

Donaldson®  
Torit®

## DOWNFLO® EVOLUTION DUST COLLECTORS

UP TO **40%**  
FEWER FILTERS  
& SMALLER FOOTPRINT



# EVOLUTIONARY DESIGN

## THE ORIGINATORS OF THE CARTRIDGE COLLECTOR

The breakthrough performance of the Downflo® Evolution (DFE) family of cartridge dust collectors is the result of Donaldson Torit's relentless drive to improve its products and exceed customer expectations. Donaldson Torit put decades of industry experience to work to produce a new, best-in-class dust collector capable of reducing equipment size and number of required filters by up to 40% compared to a typical cartridge collector. A smaller collector helps lower the initial purchase price, reduces filter replacement costs, and opens up valuable manufacturing floor space.

This state of the art collector, coupled with Donaldson's industry-leading Ultra-Web® nanofiber filtration technology, is truly an intelligent design.

### Revolutionary Airflow Management

Directs incoming air to an intelligent dropout zone for reduced filter loading

### Breakthrough Filter Cleaning

MaxPulse™ Cleaning System delivers 27% more cleaning energy to filtration media

### Industry-Leading Filtration Design

Positions more filtration media in beneficial locations and ensures easy, leak-free installation with Ultra-Web MERV15 media as standard

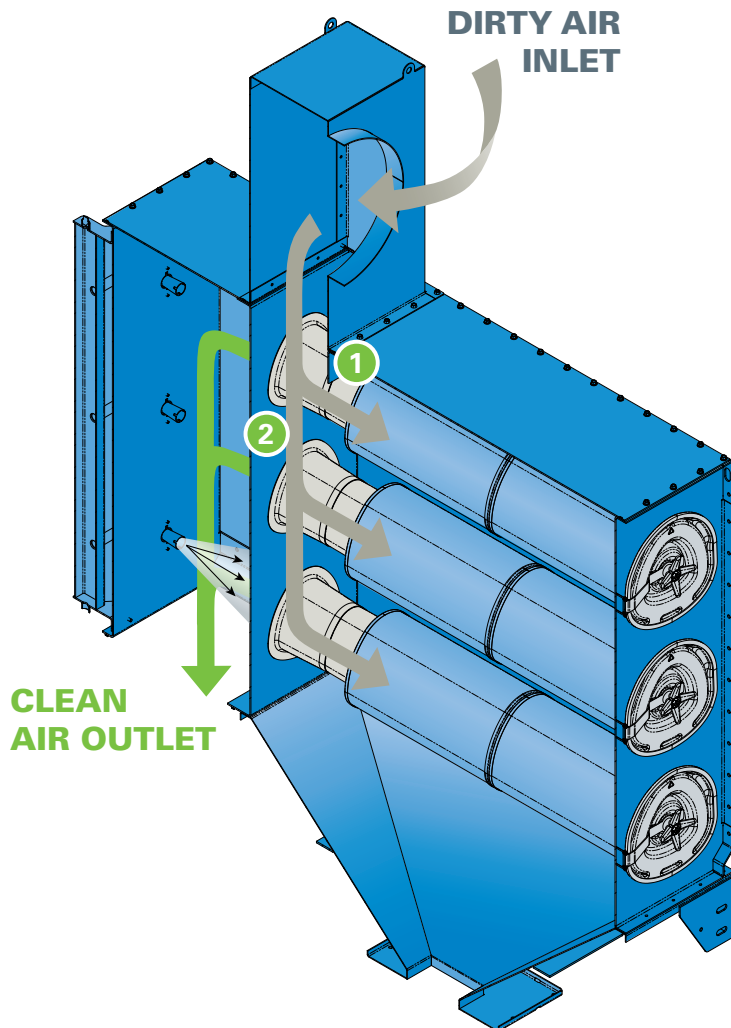
## RESULTS

A smaller cartridge collector with fewer filters and the lowest cost of ownership



# ENGINEERED AIRFLOW MANAGEMENT

The DFE's game-changing dust collection performance is achieved through a combination of design features that result in significant customer benefits.



## INTELLIGENT DROPOUT ZONE

- 1 Metal venturis
- 2 Dropout zone ensures
  - Pre-separation of heavy dust particles
  - Lower pressure loss than baffle design used by competitors
  - Minimal filter element abrasion

## DOWNFLO EVOLUTION INTELLIGENT DESIGN

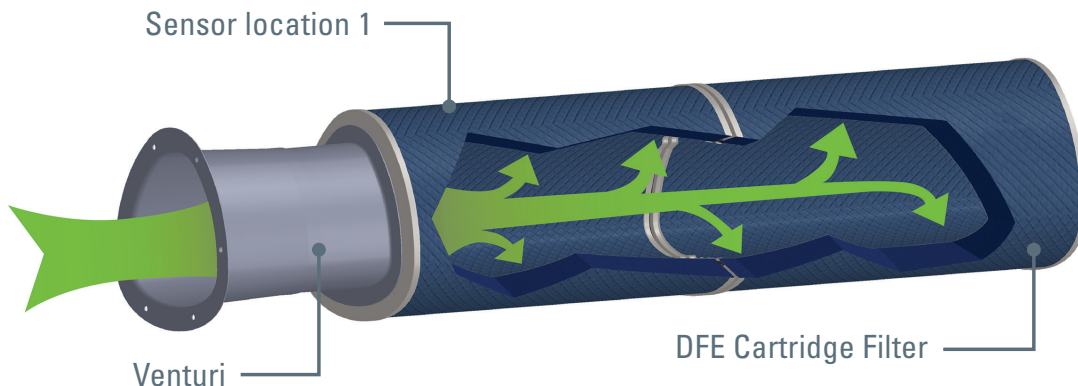
# MAXPULSE™ CLEANING SYSTEM

## SUPERIOR CLEANING PERFORMANCE

The DFE provides breakthrough cleaning performance resulting in improved filtration capacity without sacrificing filter life or taxing compressed air consumption. Typical pulse-jet cleaned dust collectors deliver only a fraction of the compressed air energy to clean the filtration media. The DFE's proprietary, MaxPulse Cleaning System minimizes energy losses by focusing on the cleaning air's exact path and delivers uniform cleaning energy to all effective filtration media.

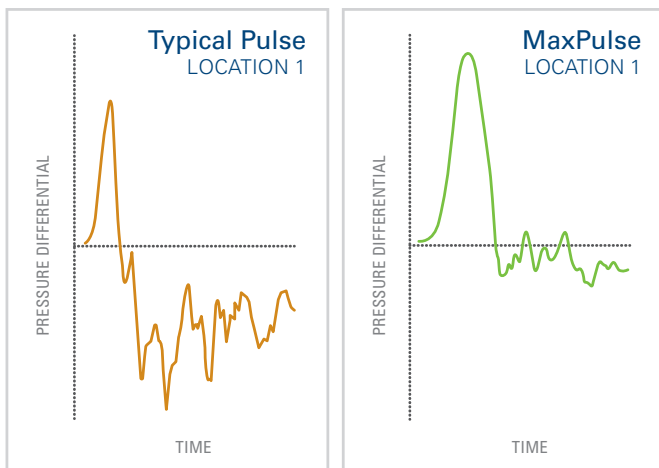
The cleaning action starts with the release of compressed air from the diaphragm valve through a unique, double-diverging pulse nozzle. The nozzle precisely controls the initial pulse expansion to minimize energy losses associated with uncontrolled compressed air expansion. Donaldson Torit's proprietary, pulse-shaping design distributes the cleaning energy evenly to match the unique shape of the filter.

After exiting the pulse nozzle, the cleaning air flows through smooth, easy transitions into the filter interior ensuring the compressed air expands naturally without abrupt, energy-wasting restrictions, sharp edges, or volume changes. More effective filtration media results in increased airflow capacities through Donaldson Torit dust collection equipment.



## PROVEN IN PULSE TEST BENCH ANALYSIS

Significantly higher pulse pressures are recorded and sustained at critical locations along the filtration media profile. More uniform cleaning results in more effective filtration media over the life of the filter.



**27%**  
**HIGHER**  
IMPULSE CLEANING  
ENERGY DELIVERED

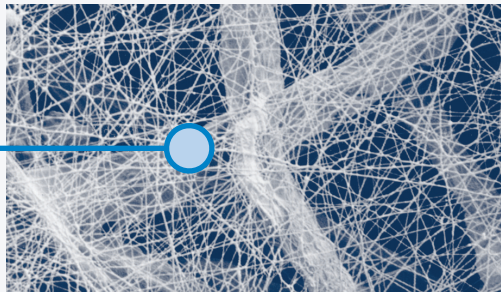


# CARTRIDGE FILTER TECHNOLOGY

## HIGH PERFORMANCE FILTERS

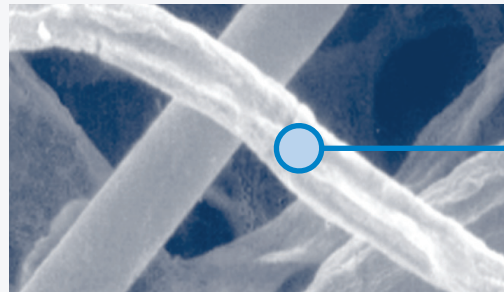
The DFE filter design is another indication of Donaldson Torit's commitment to technical research and development. The distinguishing factor in our filters is Ultra-Web filtration technology. Ultra-Web nanofiber media uses a layer of fibers 0.2 to 0.3 microns in diameter to capture contaminants on the surface of the media less than one micron in size. The resulting dust cake is easily cleaned off during the automated collector cleaning cycles providing cleaner air longer, with a minimum MERV\* 15 efficiency rating based on ASHRAE 52.2 - 2007 test standards.

10 micron



**Nanofiber Media**  
(600x)

Nanofiber surface loading technology is available in all Ultra-Web and Fibra-Web filter cartridges.



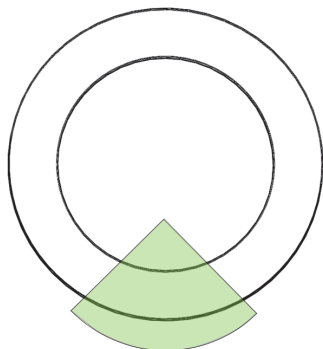
**Commodity Filter Media**  
(600x)

Conventional media has spaces of up to 60 µm between fibers, allowing dust to become deeply embedded.

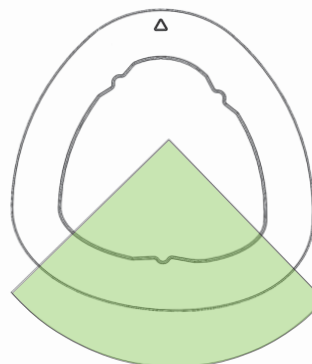
10 micron

## TRIANGULAR FILTER SHAPE

The ultimate goal of any pulse-cleaned dust collector is to remove the contaminant from the airstream and get the contaminant into a containment vessel under the equipment's hopper. The DFE's unique shape positions more filter media at the bottom of the cartridge element so pulse-cleaning energy directs the ejected dust toward its ultimate destination – the containment vessel!



**25%**  
**ROUND FILTER**



**27%**  
**DFE TRIANGULAR FILTER**

The DFE triangular filter features more filter media at the bottom of the cartridge element than any other cartridge on the market.

## QUICK FILTER CHANGEOUT

The interior of the metal filter element endcaps features a specific profile that engages with the collection equipment's support yoke. The asymmetrical yoke design ensures proper filter installation, seal, and cleaning alignment.



**1** Loosen cover with 4-lobe knob. Knob has center lug enabling power tool operation.

**2** Open hinged filter access cover.

**3** Filter supported by asymmetrical suspension yoke ensure proper installation for worry-free operation.

**\*** No special tools are required, and you never have to enter a confined space or dirty air plenum to do the job.

## COMBUSTIBLE DUST MANAGEMENT DEFLAGRATION ISOLATION

Donaldson Torit's DFE assists operators' combustible dust management. A DFE collector was tested to determine if the collector could isolate a deflagration and stop flames or sparks from passing into the clean air plenum. When applied in conjunction with effective explosion protection strategies including inlet isolation and explosion venting, the performance results support conformance to Chapter 5 Performance-Based Design Option requirements of both NFPA 654 - to prevent the "extension of the flame front outside the compartment or equipment of origin except where intentionally vented to a safe location" [5.2.5 (2)] and NFPA 69 - to "limit the risk of flame spread from vessel to vessel via interconnecting ducts." [5.5.3.4]

### TEST RESULTS<sup>1</sup>

- In all tests, the filters successfully isolated the deflagration and allowed no flame or sparks to pass into the clean air plenum.
- The filter media and support frames were found to be free from any plastic deformation due to deflagration loads at dirty air plenum pressures up to and including 8.3 psig.

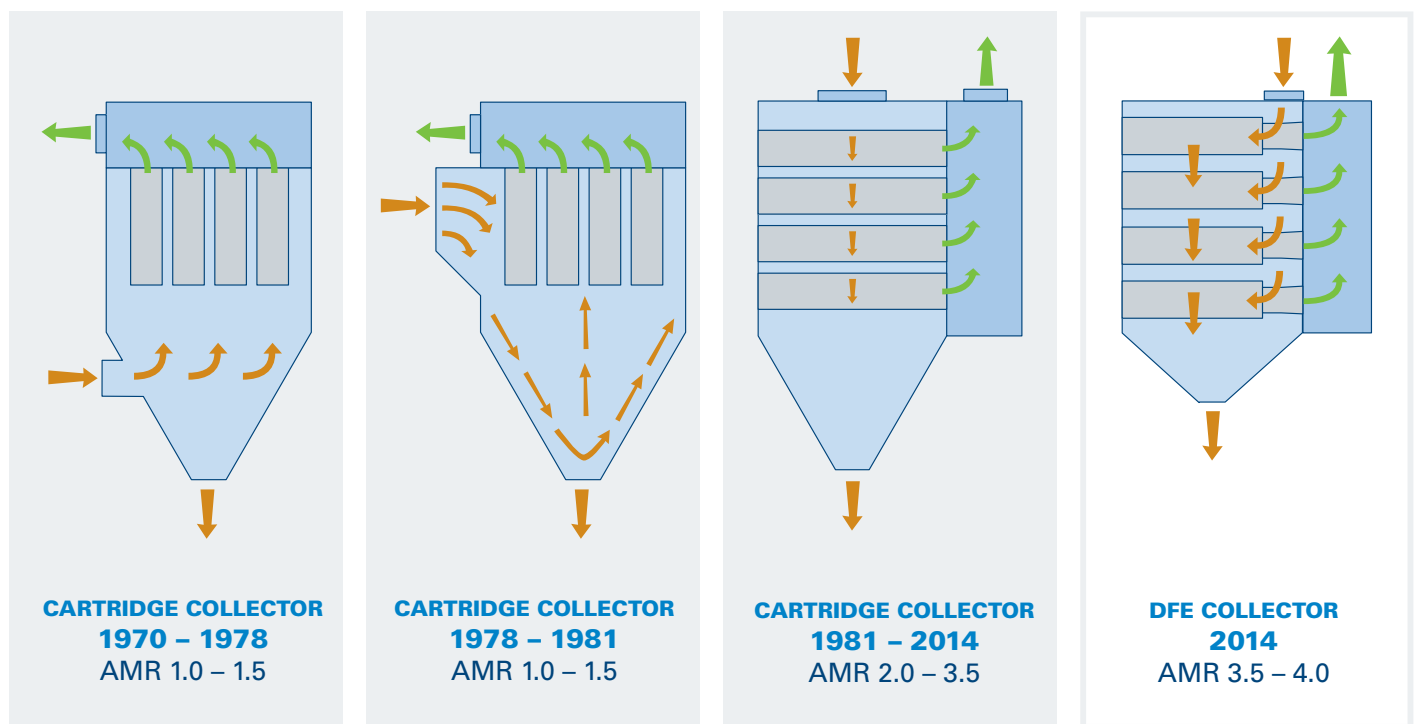


<sup>1</sup> Tests conducted on a Downflo Evolution (DFE) cartridge collector with standard FR Cartridge filter elements, top-mounted explosion vents, and without secondary filtration. Tests performed with airflow through the collector at typical air volumes. Tests repeated with no airflow through the unit. Tests used clean filters and were repeated with 'dirty' filters loaded with enough dust (cornstarch) to generate a 4-inch differential pressure across the filters and tubesheet. (Cornstarch dried to less than 2% moisture by weight was used as the dust / fuel for all tests.) Optical detectors sensitive in the IR band were mounted in multiple locations within the clean air plenum to determine flame transmission through the filter media.

# THE CONTINUING EVOLUTION OF CARTRIDGE COLLECTION

Donaldson Torit has been at the forefront of cartridge collection for over 40 years, and has developed game-changing solutions others can only attempt to imitate. Now, the game is changing again! With the DFE's airflow design, MaxPulse cleaning system, triangular filter shape, and industry-leading Ultra-Web filtration media, customers benefit from a smaller collector containing fewer filters.

## AIR-TO-MEDIA (AMR) RATIO EVOLUTION – WELD FUME

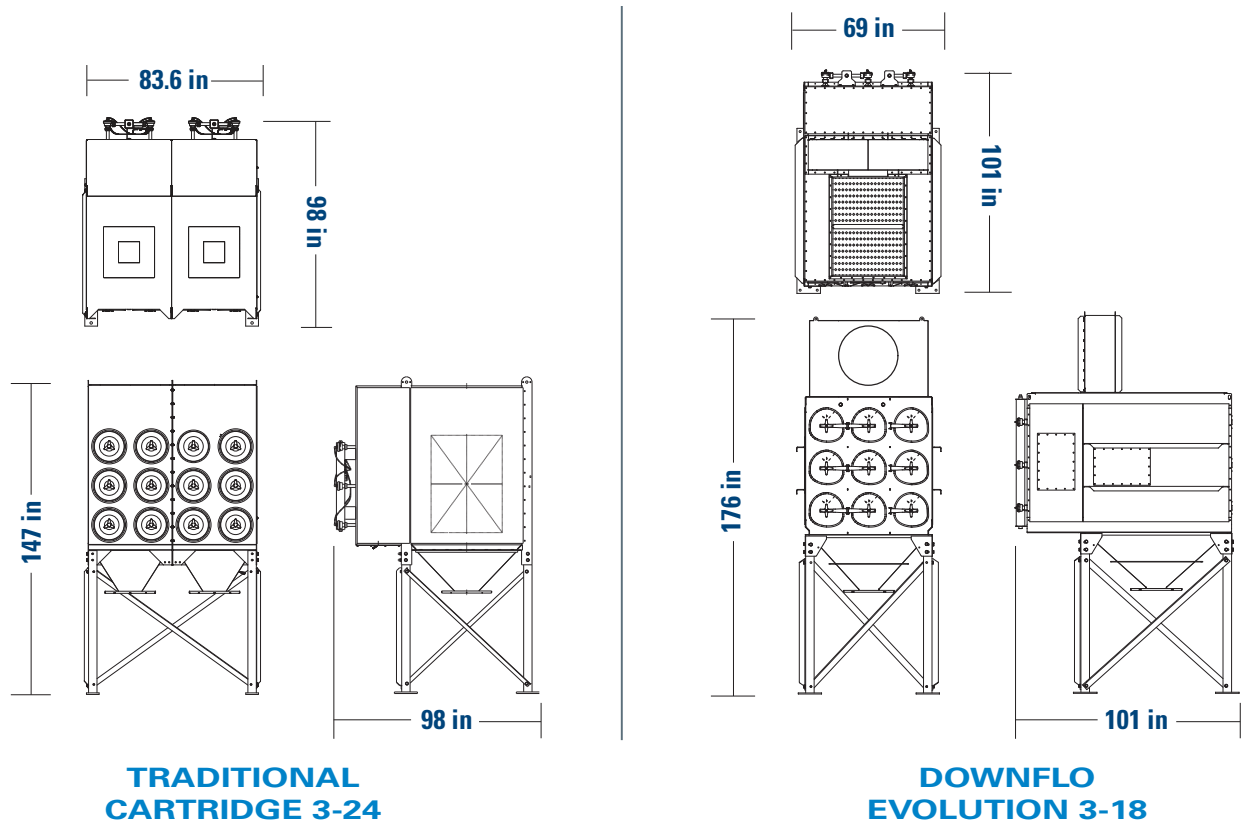


The graphic above shows an example of the Air-to-Media ratios for a typical weld fume application. The DFE features higher AMRs, smaller footprint, fewer filters, superior performance, and lowest cost of ownership!

**UP TO 40%**  
**FEWER FILTERS**  
**& SMALLER FOOTPRINT**

# EQUIPMENT COMPARISON

The DFE dust collector has increased filtration capacity compared to traditional cartridge collectors. This advantage reduces required collector footprint, with fewer filters, and lowers the total cost of ownership.



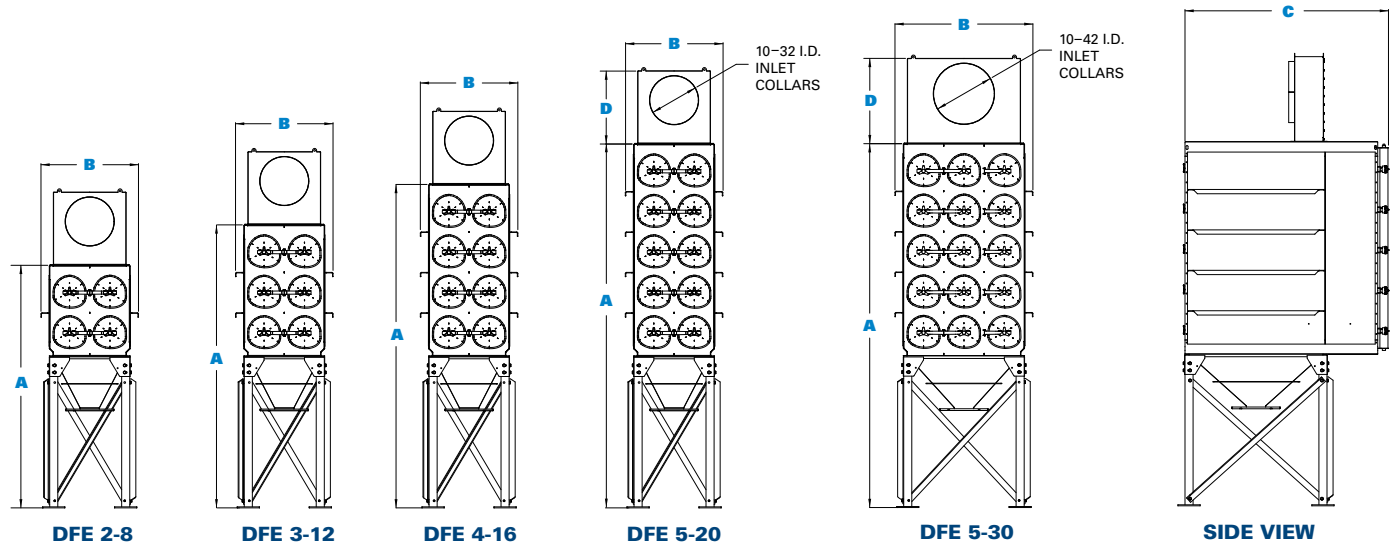
Automatic Shot Blast	Application	Automatic Shot Blast
10,500 cfm	Airflow	10,500 cfm
56.9 ft²	Footprint	50.3 ft²
147 in	Height	176 in
24	Filter Count	18
2	Hopper Outlets	1
13 scfm	Compressed Air	10 scfm

## OPERATING CONDITIONS FOR DFE COLLECTORS

Seismic Spectral Acceleration	$S_s = 1.5\text{ g}$ $S_1 = 0.6\text{ g}$ per IBC 2009 FIG 1613.5
Basic Wind Speed and Exposure (mph/kph)	90/145 Exposure C per IBC 2009
Housing Rating (inches of H <sub>2</sub> O/millimeters of H <sub>2</sub> O)	-25 – +10 / -635 – +254
Compressed Air Required (psi/bar)	90-100/6.2-6.9
Operating Temperature	150°F/66°C
Housing Construction	3/16" (4.8mm) - 10-gauge steel
Control Voltage	120 VAC -or- 24 VDC



# DIMENSIONS & SPECIFICATIONS



DFE Model*	No. of Filters	Ultra-Web Filter Area		No. of Valves	Approx. Shipping Weight*		Dimensions					
							A		B		C	
		ft <sup>2</sup>	m <sup>2</sup>		lb	kg	in	mm	in	mm	in	mm
DFE 2-4	4	1,016	94.4	4	1,890	857	110	2,794	48	1,219	75	1,905
DFE 3-6	6	1,524	141.6	6	2,300	1,043	130	3,302	48	1,219	75	1,905
DFE 2-8	8	2,032	188.8	4	2,300	1,043	120	3,048	48	1,219	101	2,565
DFE 2-12	12	3,048	283.2	6	2,900	1,316	120	3,048	68	1,727	101	2,565
DFE 3-12	12	3,048	283.2	6	2,800	1,043	140	3,556	48	1,219	101	2,565
DFE 4-16	16	4,064	377.6	8	3,300	1,497	160	4,064	48	1,219	101	2,565
DFE 3-18	18	4,572	424.8	9	3,500	1,588	140	3,556	68	1,727	101	2,565
DFE 5-20	20	5,080	471.9	10	3,850	1,746	180	4,572	48	1,219	101	2,565
DFE 3-24	24	6,096	566.3	12	4,500	2,041	140	3,556	88	2,235	101	2,565
DFE 4-24	24	6,096	566.3	12	4,090	1,855	160	4,064	68	1,727	101	2,565
DFE 5-30	30	7,620	707.9	15	4,800	2,177	180	4,572	68	1,727	101	2,565
DFE 4-32	32	8,128	755.1	16	5,200	2,359	160	4,064	88	2,235	101	2,565
DFE 3-36	36	9,144	849.5	18	5,700	2,585	140	3,556	128	3,251	101	2,565
DFE 5-40	40	10,160	943.9	20	6,200	2,812	180	4,572	88	2,235	101	2,565
DFE 3-48	48	12,192	1,132.7	24	8,200	3,719	140	3,556	168	4,267	101	2,565
DFE 4-48	48	12,192	1,132.7	24	6,700	3,039	160	4,064	128	3,251	101	2,565
DFE 3-60	60	15,240	1,415.8	30	9,900	4,490	140	3,556	208	5,283	101	2,565
DFE 5-60	60	15,240	1,415.8	30	7,700	3,493	180	4,572	128	3,251	101	2,565
DFE 4-64	64	16,256	1,510.2	32	9,500	4,309	160	4,064	168	4,267	101	2,565
DFE 3-72	72	18,288	1,699.0	36	11,600	5,262	140	3,556	248	6,299	101	2,565
DFE 4-80	80	20,320	1,887.8	40	11,500	5,216	160	4,064	208	5,283	101	2,565
DFE 5-80	80	20,320	1,887.8	40	11,000	4,990	180	4,572	168	4,267	101	2,565

Inlet Size	D	
	in	mm
10 – 16	24.0	610
17 – 24	36.0	915
26, 28, 30, 32	42.0	1,067
34, 36, 38, 40, 42	48.0	1,219

\* Without accessories or optional equipment.

# DFE SERIES APPLICATIONS



**Metal Grinding**  
**Plasma Cutting**  
**Dry Bulk**  
**Pharmaceutical**

**Thermal Spray**  
**Welding**  
**Metal Manufacturing**  
**Glass**  
**Food Processing**

# STANDARD FEATURES & AVAILABLE OPTIONS

## DFE 2-4 to 5-80

Collector Design <sup>†</sup>	Std	Opt
Mild Steel Construction	7	
MaxPulse™ Filter Cleaning System	7	
Quick-Removal Access Covers	7	
Inlets	7	
Ledge-Free Hopper	7	
Sprinkler Taps	7	
Stainless Steel Construction		7
High Temperature Construction		7
Explosion Protected Models		7
Direct Drive Fans		7
Chamber and Exhaust Silencers		7
High-Flow Inlet		7
Air Management Modules		7
Extended Dirty Air Plenum		7
Steep-Sided Hopper		7
2-Mod Hopper		7
Sprinkler Heads		7
Service Platform (OSHA compliant)		7
Damper Pack		7
Drum Sentry™ Drum-Full Indicator		7
Lined Clean Air Plenum		7
Bag-Out Kit (Filter & Discharge)		7
Bag-In/Bag-Out Kit (Filter & Discharge)		7
<b>Cartridge Filters</b>		
Ultra-Web® (MERV* 15)		
Ultra-Web® FR (MERV* 15); Ultra-Web® SB (MERV* 15); Ultra-Web® AS (MERV* 15); Fibra-Web® (MERV 14); Thermo-Web™ (MERV 14); Torit-Tex™ (MERV 16); High Temp (MERV 13)		7
HEPA/ASHRAE Afterfilters		7

<b>Paint System</b>		
Prime Coated Interior		
Textured Multi-Coat Paint Finish with 2,000-Hour Salt Spray Performance		
Custom Color		
Premium Duty Finish		
Epoxy Coating		
<b>Hopper Discharge</b>		
Drum Cover and Hose		7
Slide Gates		7
Rotary Valves and Transitions		7
Screw Conveyors		7
<b>Electrical Controls, Gauges &amp; Enclosures</b>		
Control Box w/Timer in NEMA 4 Enclosure	7	
Magnehelic®** Gauge Controls	7	
Delta P Control, Delta P Plus Control		7
Dustronix™ Control Assembly		7
Custom Panels		7
Photohelic®** Gauge Standard and Weatherproof		7
Basic Cold Climate Kit		7
Heavy-Duty Cold Climate Kit		7
Solenoid Enclosure (NEMA 7 & 9)		7
<b>Warranty</b>		
10-Year Warranty	7	

<sup>†</sup> Donaldson Torit equipment is designed to IBC guidelines for specific wind speed exposure and seismic spectral acceleration at grade level. Contact your Donaldson Torit representative for detailed information available on the equipment's Spec Control drawings. Equipment may be customized to meet unique, customer-specified site requirements.



## **Global Support**

- Facilities in 37 countries
- 40 manufacturing plants and 14 distribution centers

## **Leading Technology**

- Over 1,000 engineers and scientists worldwide
- Broad range of innovative collectors and filters
- 100s of filter media formulations

## **Experience and Service**

- Technical expertise and support
- Ready-to-ship filters and parts within 24 hours



### **EXACTLY WHAT YOU NEED.™**

#### **Downflo Evolution Dust Collectors (07/15)**

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