MistBLASTER

MistBLASTER - MIST EXTRACTION UNIT

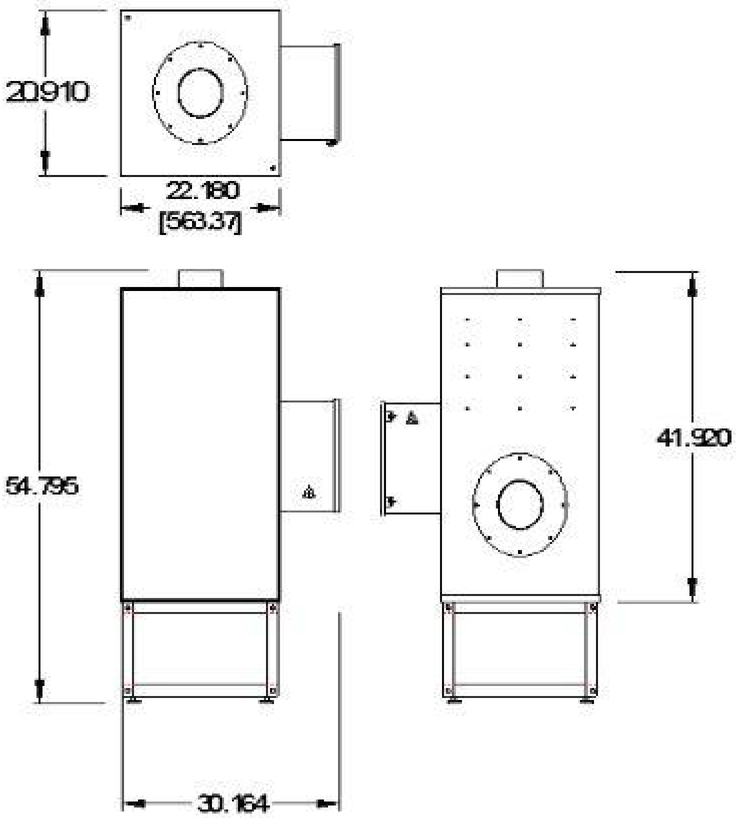
- Variable frequency drive.
- Programmable for each machine
- Reduce operator exposure
- Extremely efficient
- Measurable performance
- No make-up air required

MISTBLASTER TECHNOLOGY

The MistBLASTER is programmable - when the machine doors are closed the MistBLASTER runs fast enough to prevent mist from escaping from the machine enclosure by creating a slight negative air pressure. This negative pressure is measurable. When the machining cycle ends and the coolant shuts off the MistBLASTER senses the end of cycle and over speeds for a pre-programmed time, this will increase the rate of mist removal. Virtually no mist escapes and the operator exposure is greatly reduced.

PUMPS and EQUIPMENT (Warwick) Limited

FOOT PRINT



MISTBLASTER SPECIFICATIONS

- Max CFM 1500
- Amperage - @ 240vac, 7.6 Amps
- Remote location
- Liquid pumped back to coolant tank
- Outstanding air quality
- Weight 225lbs.

MistBLASTER

FILTER ELEMENTS

WASHABLE

WASHABLE

WASHABLE

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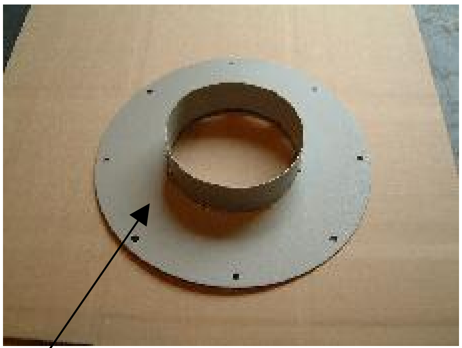
MistBLASTER

AIR SUCTION PORT

AIR SUCTION PORT 6”



MACHINE FLANGE 6”

PUMPS and EQUIPMENT (Warwick) Limited

ELECTRICAL INTERFACE PLUG AND PANEL LAYOUT

PANEL LAYOUT

INTERFACE PLUG AND SOCKET

The benefits of programmable mist collection

All of us in the metal cutting industry have seen this problem. The shop is filled with coolant mist- when you look at the overhead lighting you see what looks like a light fog. Every surface in the shop is covered with an oily residue that requires constant clean up. When the machine cutting cycle ends, the operators don't want to get a blast of coolant in the face so they hesitate to open the door for as long as they can, and when they do mist billows from the machines. I have often seen operators try to blow the mist out of the CNC enclosure with compressed air when the doors open. Most mist collectors don't work very well, many are based on a 30-year-old design. In my experience, coolant mist is the cause of some of the most serious employee satisfaction problems in our industry.

It isn't a pretty picture and is a throw back to a time when employee exposure was not taken very seriously. To oversimplify the current situation, there is a controversy between one side that says that coolant exposure may cause long-term problems and another that says that these long-term problems have not been proven. Short-term problems do exist but may be related to the notoriously poor concentration control in our industry. Lets get past this discussion and get to the obvious, t**he operator's lungs should not be exposed to coolant mist, period**. Think of that 18 year old that you just hired as one of your kids! In my opinion the current standard of five ml per cubic meter is much too high, the UAW has requested a standard 10 times this stringent and the eventual standard may be even tighter. Regulations aside, there are lots of sound economic reasons to control mist and inexpensive technology exists to do it now.

The problem is really that the mist collectors don't work very well. With the outdated technology commonly used in the metal cutting industry, a rotating drum pulls air out of the machine enclosure at a constant speed (we will use 500 cfm in our example). When the enclosure doors are closed there is too much suction, and because the air isn't filtered very well lots of contaminants are unnecessarily blown around the shop. When the operator opens the door to change a part there isn't enough suction (still 500 cfm) and he or she gets a face full of coolant mist as it billows out of the machine into the shop. Fortunately, a new generation of mist collectors now exists that can meet the stringent new standards.

The first thing we have to do is really figure out what we are trying to accomplish. There are two conditions that occur when the machine is in production.

1. The machine can be cutting with the doors closed or
2. the machine doors are open and the part(s) is being changed.

When I ask most people in our industry what they want a mist collector to do when the machine is cutting, they say "take the mist out of the machine of course". That is absolutely the wrong answer. It is what they are doing now, and it causes the problems that exist now. What we should be trying to do is protect the operator's lungs, and the lungs of the rest of the people in the building by keeping the mist inside the machine. If it isn't allowed to escape from the enclosure, most of the coolant mist will simply fall back onto the surfaces inside the machine and drain back into the sump. When the coolant is on, there is a great deal of mist and splash, pulling relatively large volumes of air out of the enclosure also pulls a lot of coolant out of the enclosure. This coolant collects on the filter media and is in turn blown around the shop. The new MistBLASTER is programmable, when the machine doors are closed the Mist BLASTER runs just fast enough to prevent mist from escaping from the machine enclosure by creating a slight negative air pressure (100 cfm in our example). You don't need to remove very much air from an enclosed CNC machine to keep the mist inside the machine and safely away from the human beings in the plant. This is an important difference, remember, the old fashioned way of doing things is to run the mist collector at the same speed all of the time, and because a comparatively large volume of air and a high load on whatever filter media that is used more coolant mist is sprayed into the air.

But what about when you change a part and the doors are open? Our goal should be the same, protect everybody's lungs, but our method must change. We should remove all of the mist in the enclosure as quickly as possible, so that an operator leaning in to the machine to change a part doesn't get a face full of coolant mist. When the doors open to change parts, the mist collection system must be capable of preventing any coolant from escaping.

Remember, most mist collectors run at the same speed all of the time (500 cfm in our example), so that they keep running all of the time that the door is open or closed. But 500 cfm isn't typically enough air flow to evacuate the enclosure quickly, and because it runs all of the time any coolant that saturates the filter media will tend to be blown back into the air. The new technology is different, When the machining cycle ends and the coolant shuts off MistBLASTER senses the "end of cycle" and over speeds to 1500 cfm for a pre-programmed time, typically 10 to 15 seconds to greatly increase the rate of mist removal. Virtually no mist escapes and the operator exposure is minimal (see attached data).

Ironically the new generation of equipment delivers a 10 fold improvement in air quality and doesn't cost anymore than the old technology that does not work very well.

Example:

The conditions are a 10 minute cycle and a 30 second (0.5 min) change time. The old fashioned systems run all of the time at 500 cfm. The Mist BLASTER runs at 100 cfm during the cutting cycle and at 1500 cfm for 15 seconds at the end of the cycle.

Current Systems	MistBLASTER
500 cfm x 10 = 5000 cfm	100 cfm x 10 = 1000 cfm
500 cfm x .5 = 250 cfm	1500 cfm x .25 = 375 cfm
total = 5250 cfm	total = 1375 cfm

This represents a 74% reduction in the volume of air that must be filtered, but the results are actually better than these airflow numbers would suggest. Because the MistBLASTER airflow is so low when all of the water is splashing around the inside of the enclosure much less coolant reaches the filters. The system goes to it's highest speed only after the coolant has been turned off so that the only coolant that is in the air is in the form of mist, which constitutes a very small volumetric amount of liquid coolant.

Independent lab tests

The purpose of this series of tests was to determine if;

MistBLASTER mist collection equipment could meet the proposed ***NIOSH air quality standard of 0.5mg per cubic meter.***

Very controlled conditions were used in this testing so that data would be useful in the real world prediction of air quality levels based on these tests. The first test was done with no air exchange in a completely enclosed room so that baseline data was available to anchor our predictions. The second data set gives us information on relative air quality with different relative volumes and air exchange rates.

NIOSH METHOD 0500

AVERAGE mg per m^3	No air Exchange	With MistBLASTER air Exchange		
		0.1 cfm (std)	0.1 cfm	0.5 cfm
Low pressure C340	0.82			
High pressure E206	1.40			
High pressure C340	0.91	0.54	0.41	0.46

The air used in this study was drawn from the inside of our facility. A baseline air quality measurement was done and is used in the individual graphs. The numbers include a -0.11 correction fact

Air exchange took the ml/m from .91 to .41 with only 0.1 cfm per square foot air change (20% of the ASHRA standard).

This represents a 55% reduction.

When the air change was reduced by 50% the air quality improvement was only 49%.

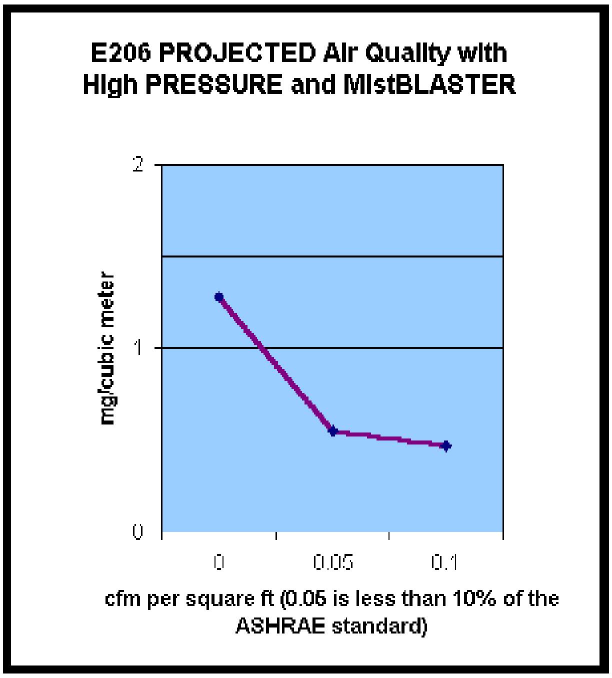
95 minutes for one complete air change @0.1

190 minutes for one complete air change @0.05

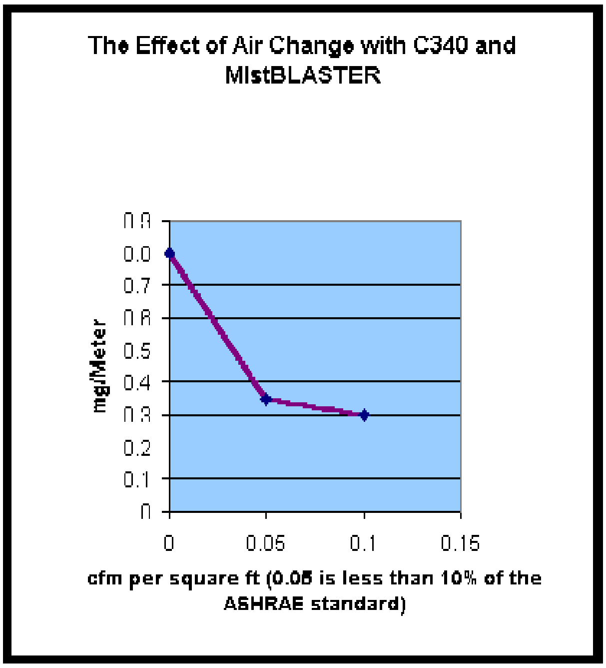
MistBLASTER

TECHNICAL CHARTS

EMULSION BASED COOLANTS



SYNTHETIC



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