

## Air Conditioning and Refrigeration Equipment (Non-Ammonia Types) Maintenance Guidelines

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### Introduction

Air conditioning and refrigeration equipment is the workhorse of many manufacturing and commercial operations, whether used in processing, storage of perishable goods or for general comfort cooling. The value of keeping the business operating or cooling the materials being stored can be many times higher than the value of the equipment itself.

The best way to ensure equipment is reliable and in good condition is through regular maintenance, inspection and testing. Through many years of working with our clients and investigating equipment breakdowns, Travelers Risk Control has developed maintenance guidelines for air conditioning and refrigeration equipment. These guidelines are based in part on standards established by the American Society of Heating, Air Conditioning and Refrigeration Engineers. While it is difficult to address all types of equipment and take into account the wide variety of applications and operating conditions, these guidelines provide an information base that can be used to develop an effective maintenance program. Since operating conditions vary, it may be necessary to have more frequent and thorough inspections and maintenance than described in these standards. In addition, using longer intervals between inspections should be considered only after discussion with qualified individuals, including but not limited to, your Boiler and Machinery Insurance Engineer. These discussions should include a careful review of the system configuration and history of inspections, as well as any past problems with the equipment.

The guidelines that begin on the next page relate to maintaining good operational reliability. Federal EPA regulations associated with the Clean Air Act require additional record keeping regarding CFC refrigerant consumption. There are also requirements relating to leak repair. For further details, contact your refrigeration maintenance contractor or the EPA. To obtain a copy of the Clean Air Act Regulations, you can call the EPA Hotline at 800.296.1996.

**Note: The system maintenance guidelines begin on the next page.**

## Air Conditioning and Refrigeration Equipment (Non-Ammonia Types) Maintenance Guidelines

### Compression Air Conditioning and Refrigeration Systems Maintenance

Task	Frequency
Log system parameters manually and perform visual inspection of system components (this is done in addition to any electronic data logs)	Daily
Document all maintenance activities	As performed
Check superheat setting (adjustable expansion valves only) Superheat for halocarbon refrigerants is recommended at 8 to 12 degrees for air conditioning and 3 to 6 degrees for refrigeration	Annually
Perform motor insulation resistance test (Megger) For hermetically sealed systems, follow manufacturer's instructions	Annually
Test compressor oil (test should include: acid content, water content, viscosity and wear metal content)	Annually
Test safety trip and alarm devices	Annually
Test crankcase heater or oil reservoir heater operation	Annually
Inspect cylinder unloaders <b>Note:</b> Reciprocating compressors, if installed	Annually
Test vane control motor on centrifugal units	Annually
Inspect and overhaul purge unit on units with evaporators that operate at less than atmospheric pressure (e.g., R-123 units)	Annually
Clean condenser and evaporator <b>Note:</b> Air-cooled – include combing of cooling fins; water-cooled – include brushing of tubes	Annually
Clean and inspect cooling tower and fans	Annually
Perform electronic tube testing (eddy current) of condenser and evaporator tubes <b>Note:</b> Results of initial test will determine frequency of future tests	Initial test of vacuum units (low pressure) – 5 years High-pressure units – 8 years
Dismantle compressor and perform overhaul inspection <b>Note:</b> Follow manufacturer's frequency if different	Reciprocating $\geq$ 50 HP – 25,000 hours Centrifugal – 50,000 hours
Institute water treatment program <b>Note:</b> For condenser cooling water and chilled water systems	Continuous

**Note:** The absorption system maintenance guidelines begin on the next page.

## Air Conditioning and Refrigeration Equipment (Non-Ammonia Types) Maintenance Guidelines

### Absorption Air Conditioning and Refrigeration Systems Maintenance

Task	Frequency
Log system parameters manually and visually inspect system components	Daily
Document all maintenance activities	As performed
Operate purge unit	Weekly
Test safety trip and alarm devices	Annually
Test all temperature and pressure sensing devices	Annually
Perform motor insulation resistance test (megger) on solution pump motors <b>Note:</b> As per manufacturer's instructions	Annually
Service and overhaul purge unit	Annually
Clean magnetic strainers	Annually
Analyze lithium bromide solution Test to include: inhibitor concentration, specific gravity, wetting agent concentration, dissolved metal concentration, alkalinity and ammonia concentration	Annually
Perform electronic tube test of all tube nests <b>Note:</b> Results of initial test will determine frequency of future testing	Initial test – within 5 years
Water treatment program <b>Note:</b> Chilled water and condenser cooling water systems	Continuous

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