

# YORK<sup>®</sup> Millennium<sup>™</sup> Absorption Chillers

## Two-Stage Direct Fired and Steam



### Millennium<sup>™</sup> Absorption Chiller

HI TEMP. GENERATOR CONCENTRATION=60.7%

Display		Entry		Setpoints	
CHILLED LIQUID TEMP.	CONDENSER LOAD TEMP.	1	2	3	CHILLED LIQUID TEMP.
REFRIGERANT PRESSURE	FLOW	4	5	6	HOLDKEY
oil PRESSURE	% MOTOR CURRENT	7	8	9	PHASE SEQUENCE
OPTIONS	OPERATING LIFE START COUNTER	0			DATA LOGGING
USER PARAMETERS	USER HISTORY				

**Service**

OPEN MOTOR  
 CLOSE MOTOR  
 HOLD MOTOR  
 STOP MOTOR

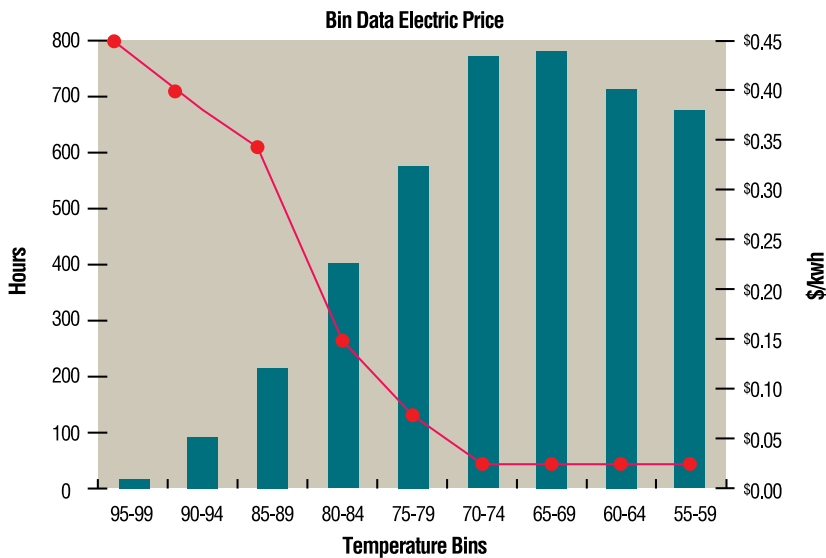
HI STATEN FASE  
 LOW OUTPUT FREQUENCY

RUNNING  
 STOP

STOP  
 STOP  
 STOP

COMPRESSOR  
 START  
 STOP  
 STOP

# Only the leading absorption chiller is this easy on Earth's resources ... and yours



## Easy on the environment to help save our Earth

From an environmental standpoint, the Millennium Absorption YPC choice is a vote for the Earth. By using water as its refrigerant, Millennium Absorption chillers do not depend on CFC or HCFC refrigerants. And with water, the ozone depletion potential of the refrigerant is zero.

By using clean burning natural gas as its primary fuel source, a direct-fired Millennium Absorption chiller produces far less acid-rain-producing emissions per ton-hour of cooling than electrically-driven chillers.

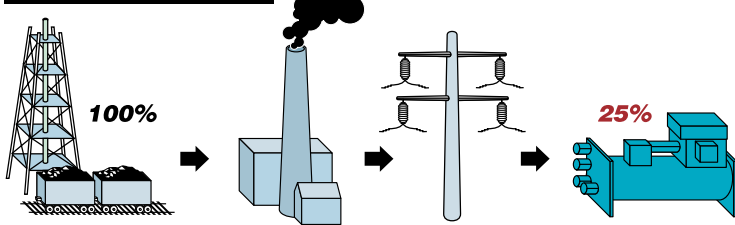
And in contrast to many competitive absorption chillers, even the most recently designed, using chromates or arsenates as corrosion inhibitors, Millennium chillers use environmentally-friendly molybdate inhibitors. So Millennium's inhibited solution is not classified as a hazardous waste under the Resource Conservation and Recovery Act. No special disposal or handling is required in most localities.

## Capitalize on energy deregulation

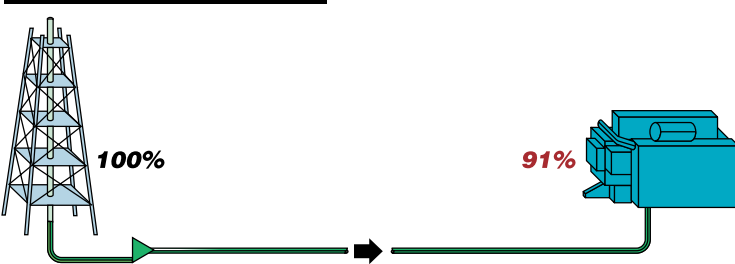
Deregulation will change the way you buy energy. Hopefully, the average price of electricity will decline. But, it is also very likely that prices during peak usage times will go up. Prices could range from 1.5 cents/KWH at the low end to \$1.50/KWH during peak demand. Consequently, control of peak demand will be just as important as before—if not more so.

Unfortunately, air conditioning is not only the largest energy consumer, it is needed most at peak times when electricity is most expensive. That makes managing the cooling load at those hours especially critical. Bringing an absorption chiller on-line is a very attractive alternative to running an

### Electric Fuel Energy Losses



### Natural Gas Energy Conservation



*With natural gas, only 9% of source energy is lost in transportation to your chiller—a far more energy-efficient and environmentally-friendly energy path than electric.*



electric chiller. Because it reduces electric energy consumption at peak times, an absorption chiller can cut expensive KW usage and cut overall electric usage. That's why you can count on a Millennium Absorption chiller alone, or as part of a hybrid plant, to play an important role in minimizing your total chiller-system energy costs.

### **Full chiller-system control for maximum efficiency**

A built-in time clock provides programmable start/stop control over your chiller and auxiliary equipment, such as system pumps and cooling towers, even when a building automation system interface is not used. By coordinating the operation of these chiller-system components with the operating schedule of the chiller itself, overall energy consumption can be minimized.

### **Flexible burner options meet air-quality codes**

Millennium direct-fired units can meet virtually every national, state or local air-quality burner codes, including stringent NOx requirements of 30 ppm corrected to 3% oxygen. Burners are capable of firing on any combination of natural gas, no. 2 oil or propane fuels.

### **Crafted and backed in the U.S.A.**

A YORK Millennium chiller choice means you're dealing with the industry leader. For these units, YORK uses 99% U.S.-sourced components and offers the widest range of environmentally-acceptable chiller options. Plus, you're backed by the largest and best-trained national HVAC service organization.



# Only the most renowned micropanel gives you this much control so easily



## No other absorption chiller gives you more information

With the Millennium Control Center, all monitoring and control parameters can be easily read on the large, illuminated, alphanumeric display. You never have to worry about interpreting special reference codes, shuffling through menu systems or struggling to read imprecise gauge increments. The Millennium Control Center displays messages in plain English, with numeric data available in a choice of metric or English units.

Typical operating parameters that can be displayed include: inlet and outlet temperatures of chilled, condenser, and hot water circuits; first stage generator pressure and temperature; refrigerant and solution temperature; and the heat input command in percentages (i.e., burner firing-rate or steam-valve actuator position). In addition, the panel can display the unit's cumulative operating hours, number of starts, and number of purge cycles completed.



## Millennium Control Center puts you in control

A breakthrough in electronic engineering when introduced on YORK centrifugal chillers, the Millennium Control Center makes Millennium Absorption

chillers the easiest to operate in the industry. All performance information is accessible on one easy-to-read display. Plus, digital technology provides more precise readings than gauges and meters.

## All functions are easily programmed—just push a button

A tactile-feel keypad, divided into distinct color-coded groups according to function, provides easy access to all chiller control and monitoring functions. Keys are clearly labeled and amply spaced to avoid “neighbor-key” errors, and each key is dedicated to one function, eliminating confusion. Essential setpoints that can be programmed include: leaving-chilled and hot water temperatures, remote-reset temperature ranges, 7-day schedule for unit start/stop, and pulldown demand limits to limit heat input to unit during start-up.

**CHILLED LEAVING= 44.0°F; RETURN= 52.5°F**

**GEN PRESSURE = 12.05PSIA; TEMP = 302.0°F**

## Troubleshooting diagnostics for sure, speedy repairs

If a safety shutdown should occur, there's a wealth of diagnostic information at the operator's disposal. Information is stored inside the Millennium Control Center's nonvolatile memory.

Safety shutdown annunciations include: information on date and time of shutdown, cause of shutdown, and type of restart required. All system operating information that was on display immediately prior to shutdown can be redisplayed in English, eliminating time-consuming cross referencing. Safety shutdown information is not only retained for the most recent safety shutdown, but is also stored for the previous four safety shutdowns to provide even further insight into the unit's operating history.

The Millennium Control Center is also equipped with a software test button to enable verification of the operational status of each electronic circuit board in the panel.

## Data logging has never been easier

The comprehensive monitoring capabilities of the Millennium Control Center dramatically simplifies log reading and recording. All data needed for accurate, detailed logs can be gathered directly from the display panel. Instead of moving from thermometer to thermometer and gauge to gauge, chiller status can be accessed from one station. That saves valuable operator time for other important activities. Another time-saver: interface an approved printer with the Millennium Control Center to output logs at programmable intervals without involving an operator.

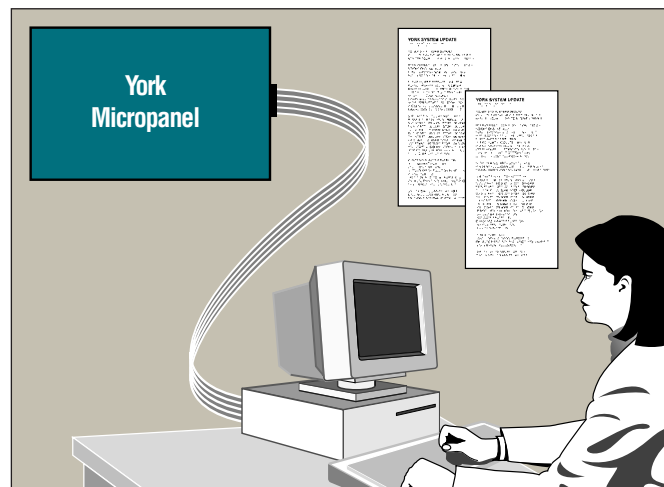
## No need to reprogram in event of power failure

A factory-supplied lithium battery (11 years rated shelf-life) provides power to store programs safely without external power to the panel. Then when utility-supplied power returns, the chiller restarts safely, easily, and according to the operation parameters established before interruption.

## The power of networking

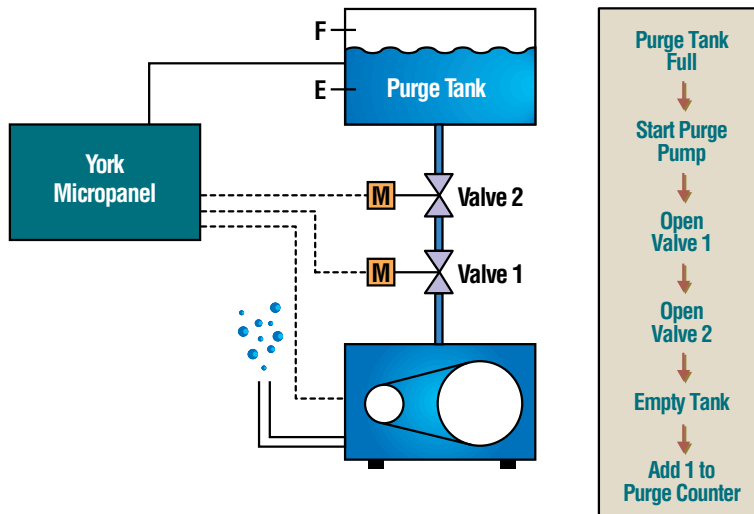
The same technological leadership that introduced the Millennium Control Center also provides compatibility with the YORK "Integrated Systems Network"—or "ISN."

Three levels of system integration are possible. Through the ISN interface, the micropanel can communicate all data from the keypad to a remote control center via a single shielded cable. Or it can communicate through a translator to virtually any brand of building automation system. Or it can communicate through hard-wire inputs and output to a remote readout or status display. In any case, no other micropanel on the market offers this degree of system-integration flexibility.





# Only the leader in absorption technology can cut operating costs this many ways



## Automatic purge— SmartPurge™ ...

SmartPurge™ knows when the purge tank is full, automatically empties its contents, and alerts the operator if the unit is purging too frequently. This convenient feature maintains peak performance by eliminating non-condensibles that could raise operating pressures. It also eliminates labor and maintenance time—up to one-half-hour a day—since no personnel are needed to purge the unit or empty the purge tank.

With SmartPurge, there's no worry of purge-system neglect or abuse. For example, if purging is not done often enough, non-condensibles in combination with lithium bromide could lead to corrosion in the absorber. If done too often or longer than necessary, absorber solution can be carried over to the purge pump and cause pump damage.

SmartPurge also enhances equipment reliability by giving an early warning of a leak. Competitive purge systems purge the chiller during operation and store the non-condensibles in a holding chamber. Most utilize a palladium cell, but still require periodic manual purging. The palladium cell only removes hydrogen automatically, manual purging is needed to eliminate other non-condensibles. In reality, the selective

purging of hydrogen is problematic. The production of excess hydrogen indicates leaks that require corrective action before corrosion occurs—a situation that will go undetected with a palladium cell. But because of SmartPurge's frequent purging alert, the YORK system gives an early warning that lets you take action to stop leaks before damaging corrosion.

SmartPurge employs digital technology for accurate operation. It retains a purge count in resident memory. It automatically senses pressure levels to determine when to purge non-condensibles. And will output a warning message on the micropanel display that can be transmitted to your own building automation system for appropriate action.

## Low power dilution

YORK has developed a new method of preventing any chance of crystallization during a power failure. Without using the large amount of back up generator power necessary to run a full dilution cycle, including tower water, chilled-water, solution, and refrigerant pumps, we can provide a means of safely keeping the lithium bromide solution in a liquid form. All that is required is a small amount of backup power provided to the power panel and a signal sent to the Millennium Control Center to prevent crystallization and assure easy restart after main power supply is restored—even after extended power outages.

## Concentration Calculator

A Concentration Calculator is built into the Millennium Control Center and its safety control system. Similar to YORK's corrective action used for other safety parameters, the Concentration Calculator minimizes downtime by putting the chiller into a warning mode that inhibits the chiller load to 30% when high concentration in the generator is sensed.

This allows the opportunity to correct the problem without the machine going off-line. If

the concentration does continue to rise, the machine will shut down and go into a dilution cycle, assuring that the unit will not crystallize.

The Concentration Calculator also allows the operator, with the Millennium Control Center in Program mode, to input any two of three parameters (bromide solution temperature, saturation temperature, and pressure) and calculate the solution concentration. It will also indicate if the entered condition is in the crystallization zone.

## Steam system integration is easy, too

Take the guesswork out of steam system integration, thanks to convenient steam-demand-limiting features.

The Pulldown Demand feature permits ramp loading of the input steam flow rate on start-up. Programmable inputs include: initial-pulldown valve position, final-pulldown valve position, and duration of pulldown demand period (0 to 255 minutes). The duration setpoint effectively prevents the chiller from drawing more steam on start-up than the steam-system can provide. As a result, the chiller avoids sudden steam-system pressure loss and associated problems, such as boiler-water carryover.

The Remote Steam-Limit feature permits steam-limiting at any time based on a remote signal generated from the building automation system. Consequently, the automation system can prioritize steam usage between the chiller and other processes without operator intervention.

## Fuzzy-logic, steam-valve control

YORK has combined leading-edge control technology with over 30 years experience using steam valves on absorption chillers to develop a unique Fuzzy-Logic, Steam-Valve-Control System. It provides much tighter chilled-water-temperature control with less "hunting" than old-style systems and actually provides steam consumption savings. YORK's Fuzzy-Logic system monitors the leaving-

chilled-water temperature to track where its been, where it is, how fast its moving, and accurately predict where it will go. The new system went through extensive testing and development at the YORK factory and proved itself in the field to be clearly superior to previous control systems.

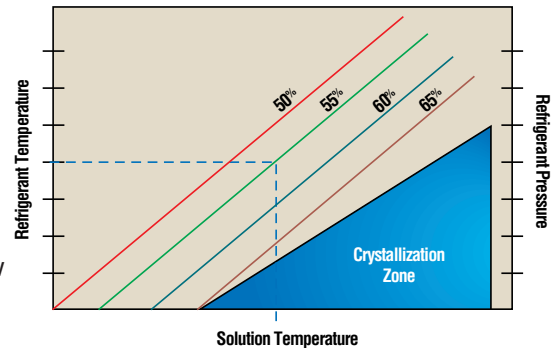
## Play it safe and minimize nuisance shutdowns

Only the Millennium Control Center comes with a comprehensive array of preprogrammed safety shutdown functions. This exclusive capability literally serves as an "early warning system," so corrective action can be taken before safety shutdown conditions occur—a capability first developed by YORK for absorption chillers and is only now being copied by competitors.

The Millennium Control Center can detect and annunciate problems as they develop, helping ensure your unit stays within the practical limits of the lithium bromide absorption cycle. If not, the operator is warned in time to avoid interrupted chilled-water production.

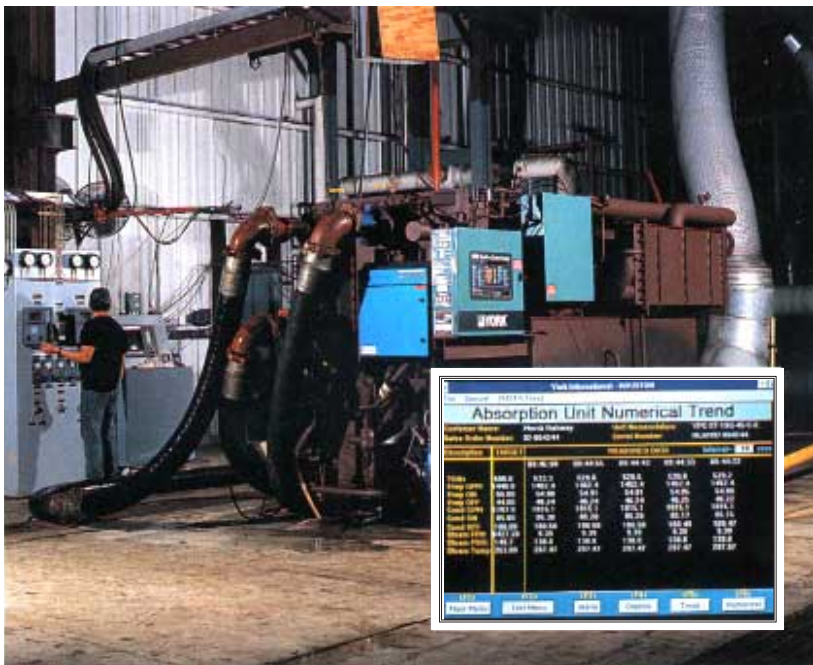
Conditions resulting in a warning annunciation, and possibly limiting heat input, include: low refrigerant temperature, high generator concentration, high first-stage-generator pressure or temperature, low or high-entering-condenser water temperatures, purge-pump current overload, faulty dilution-temperature sensor, and excessive number of purge cycles.

Additional parameters are continuously monitored, and if violated will cause a safety shutdown. These parameters include: thermal or current overloads on the solution or refrigerant pumps, low refrigerant temperatures, high first-stage-generator temperatures or pressures, loss of chilled-water flow, incomplete dilution cycle, burner malfunction, or power failure.



*Unique Concentration Calculator minimizes downtime by putting the chiller into a warning mode that inhibits the chiller load to 30% when high concentration in the generator is sensed.*

# Only the most flexible factory packaging fits your application this well



*Optional full-load factory testing and balancing verifies Millennium absorber performance and simplifies start-up.*

## Factory packaging results in lowest installation cost

Millennium direct-fired and steam chillers are shipped pre-assembled with all controls mounted and pre-wired, including a nonfused disconnect switch for single-point power connection.

Direct-fired units ship with the burner pre-mounted and wired. Standard victaulic couplings reduce piping labor. All units through 600 tons ship pre-charged from the factory with factory-balanced lithium bromide and refrigerant solutions.

## 175°F hot water available with direct-fired units

Although the standard 140°F hot-water output temperature of a Millennium direct-fired unit is adequate for typical two-pipe air handler systems, it may not be sufficient for building designs incorporating perimeter water-radiation systems.

In this case, the standard hot water heater can be replaced by a larger “high-temperature” heater, providing 175°F leaving-hot-water temperatures with no loss in heating capacity.

## Simultaneous cooling and heating available

All direct-fired Millennium chiller-heaters can be specified to provide hot water and chilled water at the same time. You get true four-pipe performance from a single operating unit — a desirable feature.

## Quality and reliability are documented

For safety and reliability, YORK Millennium direct-fired chillers are approved for listing by Underwriter’s Laboratories. CE approval is available. And the entire manufacturing process is ISO 9002 certified.





## Optional factory-performance testing simplifies start-up

As an option prior to shipment, each chiller can be subjected to full-load testing. A factory-test report will accompany the unit to verify performance. When your unit arrives at the jobsite, field start-up is simplified since the chiller has been previously balanced under full-load conditions in a factory environment.

## Stocking program

YORK maintains a stock of two-stage, direct-fired and steam-fired Millennium Absorption units to meet delivery schedules as short as three weeks. Inventory is based on the most popular models.

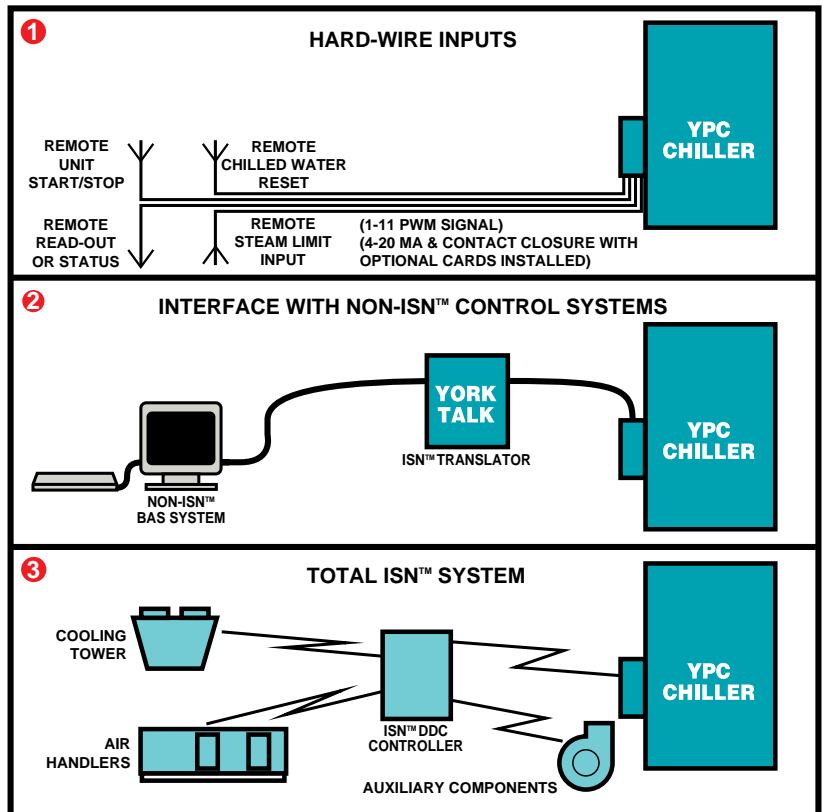
## Integration with BAS systems made easy

For building automation systems other than ISN, an ISN YorkTalk Translator can be applied to communicate between the Millennium Control Center and the non-ISN building automation system. The YorkTalk Translator uses a common twisted shielded pair cable to communicate with the Millennium Control Center.

The Millennium Control Center can also use hard-wired inputs to accept operating commands, including: chilled- and hot-water-temperature setpoints, remote steam limit input, and unit start/stop.

Unit operating status indications are available through the use of hard-wired outputs, including: "Unit Ready to Start", "Unit Operating", "Unit Safety Shutdown", and "Unit Cycling Shutdown" conditions.

## Three Levels of System Integration



**YORK ISN brings together compatible YORK HVAC equipment and can even involve competitive BAS's to deliver unprecedented system integration and flexibility.**

# Only the most adaptable factory package installs this easily in nearly any application



*YORK Service technicians are schooled at YORK's facility to deliver state-of-the-art preventive maintenance.*



*Nearly 2,500 service technicians operating out of 300 service locations globally—including our 700 U.S. personnel in 100 domestic locations—provide world-class maintenance and repair.*

## The leading service organization

As the world leader in HVAC technology, YORK brings together advanced absorption technology with the largest, most experienced, factory-trained service organization in the country, featuring over 35 YORK Service offices nationwide.

YORK introduced single-stage absorption chillers in the 1960s and has installed in recent years over 250,000 tons of cooling for a variety of two-stage applications. As a result, YORK Service uniquely claims over 30 years of specific absorption experience.

Today, YORK Service technicians are schooled at YORK's manufacturing facility. So you can count on YORK technicians to be in tune with advanced absorption chiller and controls technology — and to be in touch with the latest concepts in preventive maintenance.

## Leading technology and service from YORK

Only the leader in HVAC technology can combine a U.S.-built, state-of-the-art absorption design with the advanced Millennium Control Center. Then offer the YorkTalk Translator for versatile BAS capabilities. And then provide an experienced, factory-trained, nationwide service staff.

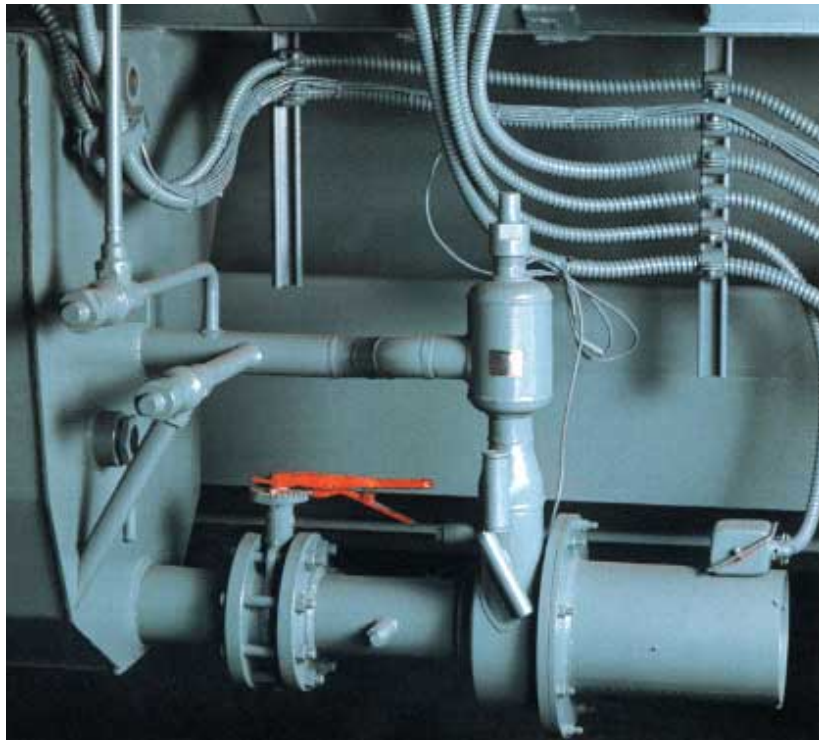
That's why you can trust YORK to meet your requirements with the most user-friendly, environment-friendly chillers on Earth.

## Isolation valves enable easy pump servicing

Changing pumps on a conventional absorption chiller can be a messy, time-consuming task. It requires refrigerant solution to be transferred to external containers, which can introduce air inside the chiller. The Millennium chiller's design avoids this hassle by using factory-mounted isolation valves on the suction and discharge sides of each refrigerant and solution pump. The valves maintain the vacuum and solution within the unit, and prevent air infiltration.

## U.S.-built pumps offer longer life

Solution and refrigerant pumps are the key component in an absorption chiller. That's why Millennium Absorption chillers use U.S.-made pumps designed for 55,000 operating hours between service inspections.



*U.S.-made pumps provide outstanding performance—up to 55,000 operating hours between inspections.*





