

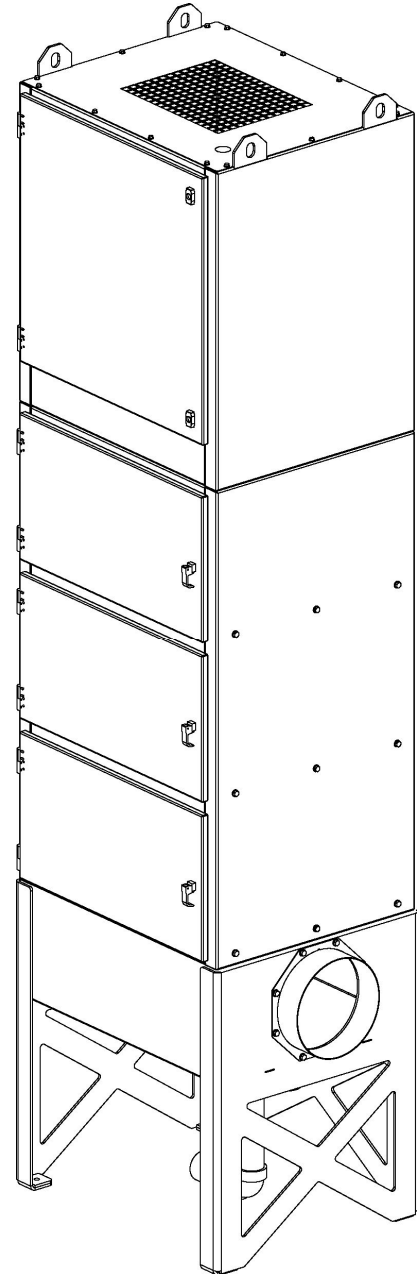
Modular High Performance Mist Collectors

Product Overview

The Donaldson® Torit® Modular High Performance, MHP, mist collector is used for collection of airborne mists. The MHP is often used to collect coolant mist resulting from high speed and/or high pressure machining operations. The unit was designed in 2003 to collect oil, water-soluble, semi-synthetic and synthetic coolant mists from a variety of machining operations and other industrial processes. The unit will also collect a small amount of dust from machining operations. Standard sizes handle airflows from 1000 to 4000 cfm (1700 to 6800 m³/h).

The Modular High Performance model names MHP-1, MHP-2, and MHP-3, correlate to the number of collector modules. These models have integral fan packages and standard safety filters, HEPA or 95% DOP. Optional prefilters for very heavy loading are also available. The prefilter options are Hi-Efficiency, Impinger, and Multi-Vee. The MHP-1 through MHP-3 models all contain the same size filters.

Proper installation and use of the Modular High Performance mist collector will greatly improve the quality of factory air, thus reducing health effects such as sore throats, respiratory problems, and even cancer; reducing maintenance problems like slippery floors and dirty lights and walls; and increasing worker productivity with a cleaner, healthier work environment. The Modular High Performance is a key component to meeting industrial and government air quality standards. The filter elements in this mist collector are the key to the efficient operation. With the high-efficiency filtration from the Modular High Performance collector, exhaust air can often be recirculated to the factory.



Operation Explanation

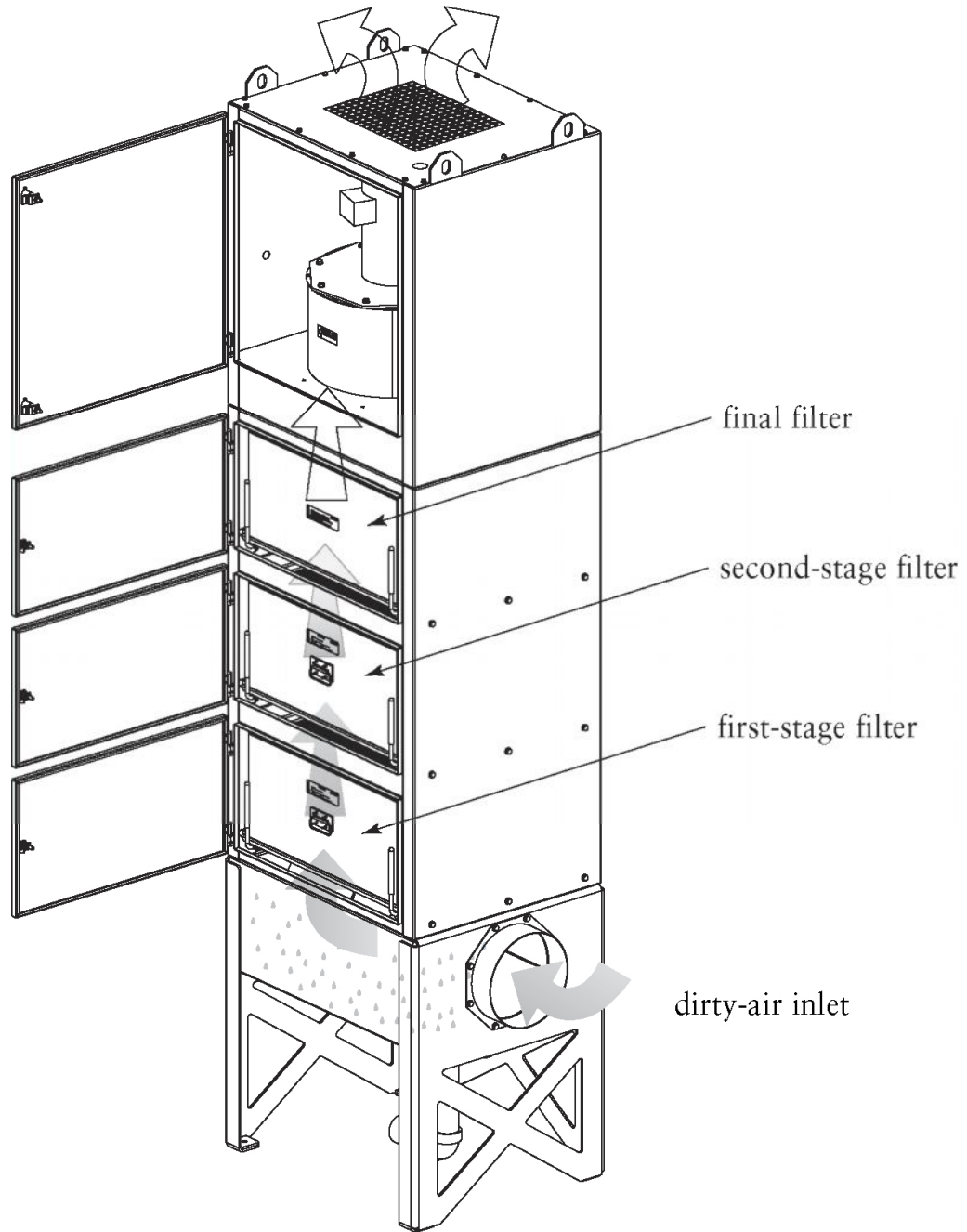
Normal Operation: During normal operation, contaminated air enters the Modular High Performance mist collector through the inlet opening located on the side of the hopper. The incoming air slows and turns upward, causing large mist droplets and particles to fall out of the airstream and into the hopper. The air passes through the first stage filter, which is designed to collect and coalesce larger droplets and particles.

The air that passes through the first stage filter still contains smaller mist droplets. A second stage filter element provides the next level of filtration. As mist particles coalesce and form larger droplets, the droplets become large enough for gravity to be their primary influencer, causing them to drain back through the collector and into the hopper.

The vertical orientation of the collector promotes drainage of the droplets. The air then passes through the third and most efficient stage of filtration, HEPA or 95% DOP.

Clean, mist-free air exits the filter element and enters the fan. The fan and motor are closed in an acoustically-lined, clean air chamber for quiet, vibration-free operation. Clean air exhausts through the top of the collector.

The collected liquid drains from the hopper via the P-trap or collection bottle.



Application Summary

The Modular High Performance collector was designed for heavy loading of very fine mist. High tech machining centers use high-pressure coolant injection (>200 psi) and/or high-speed cutting (>3000 rpm). This generates large volumes of mist (> 10mg/m³ or 1 gallon per week at 1200 CFM 24 hours per day 7 days per week) and very fine droplets (< 1.8 microns). The mist is further defined as small droplets of materials that are ordinarily liquid at normal temperature and pressure and are suspended in the air. For use with a mist collector, this is further defined as metalworking fluids used in machine tool operations. Typical metalworking fluids include straight oil, oil- and water-soluble, semi-synthetic and synthetic coolants. Mist particles are created by two basic means: mechanical action and thermal effects. Mechanical action refers to the mist generated from the oil or coolant nozzle; mechanical action creates a mist typically greater than one micron in size. Thermal effects occur when localized heat vaporizes the coolant, and then the vapor cools, condensing into a mist. Thermal effects create mist from 0.01 to 1 micron in size. Other contaminants, such as dust coming off the part or the tool and smoke from the combustion of the oil or coolant, are also generated in the use of metalworking fluids in machine tool operations.

Metal working fluids are used for a number of reasons. Primarily for heat removal (cooling) and lubrication. Secondary functions of metal working fluids are corrosion protection, removal of chips and swarf, lubrication of the machine tool, and for control of rancidity. Different types of metal working fluids are selected based on the need of the customer's machining operation. See the Wet Machining application paper online at DTIC (Donaldson Torit Information Center) for more information about metal working fluids.

Mist collection is done for numerous reasons, including: visual clarity of part being machined and containment of mist/contaminants. Secondary benefits of mist collection are reduced health effects such as sore throats, respiratory problems, and even cancer; reduced maintenance problems like slippery floors and dirty lights and walls; and increased worker productivity with a cleaner, healthier work environment.

The Modular High Performance collector can collect some dust along with the mist; however, it should not be operated without mist. The collector is not designed to handle water mist alone. There should be some type of material to allow coalescing, otherwise water vapor will pass through the filters. The extremes of very heavy oils and very light, thin oils should be avoided. The very heavy oils (similar to tar consistency) will not drain. The very light, thin oils (similar to gasoline consistency) may evaporate.

Sizing and Selecting Criteria

There are three different methods for calculating the required airflow from an enclosed machining center. Each of these methods should be evaluated based on the specific needs of the customer, design of the machine enclosure, and available locations for the inlet hood. See the Wet Machining application paper online at DTIC (Donaldson Torit Information Center) for more information about calculating the required airflow.

Features and Benefits

Features	Benefits
Exclusive MHP filtration system	<ul style="list-style-type: none"> • User is guaranteed high efficiency throughout filter life
Easy filter access	<ul style="list-style-type: none"> • Reduces maintenance time and worker contact is minimized, no confined space
Built-in filter status gauges with red and green zones	<ul style="list-style-type: none"> • No maintenance guesswork, quick indication of filter condition and when maintenance is required
Optional prefilters	<ul style="list-style-type: none"> • Filter life maximized with very heavy loading
Hinged doors and tool-free filter access	<ul style="list-style-type: none"> • Quick and simple access to filter makes collector maintenance easy
Choice of HEPA or 95% DOP final filters	<ul style="list-style-type: none"> • Final “safety” filter protects workers. Cost effective option
Negative pressure final filter	<ul style="list-style-type: none"> • Eliminates contaminate bypassing safety filter
Acoustically lined clean air plenum	<ul style="list-style-type: none"> • Smooth, quiet operation – less than 80 dB(A)
Compact unit footprint	<ul style="list-style-type: none"> • Conserves limited or expensive floor space