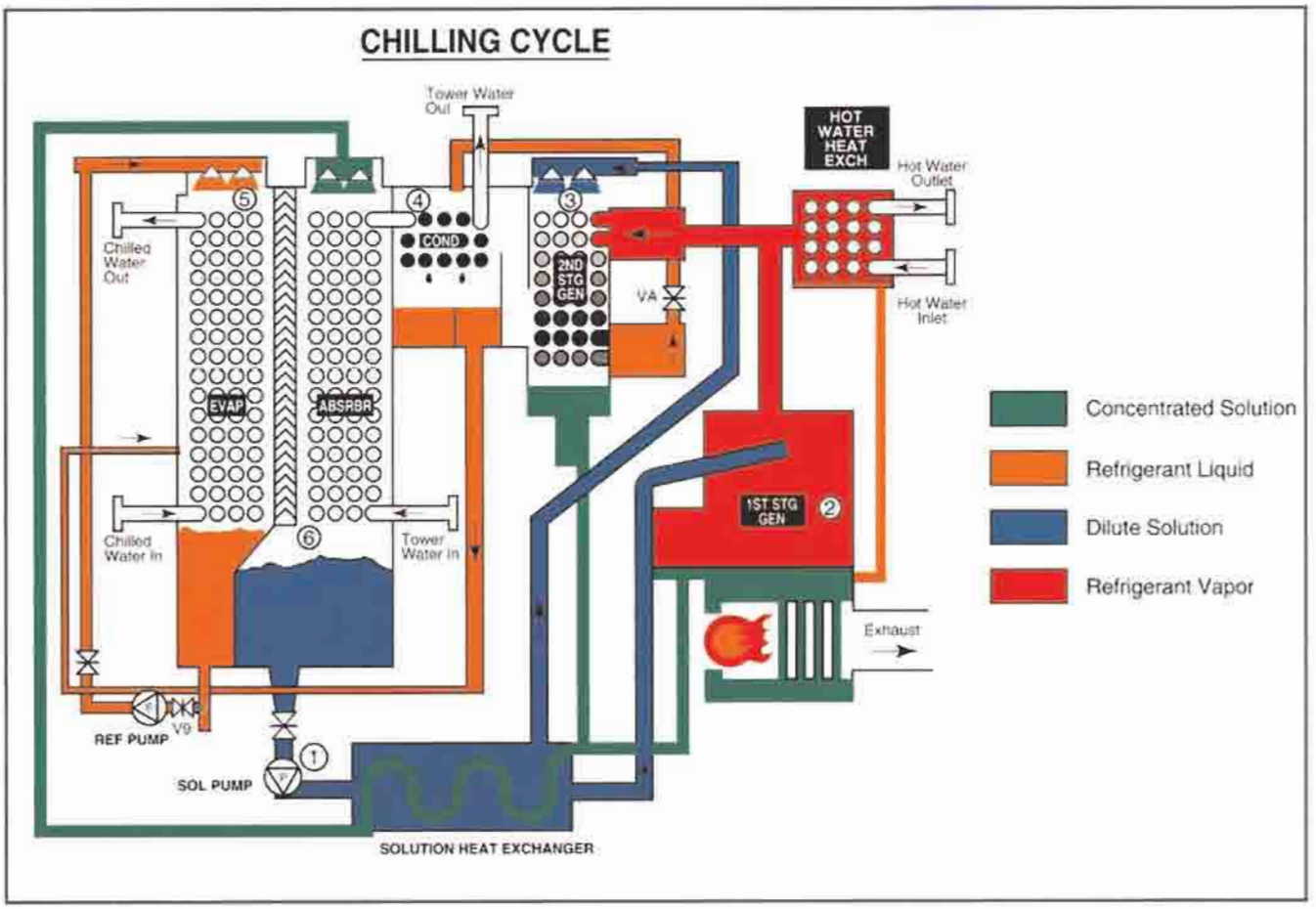
YORK® *Millennium*™ Absorption Chiller



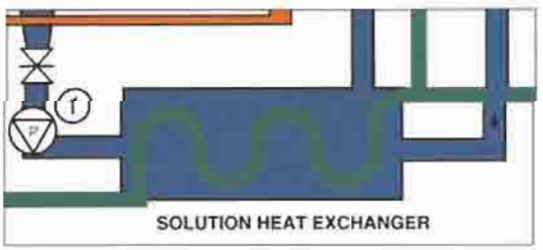
Chilling Cycle

The Millennium Absorption Chiller's remarkably efficient two-stage absorption refrigeration cycle uses water as the refrigerant and lithium bromide as the absorbent. It is the strong affinity these two substances have for each other that makes the cycle work. The entire process occurs in hermetic vessels in an almost complete vacuum.

The large diagram above indicates the complete chilling cycle. The six steps are detailed below, with corresponding numbers in the diagram to show where each step takes place. The two-stage absorption chilling cycle is continuous; however, for the sake of clarity and simplicity, it is divided into six steps.

1. Solution Pump/Heat Exchangers

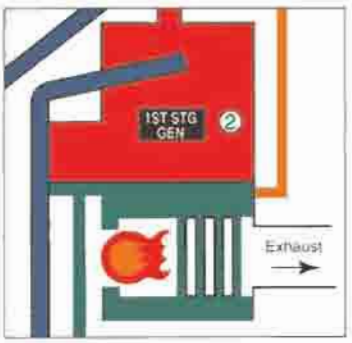
A dilute solution of lithium bromide and water descends from the Absorber to the Solution Pump. This flow of dilute solution is split into two streams and pumped through heat exchangers to the First-Stage Generator and to the Second-Stage Generator.



The exclusive two-way split of solution flow virtually eliminates the possibility of crystallization (solidification) by allowing the unit to operate at much lower solution concentration and temperatures than series flow systems.

Note: There are two heat exchangers, but only one is shown for illustrative purposes.

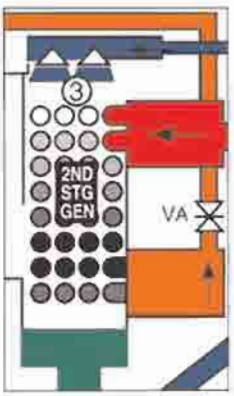
2. First-Stage Generator



A heat source heats dilute lithium bromide coming from the Solution Pump/Heat Exchangers. This produces hot refrigerant vapor which is sent to the Second-Stage Generator, leaving a concentrated solution that is returned to the Heat Exchangers.

3. Second-Stage Generator

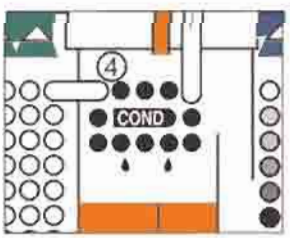
The energy source for the production of refrigerant vapor in the Second-Stage Generator is the hot refrigerant vapor produced by the First-Stage Generator.



This is the heart of YORK's remarkably efficient two-stage absorption effect. The refrigerant vapor produced in the First-Stage Generator is increased by 40%–at no additional expense of fuel. The result is much higher efficiency than in conventional systems.

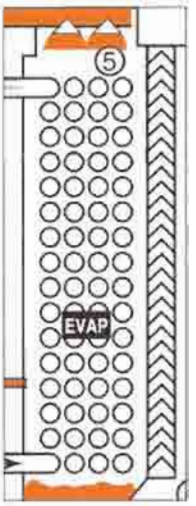
This additional refrigerant vapor is produced when dilute solution from the Heat Exchanger is heated by refrigerant vapor from the First-Stage Generator. The additional concentrated solution that results is returned to the Heat Exchanger. The refrigerant vapor from the First-Stage Generator condenses into liquid giving up its heat, and continues to the Condenser.

4. Condenser



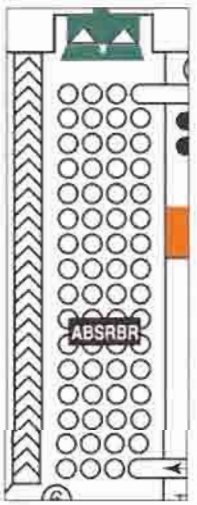
Refrigerant from two sources–(1) liquid resulting from the condensing of vapor produced in the First-Stage Generator and (2) vapor produced by the Second-Stage Generator–enters the Condenser. As the liquid refrigerant enters the low pressure of the condenser it flashes to vapor. The two sources of refrigerant vapor combine and condense to liquid as they are cooled by the condenser water. The liquid then flows down to the Evaporator.

5. Evaporator



Refrigerant liquid from the Condenser passes through a metering valve and flows down to the Refrigerant Pump, where it is pumped up to the top of the Evaporator. Here the liquid is sprayed out as a fine mist over the Evaporator tubes. Due to the extreme vacuum (6mm Hg) in the Evaporator, some of the refrigerant liquid vaporizes, creating the refrigerant effect. (This vacuum is created by hygroscopic action–the strong affinity lithium bromide has for water–in the Absorber directly to the right.)

The refrigerant effect cools the returning system chilled water in the Evaporator tubes. The refrigerant liquid/vapor picks up the heat of the returning chilled water, cooling it from 54°F to 44°F. The chilled water is then supplied back to the system.



6. Absorber

As the refrigerant liquid/vapor flows to the Absorber from the Evaporator, a concentrated solution coming from the Heat Exchanger is sprayed out into the flow of descending refrigerant. The hygroscopic action between lithium bromide and water–and the related changes in concentration and temperature–result in the creation of an extreme vacuum in the Evaporator directly above. The dissolving of the lithium bromide in water gives off heat, which is removed by condenser water entering from the cooling tower at 85°F and leaving for the Condenser at 92°F. The resultant dilute lithium bromide solution collects in the bottom of the Absorber, where it flows down to the Solution Pump.

The chilling cycle is now completed and begins again at Step 1.

Advanced absorption chiller design assures high performance and reliability

In an era of skyrocketing electric costs, building owners, architects and engineers across the country are turning to a new, more economical way of cooling and heating large buildings: The YORK Millennium™ Absorption Chiller.

These compact high-efficiency units are available in models providing from 200 to 1500 tons of cooling and operate on gas, propane, oil, or steam. Because they avoid the increasingly expensive use of electricity for air conditioning, YORK units have cut cooling and heating costs in half.

The sophisticated design of these units combines the highly efficient two stage absorption cooling cycle with YORK's exclusive Parallel Flow system. This provides a 40% increase in cooling efficiency at no additional energy cost. Outstanding reliability and quick, easy maintenance are further reasons why these advanced units have established a track record of over two decades of successful operation.

High efficiency, dependability and ease of maintenance are the result of the many exclusive features which are included as standard in every YORK unit.

PARALLEL FLOW SUBSTANTIALLY BOOSTS EFFICIENCY
YORK's exclusive two-way split of solution flow allows the unit to operate at much lower solution concentrations and temperatures than in series flow systems. This dramatically increases the unit's efficiency and virtually eliminates crystallization (solidification) problems.

COMPACT DESIGN FOR MAJOR SPACE SAVINGS
Because YORK Absorption Chillers provide both cooling and heating, they eliminate the need to purchase and maintain a separate boiler for heating in addition to a chiller (or the ancillary connecting equipment, piping and wiring). This means big savings in equipment and installation costs, up to 33% savings in head space, as well as up to 40% savings in machine room floor space. What's more, the compact two-stage steam chiller fits into the same space as the single stage unit it replaces.

STAINLESS STEEL SPRAY HEADS INCREASE EFFICIENCY AND TUBE LIFE
YORK's advanced spray head design provides an extremely uniform and soft mist which eliminates hot and cold spots in the absorber and evaporator tubes, resulting in longer tube life and increased efficiency.

PUMP ISOLATION VALVES REDUCE DOWN-TIME, RETAIN VACUUM AND REFRIGERANT
These unique isolation valves, located on the inlet and discharge sides of each pump, greatly simplify routine maintenance and pump service, with no loss of vacuum, no loss of solution and no chance of contamination.

MAINTENANCE-FREE PUMPS
Motor pump assembles are hermetically sealed, self-lubricating, and made from the highest quality materials available for years of maintenance-free operation.

PATENTED INHIBITORS FOR LONGER TUBE LIFE
YORK's specially-formulated inhibitors substantially reduce corrosion and extend tube life.

SIMPLE OPERATION
Operation of the unit does not require highly skilled or specially trained personnel.

Service Reliability Guaranteed By YORK

YORK's nationwide network of service representatives assure high-performance startup and adjustment of every YORK unit.

Extended Service Contracts Available

A comprehensive range of services is available with extended service contracts. YORK can tailor its maintenance contract to meet your specific needs.

YORK®

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