

# Backdraft & Pressure Relief Dampers

- Backdraft
- Barometric Relief
- Pressure Relief



BUILDING VALUE IN AIR.



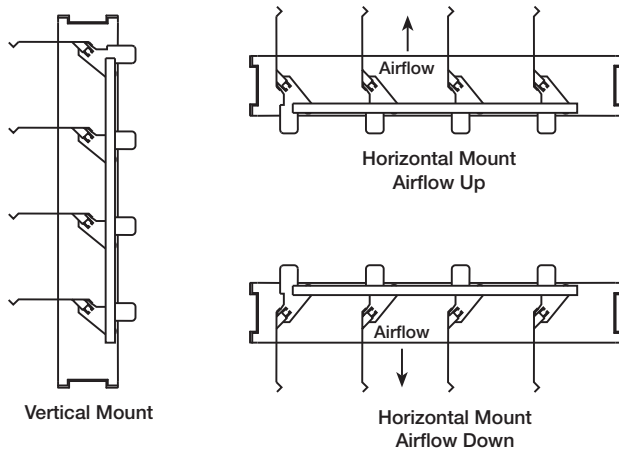
November  
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Backdraft dampers (also known as gravity dampers) are used in ventilation systems to allow airflow in one direction and prevent airflow in the opposite direction. A relief damper is developed with an elevated and adjustable start-open pressure while providing the backdraft function. When selecting the correct damper for your application, you need to know:

- System velocity and back pressure requirements
- Mounting orientation and airflow direction
- Mounting configuration (inserted into duct/opening or flange mounted)
- Damper operation (gravity or motorized)
- Start-open pressure

## Mounting Orientation

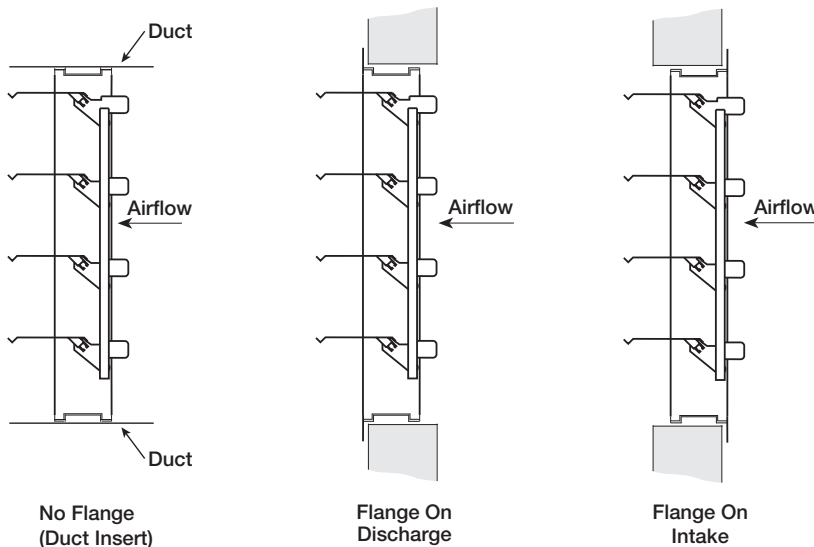
Backdraft dampers are available in vertical or horizontal mount.



## Frame Construction

Three types of frame construction are available on all commercial backdraft damper models:

- No flange
- Flange on discharge
- Flange on intake



A commercial backdraft damper is a gravity damper (when non-motorized) allowing airflow in one direction only. When placed on a propeller fan, for example, it will prevent the wind from causing the fan to run backwards when the power is off. When a backdraft damper is motorized, it functions like a control damper.

To assist with opening the damper blades, backdraft dampers may utilize springs, adjustable counterbalance weights, or a motorpack.

- **Spring assist** is a spring attached to the damper that helps in opening or closing the damper blades. The spring is adjustable by using a series of holes in the frame or blade assembly to increase or decrease the tension.
- **Adjustable counterbalance** weights are a more precise means of reducing the pressure that is required to open the damper.
- A **motorpack** is used when it is necessary that the damper opens and closes without having to rely on air velocity or pressure.

Backdraft damper selection begins by determining the damper construction required based on system velocity and static pressure. The BD damper series are used in applications up to 1500 ft/min (7 m/s) and 2 in. wg (0.5 kPa) of static pressure. The WD, ES, GM, and SSNM damper series are used in applications up to 2500 ft/min (12.7 m/s) and 2 in. wg (0.5 kPa) of static pressure. The EM damper series are used in applications up to 3500 ft/min (17.8 m/s) and 10 in. wg (2.5 kPa) of static pressure.

BD, EM, ES, GM, SSNM, and WD series dampers can be used in applications for:

- Exhaust
- Roof ventilation
- In-duct ventilation
- Air intake
- Sidewall ventilation

## BD Series

BD series have a galvanized steel frame with aluminum blades. The dampers are opened by air pressure differential and closed by gravity. They are rated for velocities up to 1500 fpm (7 m/s) and pressures up to 2 in. wg (0.5 kPa). These dampers have AMCA certified pressure drop and leakage performance that comply with ASHRAE 90.1 and IECC leakage requirements for non-motorized dampers.



BD-100



BD-300 Series

Model	Flange	Mounting Position	Airflow Direction	Spring Assisted	Maximum Velocity fpm (m/s)	Start Open Pressure* in. wg (kPa)	Maximum Back Pressure in. wg (kPa)	AMCA Air Leakage & Air Performance
BD-100	None	H	Vertical Up	Std	1500 (7)	0.01 (0.002)	2 (0.5)	Yes
BD-300	Intake	V	H	N/A	1500 (7)	0.009 (0.002)	2 (0.5)	Yes
BD-320	Discharge	V	H	N/A	1500 (7)	0.009 (0.002)	2 (0.5)	Yes
BD-330	None	V	H	N/A	1500 (7)	0.009 (0.002)	2 (0.5)	Yes

H = Horizontal    V = Vertical    N/A = Not Available    Std = Standard

\*Note that start-open is the pressure at which damper blades just begin to rotate, blades are not fully open at this point. Damper size and bearing selection may cause start-open pressure to vary from this value.

# Commercial Backdraft WD Series

The WD series are backdraft dampers constructed of a galvanized steel frame and aluminum blades with seals. The dampers are opened by air pressure differential (assisted by springs) and closed by gravity. When motorized, the damper functions like a control damper. WD series dampers are rated for velocities up to 2500 ft/min (12.7 m/s) and pressures up to 2 in. wg (0.5 kPa).

## WD-100 Series

WD-100 series dampers are horizontally mounted to allow vertical airflow. The primary application is with roof mounted exhaust fans. Optional motorpack is available.



WD-100 Series

## WD-200 Series

WD-200 series dampers are electric motorized backdraft dampers that open when energized and spring return close when de-energized. These dampers can be used for horizontal or vertical mount applications. The primary application is to prevent undesirable reverse airflow when installed with roof or sidewall supply (intake) fans.



WD-200 Series

## WD-300 Series

WD-300 series dampers are vertical mount for horizontal exhaust applications. These dampers are designed to open easily under low velocity conditions. Optional motorpack is available.

## WD-400 Series

WD-400 series dampers are non-motorized and can be mounted vertically (for horizontal intake airflow) or horizontally (for vertical airflow down).

## WDR-53/SSWDR-53

WDR-53 and SSWDR-53 are round backdraft dampers. These models can be mounted horizontally for vertical airflow down or up, or mounted vertically for horizontal airflow. The WDR-53 and SSWDR-53 are rated for velocities up to 2000 ft/min (10.2 m/s) and pressure up to 3 in. wg (0.75 kPa).



WDR-53/SSWDR-53

## End Switch Kits

An end switch kit can be used in conjunction with a motorpack. The end switch is wired to a fan and/or to a light serving as an open/closed indicator. When wired to a fan, this will ensure the damper is fully open before the fan starts.



End Switch Kit

# Commercial Backdraft WD Series

Model	Flange	Mounting Position	Airflow Direction	Spring Assisted	Motorized	Maximum Velocity fpm (m/s)	Start Open Pressure* in. wg (kPa)	Maximum Back Pressure in. wg (kPa)
WD-100	None	H	Vertical Up	Std	Opt	2500 (12.7)	0.01 (0.002)	1 (0.25)
WD-110	Discharge	H	Vertical Up	Std	Opt	2500 (12.7)	0.01 (0.002)	1 (0.25)
WD-120	Intake	H	Vertical Up	Std	Opt	2500 (12.7)	0.01 (0.002)	1 (0.25)
WD-200	None	H or V	H or V	N/A	Std	2500 (12.7)	0.017 (0.004)	1 (0.25)
WD-210	Motor Side	H or V	H or V	N/A	Std	2500 (12.7)	0.017 (0.004)	1 (0.25)
WD-220	Opposite Motor Side	H or V	H or V	N/A	Std	2500 (12.7)	0.017 (0.004)	1 (0.25)
WD-300	Intake	V	H	Std	Opt	2500 (12.7)	0.05 (0.012)	2 (0.5)
WD-320	Discharge	V	H	Std	Opt	2500 (12.7)	0.05 (0.012)	2 (0.5)
WD-330	None	V	H	Std	Opt	2500 (12.7)	0.05 (0.012)	2 (0.5)
WD-400	None	V	H	N/A	N/A	2500 (12.7)	0.026 (0.006)	2 (0.5)
WD-410	None	H	Vertical Down	N/A	N/A	2500 (12.7)	0.014 (0.003)	2 (0.5)
WD-420	Discharge	V	H	N/A	N/A	2500 (12.7)	0.026 (0.006)	2 (0.5)
WD-430	Intake	V	H	N/A	N/A	2500 (12.7)	0.026 (0.006)	2 (0.5)
WDR-53	None	H or V	H or V	Std	N/A	2000 (10.2)	0.08 (0.020)	3 (0.75)
SSWDR-53	None	H or V	H or V	Std	N/A	2000 (10.2)	0.08 (0.020)	3 (0.75)

H = Horizontal    V = Vertical    N/A = Not Available    Opt = Optional    Std = Standard

\*Note that start-open is the pressure at which damper blades just begin to rotate, blades are not fully open at this point. Damper size and bearing selection may cause start-open pressure to vary from this value.

# Commercial Backdraft EM, ES, GM & SSNM Series

## EM Series

EM series damper have 0.070 inch (1.8mm) thick blades and a 0.125 inch (3.2mm) thick frame made of extruded aluminum. These dampers are rated for velocities up to 3500 fpm (17.8 m/s) and pressure up to 10 in. wg (2.5 kPa). EM-30 series comply with ASHRAE 90.1 and IECC leakage requirements for non-motorized dampers.

Adjustable pressure controller is available for field setting of relief pressure. Paint is available on these models.

## ES Series

ES series damper have 0.050 inch (1.3mm) thick blades and 0.063 inch (1.6mm) thick frame made of extruded aluminum. They are rated for velocities up to 2000 fpm (10.2 m/s) and pressure up to 6 in. wg (1.5 kPa). ES-10 and ES-30 series comply with ASHRAE 90.1 and IECC leakage requirements for non-motorized dampers.

Birdscreen or insect screen is available.

## GM Series

GM series damper have a galvanized steel frame with extruded aluminum blades. This series is rated for velocities up to 2500 fpm (13 m/s) and pressure up to 4 in. wg (1 kPa).

## SSNM Series

SSNM series damper have 304SS blades and frame. These dampers are rated for velocities up to 2500 fpm (13 m/s) and pressure up to 2 in. wg (.5 kPa).



EM-30 Series



ES-10 Series



ES-40 Series



EM-30 with adjustable pressure controller



SSNM-30 Series

# Commercial Backdraft EM, ES, GM & SSNM Series

Model	Flange	Frame Material	Blade Material	Counter-balance Weights	Mounting Position	Airflow Direction	Maximum Velocity ft/min. (m/s)	Maximum Back Pressure in. wg (kPa)	Start-Open Pressure* in. wg (kPa)	AMCA Air Leakage & Air Performance
EM-10	None	Extruded Aluminum		Std	H	Vertical Up	3500 (17.8)	10 (2.5)	0.05 (0.01)	N/A
EM-11	Discharge									
EM-12	Intake									
EM-30	None	Extruded Aluminum		Opt	V	Horizontal	3500 (17.8)	10 (2.5)	0.03 (0.007) <sup>1</sup> 0.01 (0.002) <sup>2</sup>	Yes
EM-31	Discharge									
EM-32	Intake									
EM-40	None	Extruded Aluminum		Std	H	Vertical Down	3500 (17.8)	10 (2.5)	0.07 (0.017)	N/A
EM-41	Discharge									
EM-42	Intake									
ES-10	None	Extruded Aluminum		Std	H	Vertical Up	2000 (10.2)	2.5* (0.6)	0.035* (0.008)	Yes
ES-11	Discharge									
ES-12	Intake									
ES-30	None	Extruded Aluminum		Opt	V	Horizontal	2000 (10.2)	2.5* (0.6)	0.05 (0.012) <sup>*1</sup> 0.015 (0.004) <sup>*2</sup>	Yes
ES-31	Discharge									
ES-32	Intake									
ES-40	None	Extruded Aluminum		Std	H	Vertical Down	2000 (10.2)	2.5 (0.6)	0.075 (0.019)	N/A
ES-41	Discharge									
ES-42	Intake									
GM-30	None	Galvanized Steel	Extruded Aluminum	Std	V	Horizontal	2500 (13m/s)	4 (1)	0.03 (0.007) <sup>1</sup> 0.01 (0.002) <sup>2</sup>	N/A
GM-31	Discharge									
GM-32	Intake									
SSNM-10	None	304SS		N/A	H	Vertical Up	2500 (13 m/s)	2 (0.5)	CF	N/A
SSNM-11	Discharge									
SSNM-12	Intake									
SSNM-30	None	304SS		N/A	V	Horizontal	2500 (13 m/s)	2 (0.5)	CF	N/A
SSNM-31	Discharge									
SSNM-32	Intake									

H = Horizontal    V = Vertical    N/A = Not Available    CF = Consult Factory    Opt = Optional    Std = Standard

<sup>1</sup> = without weights

<sup>2</sup> = with weights

\*Note that start-open is the pressure at which damper blades just begin to rotate, blades are not fully open at this point. Damper size and bearing selection may cause start-open pressure to vary from this value.

# Heavy Duty/Industrial Backdraft - HB & HBR Series

Heavy duty/Industrial backdraft dampers are designed to prevent backflow at static pressures up to 20 in. wg (5 kPa) and velocities up to 6400 ft/min (32.5 m/s). Counterbalance weights are mounted externally for easy adjustment and balancing in the field.

The HB series dampers are flange frame mounted. Width and height dimensions are to the inside of the frame.

HB and HBR series dampers can be used in applications for:

- Blower outlets
- Branch duct isolation
- Industrial process isolation
- Emergency generator radiator outlets

## HBR-050 & HBR-150

- Round frame and blade
- Corrosion resistant
- Optional 304 or 316 stainless steel construction

## HB-110

- Corrosion resistant
- Spark B and C resistant
- Optional 304 or 316 stainless steel construction

## HB-120

- Optional 304 or 316 stainless steel construction

## HB-230

- Optional 304 or 316 stainless steel construction

## HB-240

- Spark B and C resistant
- Optional Spark A resistant
- Optional 304 or 316 stainless steel construction (except blades)

## HB-330

- Fan Class III
- Optional 304 or 316 stainless steel construction



HBR-050



HB-110



HB-120



HB-330

Note: HB series dampers are flange frame mounted. Width and height dimensions are to the inside of the frame.



# Heavy Duty/Industrial Backdraft - HB & HBR Series

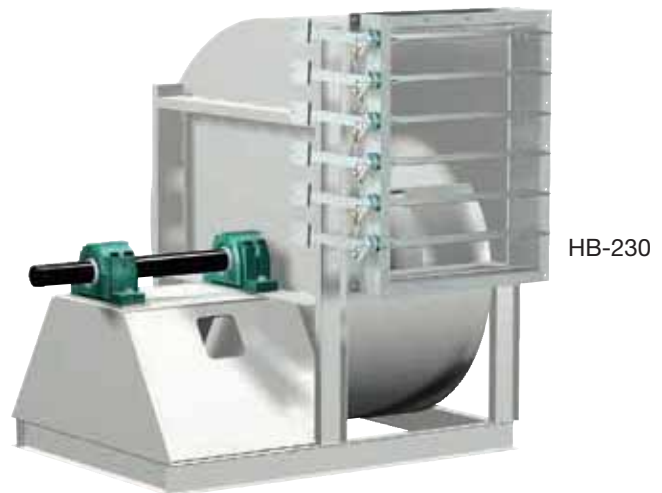
Model	Material		Counterbalance Weights	Maximum Velocity ft/min. (m/s)	Maximum Back Pressure in. wg (kPa)	Start-Open Pressure* in. wg (kPa)
	Frame	Blade				
HBR-050	Galvanized Steel	Galvanized Steel	Std	3000 (15.2)	6 (1.5)	0.12 (0.03)
HBR-150	Painted Steel	Painted Steel	Std	4000 (20.3)	6 (1.5)	N/A
HB-110	Galvanized Steel	Aluminum Single	Std	3900 (20)	5 (1.2)	0.02 (0.005)
HB-120	Galvanized Steel	Galvanized Steel 2V	Std	5150 (26)	8.5 (2.1)	0.045 (0.11)
HB-230	Galvanized Steel	Galvanized Steel Airfoil	Std	5150 (26)	13.5 (3.4)	0.04 (0.010)
HB-240	Galvanized Steel	Extruded Aluminum Airfoil	Std	5150 (26)	13.5 (3.4)	0.04 (0.010)
HB-330	Galvanized Steel	Galvanized Steel Airfoil	Std	6400 (33)	20 (5)	0.25 (0.06)

N/A = Not Applicable    Std = Standard

\*Note that start-open is the pressure at which damper blades just begin to rotate, blades are not fully open at this point. Damper size and bearing selection may cause start-open pressure to vary from this value.

## Fan Accessory Industrial Backdraft Dampers

Industrial backdraft dampers are used on blower outlets for automatic isolation which allows air to pass in one direction and restrict flow in the opposite direction. Each damper is factory-adjusted for its intended flow direction. Multiple nested counterbalance arms and weights are positioned to reduce load on bearings and linkage. Industrial backdraft dampers are recommended for low temperatures and clean air applications.



HB-230

## Relief Dampers

Relief dampers are backdraft dampers with an adjustable start-open pressure capable of maintaining a relatively constant pressure at various airflows and which closes upon a decrease in differential pressure. Suitable to relieve built up pressure in zoned duct system that could potentially cause damage to HVAC equipment.



BR-40 Series



HPR-120

# Barometric Relief BR and SEBR Series

A barometric relief damper is a backdraft damper with an adjustable start-open pressure. It is used for gravity ventilation and low velocity systems. Counterbalance weights provide the ability to fine tune start-to-open and full-open operation.

BR series dampers are constructed with a galvanized steel frame and aluminum blades. The SEBR series is constructed of 316 stainless steel for severe or corrosive environments. Vinyl blade seals are used on both series of dampers. This damper series is rated for velocities up to 2000 ft/min (10.2 m/s) and back pressure up to 2 in. wg (0.5 kPa). The start-open pressure is selectable from .05 to .13 in. wg (0.01 kPa to .03 kPa).

BR and SEBR series dampers can be used in applications for:

- Gravity hood intake and exhaust
- Stairwell pressurization
- Room pressurization
- Ductwork outlets



BR-30 Series



BR-10 Series

Model	Flange	Material		Mounting Position	Airflow Direction	Maximum Velocity ft/min. (m/s)	Maximum Back Pressure in. wg (kPa)	Start-Open Pressure* in. wg (kPa)		
		Frame	Blade							
BR-10	None	Galvanized Steel	Aluminum	H	Vertical Up	2000 (10.2)	2 (0.5)	0.05 - 0.30 (0.012-0.075)		
BR-11	Discharge			H	Vertical Up					
BR-12	Intake			H	Vertical Up					
BR-30	None			Galvanized Steel	Aluminum	V	H	2000 (10.2)	2 (0.5)	0.05 - 0.30 (0.012-0.075)
BR-31	Discharge					V	H			
BR-32	Intake					V	H			
BR-40	None			Galvanized Steel	Aluminum	H	Vertical Down	2000 (10.2)	2 (0.5)	0.05 - 0.30 (0.012-0.075)
BR-41	Discharge					H	Vertical Down			
BR-42	Intake					H	Vertical Down			
SEBR-10	None	316 Stainless Steel	316 Stainless Steel	H	Vertical Up	2000 (10.2)	2 (0.5)	0.05 - 0.30 (0.012-0.075)		
SEBR-11	Discharge			H	Vertical Up					
SEBR-12	Intake			H	Vertical Up					
SEBR-30	None			316 Stainless Steel	316 Stainless Steel	V	H	2000 (10.2)	2 (0.5)	0.05 - 0.30 (0.012-0.075)
SEBR-31	Discharge					V	H			
SEBR-32	Intake					V	H			
SEBR-40	None			316 Stainless Steel	316 Stainless Steel	H	Vertical Down	2000 (10.2)	2 (0.5)	0.05 - 0.30 (0.012-0.075)
SEBR-41	Discharge					H	Vertical Down			
SEBR-42	Intake					H	Vertical Down			

H = Horizontal    V = Vertical

\*Note that start-open is the pressure at which damper blades just begin to open. The blades are not fully open at this point. Damper size and bearing selection may cause start-open pressure to vary from this value.

# Heavy Duty/Industrial Pressure Relief - HPR Series

A pressure relief damper is a backdraft damper having an adjustable start-open pressure that is capable of maintaining a relatively constant pressure at various airflows and which closes upon a decrease in differential pressure. Pressure relief dampers do not immediately open fully upon reaching their start-open pressure. HPR series dampers maintain tight leakage to approximately 60% of the start-open pressure and have a relatively flat flow control, somewhat above the start-open pressure. Counterbalance weights are mounted externally for easy adjustment and balancing in the field. This damper series is designed to handle velocities up to 6400 ft/min. (32.5 m/s).

HPR series dampers can be used in applications for:

- Fume exhaust
- Duct/plenum protection

Additional material and coating selections are available in aluminum and stainless steel for corrosive or clean room applications.



HPR-120



HPR-230



HPR-330

Note: HPR series dampers are flange frame mounted. Width and height dimensions are to the inside of the frame.

Model	Material		Counterbalance Weights	Maximum Velocity ft/min. (m/s)	Maximum Back Pressure in. wg (kPa)	Start-Open Pressure* in. wg (kPa)	Pressure Relief in. wg (kPa)
	Frame	Blade					
HPR-120	Galvanized Steel	Galvanized Steel 2V	Std	5150 (26)	5-8.5 (1.2-2)	N/A	0.10-2 (0.02-0.5)
HPR-230	Galvanized Steel	Galvanized Steel Airfoil	Std	5150 (26)	6-13.5 (1.5-3)	N/A	0.25-4 (0.06-1)
HPR-330	Galvanized Steel	Galvanized Steel Airfoil	Std	6400 (33)	13.5-20 (3.4-5)	N/A	0.50-6 (0.12-1.5)

N/A = Not Applicable    Std = Standard\*

\*Note that start-open is the pressure at which damper blades just begin to rotate, blades are not fully open at this point. Damper size and bearing selection may cause start-open pressure to vary from this value.

Two common energy code standards that pertain to backdraft dampers are:

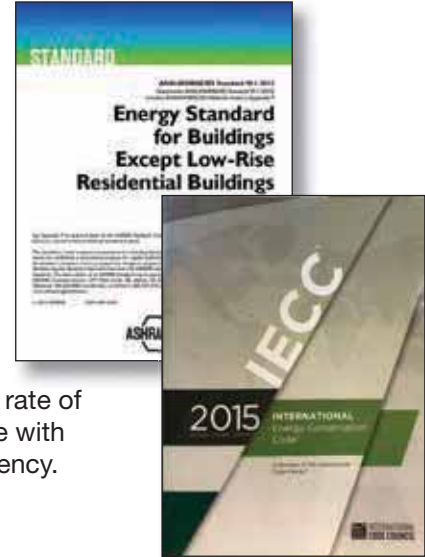
- ASHRAE Standard 90.1 - Energy Standard for Building except Low-Rise Residential Building
- IECC - International Energy Conservation Code

Here's the list of primary requirements for damper based on each standard:

**ASHRAE Standard 90.1 (2013 edition)** states that maximum damper leakage at 1 in. wg for a non-motorized damper is 20 cfm/ft<sup>2</sup>. Dampers smaller than 24 inches in either dimension may have leakage of 40 cfm/ft<sup>2</sup>.

**IECC (2015 edition)** states that gravity (non-motorized) dampers shall have an air leakage rating not greater than 20 cfm/ft<sup>2</sup> where not less than 24 inches in either dimension and 40 cfm/ft<sup>2</sup> where less than 24 inches in either direction. The rate of air leakage shall be determined at 1 inch water gauge when tested in accordance with AMCA 500D for such purpose. The dampers shall be labeled by an approved agency.

Greenheck's BD, EM-30, ES-10, and ES-30 series backdraft dampers meet the requirements of ASHRAE and IECC.



Air leakage is based on operation between 32°F and 120°F (0°C and 48°C).

Tests for air leakage were conducted in accordance with ANSI/AMCA Standard 500-D Figure 5.7B in the intake direction. Air performance testing conducted in accordance with ANSI/AMCA Standard 500-D, Figure 5.7B

Model	Maximum Leakage cfm/sq. ft	Pressure in. wg
BD-100	39	1

Air leakage is based on operation between 32°F and 120°F (0°C and 48°C).

Tests for air leakage were conducted in accordance with ANSI/AMCA Standard 500-D Figure 5.5 in the intake direction. Air performance testing conducted in accordance with ANSI/AMCA Standard 500-D, Figure 5.5

Model	Maximum Leakage cfm/sq. ft		Pressure in. wg
	Width and Height 24 in. or greater	Width or height less than 24 in.	
BD-300, 320, 330	N/A	39	1
ES-30, 31, 32	7.6	37	1
EM-30, 31, 32	8.9	35	1

Air leakage is based on operation between 32°F and 120°F (0°C and 48°C).

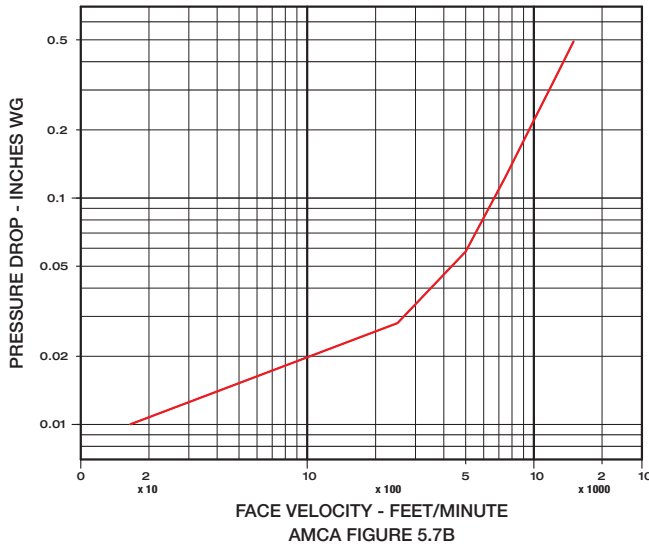
Tests for air leakage were conducted in accordance with ANSI/AMCA Standard 500-D Figure 5.5 in the backdraft direction. Air performance testing conducted in accordance with ANSI/AMCA Standard 500-D, Figure 5.7B

Model	Maximum Leakage cfm/sq. ft		Pressure in. wg
	Width and Height 24 in. or greater	Width or height less than 24 in.	
ES-10, 11, 12	7.6	28.9	1

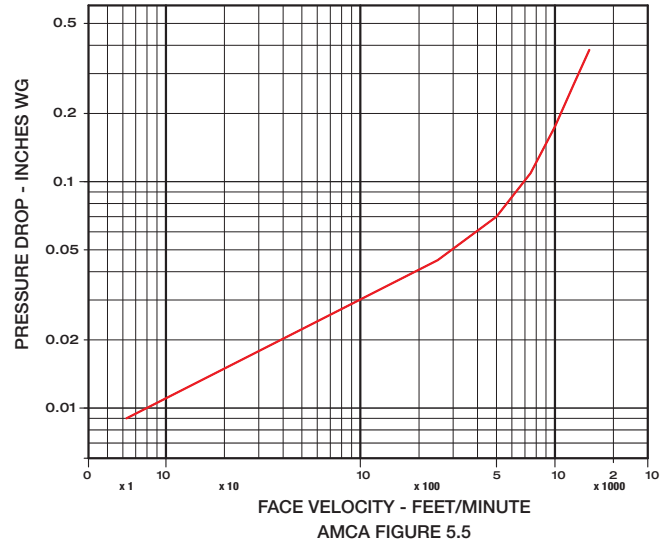


Greenheck Fan Corporation certifies that the models BD-100, BD-300, BD-320, BD-330, ES-10, ES-11, ES-12, ES-30, ES-31, ES-32, EM-30, EM-31, and EM-32 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to Air Leakage and Air Performance Ratings.

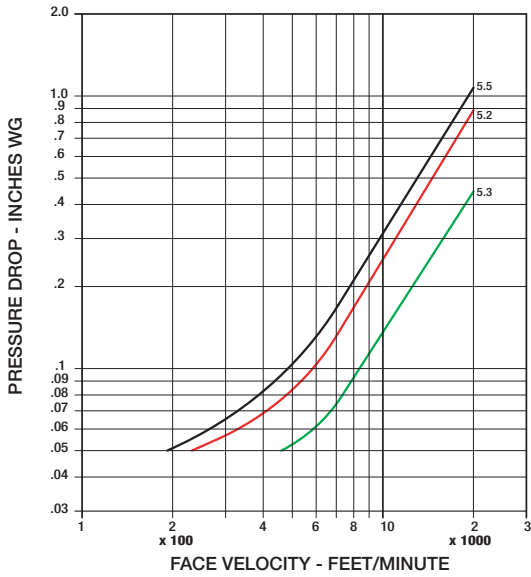
## BD-100 18 in. x 18 in.



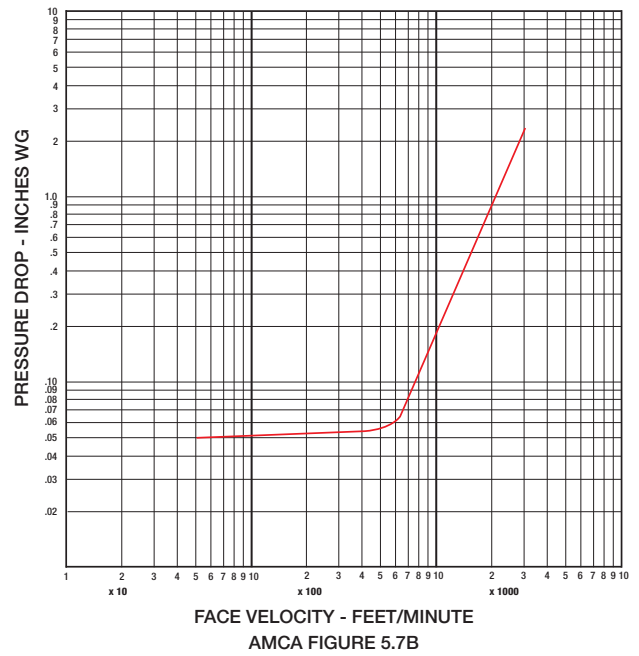
## BD-300 Series 18 in. x 18 in.



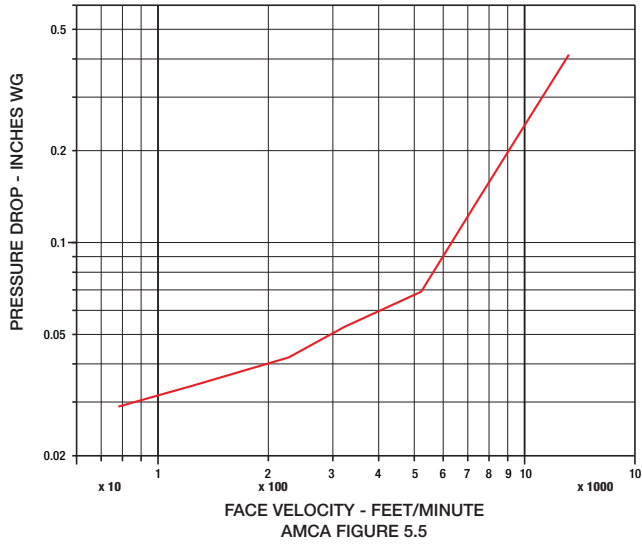
## BR and SEBR Series 36 in. x 36 in.



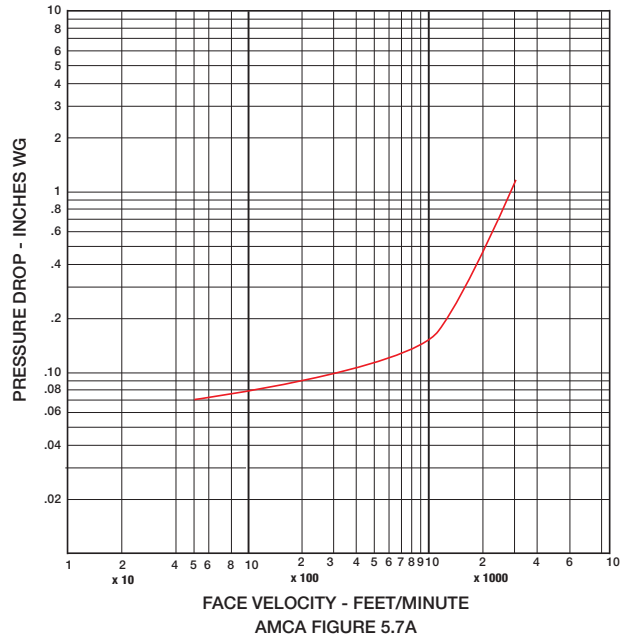
## EM-10 Series 36 in. x 36 in.



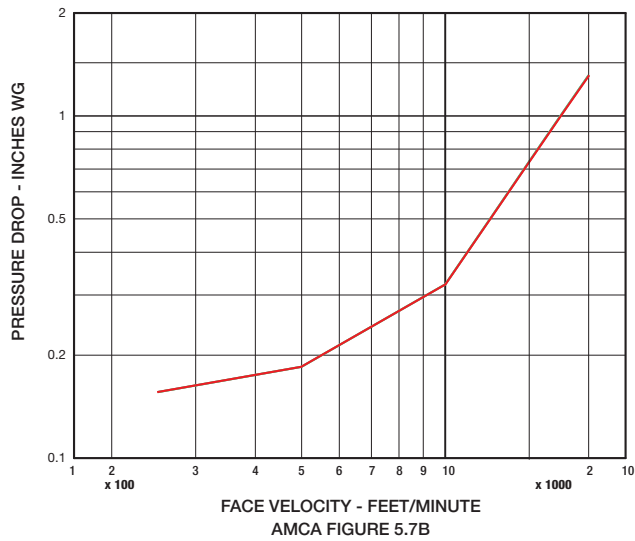
## EM-30 Series 24 in. x 24 in.



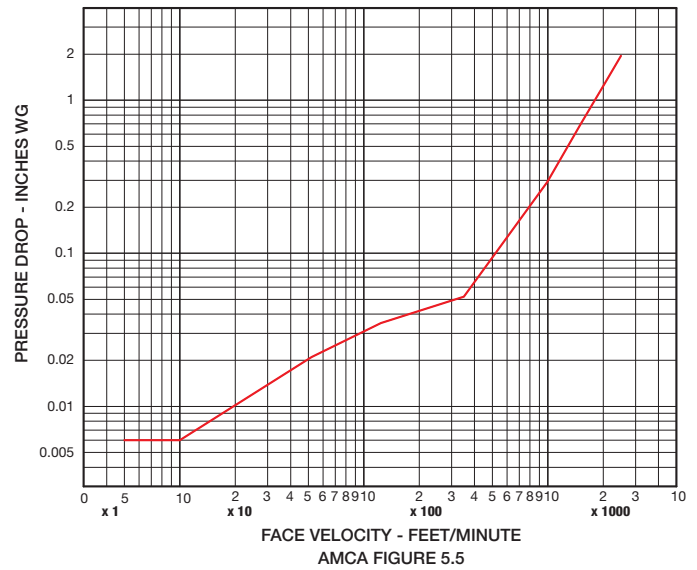
## EM-40 Series 36 in. x 36 in.



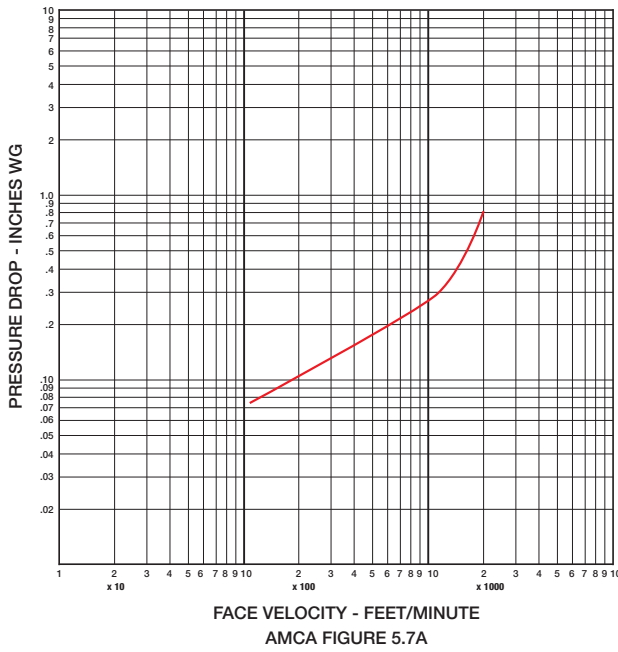
## ES-10 Series 24 in. x 24 in.



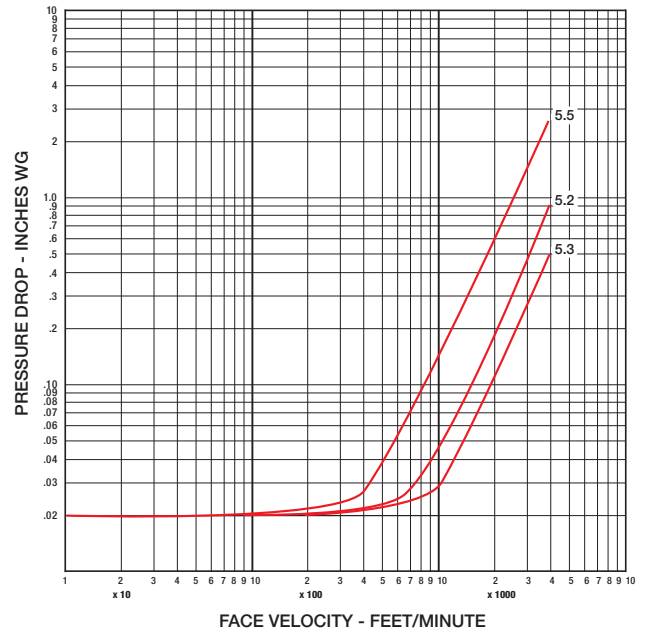
## ES-30 Series 24 in. x 24 in.



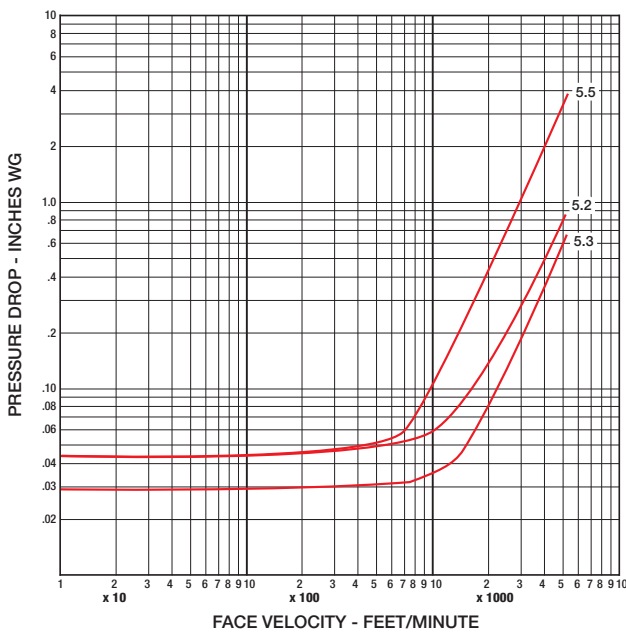
## ES-40 Series 36 in. x 36 in.



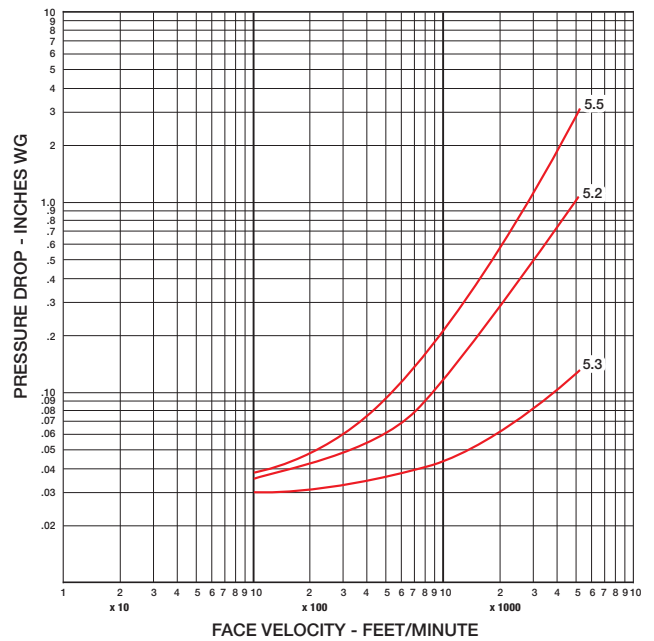
## HB-110 36 in. x 36 in.



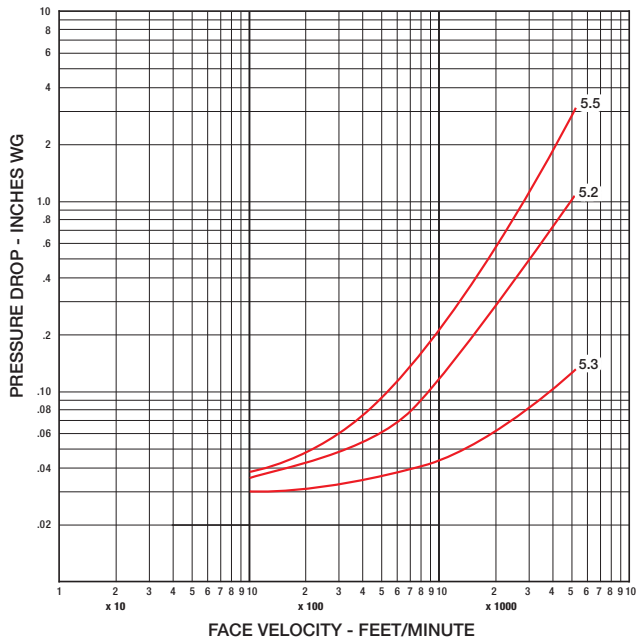
## HB-120 36 in. x 36 in.



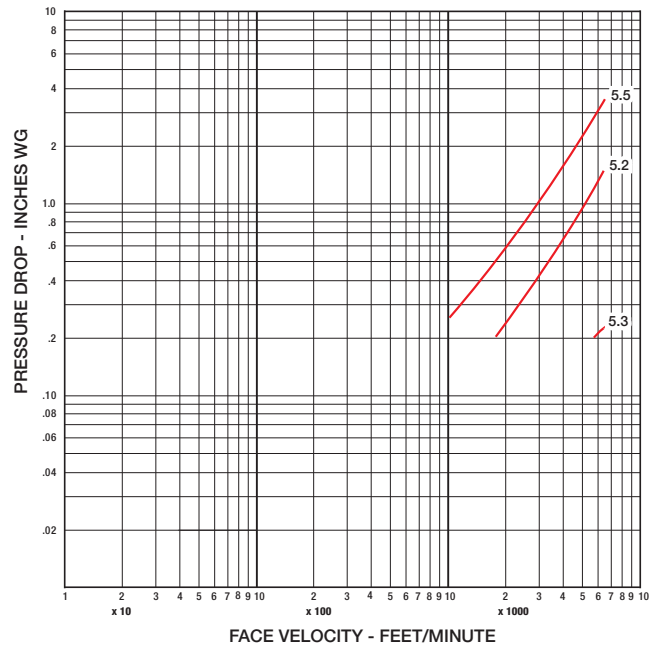
## HB-230 36 in. x 36 in.



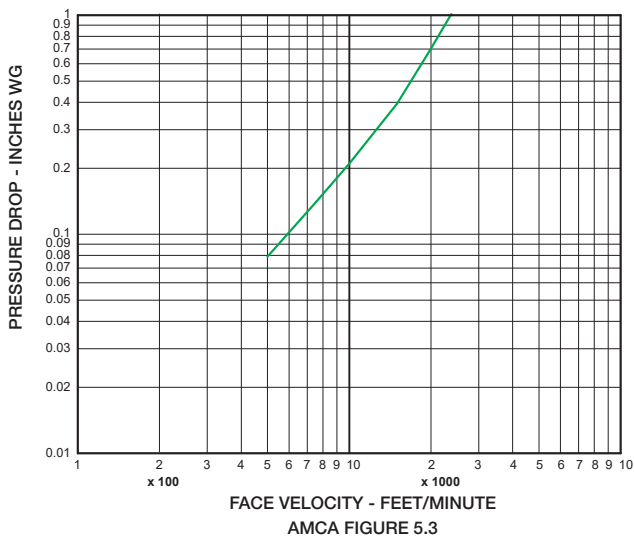
**HB-240**  
36 in. x 36 in.



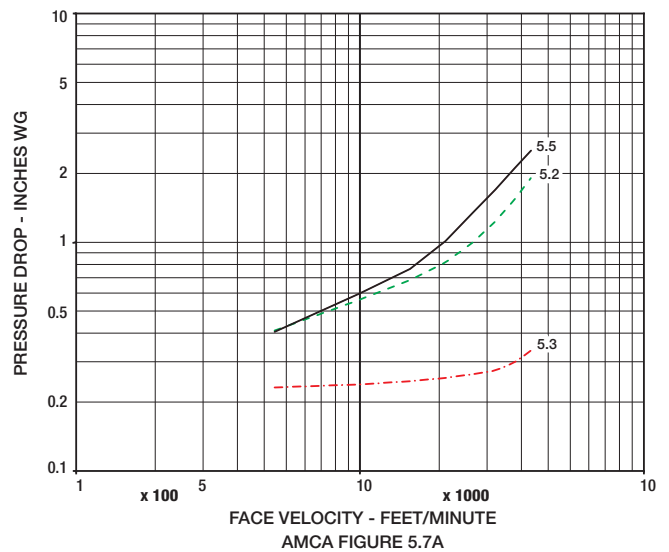
**HB-330**  
36 in. x 36 in.



**HBR-050**  
24 in.

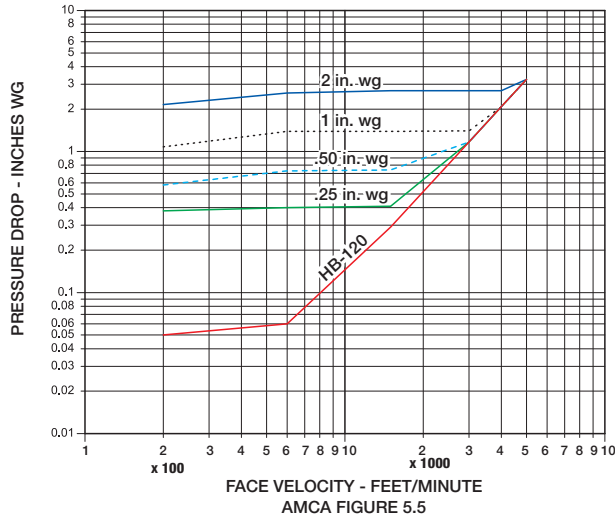


**HBR-150**  
24 in.

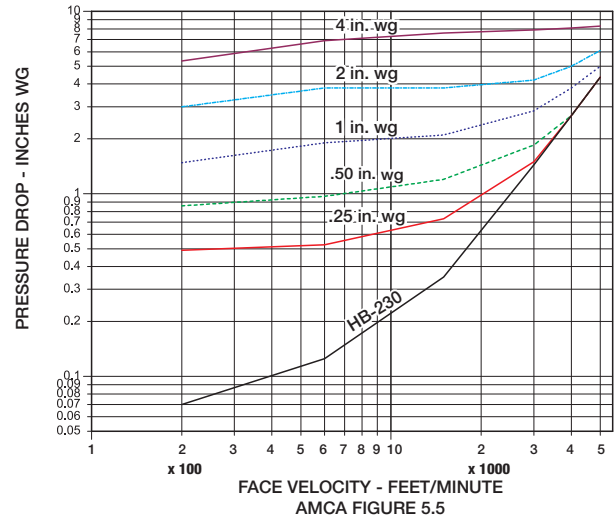




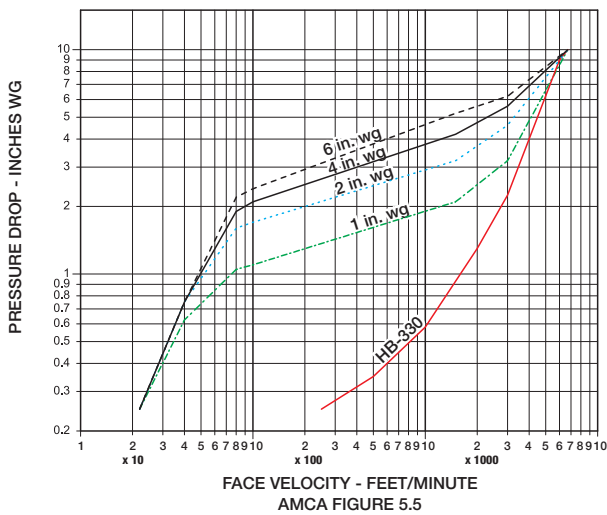
## HPR-120 24 in. x 24 in.



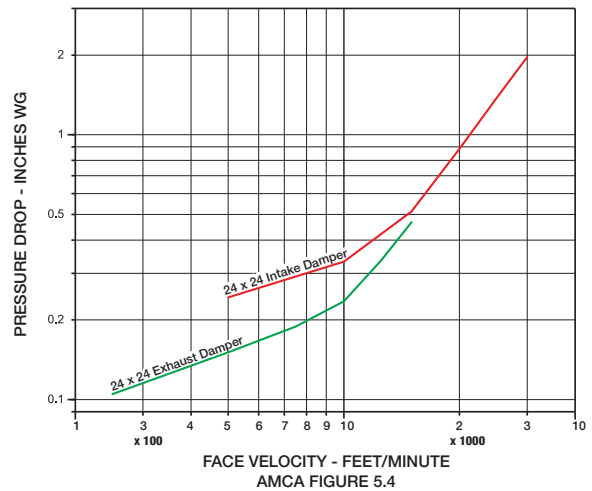
## HPR-230 24 in. x 24 in.



## HPR-330 24 in. x 24 in.



## SSNM-30 Series 24 in. x 24 in.



## WDR-53/SSWDR-53

Ducted Inlet/Ducted Outlet			
Velocity (fpm)	6 in.	12 in.	24 in.
	Pressure (in. wg)		
500	0.233	0.070	0.045
1000	0.321	0.135	0.132
1500	0.444	0.228	0.252
2000	0.601	0.392	0.448

Free Inlet/Ducted Outlet			
Velocity (fpm)	6 in.	12 in.	24 in.
	Pressure (in. wg)		
500	0.236	0.072	0.049
1000	0.317	0.105	0.136
1500	0.414	0.205	0.274
2000	0.549	0.350	0.484

## Blast Dampers - HBS Series

Blast dampers are designed to protect against blasts and instantaneous pressure changes. External clevis type linkage and external mount relubricable ball bearings are standard. Model HBS-330 will close in the same direction as normal flow and HBS-331 will close in the opposite direction as normal flow.



## Tornado Dampers - HTOD Series

Tornado dampers are designed to protect against tornadoes and instantaneous pressure changes. External clevis type linkage and external mount relubricable ball bearings are standard. Model HTOD-330 will close in the same direction as normal flow and HTOD-331 will close in the opposite direction as normal flow.



	HBS-330	HBS-331	HBS-430	HBS-431	HTOD-330	HTOD-331
Maximum Pressure	160 in. wg (5.77 psi)	160 in. wg (5.77 psi)	415 in. wg (15 psi)	415 in. wg (15 psi)	83 in. wg (20.7 kPa)	83 in. wg (20.7 kPa)
Maximum Velocity fpm (m/s)	4000 (20.3)	4000 (20.3)	4000 (20.3)	4000 (20.3)	6400 (32.5)	6400 (32.5)
Minimum Temperature °F (°C)	-40° (-40°)	-40° (-40°)	-40° (-40°)	-40° (-40°)	-40° (-40°)	40° (-40°)
Maximum Temperature °F (°C)	250° (121°)	250° (121°)	250° (121°)	250° (121°)	250° (121°)	250° (121°)
Pressure Rise or Decrease	—	—	—	—	3 psi/seconds	3 psi/seconds

Greenheck's experienced staff will work with you to develop custom products to meet your needs.

This HPR-330 was specifically designed for a tunnel sewage system in Singapore. The customer required a large pressure relief damper to vent-off excessive gasses upward due to rapid storm water influx. The design used blade weights to provide the initial 2 in. wg (0.5 kPa) relief pressure and movable weights to extend start-open pressure to 6.3 in. wg (1.6 kPa). The HPR-330 was constructed of 316 stainless steel.



This backdraft damper was designed to prevent backflow to the customer's 48 in. diameter axial fan. To meet the customer's needs, we designed a special 2-bladed vertical blade unit that can withstand 10 in. wg (2.5 kPa) of pressure and velocity over 5900 ft/min (30 m/s). The damper was constructed of carbon steel with a highly protective paint finish.



Backdraft dampers are used on sidewall propeller fans, sidewall exhaust fans, and centrifugal utility fans for exhaust or supply applications. Can be used alone or in conjunction with a wall housing or wall collar.

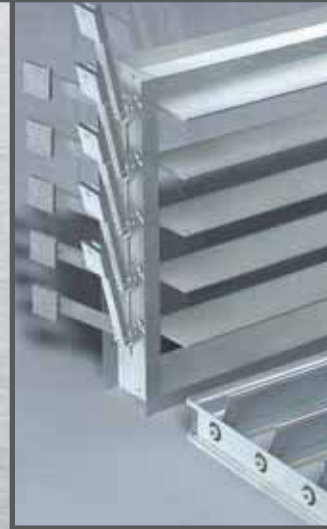


WD series installed on sidewall propeller fan with a filtered supply wall housing.

# Greenheck In-House Testing

## In-House Testing

State-of-the-art laboratory and testing facilities have always been important to Greenheck's ongoing business success. Greenheck has a laboratory facility devoted exclusively to development of damper and louver related products as well as testing to the latest version of AMCA, ANSI, ASHRAE, UL, Miami-Dade County, and other industry standards of performance.



## Damper Products

Greenheck has a complete line of damper products which includes:

- Doors: Access & Pressure Relief
- Backdraft Dampers
- Barometric Relief Dampers
- Blast Dampers
- Combination Fire Smoke Dampers
- Fire Dampers
- Industrial Control Dampers
- Pressure Relief Dampers
- Tornado Dampers
- Air Measuring Products
- Balancing Dampers
- Bubble Tight Dampers
- Ceiling Radiation Dampers
- Commercial Control Dampers
- Industrial Backdraft Dampers
- Marine Products
- Smoke Dampers
- Tunnel Transit Dampers



**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, 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)

## 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](http://Greenheck.com), either on the specific product page or in the literature section of the website at [Greenheck.com/Resources/Library/Literature](http://Greenheck.com/Resources/Library/Literature).



*Prepared to Support  
Green Building Efforts*

