

# Centrifugal Fans Models BIDW and AFDW

- Backward-Inclined and Airfoil Wheels
- Double-Width



*Commercial &  
Industrial Applications*




BUILDING VALUE IN AIR.

January  
2018

Greenheck's airfoil and backward-inclined 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 endure our quality control testing to ensure trouble-free start-up.

Greenheck double-width centrifugal products include:

- AMCA Licensed for Sound and Air Performance
- All welded designs or Permalock™ construction
- Concentric mount bearings with industry's highest cataloged bearing life
- Corrosion-resistant, electrostatically applied and baked powder coatings
- Three-plane, six-channel vibration analysis on all manufactured double-width models



Greenheck Fan Corporation certifies that the backward-inclined and airfoil centrifugal fans shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and Publication 311 and comply with the requirements of the AMCA Certified Ratings Program. AMCA Licensed Sound and Air Performance can be found in Greenheck's Computer Aided Product Selection program (CAPS).

## Applications

- Indoor use only with unducted inlets
- Excellent for built-up plenums or custom air handlers

**BIDW Size 12-73**  
up to 379,000 cfm (643,900 m<sup>3</sup>/hr)  
up to 15 in. wg (3.74 kPa)

**AFDW 18-73**  
up to 379,000 cfm (643,900 m<sup>3</sup>/hr)  
up to 15 in. wg (3.74 kPa)

Greenheck's double-width centrifugal products are specifically designed for supply or return fans in built-up or custom air handlers or retrofit (replacement) applications.

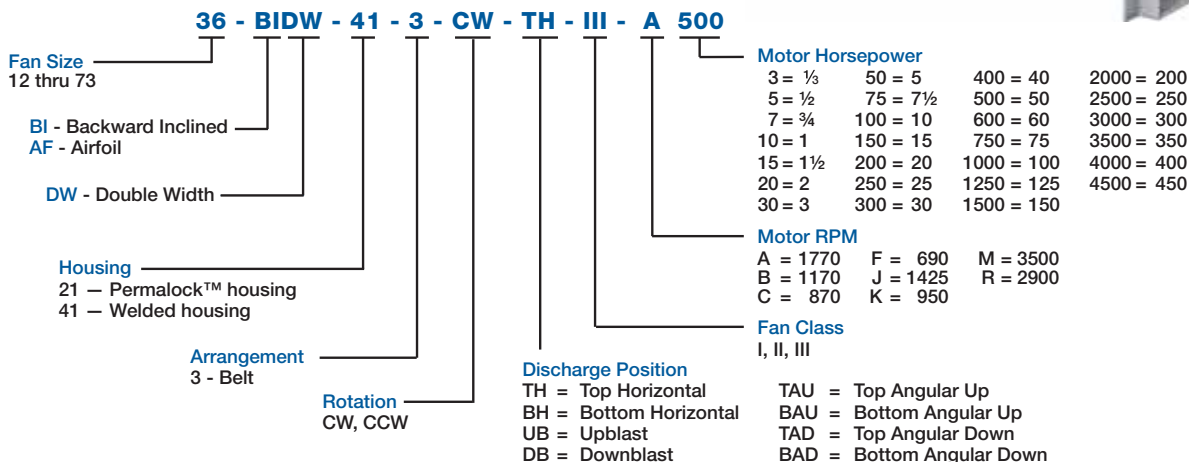
Our expertise in air movement technology can assist you in improving the operational efficiency of your system.



UL/cUL 705 Listed Power Ventilator  
File #E40001



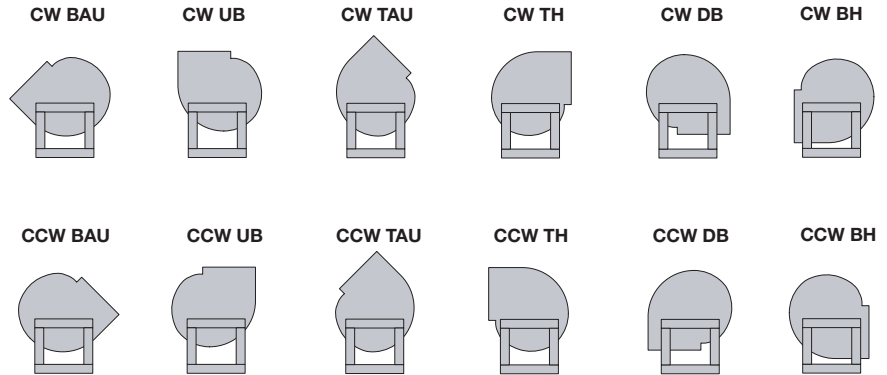
## Centrifugal Fan Model Number Code:



## Discharge Positions and Rotatable Housings

All double-width centrifugal fans are available with clockwise (CW) or counterclockwise (CCW) rotation in all standard discharge positions. **Rotation and discharge is always determined from the drive side of the fan.**

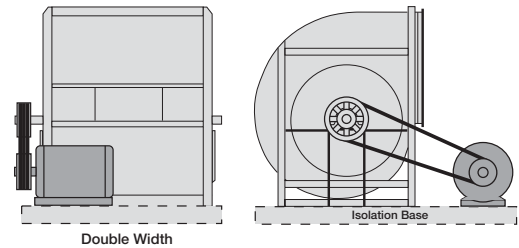
Top Angular Down (TAD) and Bottom Angular Down (BAD) discharge positions are only available with special construction to prevent interference between the drive frame and fan discharge.



## Arrangement 3 – Belt Drive

*Double-Width Backward-Inclined or Airfoil Wheel*

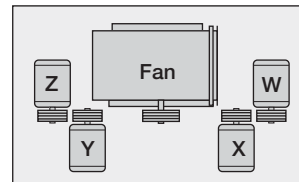
- Bearings are mounted in the airstream.
- Unlimited motor size.
- Requires an isolation base (by factory) or structural pad to mount the fan and motor.
- Choice of motor positions W, X, Y or Z.
- Weatherhood is not available on this arrangement. Recommend belt guard and shaft guard.
- Recommended for clean air at ambient temperatures.



**Class I, II, III**

## Motor Positions

Fan arrangement 3 requires an isolation base or structural platform to support the fan and motor. The motor can be located in any of four positions around the fan shaft to ensure proper alignment. Motor positions W and Z tend to make a longer footprint from end to end. Positions X and Y tend to make a shorter but wider footprint.



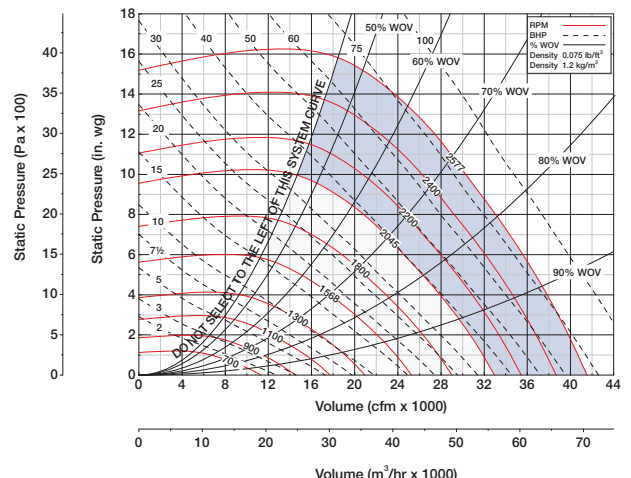
Motor position and fan rotation are determined from drive side

## Class of Construction

Fan class refers to a construction level designed to handle a given fan outlet velocity and pressure. As the fan performance requirements increase, the fan construction (material gauge, shaft diameter, motor size) must also increase to physically handle the new work load.

Double-width centrifugal products are available in Class I, II, or III, with Class I being the lightest construction and Class III having the heaviest construction and performance capacity.

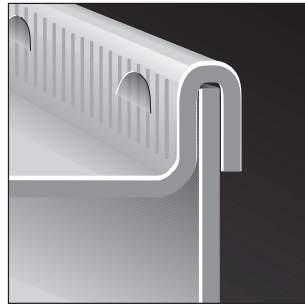
A typical fan curve is shown with shaded class limits. Complete AFDW and BIDW fan performance can be found within our Computer Aided Product Selection (CAPS®) program, or at [greenheck.com](http://greenheck.com) in eCAPS®, our online product selection program designed for HVAC engineer.



Class I	Class II	Class III
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## Permalock™ Housing

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



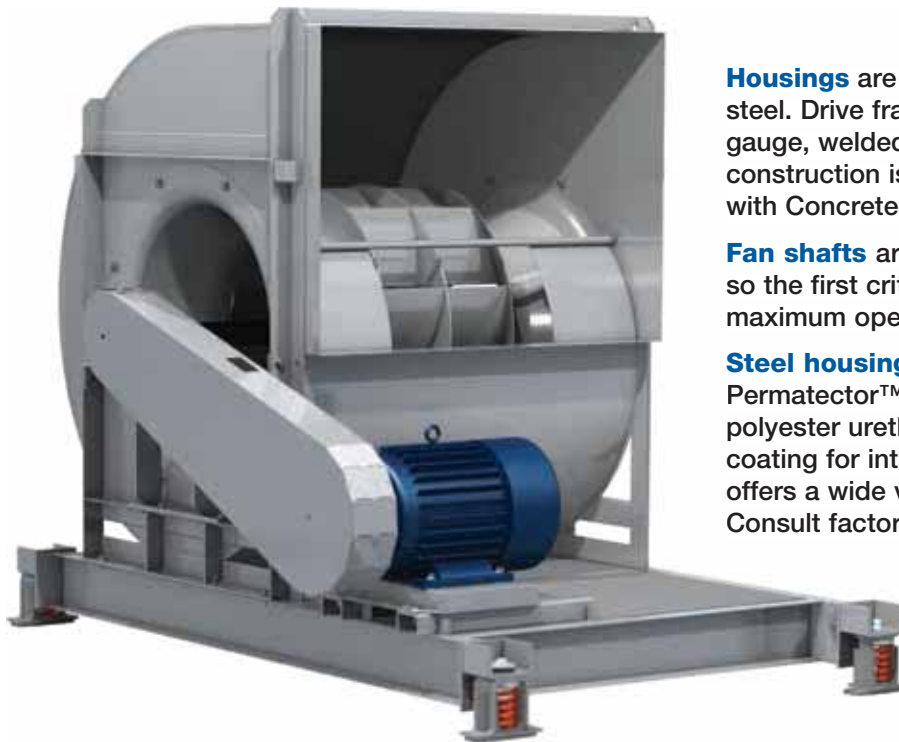
## Welded Housing

Greenheck centrifugal fans are manufactured with heavy gauge, edge-to-edge welded housing construction. All-welded construction is common for industrial applications and is suitable for pressures up to 15 in. wg (3.74 kPa).



Housing	Size	Class	Housing Material	Wheel Type
Permalock™	18–49	I, II	Steel	Backward-Inclined or Airfoil
Welded	18–73	I, II, III	Steel	

## Standard Construction Features





**Housings** are manufactured of laser cut and formed steel. Drive frames are manufactured with heavy-gauge, welded steel. Aluminum or stainless steel construction is optional. All steel surfaces are coated with Concrete Grey RAL-7023 Permator™.

**Fan shafts** are turned and polished steel that is sized so the first critical speed is at least 25% over the maximum operating speed for each pressure class.

**Steel housings** and **wheels** are coated with Permator™, an electrostatically applied and baked polyester urethane. Permator is an excellent coating for interior or exterior applications. Greenheck offers a wide variety of additional protective coatings. Consult factory for more information.

## Wheels

Greenheck’s double-width centrifugal fans have non-overloading backward-inclined blades. Both our backward-inclined (BI) and airfoil (AF) designs operate efficiently and quietly. All wheels are statically and dynamically balanced to grade G6.3 per ANSI S2.19.

	BIDW	AFDW
Wheel Type		
Application	Clean air	
Temperature	Up to 180°F (82°C)	
Construction	Steel <i>Consult factory for alternate materials</i>	

## Premium Bearings

Double-width centrifugal products are manufactured with “air handling quality” self-aligning ball or roller pillow block bearings. Our standard bearings use concentric lock collars (no set screws) which ensure smooth operation and provide superior grip force between the bearing collar and fan shaft. All bearings are selected for a basic rating fatigue life of L<sub>10</sub> in excess of 80,000 hours (L<sub>50</sub> at 400,000 hrs.) at the maximum RPM for the selected pressure class. For more critical applications, Greenheck offers bearings with a minimum L<sub>10</sub> life in excess of 200,000 hours (L<sub>50</sub> at 1,000,000 hrs.). Our bearings include zerk fittings for relubrication.

	L <sub>10</sub> Life	Equal to L <sub>50</sub> or Average Life
Industry Standard	40,000 hrs.	200,000 hrs.
<b>Greenheck Standard</b>	<b>80,000 hrs.</b>	<b>400,000 hrs.</b>
Greenheck Upgrade	200,000 hrs.	1,000,000 hrs.

L<sub>10</sub> life implies 90% reliability or 10% failure rate after the stated hours.  
 L<sub>50</sub> life implies 50% reliability or 50% failure rate after the stated hours.

## Vibration Analysis

All Greenheck double-width products endure a 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.

Model	Drive Type	Filter-In Vibration Limit (Rigidly Mounted)
BIDW, AFDW	Belt, Arrg. 3	0.15 in/sec-pk



## Sure-Aire™

The Sure-Aire™ airflow monitoring station measures fan airflow within an accuracy of 3%. Sure-Aire does not interfere with airflow and will not impact the fan's air or sound performance, unlike traditional flow probes mounted in the fan venturi that create a system effect. This option is available on all double-width centrifugal products and ships completely assembled from our factory. An electronics package with pressure transmitter and digital read out is available with the Sure-Aire system. The electronic kits are available for 50 or 60 Hz power supplies and provide a 4-20 mA output that can be tied into the building's automation system.



## Motor Starters

The fundamental function of a motor starter is to protect the motor from damage that can occur from overheating. With a Greenheck motor starter you will be provided with the best motor protection available.

Specific model components may include: physical interface, overload protection, disconnect, magnetic contactor, NEMA-1 or NEMA-3R steel enclosures and pre-engineered easy system integration. For complete information on specific Greenheck Motor Starter models refer to [greenheck.com](http://greenheck.com), Motor Starter web page.



## Volume Control

### VFD Rated Motors

Variable Frequency Drives (VFD's) 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.

### Volume Control Dampers

Control dampers are available in painted steel, aluminum or stainless steel. Actuator options include manual quadrants (manual operation), electric actuators, or pneumatic actuators.



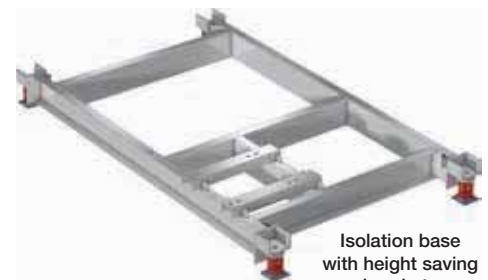
## Vibration Isolators and Isolation Bases

Greenheck offers a complete package of steel isolation bases, inertia bases and vibration isolators to simplify field assembly and reduce transmitted vibrations. Arrangement 3 isolation bases include a motor adjustment (vertical adjustment on X/Y) base for belt adjustments. Additionally, bases are available with height saving brackets to keep the base and fan center of gravity lower to the mounting surface.

Steel bases consist of laser formed steel members welded into a rigid one piece base. Bases are available without isolators or with rubber or spring mount isolators.

Inertia bases may be desirable when steel bases do not provide sufficient mass or where discharge velocities cause greater reaction forces. Concrete is provided by others.

For more information, refer to the Mounting Bases and Vibration Isolation catalog, found on the catalog tab of the Centrifugal Industrial Blowers page on [greenheck.com](http://greenheck.com).



Isolation base with height saving brackets



Inertia base



Neoprene



Free Standing



Restrained

## 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.

## 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.

## Access Doors

Bolted or hinged (quick-opening) access doors provide access for cleaning or inspection. Access doors are standard on downblast discharge fans. Raised bolted access doors are also available to allow up to 4 in. (102 mm) of field-applied insulation on the fan housing.

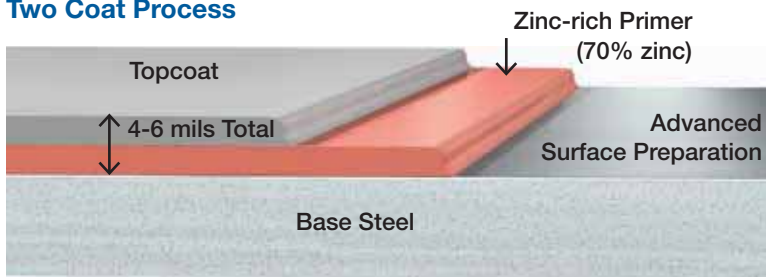
## Two Coat System

For corrosive environments (outdoor, coastal, laboratory), discover Greenheck's zinc-rich basecoat technology. Our advanced two-coat powder application includes a basecoat of zinc-rich epoxy powder and a topcoat of Greenheck's Permator™ or Hi-Pro Polyester.

The sacrificial protection offered by the zinc-rich basecoats in Perma-Z and Hi-Pro Z result in extraordinary corrosion resistance. Test data demonstrates our two-coat paint system offers three (Perma-Z) and four (Hi-Pro Z) times the corrosion resistance of other coatings commonly available within the fan industry.

For more information about the zinc advantage, see Greenheck's [Coatings for Extreme Applications](#) catalog, available online at [greenheck.com](http://greenheck.com).

### Two Coat Process



Salt Spray ASTM B117				
Hours	1000	2000	3000	4000
Permator™	██████████			
Hi-Pro Polyester	██████████			
Perma-Z	██████████	██████████		
Hi-Pro-Z	██████████	██████████	██████████	
Baked Phenolic	██████████			
Epoxy Phenolic	██████████			
Fluorocarbon	██████████			

Salt Spray ASTM B117 is a comparative test that indicates the corrosion resistance of powder paint coatings.

## 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 [greenheck.com](http://greenheck.com) and navigate to Library/Application Articles. Search for [Performance Coatings for Ventilation Products](#).



## Split Housings

Split housings can solve many space limitation problems in both retrofit and new construction situations. The standard split is horizontal, through the centerline of the fan shaft. Split housings are available on double-width fans sizes 33 and larger. Vertical splits are available upon request.



# Design and Selection Support

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- 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 has been **Green** for a long time! Our energy-saving products and ongoing corporate commitment to sustainability can help you qualify for LEED credits.
- Our **3D service** allows you to download at no charge, lightweight, easy-to-use AutoDesk® Revit® 3D drawings for many of our ventilation products.

Find out more about these special Greenheck services at [greenheck.com](http://greenheck.com)



## Building Value in Air

Greenheck delivers value to mechanical engineers by helping them solve virtually any air quality challenges their clients face with a comprehensive selection of

top quality, innovative air-related equipment. We offer extra value to contractors by providing easy-to-install, competitively priced, reliable products that arrive on time.

And building owners and occupants value the energy efficiency, low maintenance and quiet dependable operation they experience long after the construction project ends.

## Our Commitment

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

Specific Greenheck product warranties are located on [greenheck.com](http://greenheck.com) within the product area tabs and in the Library under Warranties.



Prepared to Support  
Green Building Efforts

