

NAVAL SHIPS APPLICATION GUIDE



Fleet corrosion protection from
the damaging effects of humidity





The Challenge

High levels of humidity can cause costly damage to ships and internal components.

Moisture facilitates the formation of rust on metal parts of the ship, including hull, cables, sensors, propulsion subsystems, weapon and command (sub) systems. Rusting on any of these vital areas can lead to such problems as tension corrosion, susceptibility to bending and torque forces, reduction in electrical resistance and

induced faults on electric and electronic components leading to breakdowns of complete systems.

Additional moisture related issues include extensive maintenance labor, fungus in fuel tanks, decreased shelf life of ammunition and mold growth on dry good and equipment.

A humid environment in combination with high salinity can create an aggressive agent that

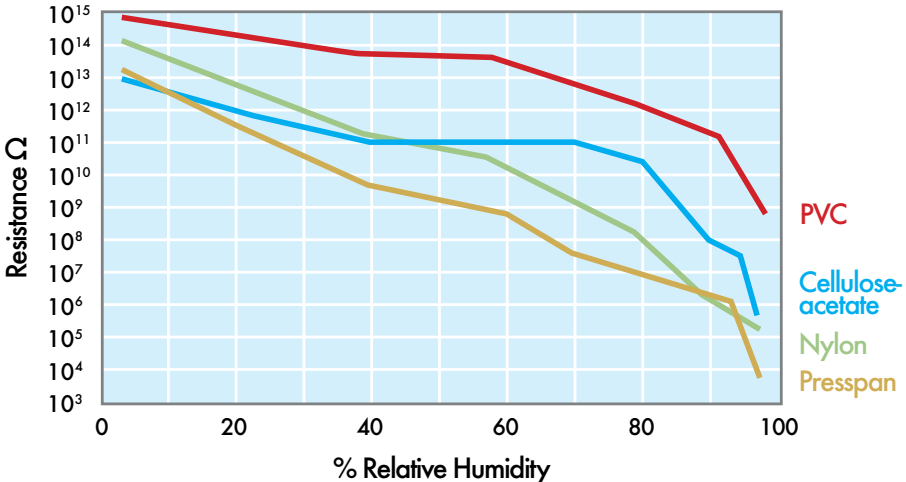
can cause electrical/electronic failures and/or mechanical damage in a multitude of areas. This extremely corrosive environment can affect the operation of sensors, weapon command systems and propulsion systems of naval ships. Uncontrolled humidity can cause serious problems and will adversely influence the operational readiness of the ships.

The Solution

Corrosion can be prevented by reducing the Relative Humidity (RH) or "taking away" the moisture from the atmosphere around corrosion sensitive parts and materials.

Traditionally, heat is most commonly used to reduce the RH of the air. But heating does not take away the moisture, and in fact can make it worse over a prolonged period, not to mention the increase in cost as a result of adding heat.

Munters DEW-Series of dehumidification systems, designed specifically for military applications, removes unwanted moisture and delivers air at the required specification for the application.



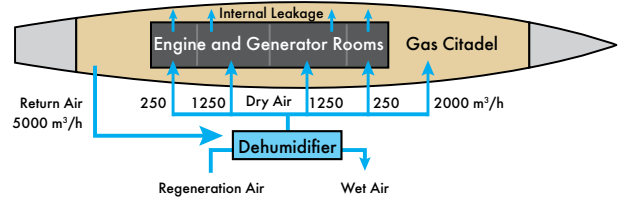
How Munters Can Help

Ships in storage

For ships in short or long term storage, Munters dehumidification solution includes:

- One or more dehumidifiers
- A network of blower ducts for efficient distribution of dry air
- A control system of humidistats to maintain the specified RH
- Deck installations can be either removed and stored in dry air storage on shore, or covered using dehumidified cocooning

A 3600 ton frigate can be stored for short or long periods using 3000 SCFM of dry air. The ship can be activated within 24 hours.



Active status ships

Active status ships can be protected in the following ways:

- Protection of certain rooms or areas with stand alone dehumidifiers
- Protection of the whole gas citadel with dehumidification integrated into the ships' air handling system
- Protection during maintenance activities
- During refit or maintenance activities, small portable dehumidifiers can be used
- Use of the ships' air handling system to distribute dry air throughout the ship both day and night

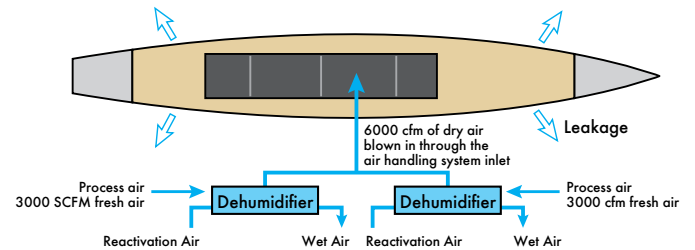
When the air handling system is removed during refit or intermediate maintenance, selected rooms with high value electronics can be protected using small dehumidifiers.



Selected rooms and objects are dehumidified

- Operations rooms
- Central computer room
- Electronic warfare rooms
- Fire control rooms
- Communications centers
- Radar rooms
- Radar antenna domes
- Gas turbines
- Reduction gearboxes

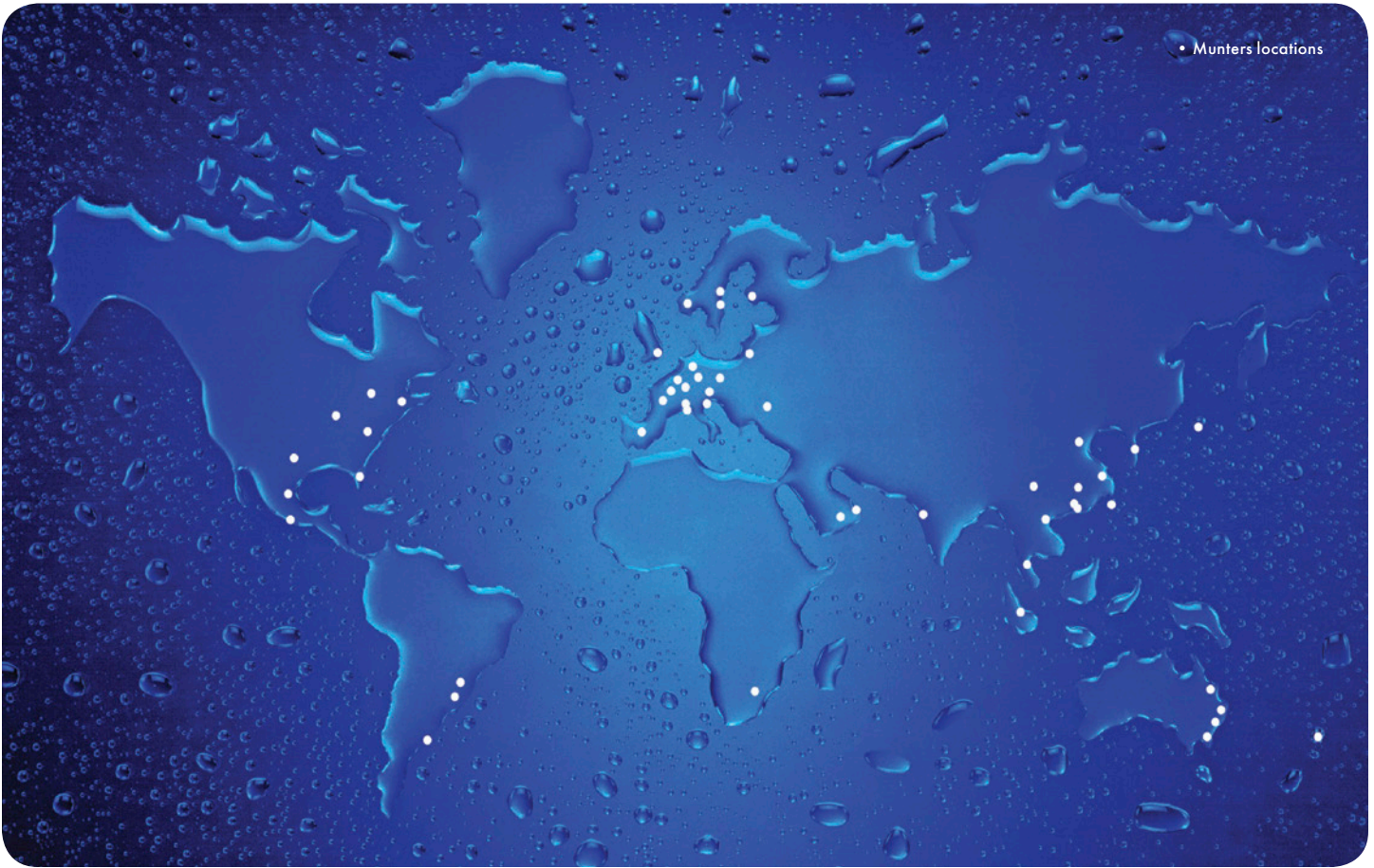
During refit or intermediate maintenance, in some cases, the ships entirety can be dehumidified using dehumidifiers placed on deck.



Benefits

- Reduced corrosion and other moisture induced damages
- Extended MTBF on mechanical and electrical (sub)systems
- Ease of ship maintenance
- Improved ship readiness
- Fast reactivation after storage
- Optimal protection of ship stores
- Internal component condensation avoided





Munters is a global leader in energy efficient air treatment solutions.

Munters manufactures engineered products that can economically control humidity and temperature, provide energy recovery, and/or utilize direct or indirect evaporative cooling for comfort, process and environmental protection.

With permanent or temporary solutions, Munters offers a wide variety of options to meet specific climate, application and budget requirements.

Munters has net sales approaching \$1 billion USD with more than 20 manufacturing facilities across the globe and sales offices in over 30 countries.

Munters employs approximately 2,900 people worldwide.

For more information see www.munters.us

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