG and Induction).

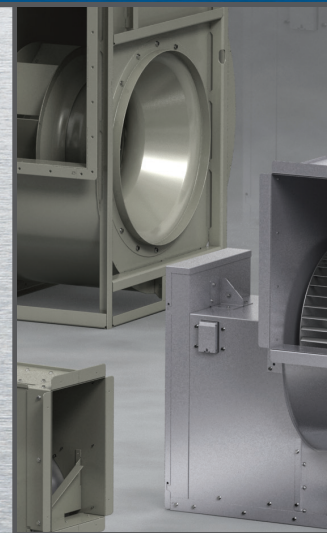
- Hands/Off/Auto (HOA)
- Remote Dial
- Touch Remote
- Constant Pressure
- IAQ – Temperature/Humidity
- IAQ – VOC

Centrifugal Fans

Greenheck's Centrifugal Product Offering

Greenheck's tiered model approach gives you flexibility in size, performance and construction matching the appropriate model to your application. Our centrifugal product line offers a variety of options in construction features, materials and performance by model.

- Backward-inclined, forward-curved or airfoil wheel options
- Class 0-III pressure ratings
- Permalock™, fully welded or Quad-Split scroll designs
- Belt or direct drive configurations
- Galvanized, coated steel, aluminum or stainless construction materials
- Spark-resistant or high temperature packages
- Variable Frequency Drive (VFD) and Vari-Green® controls



Enjoy Greenheck's extraordinary service, before, during and after the sale.

Greenheck offers added value to our wide selection of top performing, energy-efficient products by providing several unique Greenheck service programs.



- Our Quick Delivery Program ensures shipment of our in-stock products within 24 hours of placing your order. Our Quick Build made-to-order products can be produced in 1-3-5-10-15-20 or 25-day production cycles, depending upon their complexity.



- Greenheck's free Computer Aided Product Selection program (CAPS®), rated by many as the best in the industry, helps you conveniently and efficiently select the right products for the challenge at hand.
- Greenheck continues to take an industry-wide leadership position to affect positive global sustainability. We believe that providing education on products we offer contributes to reducing energy consumption and improving healthier indoor environments.



- Our 3D service allows you to download, at no charge, easy-to-use AutoDesk® Revit® 3D drawings for many of our ventilation products.

Find out more about these special Greenheck services at greenheck.com

Our Commitment

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Product warranties can be found online at Greenheck.com, either on the specific product page or in the literature section of the website at Greenheck.com/Resources/Library/Literature.

