Custom Engineered Chillers
For Medical Imaging Equipment

Filtrine

Made in USA
**Filtrine Manufacturing Company**

15 Kit Street Keene, NH 03431 USA

800-930-3367 • 603-352-5500

www.filtrine.com • cool@filtrine.com

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**Filtrine...** as a company with more than a century of experience, we are understandably proud of our long-standing reputation for engineering and building high-quality, application specific products.

**Filtrine** is recognized around the world as the provider of innovative solutions for liquid cooling as well as the manufacturer of the highest quality chillers for medical applications. No other chiller manufacturer has been doing it longer.

**What makes Filtrine different?**

Over 80 years ago Filtrine decided to use the storage method of cooling. This fly-wheel approach has stood the rigorous test of time and provides:

- **Consistent outlet temperatures** even with the wide and variable load swings typical in medical applications.
- **Low energy consumption** due to long cooling cycles (fewer stops and starts) and lower condensing temperature.
- **No risk** of chiller barrel freeze-up.
- **Reliability**. Typically, chiller operating lifetime is 2-3 decades.
- **Glycol-free solutions** that are more environmentally friendly without the risk of freeze up.
- **Demanding ambient conditions from -30°F to 120°F**.
- **Multiple medical systems or multi-modality cooling** from a single chiller with full redundancy and fail-safe backup (MRI/CT, MRI/MRI, CT/CT, LinAcc/LinAcc)

These leading medical equipment manufacturers recommend Filtrine in their planning documents:

- Varian Medical Systems
- Siemens Medical Solutions
- Hitachi Medical Systems
- GE Medical Systems
- Aurora Imaging Technology
- Philips Medical Systems
- Elekta

See Medical Chiller Selection Chart (page 3) for specific model designs for each manufacturer.

As chiller experts in the medical field, we have learned what is vital to our users:

- **Proper installation**
- **Trouble-free start up**
- **No-hassle 24/7 operation**
- **Quick response for service**

This translates to more scan time and productivity for the medical facility.

**Filtrine** actively maintains a roster of over 250 service agents, nation-wide, so the call for service is answered quickly and effectively. Your problem is resolved by technicians experienced in servicing and repairing of equipment for medical applications.

Our field sales engineers are fully trained and well-versed in our chiller design options and are eager to meet with the engineer, architect, owner or project manager to address any chiller questions or concerns.

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### MEDICAL CHILLER SPECIFICATIONS AND SELECTION CHART

<table>
<thead>
<tr>
<th>MFR</th>
<th>SYSTEM</th>
<th>MFR MODEL</th>
<th>HEAT DISSIPATED INTO WATER</th>
<th>COOLANT FLOW RATE</th>
<th>COOLANT TEMP.</th>
<th>FILTRINE CHILLER MODEL</th>
<th>FILTRINE ENGINEERING BULLETIN</th>
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**CHART CONTINUED FROM PREVIOUS PAGE**
Chiller specs, start-up and warranty

GENERAL SPECIFICATIONS AND CONSTRUCTION FEATURES
SHARED BY ALL FILTRINE MEDICAL CHILLERS

Cooling Tank
Tank constructed of welded stainless steel plate — tested at 250 psi for 125 psi working pressure. Cooling tank insulated with closed cell thermo-elastomer with R factor of 3.7 and supplied with air vent and drain connections.

Evaporator
Immersion coil design, constructed of heavy stainless steel tubing, mounted in a welded stainless steel storage tank.

Condensing Unit
Oversized, lifetime lubricated compressor mounted on vibration isolators. Extra large copper condenser with aluminum fins and heavy duty fan motors, all designed to operate in ambient to 90°F. Complete ready-to-use system is fully charged with HFC refrigerant and capacity tested.

Circulation Pump
Pump mounted on a rubber pad over a stainless steel condensation tray and supplied with unions and service valves and a pressure relief bypass valve. All piping and fittings brass, copper or bronze and insulated with R factor 3.7 closed cell thermo-elastomer.

Controls
Reliable analog thermostat control for easy maintenance. Refrigeration controls include high/low pressure control, freeze control, thermostatic expansion valve, dehydrator, moisture indicator and magnetic starter.

Adjustable Differential Thermostat
40°F to 90°F (4°C to 32°C) Temperature stability ±1.5°F (0.8°C)

Cabinet
All components are mounted in a rugged, rust proofed and enameled aluminum cabinet on a welded angle iron frame with channel skids for easy mounting. Top and corner legs are stainless steel. Panels are easily removed for complete access to all components.

START-UP and FIRST YEAR SERVICE
FILTRINE Mfg. Co. provides start-up and first year service on all parts and labor. Regular maintenance on a yearly contract basis is a wise investment and will prevent costly downtime.

WARRANTY
All parts are covered FOB jobsite for (12) months from the start date or (15) months from date of shipment or whichever comes first.

SERVICE MAKES THE DIFFERENCE
Recognizing that downtime on critical medical equipment is unacceptable, Filtrine has established a national network of qualified service technicians, selected because of their extensive experience working on medical equipment chillers and their location within the “Emergency Response Zone” (approximately 40 miles). This expert and quick service is available on an 8/5 or 24/7 basis for all Filtrine medical chillers and heat exchangers.

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Filtrine recognizes the importance of keeping valuable floor space available for medical imaging equipment. To accommodate this need, Filtrine chillers are available in six configurations which are suitable for almost any application. We can custom engineer special sizes and configurations based on your specifications.

**SELF-CONTAINED / AIR COOLED CONDENSER INDOOR INSTALLATION**
All components - compressors, condensers, etc. are contained within a single housing, located within the building where it will be used. *(Suffix -A)*

**SELF-CONTAINED / WATER COOLED CONDENSER INDOOR INSTALLATION**
Water cooled condenser for hookup to city water or tower water. All components - compressors, condensers, etc. are contained within a single housing, located within the building where it will be used. *(Suffix -W)*

**REMOTE / AIR COOLED CONDENSING UNIT**
Outdoor refrigeration system, indoor evaporator and pump only - saves indoor space and reduces noise and exhaust heat and *no glycol is used.* *(Suffix -ARC)*

**WEATHER-RESISTANT / OUTDOOR INSTALLATION**
Weather-resistant models have the same specifications and profile as our standard self-contained units, but are designed for rooftop installation and operation. Weather-resistant models come with anodized aluminum panels and stainless steel corner legs and top. *(Suffix -A-WP)*

**REMOTE / AIR COOLED CONDENSER SPLIT CONFIGURATION**
Supplied with a separate weather-resistant air cooled condenser mounted outdoors at a remote location - usually within 100 feet of the chiller. The standard remote condenser may be used in a range of ambient temperatures from -20 to 100°F. High Ambient (HA) options are available. By installing the condenser outdoors, noise and exhaust heat are greatly reduced or eliminated within the building where the chiller is in use. Due to the extra demand placed upon the condenser by outdoor temperature, the remote air condenser is sized according to the temperature in which it will be expected to operate. Consult the factory for selection of the remote condenser for your chiller. *(Suffix -AR)*

**WEATHER-RESISTANT / LOW PROFILE OUTDOOR INSTALLATION**
Unique to Filtrine are weather-resistant, low profile models which incorporate all the specifications and features of the standard weather-resistant models, but are housed in a low profile cabinet which will not detract from the visual appearance of the roof line. *(Suffix -A-WP-LP)*

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Filtrine's Quick Connect Panels... designed especially for medical equipment

A properly operating chiller is essential for the operation of your medical equipment such as MRI, CT or linear accelerators. This panel provides diagnostic information on the chiller so that you can see at a glance if it is operating correctly and carry out maintenance, if required, to prevent downtime. Filtrine has designed these wall-mounted panels in consultation with medical equipment manufacturers to make sure every installation includes this vital information.

Easy Hook Up Connections and Monitoring

Install this compact panel between chiller and equipment for instantaneous availability of autoswitchover to city water or plant chilled water, pressure gauges, temperature gauges, flow meter and in-line filter. Panel is complete with all valves, solenoids, bypass and drains installed. Easy-to-open door on front of panel provides access to valves and filter for routine maintenance. Complete unit housed in aluminum cabinet with stainless steel top, bottom and frame.

Temperature Gauges

For water entering and leaving equipment are dial-type, in Celsius and Fahrenheit, on the water supply and return.

Pressure Gauges

Dial-type, in psi and bar on the water supply and return.

Flow Meter

Analog type with moving indicator in liters and gallons per minute, on the water supply and return.

Filter

Bag-type, using 50 micron bag with less than 1 psi pressure drop when new. Filter located inside the panel; includes bypass piping to ensure easy filter element change.

QCP-ASX... Glycol Loss Solved

Complete equipment connections & protection:

Compact, wall mountable unit which provides foolproof hookups for coolant connections between medical equipment, the chiller unit and backup cooling as required.

No More Glycol Down the Drain:

Inter-connection with city water when switchover occurs eliminated. Sealed glycol circuit insures clean, safe cooling.

No Shutdown From Power Failure:

Backup pump connected to emergency power insures continuous operation.

No More Fouling of Coolant:

Two independent cooling circuits... no cross-contamination.

Heat Exchanger:

Separate circuits operated by solenoid valves to allow equipment cooling by chiller or city water.

Backup Coolant Pump:

Backup pump is wired to emergency lighting circuit. In event of power loss, pump provides required flow and pressure to the medical equipment coolant loop.

QCP-AS... Flow Schematic

Water inlet with backflow preventer and drain to be included for connection to city water supply for emergency use. Solenoids to be included to automatically switchover to city water cooling utilizing trip-points on temp, flow and/or power loss.

QCP-AS... Automatic Switchover

Standard QCP Flow Schematic

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Chiller options and accessories to meet every requirement

**CABINETRY**

**Custom Dimensions**
- Built to fit into unusual locations. Two-piece construction also available.

**Corrosion Resistance**
- Epoxy coated condenser or special cooling fin material for salty or chemical environments.

**Low Profile**
- Less than four feet tall to reduce visibility on rooftop installation.

**Vibration Pads**
- Neoprene pads in rugged, cast-iron casings mounted under channel skids.

**Stainless Steel Cabinet**
- Cabinet and frame constructed throughout of stainless steel.

**Space Saver Design**
- Increases usable floor space by using smaller footprint cabinet.

**Rubber Casters**
- For complete mobility.

**Weather Resistant**
- Outdoor installation in most climates.

**COMPONENTS**

**Blower**
- Built into cabinet, to duct hot air out of building.

**Deionizer**
- Installed in-line (specify requirements).

**Dual Pumps**
- Provide complete backup. Available with automatic switchover in case of failure.

**Glycol Safe**
- For installations where the entire chiller cannot be indoors, ARC design (see p. 5) eliminates the need for glycol. The QCP-ASX design (see p. 6) prevents glycol from going down the drain.

**High Ambient**
- Designed for up to 110°F or 120°F.

**In-Line Filter**
- Removes sediment from makeup ensuring clean liquids.

**In-Line Heater**
- Heat liquids to optimum temperature automatically. Specify heater kw and temperature range.

**Pure System**
- For deionized water or other liquids that cannot come in contact with copper or brass. Evaporator fabricated out of type 304 stainless steel with polypropylene piping and fittings. Type 316 stainless steel also available for salt water or acids.

**Redundancy**
- For critical applications where downtime can be extremely expensive. Fail-safe design with 50% or 100% backup refrigeration and circulating system packaged in a single housing.

**Remote Air Cooled Condenser**
- Ready for remote installation on roof.

**Water Cooled Condenser**
- For hookup to city or tower water or plant chilled water.

**CONTROLS**

**Auto Fill**
- Float switch senses liquid level in tank, activates solenoid valve on makeup line to keep tank full.

**Auto Switchover to City or Plant Chilled Water**
- Auto switchover to city or plant chilled water in case of pump or compressor failure (see p. 6).

**Close Temperature Control**
- Solid state temperature controller and hot gas bypass maintain liquid temperature at ±0.5°F of setting.

**Dial Thermometer**
- For makeup and/or discharge temp.

**Flow Meter**
- Mounted on discharge line.

**Fused Disconnect Switch**
- On power supply.

**High/Low Temperature Interlock**
- In-line sensor activates warning light, audible alarm or shuts down machine to prevent damage if water temperature exceeds high temperature limit (indicating possible refrigeration failure) or gets too cold.

**Low Ambient**
- For down to -30°F.

**Low Flow Interlock**
- In-line sensor activates warning light, audible alarm or shuts down machine to prevent damage if water flow rate falls below low flow limit (indicating possible pump failure).

**Low Pressure Interlock**
- In-line sensor activates warning light, audible alarm or shuts down machine to prevent damage if water pressure falls below low flow limit (indicating possible pump failure).

**Low Temperature**
- Chill water down to 34°F or antifreeze liquids down to 0°F. Consult Filtrine for capacities.

**Low Water Level Interlock**
- In-line sensor activates warning light, audible alarm or shuts down machine signifying low water level in tank.

**Pressure Gauge**
- For makeup and/or discharge pressure.

**Remote Panel**
- For alarm indication and start/stop switch.

**Solid State Controls/Digital Indicator**
- For temperature, pressure, flow, remote control panel, recorders, etc.