



How a Chiller System Works & Preventative Maintenance

Damon Reed
Pro Refrigeration, Inc.



District Northwest

October 2017,
Eugene, Oregon

The less time you worry about cooling,
the more time you can focus on
making great beer.

1. How a Chiller System Works
2. Chiller System Components
3. Preventative Maintenance



District Northwest

UNITED WE BREW.
October 20, 21, 2017
Eugene, OR

How a Chiller System Works Heat Transfer



UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

How a Chiller System Works BTU's & TONS

Heat is measured in **B**ritish **T**hermal **U**nits or BTU's

To cool 1 LB of water by 1°F we must remove 1 BTU



12,000 BTU's equals 1 TON of Refrigeration Effect

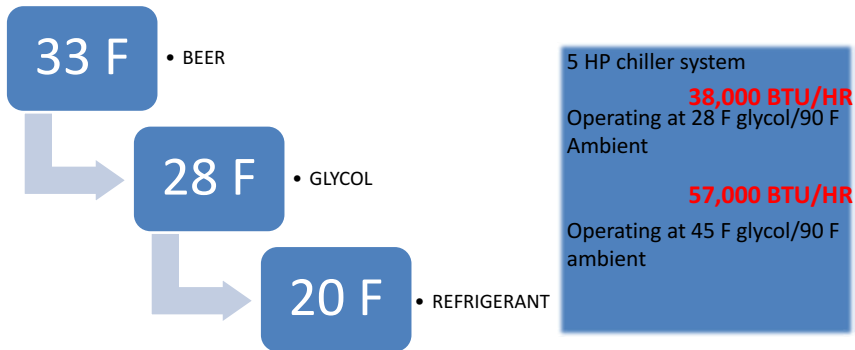


District Northwest

UNITED WE BREW.
October 20, 21, 2017
Eugene, OR

How a Chiller System Works Heat Transfer

The greater the Temperature Difference, the faster the heat transfer
The higher Glycol Temperature = Increased System Efficiency and Cooling Capacity

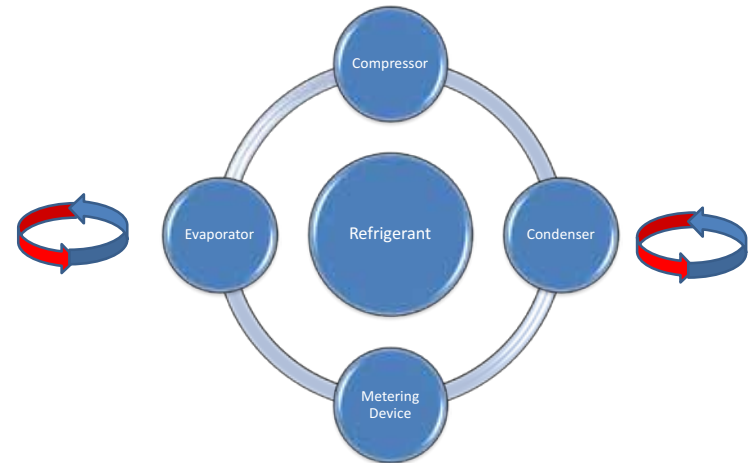


UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

How a Chiller System Works The Circle of Cool – REFRIGERANT CIRCUIT



UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

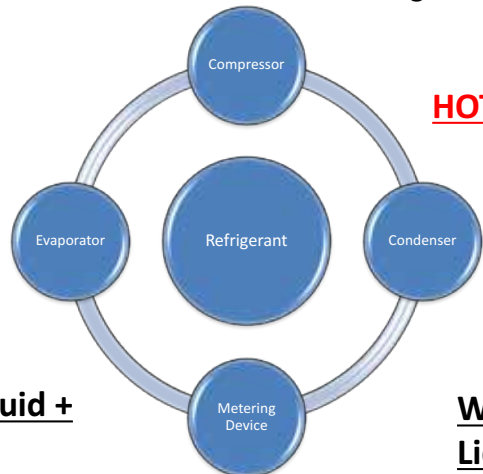
How a Chiller System Works The Circle of Cool – State of Refrigerant

COLD Vapor

HOT Vapor

Cool Liquid + Vapor

Warm Liquid

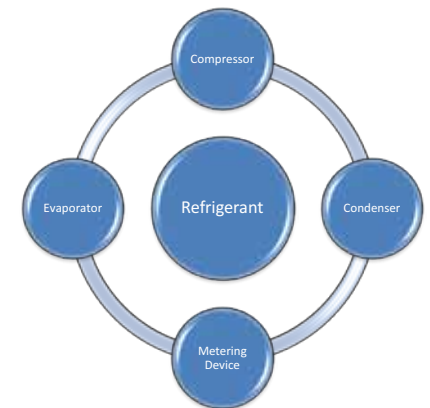


UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

How a Chiller System Works The Circle of Cool – CHILLER SYSTEM CIRCUIT



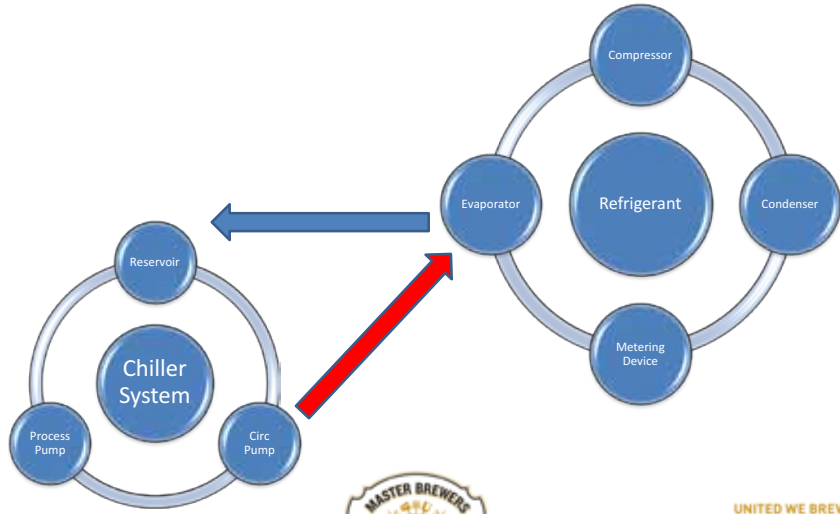
UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

How a Chiller System Works

The Circle of Cool – CHILLER SYSTEM CIRCUIT



District Northwest



UNITED WE BREW.
October 20, 21, 2017
Eugene, OR



District Northwest



UNITED WE BREW.
October 20, 21, 2017
Eugene, OR

Component Identification

Compressor

Scroll



**COMMERCIAL
TO LIGHT
INDUSTRIAL**

Hermetic
Reciprocating



District Northwest

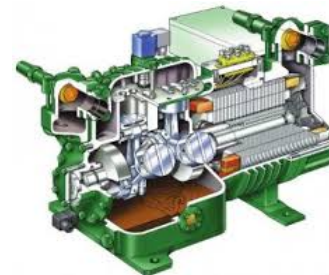


UNITED WE BREW.
October 20, 21, 2017
Eugene, OR

Component Identification

Compressor

Semi-Hermetic Recip



**UP TO HEAVY
INDUSTRIAL**

Screw



District Northwest



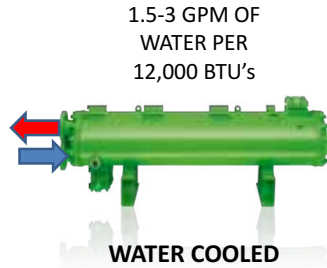
UNITED WE BREW.
October 20, 21, 2017
Eugene, OR

Component Identification

Condenser



AIR COOLED



1.5-3 GPM OF WATER PER 12,000 BTU's

WATER COOLED



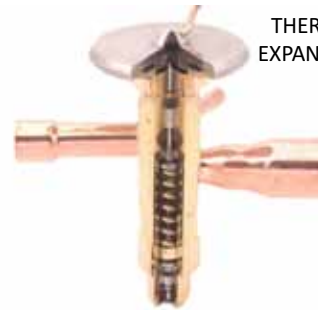
UNITED WE BREW.

October 20, 21, 2017
Eugene, OR

District Northwest

Component Identification

Metering Devices



THERMOSTATIC EXPANSION VALVE



ELECTRONIC EXPANSION VALVE



UNITED WE BREW.

October 20, 21, 2017
Eugene, OR

District Northwest

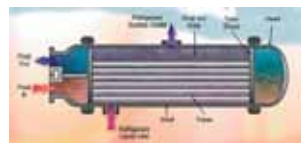
Component Identification

Evaporator

BRAZED PLATE



SPIRAL DRUM



BARREL

UNITED WE BREW.

October 20, 21, 2017
Eugene, OR

District Northwest



UNITED WE BREW.

October 20, 21, 2017
Eugene, OR

District Northwest

Preventative Maintenance

"How long will my chiller system last?"



"Take care of the mechanical systems and they'll take care of you"



UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

Preventative Maintenance

MONTHLY	
Date	
<input type="checkbox"/>	Air Cooled Condenser Clear of Obstruction
<input type="checkbox"/>	Check Glycol Reservoir Level
<input type="checkbox"/>	Check for Audible or Visual Alarms
<input type="checkbox"/>	Refrigerant Sight Glass Inspection
Date	
<input type="checkbox"/>	Chiller System Setpoint
<input type="checkbox"/>	Note Compressor Suction PSI
<input type="checkbox"/>	Note Compressor Discharge PSI
<input type="checkbox"/>	Inspect for Glycol Leaks



UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

Preventative Maintenance

MONTHLY	
Date	
<input type="checkbox"/>	Air Cooled Condenser Clear of Obstruction
<input type="checkbox"/>	Check Glycol Reservoir Level
<input type="checkbox"/>	Check for Audible or Visual Alarms
<input type="checkbox"/>	Refrigerant Sight Glass Inspection
Date	
<input type="checkbox"/>	Chiller System Setpoint
<input type="checkbox"/>	Note Compressor Suction PSI
<input type="checkbox"/>	Note Compressor Discharge PSI
<input type="checkbox"/>	Inspect for Glycol Leaks



35-55 PSIG SUCTION
PRESSURE



UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

Preventative Maintenance

MONTHLY	
Date	
<input type="checkbox"/>	Air Cooled Condenser Clear of Obstruction
<input type="checkbox"/>	Check Glycol Reservoir Level
<input type="checkbox"/>	Check for Audible or Visual Alarms
<input type="checkbox"/>	Refrigerant Sight Glass Inspection
Date	
<input type="checkbox"/>	Chiller System Setpoint
<input type="checkbox"/>	Note Compressor Suction PSI
<input type="checkbox"/>	Note Compressor Discharge PSI
<input type="checkbox"/>	Inspect for Glycol Leaks



225-325 PSIG DISCHARGE
PRESSURE



UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

Preventative Maintenance

MONTHLY

Date		Date	
	Air Cooled Condenser Clear of Obstruction		Chiller System Setpoint
	Check Glycol Reservoir Level		Note Compressor Suction PSI
	Check for Audible or Visual Alarms		Note Compressor Discharge PSI
	Refrigerant Sight Glass Inspection		Inspect for Glycol Leaks

The sight glass should always look clear



UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

Preventative Maintenance

Working with a service professional is highly recommended when testing electrical components

EVERY 3 MONTHS

Date		Date	
	Glycol Freeze Concentration		Check Compressor Amps
	Check Pump Amperage		Check Condenser Fan Amps
	Clean Air Cooled Condenser		Check System Amps



UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

Preventative Maintenance

EVERY 3 MONTHS

Date		Date	
	Glycol Freeze Concentration		Check Compressor Amps
	Check Pump Amperage		Check Condenser Fan Amps
	Clean Air Cooled Condenser		Check System Amps

Checking Glycol Concentration

What type of glycol & water to use



UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

Preventative Maintenance

EVERY 3 MONTHS

Date		Date	
	Glycol Freeze Concentration		Check Compressor Amps
	Check Pump Amperage		Check Condenser Fan Amps
	Clean Air Cooled Condenser		Check System Amps



UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

Preventative Maintenance

Working with a service professional is highly recommended

YEARLY	
Date <input type="text"/>	Inspect / Replace Condenser Fan Contactor
Date <input type="text"/>	Inspect / Replace Compressor Contactors
<input type="text"/>	Inspect / Replace Pump Contactor



UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

Preventative Maintenance

Working with a service professional is highly recommended

YEARLY	
Date <input type="text"/>	Inspect / Replace Condenser Fan Contactor
Date <input type="text"/>	Inspect / Replace Compressor Contactors
<input type="text"/>	Inspect / Replace Pump Contactor

Change Contactors Yearly



Reduce downtime and costly repairs by changing contactors yearly. This repair cost over \$2,000.00 not including the cost of downtime.



UNITED WE BREW.

District Northwest

October 20, 21, 2017
Eugene, OR

Thank You

Damon Reed
Pro Refrigeration, Inc.
damonr@prorefrigeration.com
support@prorefrigeration.com

www.mychiller.com



District Northwest

October 2017,
Eugene, Oregon