

Downflo® II (DFT) Collectors

Product Overview

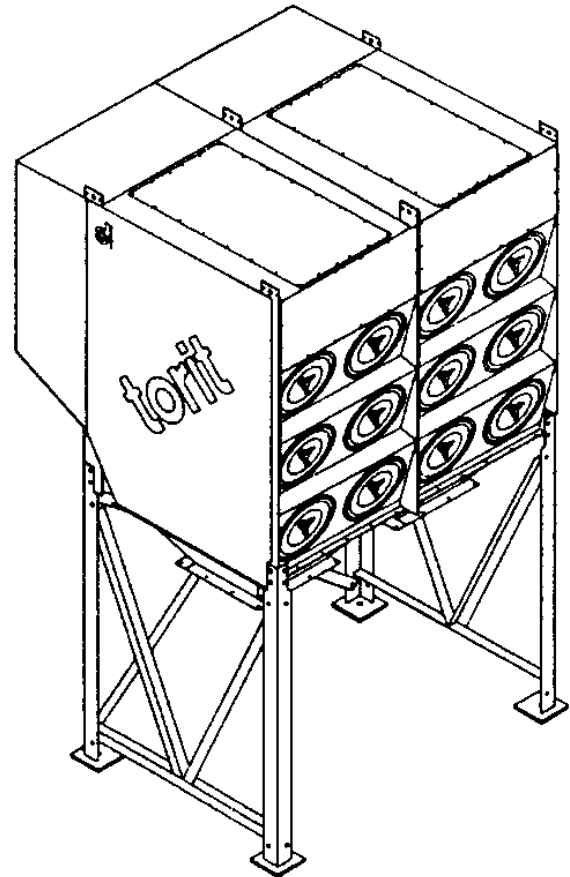
The Torit® Downflo II dust collector is a continuous-duty, modular cartridge-style dust collector. It uses the principle of a high, dirty air inlet to minimize re-entrainment of dust onto the filters during pulse cleaning. The Downflo II (1991) collector improved upon the original Downflo design (1983) by minimizing the pressure drop through the module and increasing the filter area. The improvements allow each Downflo II module to handle more air than the original Downflo. The ability to handle more air translates into a more competitive dust collector with cost savings to the customer.

Downflo II collectors are modular in design with each standard module being two rows of filters wide by two, three or four rows of filters high. Each filter row is two filters deep. Unit model numbers describe the modular configuration such as DFT 2-, DFT 3-, or DFT 4-, indicating the number of rows in height of the module (2, 3, or 4), with the number following the - (dash) indicating the total number of filters in the collector. For example, a DFT 4-48 is four rows of filters high and contains 48 filters. DFT 2-12 (two rows of filters high by three rows wide) is a deviation from the standard module design; the DFT 2-4 and DFT 3-6 are nonmodular, single filter-depth unit designs.

In addition to redesigning the unit for increased filter area and reduced pressure drop, features that were once custom have been standardized. These options include: abrasive resistant (AR) inlets, extended dirty air plenums (EDAP), and air management modules (AMM). These options greatly increase the versatility of the Downflo II dust collector.

In 1997, several enhancements were added to the DFT offering, including: bridge-free hoppers, quick removal access covers, the Drum Sentry™, bag-out option, two cold climate kits, and steep-sided bridge-free hoppers.

In 1998, the Extra Life Cleaning System was introduced to maximize filter cleaning and cartridge life. The Extra Life Cleaning System optimizes blow pipe placement with a proprietary venturi to effectively clean the filter cartridges, including the area on top of the cartridge closest to the tubesheet.

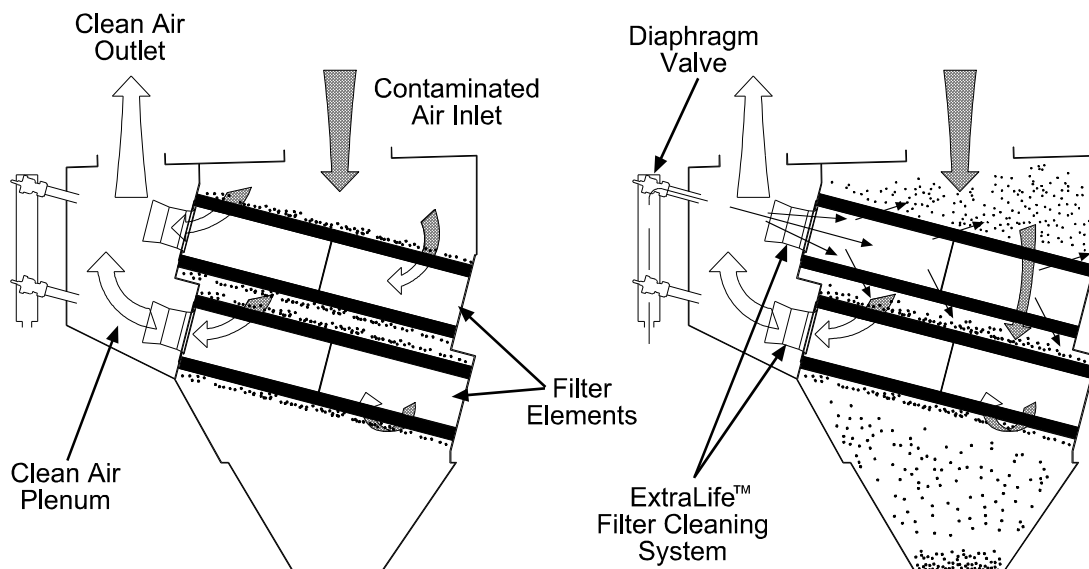


Operation Explanation

Normal Operation: As dust-laden air enters the unit above the filters, airflow is directed downward through the collector with heavier particulate falling into the hopper beneath the filters. Fine particulate is filtered by the cartridges, mounted at a 15° angle, and clean, filtered air passes through to the clean air plenum on the rear of the unit. The bottom outlet zone of the clean air plenum utilizes a 26° angle from vertical on the Downflo II. The cartridge is the heart of the collector, with numerous cartridges available from Torit Products specifically for your application.

Filter Cleaning: Filter cleaning is accomplished using standard pulse-jet technology. A single solenoid/diaphragm is matched to each filter row for pulse cleaning, and the cleaning sequence is designed to pulse from the top rows down through each module.

The cartridge filter elements can be removed, inspected and changed from outside of the unit by removing the filter access cover (porthole cover) for each filter row and sliding the filters out through that opening.



Application Summary

The Downflo II dust collector is a competitively priced alternative to other continuous-duty, cartridge-style dust collectors and is a proven alternative to pulse-jet baghouses for many applications.

The unit is designed for on-line cleaning, using standard pulse-jet technology which allows the system airflow to be maintained while the filters are cleaned, a small percentage at a time, by short bursts of 90 - 100 psig (621 - 690 kPa) air. Downflo II collectors are typically applied on nuisance dusts where the loading to the collector is less than 2 gr/ft³ (4.69 gm/m³). The high efficiency of a cartridge filter compared to a baghouse is especially beneficial for applications returning filtered air to the workplace. Some of the more typical applications include abrasive

blasting, grinding, pharmaceuticals, powdered (electrostatic spray) paint, sand handling, and welding.

It should be noted, that certain precautions should be taken depending on the application and the type of dust. These recommended suggestions are as follows:

- For **fibrous dusts**, a cartridge with an open pleat design, such as Fibra-Web® or Ultra-Tek®, should be utilized. In addition, the ability of the dust to be removed from the collector without bridging between the cartridges or within the hopper should be confirmed.
- **Pneumatic conveying** applications with loadings greater than 20 gr/ft³ (46 gm/m³) should be avoided. Other collectors, such as baghouses, cyclones, etc., would be more appropriate for higher loadings.
- Process operations involving **high temperature** and **humidity** require special attention. Temperature, moisture content and chemistry issues may exist, and custom design modifications to the collector may be required, as well as alternative cartridges such as Thermo-Tek®. Contact Applications Engineering to review these applications.
- **Hygroscopic dusts** such as fertilizer, salt, and sugar should be handled under a controlled environment (low relative humidity). In addition, a cartridge with a synthetic substrate, such as Fibra-Web, Ultra-Tek, or Torit-Tex™ should be utilized.
- **Hazardous dusts** such as cadmium, chromium, lead, and silver may benefit from EZ Ultra-Web II as the filters can be crushed to reduce disposal costs.
- For **flammable** or **explosive dusts**, cartridges with metal end caps should be utilized for more effective grounding (rather than EZ Ultra-Web II).
- Applications with high **hydrocarbon** or **oil** content should be avoided as these contaminants will depth load and plug the cartridge media to the point that it cannot be sufficiently cleaned.

Sizing and Selecting Criteria

The unit size is determined by air-to-media ratios. For the maximum recommended air-to-media ratio, use the “Ruler of Dust Collection” slide rule available through your regional sales office or Applications Engineering. The original Downflo and the Downflo II dust collectors have separate air-to-media guidelines, so be sure to use the proper column.

In many cases, the Downflo II allows you to significantly increase your air-to-media ratio when compared with recommended air-to-media on the original Downflo. The chart below provides a general guideline to follow for the allowable increase in air-to-media on Downflo II. It should be noted that, on some dusts, there is no air-to-media advantage with the Downflo II collector compared to the Downflo. This is due to the tendency of some dusts to re-entrain at high air-to-media ratios.

Original Downflo A:M	Downflo II A:M % Increase
< 1.4:1	0%
1.4:1 to 1.8:1	12%
> 1.8:1	25%

To determine the number of filters needed, use this formula:

$$\text{Number of filters needed} = \text{CFM} \div (\text{air-to-media ratio} \times \text{square footage per filter})$$

Once the number of filters is known, the unit configuration can be selected to meet the customer's needs.

Note: Because of the single depth on the DFT 2-4 and DFT 3-6, they can be operated at higher than normal airflow. For these units, use a multiplier of 1.25 on the air-to-media ratios of 1.5 and lower, and a multiplier of 1.50 on air-to-media ratios higher than 1.5. However, do not exceed 3.3:1.

Features/Advantages/Benefits

Features	Advantages	Benefits
Modular design with different height (low profile) options	<ul style="list-style-type: none"> Allows flexibility in system design 	<ul style="list-style-type: none"> Adaptable to space limitations
Downflo air pattern	<ul style="list-style-type: none"> Aids in filtering and filter cleaning 	<ul style="list-style-type: none"> Lower operating pressure drop at given airflow per filter Higher airflow per filter for given pressure drop
Multiple cartridge filter options for fine, fibrous, non-fibrous, agglomerative, and high temperature applications	<ul style="list-style-type: none"> Unequaled cartridge filter performance specific to each application 	<ul style="list-style-type: none"> High filtration efficiency Lower pressure drop (operating costs) Longer filter life Less maintenance
Filter mounting and accessibility: <ul style="list-style-type: none"> Inclined filter support yoke No tools required to service Quick removal access covers 	<ul style="list-style-type: none"> Easy servicing of filters from outside unit No tools to drop, lose, or break 	<ul style="list-style-type: none"> Less time required to service filters Less exposure to collected dust Ease of servicing
Factory assembled with filters installed	<ul style="list-style-type: none"> Ease of installation 	<ul style="list-style-type: none"> Lower installation costs
Pulse cleaning system: <ul style="list-style-type: none"> Each module has its own air manifold, solenoids, and diaphragm valves One solenoid/diaphragm per filter row Goyen solenoids and diaphragm valves; NCC timer Bridge free 	<ul style="list-style-type: none"> Modular design Superior filter cleaning Standard dust collector components 	<ul style="list-style-type: none"> Easy to service Longer filter life Reliability; availability

Features	Advantages	Benefits
Bridge-free hopper under each module	<ul style="list-style-type: none"> • Better flow of dust for disposal • Reduces unit height • No ledges with octagonal outlet 	<ul style="list-style-type: none"> • Ease of removing dust from unit • Collector fits in more locations • Prevents hopper bridging
Steep-sided bridge-free hopper option	<ul style="list-style-type: none"> • 60° Hopper 	<ul style="list-style-type: none"> • Minimizes bridging of fibrous and agglomerative dusts
Drum Sentry™ option	<ul style="list-style-type: none"> • Easy to check dust in storage drum 	<ul style="list-style-type: none"> • Service only when necessary
Heavy-duty construction: <ul style="list-style-type: none"> • 12-Gauge minimum • Inlet baffles over each filter row • Continuous welded 7-gauge tubesheet • Sloped roof 	<ul style="list-style-type: none"> • Housing rated to -20 "wg (-4.9 kPa) operating pressure • Protects filters from abrasion • Directs airflow • Improves unit integrity • Water runs off roof 	<ul style="list-style-type: none"> • Surpasses most unit specifications • Longer filter life • Water does not pool on roof in outdoor installations
Universal leg design	<ul style="list-style-type: none"> • Rated for 100 mph (160 km/h) wind and seismic zone 4 or rated for 100 mph wind and seismic zone 3 with EDAP or AMM 	<ul style="list-style-type: none"> • Reduced lead time • Very sturdy structural design
Checker™ board controls	<ul style="list-style-type: none"> • Provides color-coded information on pressure drop and airflow 	<ul style="list-style-type: none"> • Easy to operate and maintain
Torit Delta P Control	<ul style="list-style-type: none"> • Provides digital display pressure indicator with high, low, and alarm set points 	<ul style="list-style-type: none"> • Long-term accuracy and user-selected lockout to prevent unauthorized adjustment of set points
Bag-out option	<ul style="list-style-type: none"> • Reduces worker exposure to dust 	<ul style="list-style-type: none"> • Protects worker • Minimizes cleanup during filter changeout
Cold climate kit	<ul style="list-style-type: none"> • Prevents solenoid valve freezing 	<ul style="list-style-type: none"> • Easier maintenance on outdoor installations
Heavy-duty cold weather kit	<ul style="list-style-type: none"> • Prevents solenoid valve and diaphragm valve freezing 	<ul style="list-style-type: none"> • Easier maintenance on outdoor installations when no moisture trap or dryer is used
Extra Life Cleaning Control System	<ul style="list-style-type: none"> • Optimal placement of blow pipes and proprietary venturi 	<ul style="list-style-type: none"> • Maximized cartridge cleaning • Extended filter life

Features	Advantages	Benefits
Abrasion Resistant (AR) Inlet <ul style="list-style-type: none"> • Inlets are a standard option in a 1, 2, or 3 module configuration 	<ul style="list-style-type: none"> • Reduced lead time • Reduces element wear • Proper airflow distribution 	<ul style="list-style-type: none"> • Simplifies ductwork • Reduces maintenance • Increases filter life
Extended Dirty Air Plenum (EDAP)	<ul style="list-style-type: none"> • Provides air to multiple modules with one inlet • Allows side, front, or top inlet to be used • Proper airflow distributions 	<ul style="list-style-type: none"> • Reduces ductwork costs • Simplifies ductwork • Allows flexibility in design
Air Management Module (AMM)	<ul style="list-style-type: none"> • Reduces grain loading to active modules • Abrasion of filter is reduced • When used with extended dirty air plenums, one AMM can provide air to 4 modules 	<ul style="list-style-type: none"> • Simplifies ductwork • Reduces maintenance • Increases filter life

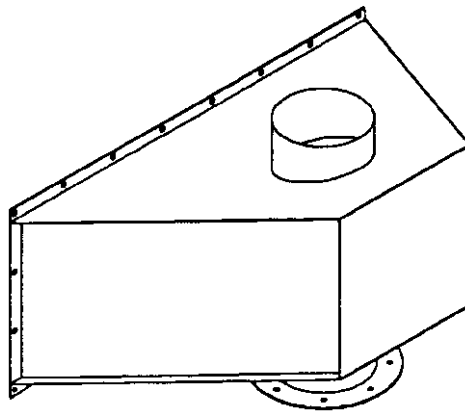
Standard Downflo Options

Abrasive Resistant Inlets

The Abrasive Resistant (AR) Inlets are used when:

- 1) abrasive particles are in the airstream,
- 2) grain loading is greater than 2 gr/ft³ (4.6 gm/m³),
- 3) space constraints prevent the use of EDAP and AMM.

The AR inlets (shown below) can span 1, 2 or 3 modules and can be entered from either the top or bottom (allow clearance for filters). The inlets serve to reduce the airflow entering the collector to less than 2,500 fpm (12.7 m/s), although 2,000 fpm (10.2 m/s) is recommended.



Abrasive Resistant Inlet

Sizing and Selecting Criteria

The AR inlet is available in 1, 2, or 3 module configurations, that is, one inlet can cover the front inlet openings of 1, 2, or 3 modules. The abrasive resistant inlets are sized to provide a maximum of 2,500 fpm (12.7 m/s) into a module, however, 2,000 fpm (10.2 m/s) is recommended. Since the new front inlet opening is 4.1 ft² (0.38 m²) at 2,000 fpm, the module can handle 8,200 cfm (13,932 m³/h) with an AR inlet.

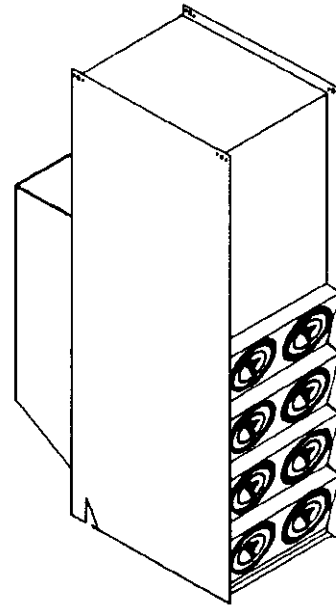
A three module AR inlet can handle 24,600 cfm (41,796 m³/h) — 8,200 cfm (13,932 m³/h) x 3 modules. The standard sizes on the AR inlets are 15, 18, 20 or 22-inch I.D. (381, 457, 508 or 559 mm). Other sizes are available though custom modification.

Extended Dirty Air Plenums

Extended Dirty Air Plenums (EDAP) are used with Downflo II dust collectors whenever:

- 1) an air management module (AMM) is used,
- 2) one inlet is to serve multiple modules,
- 3) an end inlet is needed.

If the EDAP is used without an AMM, the loadings should be light and the material nonabrasive. The extended dirty air plenum does not prevent abrasion of filters. The EDAP must be used with an air management module to accomplish this. Extended dirty air plenums can be entered from the top, front or side. The rear of the EDAP for use is severely restricted by the internal configuration of the unit.



Extended Dirty Air Plenum

Sizing and Selecting Criteria

The EDAP is a 38-inch (965 mm) extension to the dirty air plenum on a DFT4 module. The extension allows more air to be moved from module to module.

The EDAP can be used when:

- 1) the dusts are nonabrasive, with loadings less than 1 gr/ft^3 (2.3 gm/m^3),
- 2) the system is larger than two modules with one inlet needed. It does not make sense economically to use the EDAP on single or most double module units unless side inlets are needed.

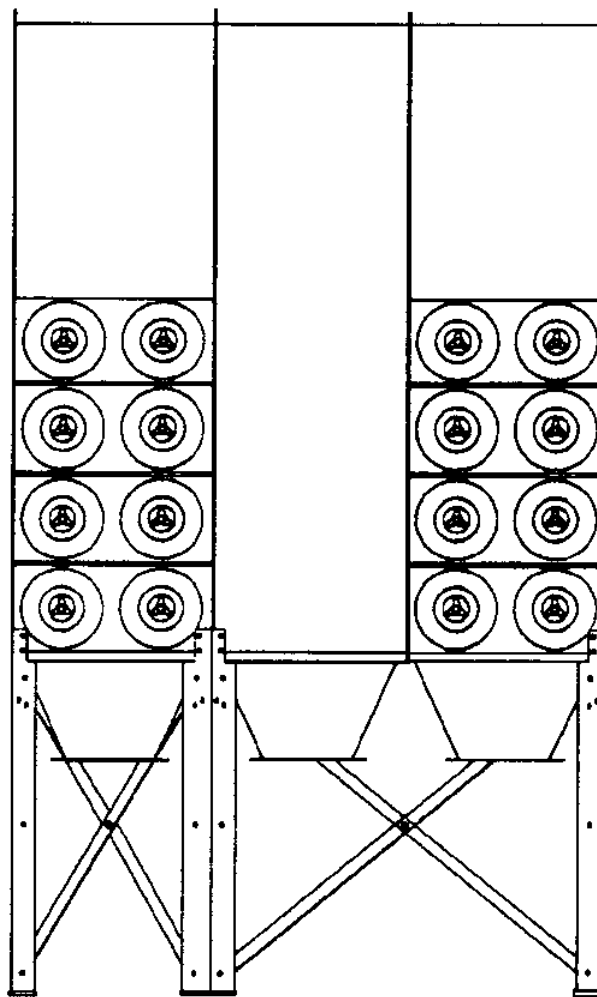
The EDAP modules are sized not to exceed 2,000 fpm (10.2 m/s) through the plenum. When the structural members are subtracted out, a cross-sectional area of 12.14 ft^2 (1.13 m^2) between modules is available. With a velocity of 2,000 fpm (10.2 m/s), 24,300 cfm ($41,286 \text{ m}^3/\text{h}$) of air can be moved through the extended plenum. A single front or side inlet on an EDAP can then handle 24,300 cfm ($41,286 \text{ m}^3/\text{h}$). One inlet can service an average of three EDAP modules, depending on the air-to-media ratio. If a nonstandard rear inlet is used, the airflow is considerably reduced due to internal supports. (Consult Applications Engineering.)

Air Management Modules

Air Management Modules (AMM) are used when:

- 1) there is a heavy grain loading, greater than 2 gr/ft³ (4.6 gm/m³),
- 2) abrasive particles are in the airstream,
- 3) large particles are present,
- 4) there is a need to enter large Downflo collectors with one inlet.

The AMM serves to reduce the grain loading and abrasion by serving as a large drop-out box and reducing airflow to less than 2,000 fpm (102 m/s) into the EDAP. As many as four active cells can be accessed through a single AMM.



**DFT 4-32 With Air Management Module
and Extended Dirty Air Plenum**

Sizing and Selecting Criteria

AMMs allow large quantities of air containing abrasive dust to enter the Downflo II collector through a single inlet whereas the standard Downflo collector without an AMM would require multiple AR inlets.

Some guidelines as to when to use an AMM are:

- 1) with grain loadings greater than 2 gr/ft³ (4.6 gm/m³). The AMM will serve as a drop-out box,
- 2) with abrasive particulate,
- 3) when large airflows into a Downflo collector are needed. The use of the AMM can reduce the number of inlets,
- 4) with most EDAP applications,
- 5) on units over three modules. An AR inlet may be used three modules or less.

The number of AMMs needed can be determined by the following chart:

# AMM	Location	Choice	Maximum Inlet Size	cfm	m ³ /h
1	End	Top	27" (686 mm) sq. or 30" (762 mm) round	18,000	30,58
		Front	40" x 36" (1,016 mm x 914 mm)	2	
		End	24" x 47" standard (610 mm x 1,194 mm)	24,300	41,28
		End	40" x 76" special (1,016 mm x 1,930 mm)	6	
				18,000	30,58
				2	
1	Center	Top	27" (686 mm) sq. or 30" (762 mm) round	18,000	30,58
		Front	40" x 36" (1,016 mm x 914 mm)	2	
				24,300	41,28
2	End	Top	34" x 48" (864 mm x 1,219 mm)	24,300	41,28
		Front	40" x 76" (1,016 mm x 1,930 mm)	6	
		End	24" x 47" standard (610 mm x 1,194 mm)	24,300	41,28
		End	40" x 76" special (1,016 mm x 1,930 mm)	6	
				24,300	41,28
				6	

				24,300	41,28
				6	
2	Center	Top Front	39" (991 mm) sq. or 44" (1,118 mm) round 40" x 76" (1,016 mm x 1,930 mm)	36,000	61,16
				4	
				48,600	82,57
				2	
3	Center	Top Front	50" x 48" (1,270 mm x 1,219 mm) or 54" (1,372 mm) round 40" x 114" (1,016 mm x 2,896 mm)	48,600	82,57
				2	
				48,600	82,57
				2	

One AMM can handle a maximum of 24,300 cfm (41,286 m³/h) and maintain a velocity of less than 2,000 fpm (10.2 m/s) in the plenum. Two AMMs located in the center of a unit using a front inlet can handle 48,600 cfm (82,572 m³/h) – 24,300 cfm (41,286 m³/h) to the left EDAP and 24,300 cfm to the right. The number of active cells to either the right or left of the AMM would be determined by the air-to-media ratio and should not exceed 24,300 total cfm (41,286 m³/h). It should be noted that the front entry AMM can handle larger airflows than the top entry design. This is due to the fact that the air entering the front experiences less turbulence than the air entering from the top. The air that enters from the top must undergo a 180° turn and flow upward against the incoming air, which reduces the capacity.