REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED

BASIC REFRIGERATION PRINCIPLES.
#1 in a series

COMPRESSED, FAST MOVING HARD HITTING, HOT . . .

REFRIGERANT GAS MOLECULES

High pressure, super heated hot gas, 300 deg F approx, 250-350 psig.

SUPER-HEATED GAS

COMPRESSION

A

B

LINES 1, 2 & 3 Create rotating magnetic field in stator.

ONLY ONE OF MANY VALVE ARRANGEMENTS SHOWN.

suction service valve shown open for operation closed to service port.

ELECTRIC MOTOR

STATOR

COPPER MOTOR WINDINGS

ROTOR

PISTON

ROD

CRANK SHAFT

REFRIGERANT SOLUBLE OIL

CRANKCASE HEATER

oil pump

OIL PRES. FAILURE SWITCH

High pressure hot gas

warm gas / some liquid refrigerant forming

Half warm gas/ mixed with liquid

High pressure, sub cooled liquid refrigerant, 25-=350 psig

CONDENSER REJECTS HEAT

Cools Hot high pressure gas. which then turns into a liquid. (condenses)

HIGH PRES. LIQUID REFRIGERANT RECIEVER

KING VALVE

DETAIL, KING VALVE.

10 MILLION X MAGNIFICATION

HEAVY VAPOR REFRIGERANT

SMALL DROPLETS AND VAPOR REFRIGERANT

LIQUID REFRIGERANT / LARGE DROPLIETS, SOME VAPOR, LOW PRESSURE

15-25 Deg F

20 PSIG Typical

20-35 Deg F and

R-22

50 60 PSIG Typical

25-35 Deg F

POWER HEAD

DIAPHRAM PRESSURE OPPOSES SPRING PRESSURE AND SUCTION PRESSURE, AND INSURES ALL LIQUID REFRIGERANT EVAPORATES. CALLED 'SUPER HEAT' 5-10F USUALLY.

Refrigerant drops squeeze through these small tubes. pressure & temp. drops further in the process.

LOW PRESSURE DROPLETS/ MIST.

HIGH PRESSURE, SLIGHTLY WARM LIQUID.

ORIFICE

Thermostatic Expansion valve - TEV

Super-heat adjustment

END VIEW DETAIL

Suction line.

ADJ.

TEV sensing bulb.

EQUALIZER LINE

For Liquid refrigerant to evaporate. . . that is the molecules in the refrigerant moving fast enough to break the bonds that make it a liquid... and turn the refrigerant to gas.... It has to absorb heat energy from its surroundings. This is a "key" concept.

That heat is called the 'Latent Heat of Vaporization'.

Heat energy is nothing but faster moving molecules in any substance "relative to the vibration or speed of molecules around it... These moving molecules exert "force on their containment. Thus pressure and termperature are in lock step. Pressure / temperature charts show these relationships.

The heat is absorbed by the refrigerant, producing the 'refrigeration effect' as the tubing and surrounding air or liquid molecules are now moving "slower having given up their speed to the refrigerant molecults that are vaporizing.

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First in series FREE. Just copy in JPEG format. and print poster.

Add your logo or name if you wish. Series covers HVAC, Refrigeration, Boilers, Controls of all types, and specialty applications for the Semi-Conductor, Food, petrochemical, and other applications. No edits approved. Copyright 2010. 4 stages of testing and practical drills for each diagram.

Next in the series:
- What is a molecule, and Boyles Gas Laws
- Compound & cascade systems, below -100F
- Math and systems engineering. for laymen.

etc.

	NAME	DATE
DRAWN	phil scott	11/17/10
CHECKED		
ENG APPR		
MGR APPR		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES ANGLES ±XX" 2 PL ±XXX 3 PL ±XXXX

Solid Edge

TITLE

SIZE D | DWG NO | REV

FILE NAME: PSN Nov 18 Refrig Basic Sheet 1.dft

SCALE: | WEIGHT: | SHEET 1 OF 1