

**Case study: Air Treatment**  
VOC Abatement for Aerospace Paint Finishing  
Montreal, Canada

**Quick facts**

By installing a Munters zeolite rotor concentrator along with a single regenerative thermal oxidizer (RTO), aerospace manufacturers have been able to:

- Capture and destroy organic solvents efficiently, while saving energy
- Achieve > 95% VOC destruction removal efficiency
- Provide high reliability and steady flow exhaust with minimal pressure fluctuations
- Realize considerable savings in operating costs

## Zeol VOC Abatement Technology Saves on Operating Costs for Aerospace Paint Finishing

For over 10 years, a Canadian aircraft manufacturer has saved over \$500,000 annually in fuel and electricity consumption by using Munters rotor concentrators to control solvent emissions from its facility's paint booths.

Before purchasing Munters equipment in 2002, the manufacturer struggled with the inconvenience of having their aircraft systems

flowed to be painted in subcontracted paint hangers. This affected production and lead times so the company decided to build new paint hangers adjacent to their assembly plants.

**Why Munters was selected**

The exhaust stream from each of the paint hangers required treatment to remove volatile

organic compounds (VOCs) in order to meet the local regulatory requirements.

Typically, aerospace paint hangers exhaust large volumes of air with a relatively low concentration of VOCs. The end user's equipment selection criteria included meeting VOC abatement performance, low capital costs, low cost of ownership, reliability and

application experience. Munters zeolite rotor concentrator abatement system met all the criteria.

The main benefits of using a zeolite rotor concentrator system are high reliability, steady flow exhaust with minimal pressure fluctuations and considerable operating cost savings. A Munters' system concentrates a large exhaust volume containing a low concentration of VOCs into a small concentrated stream using zeolite Honeycombe® media. Therefore, the concentrated VOCs can be efficiently and cost-effectively destroyed in an oxidizer. Pressure drop through the system is low which helps reduce exhaust fan electricity use.

### Building profits on Munters' unparalleled experience

In 2013, this same manufacturer was expanding operations and building a new paint hanger. Again, they came to Munters to supply the abatement equipment.

Munters designed new equipment that consisted of a dedicated zeolite rotor concentrator along with a single regenerative thermal oxidizer (RTO) that was used to destroy the VOCs. The concentrator had to be designed to fit inside the building adjacent to the paint hanger and the RTO was located outside. The new hanger was designed to exhaust 100,000 scfm. The system concentrated the total 100,000 scfm down to only 10,000 scfm which was then

sent to the RTO for VOC destruction. The overall system VOC destruction removal efficiency (DRE) was greater than 95%. The manufacturer will now save an additional \$267,000 annually on their new system compared to the competing technology, a stand-alone RTO.

By utilizing Munters technology, the company has saved more than \$5 million over the years.

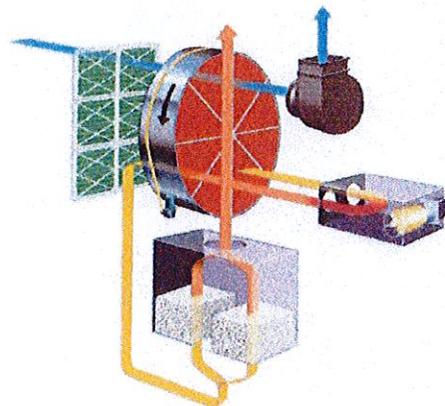
### Munters — Leading the world in VOC Abatement

Munters pioneered desiccant rotor technology over 60 years ago. Munters Zeol rotor concentrator systems are the leading technology for abatement of VOCs.

Munters' install base includes some of the world's most respected companies. For example, Munters is a two-time award recipient of Intel's Supplier Continuous Quality Improvement Program.

Munters systems are engineered, manufactured and tested in the company's ISO 9001:2008 certified manufacturing facility. Munters is the only supplier in the world that controls all aspects of rotor concentrator system manufacturing, including rotor structure and assembly of complete VOC abatement systems.

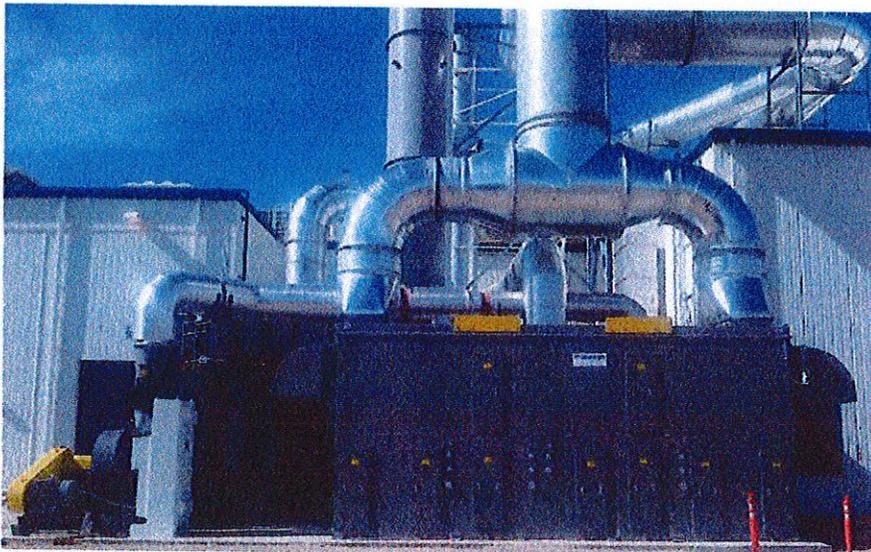
Shipped worldwide, Munters equipment is supported by an internal service organization available 7-days-a-week, 24-hours-a-day, with technicians and critical parts inventories located all over the globe.



**Rotor/RTO with Desorption Heater Configuration**  
Large airflow applications for aerospace or automotive finishing can be abated most cost effectively by taking advantage of the concentrator technology and fuel efficient regenerative thermal oxidation.

## Specifications

<b>Model No.</b>	IZS-DP3546-RTO
<b>Flow Rate</b>	100,000 scfm
<b>Inlet temperature</b>	77° F
<b>Rel. Humidity</b>	50 %
<b>Inlet Pressure</b>	-2 in W.C.
<b>VOC Loading</b>	50 lb/hr
<b>Zeolite Rotor</b>	3546 mm diameter 400 mm deep
<b>Prefilter</b>	30% paper 95% bag
<b>Thermal Oxidizer</b>	10,000 scfm
<b>CR</b>	10:1
<b>System Size</b>	31'5" x 12' (concentrator) 23'5" x 10'11" (RTO)
<b>System Weight</b>	35,930 lb (concentrator) 68,630 lb (RTO)
<b>Natural Gas</b>	2.9 mm Btu/h
<b>Electrical Usage</b>	180 kW
<b>DRE</b>	> 95%



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### Munters Zeol Installation List

CUSTOMER	Location	SCFM	Nm3/hr	APPLICATION
Firestone Building Products	CT (USA)	10,000	17000	Building Materials
Corus Lightstrip	(Netherlands)	18,000	30582	Coil Coating
Corus/EIS	(UK)	13,700	21600	Coil Coating
Preussac Stah/L&E	(Germany)	17,000	28900	Coil Coating
Amerimax Building Products	TX (USA)	36,000	56775	Composites
Azimut Yachts	Turin (Italy)	28,500	45000	Composites
Masonite	MS (USA)	20,000	31500	Composites
National RV	CA (USA)	28,000	47600	Composites
M+M Mars	IL (USA)	6,000	9500	Food & Drug
R.P. Scherer	FL (USA)	600	1100	Food & Drug
GEO	TX (USA)	7,000	11000	Groundwater
McClellan Air Force Base	CA (USA)	11,000	18700	Groundwater
Hitchiner Manufacturing	NH (USA)	13,400	21100	Investment Casting
Precicast	(Switzerland)	9,000	15300	Investment Casting
Medtronics	AZ (USA)	15,000	25485	Medical Instruments
Medtronics	AZ (USA)	30,000	49000	Medical Instruments
Soab	(Sweden)	13,000	22100	Metal Fabrication
Termoregulator	(Sweden)	18,000	30600	Metal Fabrication
Brentwood Industries	PA (USA)	15,000	25500	Packaging/Printing
Danapak	(Denmark)	152,000	258250	Packaging/Printing
Munksjo Inpack	(Norway)	12,600	20000	Packaging/Printing
SCANDIFLEX	(Sweden)	25,500	40,000	Packaging/Printing
Stenqvist	(Norway)	21,500	34000	Packaging/Printing
Tetra Pak	(Spain)	27,000	45900	Packaging/Printing
Tetra Pak	(Germany)	26,000	44200	Packaging/Printing
Tetra Pak	(Sweden)	27,000	45900	Packaging/Printing
Tetra Pak	(Italy)	35,000	59500	Packaging/Printing
Tetra Pak	Scania (Sweden)	5,000	8500	Packaging/Printing
Tetra Pak	Scania (Sweden)	27,000	45900	Packaging/Printing
Tetra Pak	(UK)	4,500	7700	Packaging/Printing
Trioplast	(Sweden)	15,800	25,000	Packaging/Printing
ABB Flakt	(Sweden)	59,000	100300	Paint/Coating
ADAC	MI (USA)	35,000	59465	Paint/Coating
Adept Plastic Finishing	MI (USA)	20,000	33800	Paint/Coating
Alcoa	(Hungary)	9,600	15,261	Paint/Coating
Alcoa Wheel Products	(Hungary)	10,600	16800	Paint/Coating
Alltub	(Czech Republic)	8,200	13,000	Paint/Coating
Barstow Marine Corps Base	CA (USA)	14,000	22000	Paint/Coating
Barstow Marine Corps Base	CA (USA)	40,000	68000	Paint/Coating
Barstow Marine Corps Base	CA (USA)	36,000	57000	Paint/Coating
Barstow Marine Corps Base	CA (USA)	23,000	36000	Paint/Coating
Becker Acroma	(Sweden)	11,000	18700	Paint/Coating
Beckers	(Sweden)	24,000	40800	Paint/Coating
Boeing	KS (USA)	86000	146200	Paint/Coating
BOMBARDIER	(Canada)	100,000	157,800	Paint/Coating
Bombardier Aerospace, Dorval	Quebec (Canada)	250,000	424753	Paint/Coating

Munters Corporation- Zeol Division  
 79 Monroe Street  
 Amesbury, MA 01913



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Bombardier Aerospace, Miralbel	Quebec (Canada)	200000	339802	Paint/Coating
Brofind S.P.A	(Italy)	25,300	40,000	Paint/Coating
Calhac, Inc.	CA (USA)	25,000	42500	Paint/Coating
Callaway Golf	CA (USA)	20,000	33800	Paint/Coating
Caterpillar	TX (USA)	50,000	79000	Paint/Coating
Caterpillar	TX (USA)	73,900	116,396	Paint/Coating
Chromium Corporation	TX (USA)	32,500	55300	Paint/Coating
Chrysler	(Mexico)	36,000	56900	Paint/Coating
Chrysler	MI (USA)	240,000	407763	Paint/Coating
Daihan Ink	(Korea)	17000	27000	Paint/Coating
Dampa	(Denmark)	22,500	38300	Paint/Coating
Decoma	(U.K.)	76,090	120,000	Paint/Coating
Decoma	(U.K.)	76,000	120,000	Paint/Coating
Donnelly Hohe	(Germany)	32250	54900	Paint/Coating
Dragon Products	TX (USA)	90,000	142000	Paint/Coating
Dragon Products	TX (USA)	164,000	259000	Paint/Coating
Elizabeth Tayler Shutters	CA (USA)	29,000	49370	Paint/Coating
FAW (Automotive)	(China)	56,400	88,900	Paint/Coating
Ferrari	(Italy)	45,625	77600	Paint/Coating
Fort Bragg ALMD	NC (USA)	40,000	68000	Paint/Coating
General Dynamics NASSCO	CA (USA)	250,000	395000	Paint/Coating
General Motors	LA (USA)	305,000	518198	Paint/Coating
Haartz Corporation	MA (USA)	20,000	34000	Paint/Coating
Harbor Truck	CA (USA)	38,400	60600	Paint/Coating
Honda of America	OH (USA)	86,000	136000	Paint/Coating
IAC Group (Automotive)	(Slovakia)	10,200	16,000	Paint/Coating
Indalex	Quebec (Canada)	72,000	114,000	Paint/Coating
International Truck	Ontario (Canada)	16,500	26000	Paint/Coating
Intesa Meccanica	(Italy)	40,000	63000	Paint/Coating
J.B Nielsen	(Denmark)	88,000	149600	Paint/Coating
JLG Industries Inc.	PA (USA)	54,000	91800	Paint/Coating
Koito	(UK)	44,000	74757	Paint/Coating
Leer West	CA (USA)	42,000	339,802	Paint/Coating
Letterkenny Army Depot	PA (USA)	135,000	229500	Paint/Coating
Lockheed Martin	CA (USA)	100,000	158000	Paint/Coating
Lockheed Martin	TX (USA)	203,000	320,150	Paint/Coating
Masonite	MS (USA)	42,000	71400	Paint/Coating
MCLB	CA (USA)	36,000	56,700	Paint/Coating
Medias Industries	(Romania)	51,300	81000	Paint/Coating
Mercedes Benz	(Germany)	140,000	238000	Paint/Coating
Mercedes Benz	(Germany)	60,000	102000	Paint/Coating
Mercedes Benz	(Germany)	24,000	40800	Paint/Coating
Metso Minerals	(Sweden)	15,800	25,000	Paint/Coating
Monaco Coach Corp	OR (USA)	2 x 50,000	2 x 85,000	Paint/Coating
National RV	CA (USA)	6 x 40,000	6 x 67,600	Paint/Coating
Northrup Grumman Ship Systems	MS (USA)	40,000	68000	Paint/Coating

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NUMMI	CA (USA)	58,700	92700	Paint/Coating
Pearl Musical Instruments	Taiwan (ROC)	39,500	62,450	Paint/Coating
Pearl Musical Instruments	Taiwan (ROC)	39,500	62,450	Paint/Coating
Peugeot	(France)	128,750	218900	Paint/Coating
Plastic Omnium	(UK)	50,500	85900	Paint/Coating
Plastic Omnium	(UK)	50,500	85900	Paint/Coating
PLM	(Austria)	12,000	20400	Paint/Coating
Rehau/Mercedes	AL (USA)	62,300	105800	Paint/Coating
Renault	(France)	30000	51000	Paint/Coating
R-TEK	Tyne&Wear (UK)	20725	36000	Paint/Coating
Saab – Scania	(Sweden)	18000	30600	Paint/Coating
Sagemis	(Russia)	700,000	1,100,000	Paint/Coating
Saleen	CA (USA)	55,000	87000	Paint/Coating
Schmalbach/ Lubeca	(Germany)	53000	90100	Paint/Coating
Schmalbach/ Lubeca	(Germany)	2 x 19,000	2 x 33,000	Paint/Coating
Sevelnord	(France)	30000	51000	Paint/Coating
Silgan Container	IL (USA)	18,000	32000	Paint/Coating
SSAB	(Sweden)	29,300	46,200	Paint/Coating
SST Truck	TX (USA)	25,000	42500	Paint/Coating
Toyo Seican	(Japan)	9,000	15300	Paint/Coating
Toyota	(France)	23,000	39077	Paint/Coating
Unknown - EIS	(Czech Republic)	20,000	31,200	Paint/Coating
Uralvagonzavod	(Russia)	760,000	1,200,000	Paint/Coating
VESTAS UNIT #1	CO (USA)	80,000	126,233	Paint/Coating
VESTAS UNIT #2	CO (USA)	80,000	126,233	Paint/Coating
Vestfrost	(Denmark)	40,000	67960	Paint/Coating
Volkswagon	(Germany)	170,000	288832	Paint/Coating
Volvo	VA (USA)	191,000	324700	Paint/Coating
Volvo	(Sweden)	5,000	8500	Paint/Coating
Volvo	(Sweden)	34,000	57800	Paint/Coating
Volvo	(Sweden)	75,000	127500	Paint/Coating
Volvo	(Sweden)	50,700	80,000	Paint/Coating
Acer	Taiwan (ROC)	37,000	62900	Semiconductor
Acer	Taiwan (ROC)	38,000	64600	Semiconductor
Analog Devices	MA (USA)	28,000	47600	Semiconductor
AOQ	Taiwan (ROC)	52,000	82,000	Semiconductor
Applied Materials	CA (USA)	15,000	25485	Semiconductor
AU Taichung	(Taiwan)	30,000	47000	Semiconductor
AUO	Taiwan (ROC)	(4) x 29,000	45,700	Semiconductor
Cando	Taiwan (ROC)	28,771	45,375	Semiconductor
Conexant	CA (USA)	15,000	25500	Semiconductor
Conexant	CA (USA)	25,000	42500	Semiconductor
Dallas Semicondctor	TX (USA)	20,000	32000	Semiconductor
Dexon	Taiwan (ROC)	60,925	96,000	Semiconductor
Fairchild Semiconductor	ME (USA)	28,000	47600	Semiconductor
Fujifilm Dimatix	CA (USA)	7,000	11,100	Semiconductor

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