

## SECTION 10 : COMMERCIAL AIR-CONDITIONING AND CHILLED-WATER SYSTEMS. pdf

### 1: Ducted and Ductless air-cooled water chiller systems | Commercial-Residential | Multiaqua

*Chilled Water Air Conditioning. Chilled water air conditioning systems are commonly used in applications that need large cooling capacity such as hypermarket, industrial process and commercial air conditioning such as offices and factories.*

Chilled Water System Basics - Chilled water systems work much the same way as direct expansion systems work. The exception is they use water in the coil rather than refrigerant. Technically speaking, water can be classified as a refrigerant. Chilled Water systems can be rather complex and many chilled water systems are found in commercial and industrial applications. There are some chilled water systems used in residential applications. A typical chiller uses the process of refrigeration to chill water in a chiller barrel. This water is pumped through chilled water piping throughout the building where it will pass through a coil. Air is passed over this coil and the heat exchange process takes place. The heat in the air is absorbed into the coils and then into the water. The water is pumped back to the chiller to have the heat removed. It then makes the trip back through the building and the coils all over again. It is used as a refrigerant to remove heat from the building. The chilled water circulates through a chilled water loop and through coils located in air handlers. Chilled water systems include other HVAC equipment designed to exchange heat such as computer room air conditioners. The chilled water absorbs the heat from the building. It then returns to the chiller where the chiller removes the heat from the water using the refrigeration process. Some chilled water loop arrangements are very complex while others are simple. Control of the chilled water from pressure to velocity, to volume, is up to the control system controlling the pumps and valve actuators in the system. Chillers range in size from smaller than 5 tons all the way up to several hundred tons. Chillers can be found in residential applications, commercial buildings, and industrial process applications. Chillers and Cooling Towers - Chilled Water System Basics Many chillers have cooling towers where the heat removed in the chiller barrel is transferred to another barrel. It is the condenser barrel where the refrigerant is condensed and sent back to the evaporator barrel to remove the heat. The process is in reverse in the condenser barrel. The water absorbs heat from the refrigerant and allows it to condense. The water is then transferred to a cooling tower where the heat in this water is removed to the atmosphere. Once the heat is removed from the water it is pumped back to the chiller barrel to absorb more heat from the refrigerant. Some chillers do not have a condenser barrel to remove the heat. The refrigerant is pumped into a condenser coil where a fan blows across the coil and removes the heat. These chillers are cheaper to purchase upfront but not as efficient to run as those with the condenser barrels. The upfront costs are less but the energy costs are more over the long run. One bonus to an air cooled chiller is that it does not require a cooling tower and therefore the maintenance costs associated with maintaining a cooling tower. While many buildings have DX systems in the way of large rooftop units, the cost of installation is generally cheap for the DX systems because all that is required to install them is ductwork and electrical service to the unit. With chilled water systems, chilled water piping must be installed throughout the building and this can be far more expensive to install over the plain old DX rooftop units which supply conditioned air to a VAV system that has electric reheat in them. Of course, adding state of the art controls like direct digital controls can improve any system and take energy management to a whole new level of control and savings. So whether your building utilizes chilled water or DX systems it will save energy dollars by adding a state of the control system like DDC or direct digital controls to make it work as efficiently as possible. In the picture, below left, a chilled water pipe had to be relocated. The gate valve that shut the water off to that section of the loop was broken and could not be closed. Pipe Freeze Machine Cooling Tower for Chilled Water System To prevent water from flooding all over the floor and in the space where the relocation of the chilled water piping was necessary, a piping freeze machine was used to stop the flow of water so that the chilled water pipe could be cut and re-soldered to accommodate its new location. Pipe freezing also allows the new piping to be soldered into place because it prevents water flow inside the pipe. Copper pipe cannot be soldered if it has water inside it. For years plumbers and HVAC technicians used bread or a mechanical stop to

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keep water out of the pipe so it can be soldered. Later, when full flow is restored, the bread breaks up and is caught in a strainer where it can be removed from the system. With the freeze machine, once the water thaws, there is no bread to contaminate the system or plug the strainers. Chilled Water System Basics.

### 2: Light Commercial Air Conditioning | American Standard

*With chilled water systems, chilled water piping must be installed throughout the building and this can be far more expensive to install over the plain old DX rooftop units which supply conditioned air to a VAV system that has electric reheat in them.*

### 3: Refrigeration & Air Conditioning Technology- Free Download

*typically a water bases system, secondary hot and chilled water go to air handler then it becomes an air distribution system sending "handled" air through the DUCTS to the room being conditioned mechanically indirect heating/ventilating/air conditioning systems, air treated or handled by equipment outside the space served, conveyed by fan or duct.*

### 4: Chilled water - Wikipedia

*Complex systems transfer heating and cooling to secondary units Cooling: the refrigerant is in the chiller and chilled water goes to cooling coils Heating: a boiler generates hot water or steam that is piped to heating coils.*

### 5: Chilled-Water System | Trane Commercial

*Refrigeration & Air Conditioning Technology is designed and written for students in vocational-technical schools and colleges, community colleges, and apprenticeship.*

### 6: Chilled Water System Basics | HVAC Commercial Cooling

*Air-cooled chillers utilize the mechanical refrigeration cycle to produce chilled water or a chilled water and antifreeze mixture. They reject the building heat to the ambient with an air-.*

### 7: Chilled Water Air Conditioning Principles And Applications

*Components of a chilled-water system Coil control (3-way valves, 2-way valves, face-and-bypass dampers) Chiller plant design concepts (parallel, series, and primary-secondary or decoupled).*

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