

# Central Valley Chemical Safety Day

May 1, 2009

Fresno State

**BASICS**

**OF**

**REFRIGERATION**

# What is the Big Picture for Today's Event?

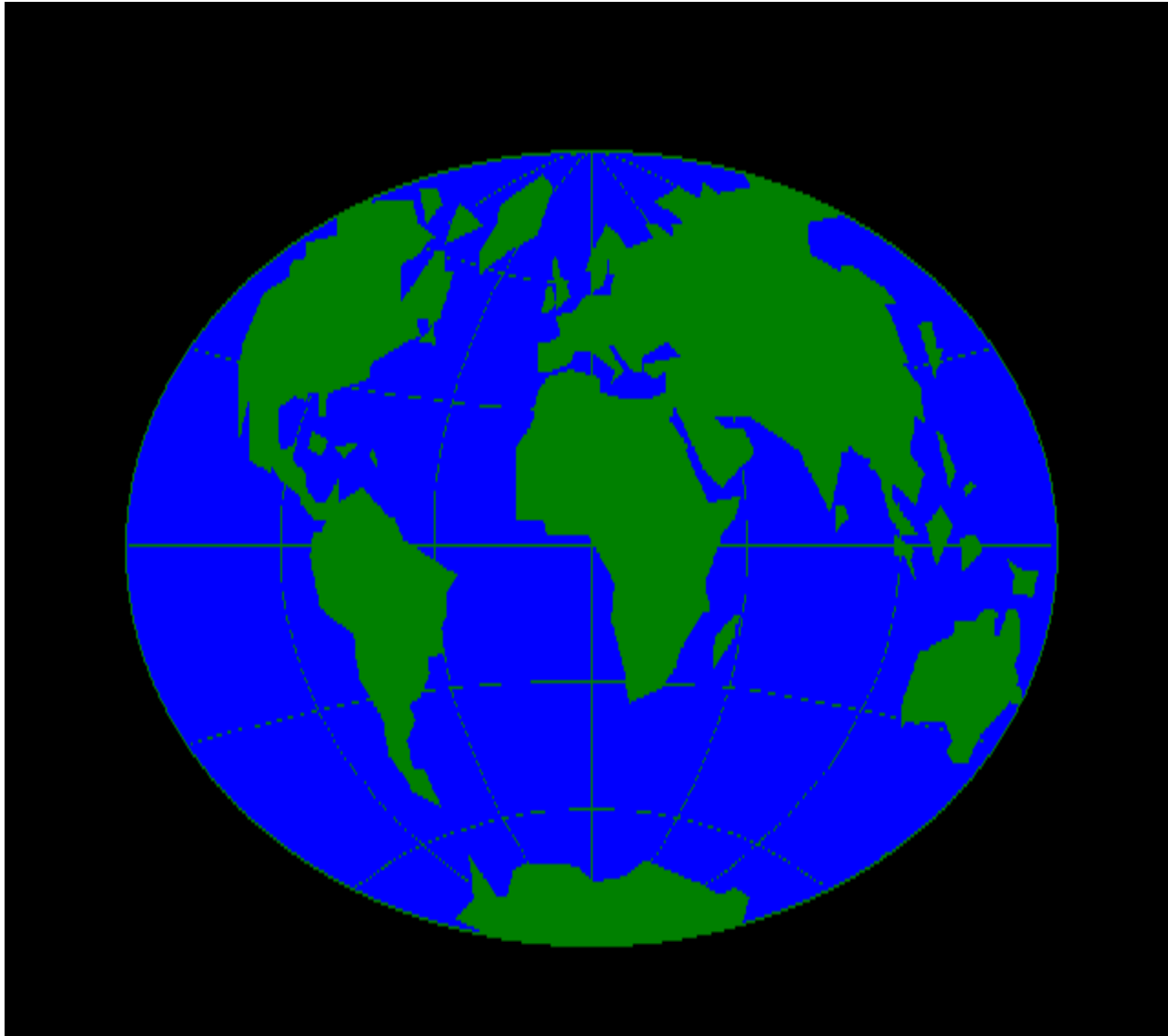
- To do our “jobs” better.
- To get better at what we do and how we do it.
- To provide a means for all of us to gain more knowledge.

# What is the Big Picture for Today's Event?

- Because through knowledge:

Our Employees, Our Plants, and  
Our Industries become safer and more  
professional





So let's keep our Eye on the Ball



And make contact with the goals



# My Simple View of the REGs

- PSM
- RMP
- CalARP
  
- AHM's Acutely Hazardous Materials  
(Prevent at all costs a Vapor Cloud)

# The Goal of the REG's

#1. To operate the systems with AHM's Safely and properly.

# The Goal of the REGs

#2. To minimize the potential for a leak or a release.

# The Goal of the REG's

#3. And to be prepared in case the leak or release ever happens, to be able to react and respond according to the “plan” you have prepared with your “team”, in a timely, safe and organized manner.

# Let's Go Learn Something!

Learning is an attitude.

Let's get excited!

GO FOR IT!

I want to see some Attitude.

Bring your "A" game.

Let's Get It On!

Don't waste my time, teach me something.

It's All About The HEAT



# Terminology

Heat transfer

Liquid and vapor

High Side

Low Side

King Valve

HPR-High Pressure Receiver

HPL-High Pressure Liquid

Compressor

Condenser

Evaporator

Expansion Valve

Suction

Discharge

Delta P

Delta T

# BASIC MECHANICAL REFRIGERATION SYTEM COMPONENTS

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Refrigeration may be defined as the process by which HEAT is removed from a place (or an object) where it is not wanted, and then transferred to an area where it does no harm (usually the atmosphere).

# BASIC MECHANICAL REFRIGERATION SYTEM COMPONENTS

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- Basic HEAT law #1 –
- HEAT energy **ALWAYS** flows from a high temperature to a lower temperature.
- In other words, HEAT **ALWAYS** flows from “hot” to “cold”.

# BASIC MECHANICAL REFRIGERATION SYTEM COMPONENTS

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- Mechanical refrigeration is simply the process of a liquid changing state to a vapor and back again. This happens when enough heat energy enters a liquid to cause that liquid to evaporate (or boil) into a vapor. Remember, this liquid had to be the coldest substance in the area for the HEAT energy to flow into it. This is what happens in the EVAPORATOR.

# BASIC MECHANICAL REFRIGERATION SYTEM COMPONENTS

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- This same vapor then travels through the compressor and enters the “high pressure side” of the system. At this point, when the high pressure – high temperature vapor loses enough heat energy to cooler surroundings, it will condense back into a liquid. This is what happens in the **CONDENSER**.

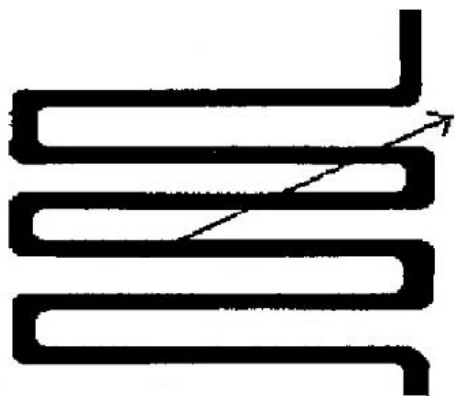
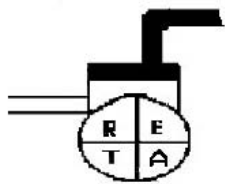
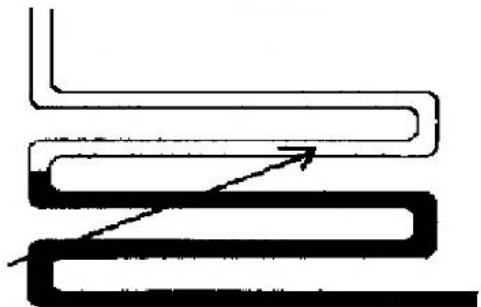
# BASIC MECHANICAL REFRIGERATION SYTEM COMPONENTS

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- Now, the cycle can be repeated if this high pressure liquid can be properly throttled to the lower pressure (or suction pressure) side of the system again.
- This is what happens at the **METERING DEVICE**, which can also be called an **EXPANSION VALVE**.

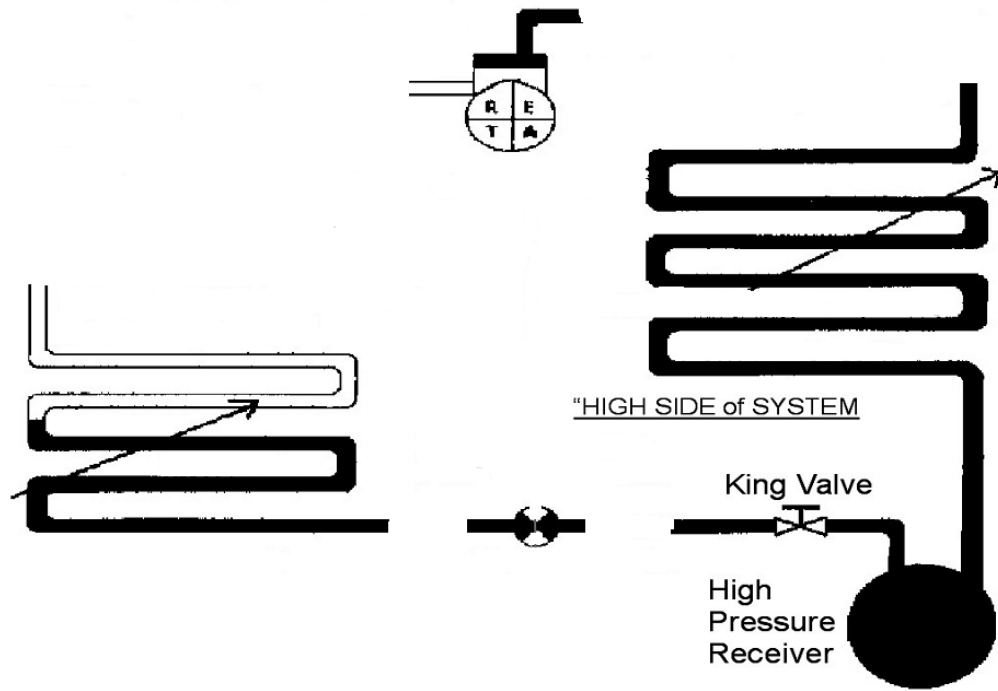
# Basic System

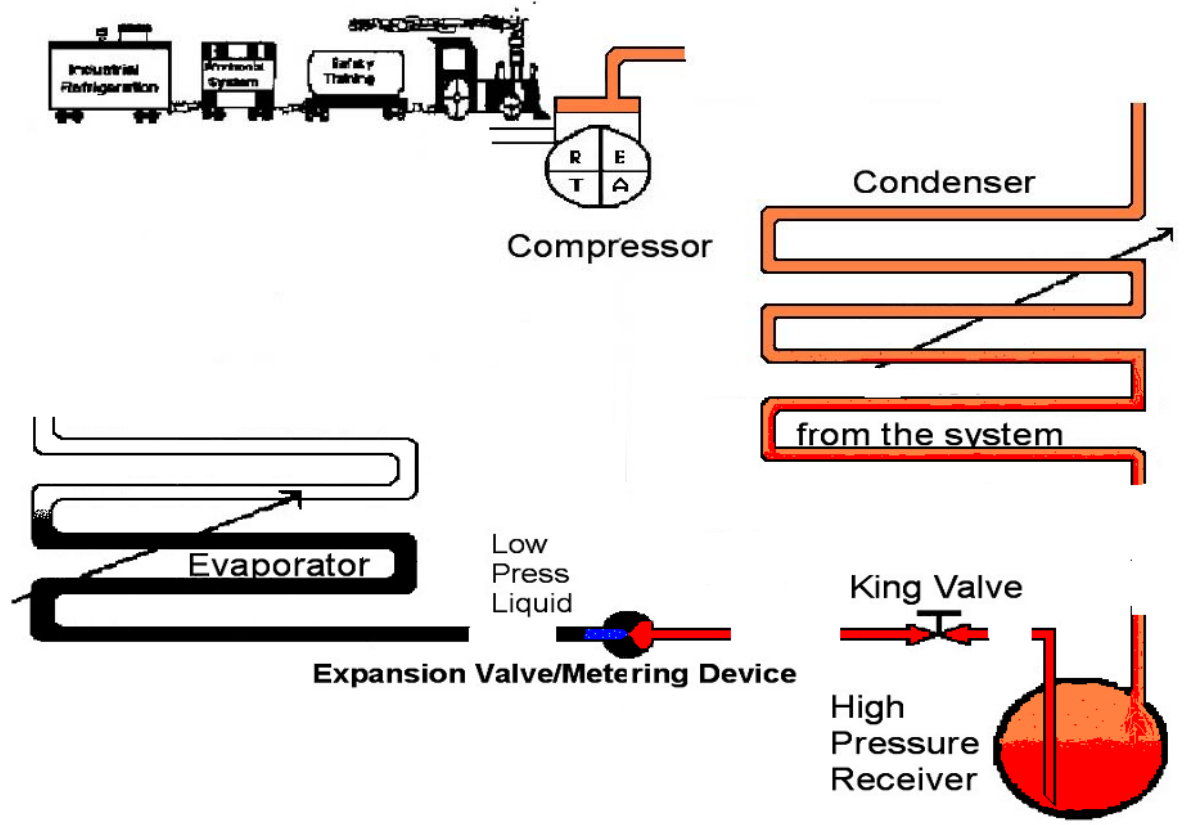
- There are 4 basic components of a mechanical refrigeration system.









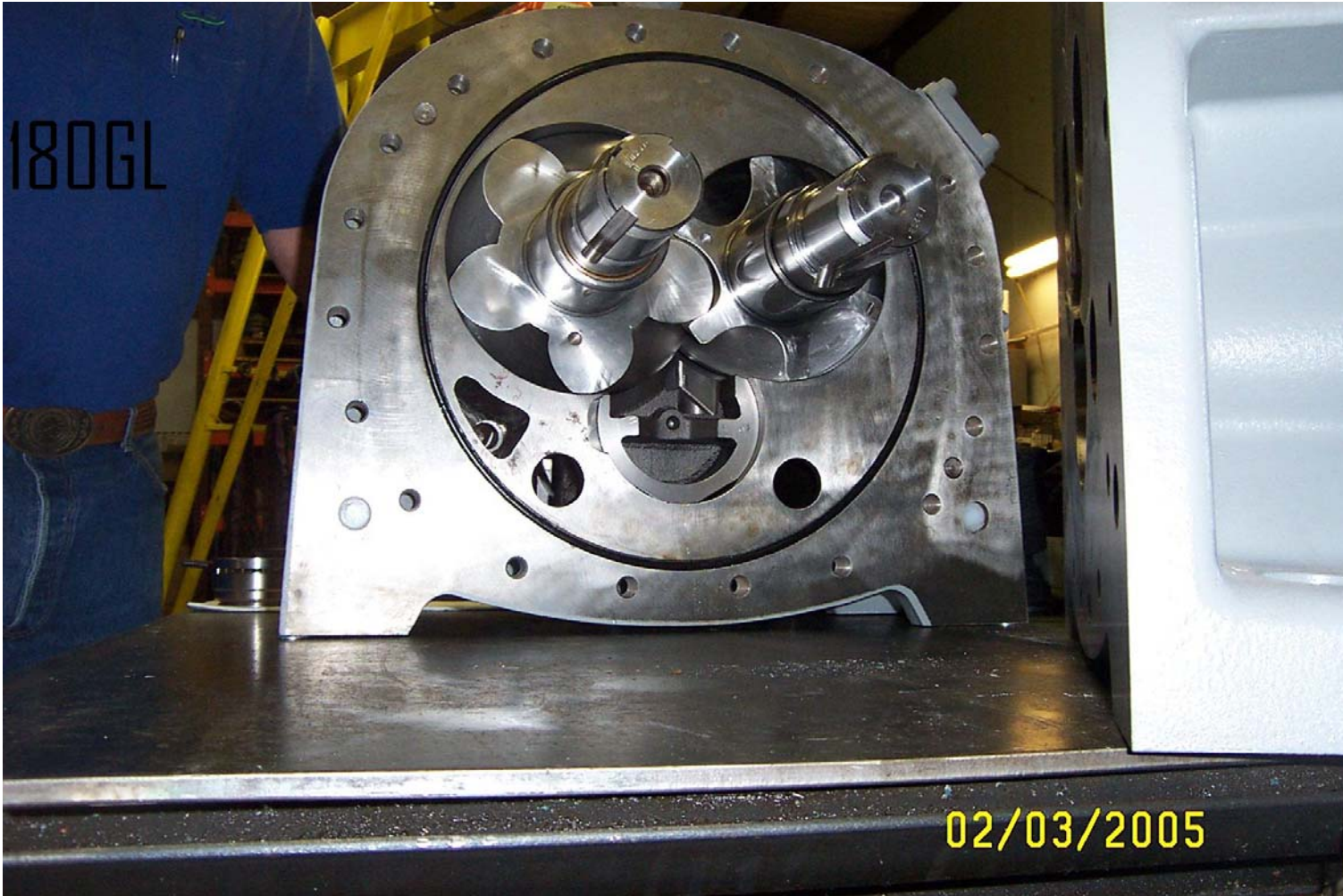






**Fan panel open for inspection and cleaning**





180GL

02/03/2005





Passivating only-Fans SN U040670901  
are not on.

08/31/2004



