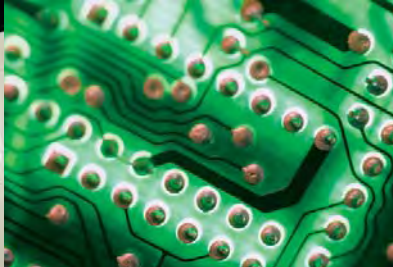


Dehumidification Division – Industrial

Dehumidification Units and Systems



The World Leader In Desiccant Dehumidification

Munters manufactures and services Cargocaire desiccant dehumidifiers and dehumidification systems. Our equipment removes moisture from the air, which allows you to control humidity in your buildings and industrial processes to very low levels. Our equipment is used by more than 20 major industries which use our products for more than 150 different applications.

Our Dehumidification Technology

When you load your camera with 35 mm photographic film, you are probably using a product manufactured with the help of our dehumidifiers. And next time you hear of a friend who has had a cardiac pace-maker implant, or when you enjoy fine chocolates, or when you find relief from an upset stomach by using an effervescent tablet, you can be reminded of the subtle but important role played by our equipment in the daily lives of hundreds of millions of people. All Cargocaire dehumidification equipment is manufactured in the USA under ISO 9001:2000 certification.

Our equipment removes moisture from air by using a desiccant – a material which easily attracts and holds water vapor. Desiccant dehumidifiers are especially well-suited to removing moisture from air at low temperatures and low humidities.

In our units, the desiccant is impregnated into a corrugated ceramic composite

material which is formed into a wheel. Air passes easily through the flutes, contacting the desiccant. The wheel rotates slowly (6 to 10 rph) between two air streams. The incoming process air stream – the larger one – gives off its moisture to the desiccant. The process air is dry as it leaves the wheel. The humidity-laden wheel rotates slowly into a second, smaller airstream which has been heated. This smaller exhaust airstream – called the reactivation air – warms the desiccant. The warmed desiccant gives off its moisture, which is then carried away by the reactivation air. The newly dried desiccant material is rotated back into the process air, where it absorbs moisture once again.

The desiccant support structure, which we call the HoneyCombe® wheel, is quite remarkable. It can hold more than its own weight in water vapor. Our wheels are built to collect and release water six times every hour, 24-hours-a-day, 7-days-a-week,

for years. This durability is one reason our dehumidifiers require so much less maintenance attention than other air conditioning system components like compressors and controls.

The rotary desiccant wheel was pioneered in Cargocaire dehumidifiers. We are the company which invented the first generation of wheels in 1958, and more than 100,000 units have been placed in service to our customers all around the world. Over the years, we have developed many different types of desiccant wheels (see page 3) which allow us to optimize our dehumidifiers to meet a broad spectrum of customer needs.

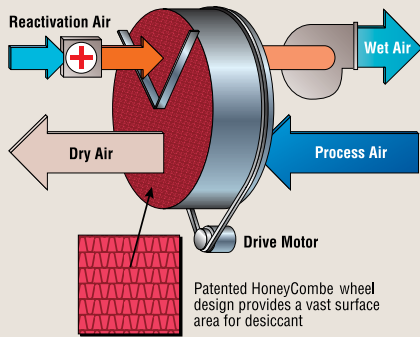
Build Your Success On Our Experience

While state-of-the-art hardware is certainly an advantage, our application experience is what really delivers the benefits to our customers. Often, our customers are first-



Used in a broad array of applications, Cargocaire dehumidifiers provide the humidity control required in many process and technical manufacturing situations.

ROTOR TECHNOLOGY



time or infrequent users of desiccant technology, and they find our half-century of day-to-day experience especially helpful. We provide a broad range of technical support services to help you optimize each installation for functional efficiency, low first cost and low operating cost.

For example, our organization includes more than 120 application engineers, who are located throughout North, Central and South America. Not only have these engineers had decades of experience, we keep track of what they have learned and make it available to you.

Our central application support office in Amesbury, MA maintains hundreds of binders full of useful technical information related to applications. Whether you call with questions about pharmaceutical and food processing, preventing corrosion and microbiological contamination, drying photographic film; or when you need to know about the hygroscopic characteristics of seeds, fertilizers and powdered potatoes, we can provide useful reference material and bibliographies. This documentation is available to you through our application engineers. Our unique consulting and information retrieval services come to you at no additional charge beyond the cost of the equipment. We want to help you avoid known problems of the past, and we are eager to support your success with our experience.

Munters: An International Company with a Tradition of Innovation

Cargocaire Engineering Corporation was founded in 1939 by Commander Oliver Colvin, USN, to provide a solution to the costly problem of cargo deterioration caused by humidity. That focus gave the company its name. After World War II, Commander Colvin expanded operations from cargo ships to military storage, and then into industrial uses for dehumidification such as pharmaceutical and electronics manufacturing. In the late 1950's, the R&D department of Cargocaire began a cooperative development program with Carl Munters, the Swedish-born inventor of the absorption refrigerator and foam-board insulation. The program resulted in the introduction of the HoneyCombe wheel, a major advance in dehumidification technology which continues to lead the industry today.

After Commander Colvin retired, the Munters and Cargocaire companies were merged, and they continued to expand operations throughout the world. Today, the company operates 11 manufacturing plants and has offices in 25 countries. Munters Corporation produces products as diverse as advanced VOC pollution control equipment, gas cleaning media, humidification media, as well as HoneyCombe dehumidifiers and Integrated Custom Air Handler (ICA) systems.

We pioneered the use of dehumidification equipment for warehouses, active-duty military equipment, lithium battery manufacturing and even supermarkets, where reduced humidity helps refrigeration systems operate more efficiently. Our equipment also helps protect the cultural heritage of humankind by preventing deterioration of ancient Egyptian artifacts in Cairo and the



TOP: Commander Oliver Colvin founded Cargocaire in 1939, pioneering the use of desiccant dehumidifiers to prevent humidity damage to marine cargo. BOTTOM: Carl Munters, the Swedish-born inventor of the absorption refrigerator and plastic foam insulation, worked with Commander Colvin's company to create the first desiccant wheel dehumidifier. Cargocaire and Carl Munters' companies were merged in 1979.

photographs of the Apollo moon landing in Houston, Texas. We have a tradition of innovation and eager pursuit of sound technical solutions to challenging problems.

Call us at (978) 241-1100 or (800) 843-5360, send us a FAX at (978) 241-1214 or e-mail us at dhinfo@munters.com. We look forward to serving your needs as we have done for our customers for over half a century.

DESICCANT OPTIONS

We manufacture five different types of desiccant wheels, each with distinct absorption characteristics.

Titanium Silica Gel

When your installation requires operation in highly saturated air streams, titanium silica gel is an excellent choice.

It has moderate moisture capacity over a broad range of humidity levels with moderate reactivation energy requirements. No silica gel wheel outperforms the Titanium gel wheel. Resistant to "wash out," these enhanced wheels provide 90% or greater efficiencies for up to ten years of operation.

Lithium Chloride

If your application requires high moisture removal capacity with minimal energy requirements over a broad range of humidity levels, lithium chloride wheels are especially useful.

Also, as a natural inhibitor of microbiological growth, lithium chloride desiccant wheels are often used where minimizing biological contaminants is essential.

HPX Desiccant

Cargocaire's unique HPX wheel is an adsorbent that provides very low dew points (-70°F and lower). This desiccant is used under the advice of a Cargocaire engineer for specialty applications.

HCR Desiccant

Munters proprietary HCR wheel is an adsorbent wheel that is designed to use low temperature air for reactivation. The wheel is standard in Munters HCU dehumidifiers. HCU dehumidifiers use refrigeration waste heat for desiccant reactivation.

Molecular Sieve

In very dry environments, zeolite desiccants are ideal. In return for a somewhat larger investment in reactivation energy, they remove moisture from even the warmest, driest airstreams. When your application requires humidity control below 10% relative humidity, or when hot air must be dehumidified, zeolite wheels offer advantages over other types of desiccants.



Off the Shelf Units (HC)

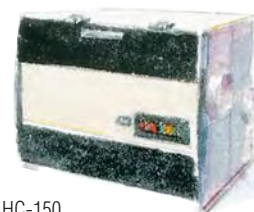
At the smaller end of our product line we make standard dehumidifiers with capacities from 30 to 300 scfm (standard cubic feet per minute). You can install these easily by plugging them into a wall socket and connecting duct work. They come complete with fans and heaters. These units can operate automatically and are often used in applications like archival storage, museums, small environmental chambers and military storage applications. For example, three of these units currently protect Leonardo da Vinci's famous fresco "The Last Supper" from excess humidity.



HC-300



MG-90



HC-150



M-120

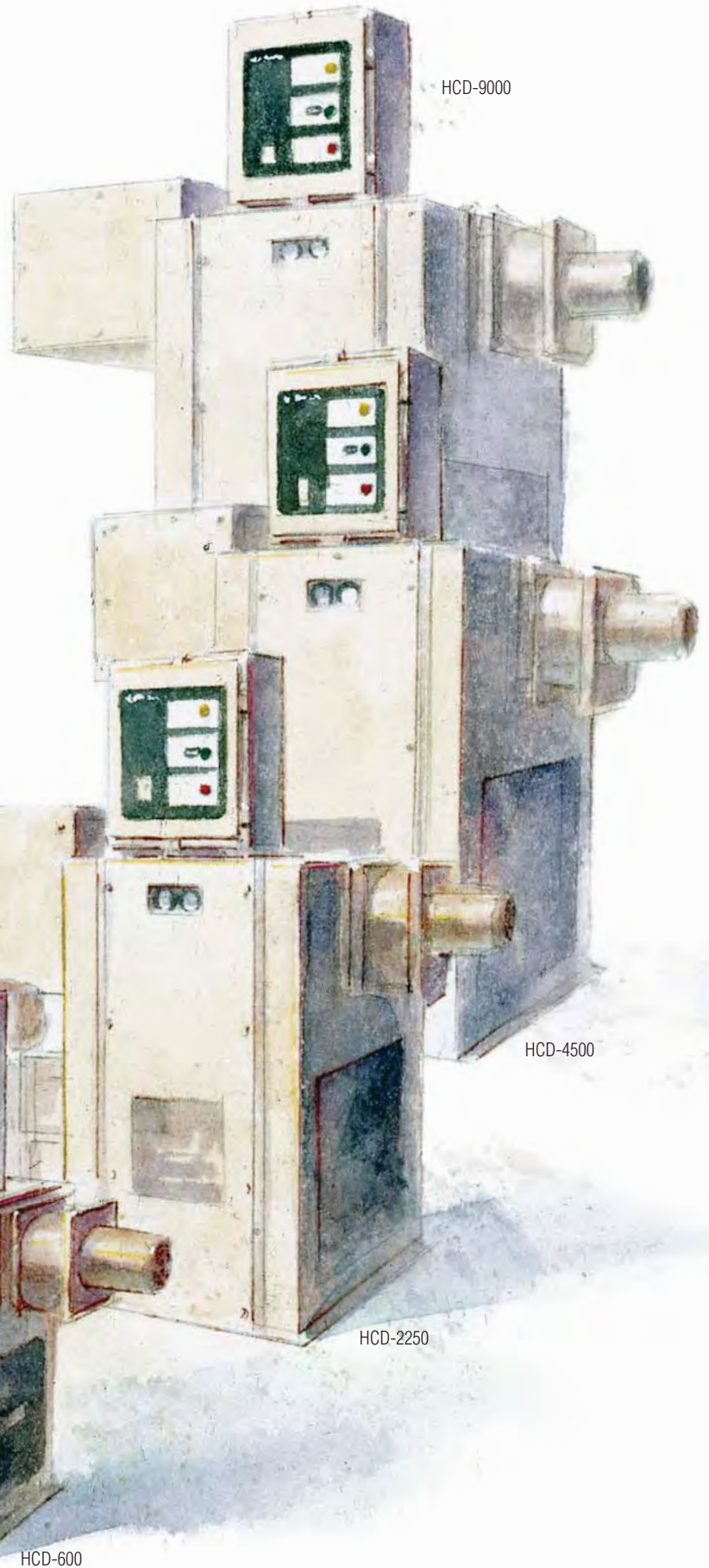


Modular Units with Options (HCD)

For customers who need to integrate desiccant dehumidifiers into their own processes or air conditioning systems, we offer our HCD-series modular dehumidifiers with capacities from 600 to 12,000 scfm. These modules can be combined to form even larger systems.

Along with the basic HoneyCombe rotor-drive-and-seal assembly, we can provide your choice of process and reactivation fan and either gas, steam or electric reactivation heater modules for you to integrate into your system. We can also supply modular heating and cooling coils and filters in air-tight enclosures to work along with the dehumidifier.

These modular dehumidifiers are used in a very wide variety of applications from clean room humidity control to chocolate coated candy and central dry air systems for pharmaceutical manufacturing.



HCD-9000

HCD-4500

HCD-2250

HCD-600

HCD-1125



Integrated Custom Air Handler (ICA)

The ICA is a state-of-the-art double wall custom air handling system. Its unique panel design provides a true no through metal construction. Panels are available in 2.5" and 4.0" thick construction to prevent external condensation in even the toughest environments. The large, smooth-fitting panels of the ICA create fewer joints, preventing leaks and improving sanitation.

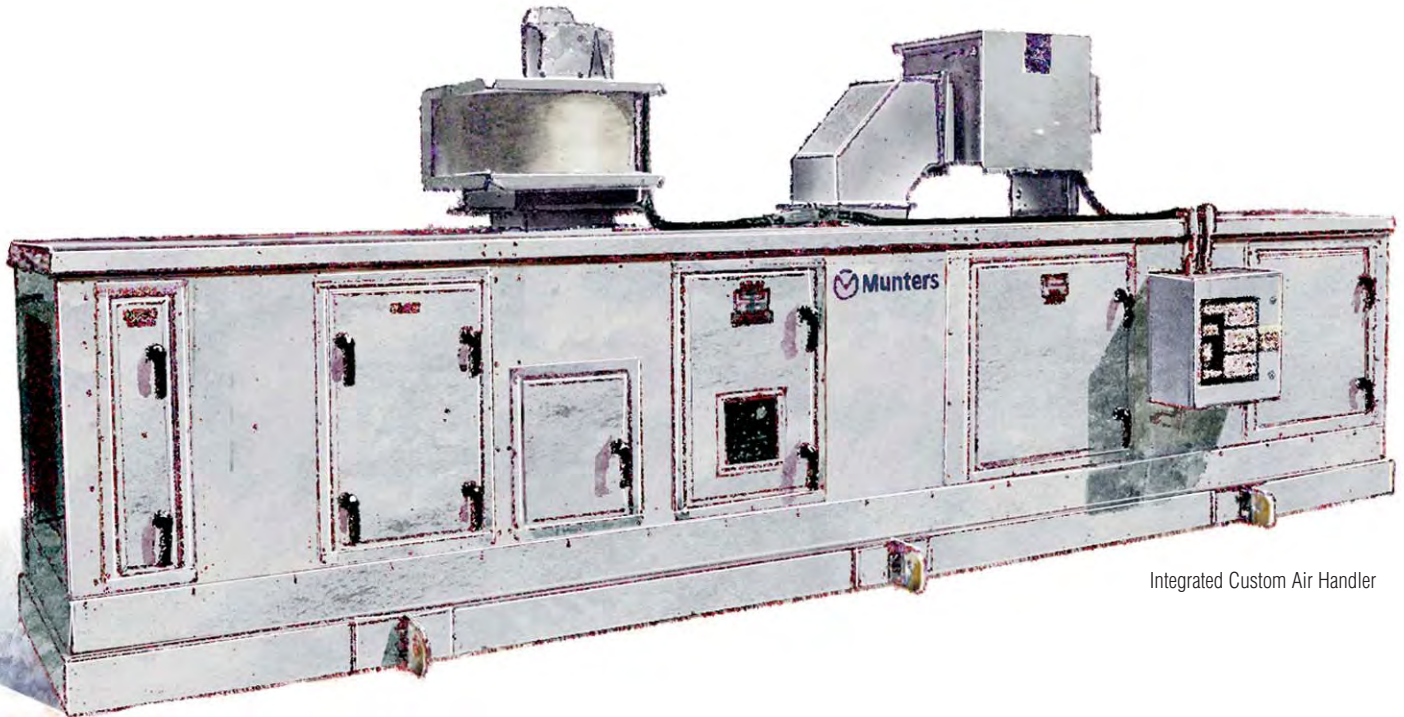
Often customers ask us to engineer and assemble an entire dehumidification and air conditioning system including cooling and heating elements and sophisticated controls, as well as the dehumidifier. All components are assembled on an aluminum skid and tested as a system at the factory. The systems are available in airflow capacities from 400 to 100,000 scfm.

Our ICA systems are often used for hundreds of critical manufacturing processes such as surgical suture

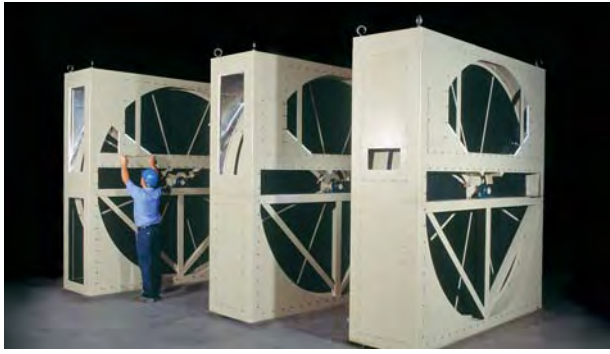
packaging, production of computer microprocessors and controlling humidity in plutonium-handling rooms.

When you need the ultimate in reliability, consider one of our custom-designed ICA systems to save you the time and costs of designing and testing your own system.

The ICA concept can save thousands of dollars and reduce coordination problems on the job site because the system arrives ready-to-run after connection of duct work and utilities. Your in-house design time is reduced and on-site construction is simplified. Many of our customers find these benefits are especially useful when their design resources are limited or where skilled labor is costly or hard to find. And for ICA systems, factory-trained service engineers are available for start-up and service contracts. With a Cargocaire ICA, you can relax and concentrate on other aspects of your complex projects, knowing the design and construction of your dehumidification system is in good hands.



Integrated Custom Air Handler



Large-scale Modular Dehumidifiers (HCE)

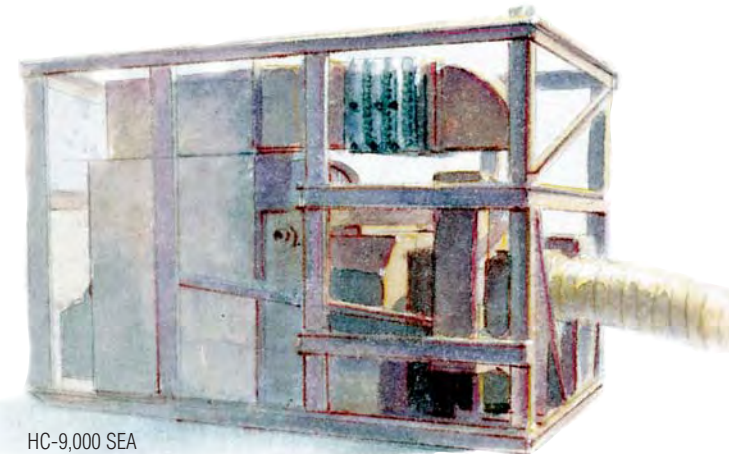
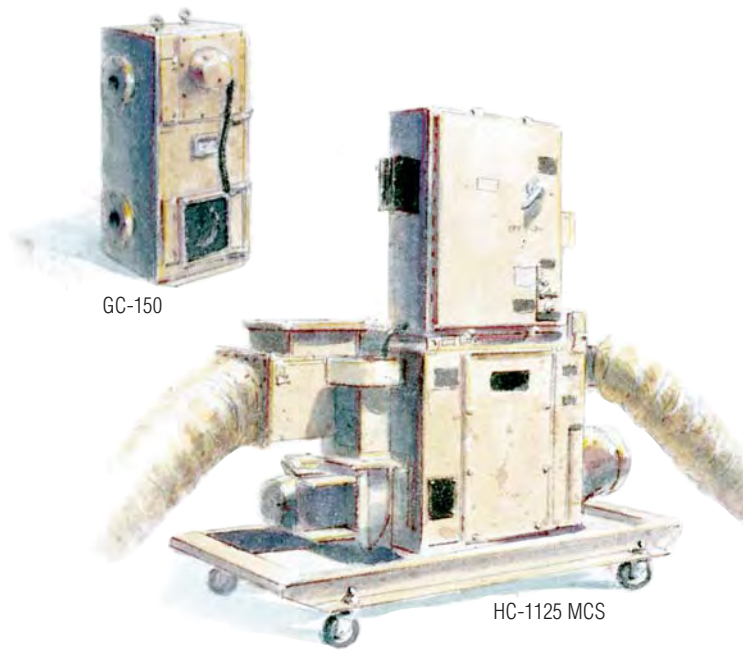
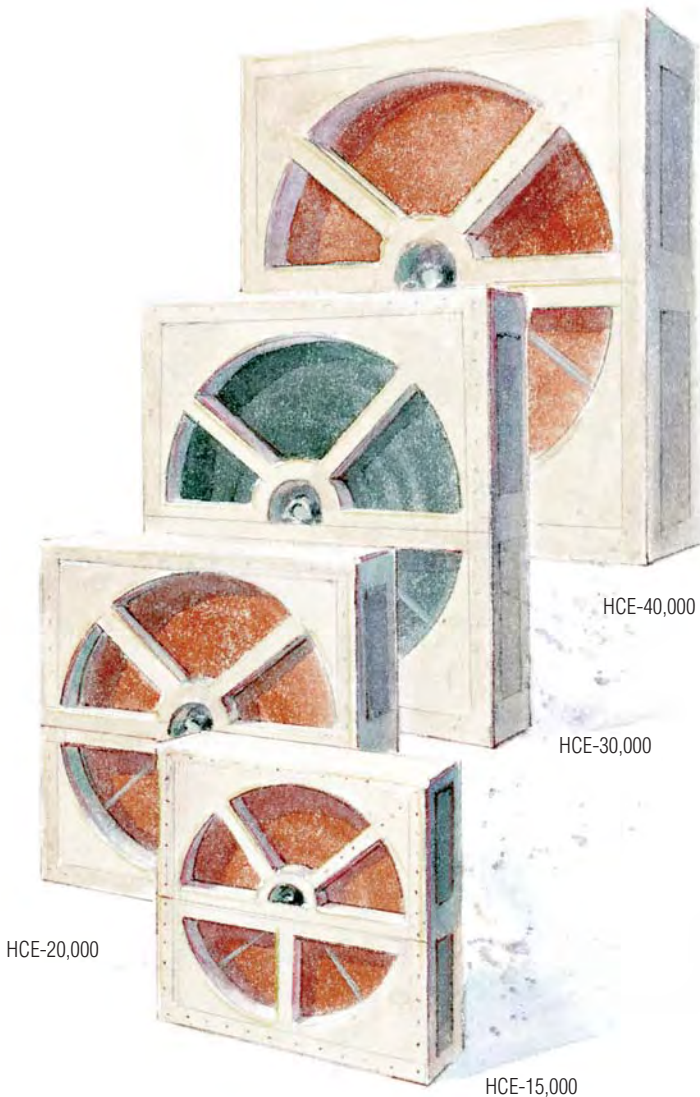
To dry airstreams larger than 10,000 scfm that do not require treatment other than dehumidification, our HCE-series of modular units are the ideal choice. Available in four sizes from 15,000 to 40,000 scfm, the HCE modules can be combined to dry airflows of any size.

Our modular approach to large airflows is economical compared to a single-unit design because individual modules can be brought on-line or shut down as the moisture load changes. This avoids the cost of running a single large unit for a small moisture load. In some cases, the energy cost savings of a modular approach to large systems can be measured in tens of thousands of dollars per year.



Special Purpose Dehumidifiers

Occasionally, customers need dehumidification solutions that are highly specific to a single purpose. For example, we supply dehumidifiers with special materials and stringent vibration and noise specifications to dry out missile tubes in the Trident Nuclear Submarine. We also provide special portable dehumidifiers with structural bases and large casters which are used for temporary drying of buildings and emergency replacements in industrial processes. We can respond to unique situations, giving you just what you need at a price which meets your budget.



Nation-wide Service Support

Because we have been serving critical industrial and military operations since 1939, we understand the need to support our customers with a fully-staffed and trained field service department. Many of our customers operate critical process applications like nuclear material production, photographic film manufacturing and industrial blasting and coating. In such applications, even a few hours of downtime can cost hundreds of thousands of dollars in lost profits. Consequently, we provide all of our customers with service support 24-hours-a-day, 7-days-a-week

at 1-800-843-5360. In addition to our service headquarters in Amesbury, MA, service technicians and critical parts inventories stand ready in offices throughout the United States, Puerto Rico and Canada.

Parts Manufactured in the US

We manufacture and stock desiccant wheels and other critical parts at our main plant in Amesbury, MA. Our domestic manufacturing facilities allow us to ship parts to you, often within hours of your order. Customers tell us that this is an important benefit, as they often have foreign made equipment out of service for

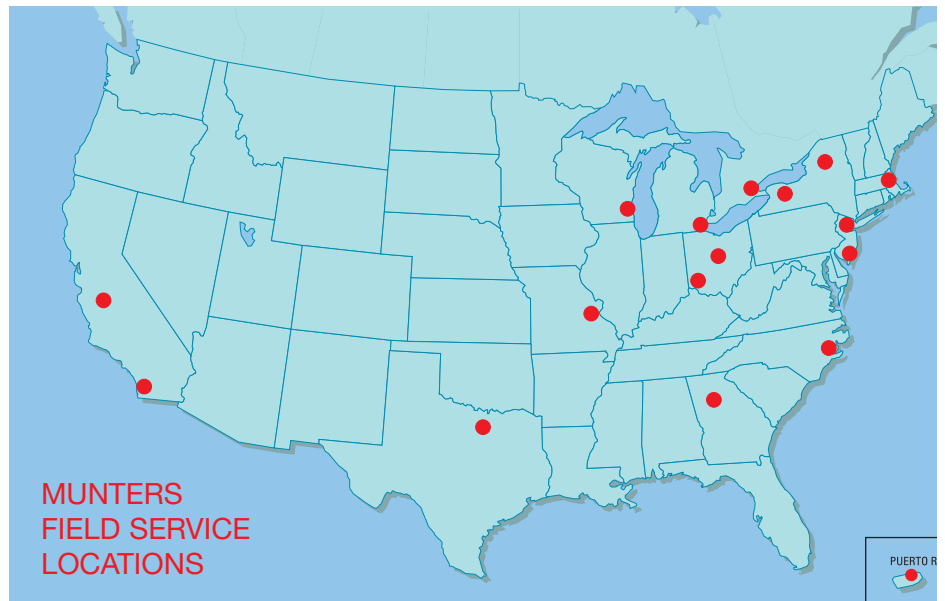
months, while critical parts are obtained from overseas.

Worldwide Support

Many of our customers use our equipment all across the globe. Munters is the largest manufacturer of desiccant dehumidification equipment in the world, with 11 factories on three continents and sales and service in over 25 countries. As the only truly international supplier of desiccant equipment, we can support your needs with local technical experts no matter where your operations may take you in the future.



A national service organization provides 24-hour support for Cargocaire wheels and dehumidifiers. Munters stocks wheels and parts at its Amesbury, MA facility, and other field service locations nationwide, allowing immediate emergency response.



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