FUNDAMENTALS OF PHYSICS AND PRESSURE

Knowledge of physics is knowledge of how chemicals are affected by the elements. Temperature, radiation, humidity, vacuum, and barometric pressure determine how the chemical will react. Boiling of a chemical can't be altered by temperature change but condensation will be. The higher the ambient temperature is, the higher the temperature must be to create condensation. The higher the temperature, the higher the static pressure will be. Radiation adds to the ambient temperature by increasing superheat. High humidity will cause pressures to operate higher because of its inability to transfer heat. Vacuum will be affected by barometric pressure. An increase in altitude decreases the boiling point. A decrease in barometric pressure will decrease the amount of vacuum that a system can be pulled down to.

The inside of a system is considered to be an atmosphere and the boiling of water will still take place at the lower vacuum. Published barometric pressures are always published of what it is at sea level.

There is no plus or minus to temperature and how it affects pressure. Temperature is never referred to as being 100 degrees plus or minus 20 degrees. It is what it is. Pressure should not be looked as having an operation range. If the pressure is not relevant to ambient temperature, there is a reason and should not be accepted.

An AC technician becomes somewhat of a weatherman. The level of humidity can be seen by what happens to the suction line. If it is cold, low humidity, sweating means higher humidity, and ice means high humidity.

Vacuum can never be pulled any lower than barometric pressure. The less vacuum achieved means there is falling barometer and a storm front moving in.

Air coming off the evaporator feels colder when the humidity is low than it does when the humidity is high. Sweat evaporators faster when the humidity is low.

AUTOMOTIVE AIR CONDITIONING REPAIR

FUNDAMENTALS OF PRESSURE AND TEMPERATURE

HUMIDITY COMPARISON

LOW HUMIDITY 0 – 35%	
LOW SIDE	30 PSI
HIGH SIDE	2 X AMBIENT + 20
DUCT AIR	LESS THAN 50 DEGREES
MED. HUMIDITY 35 –70%	
LOW SIDE	30 PSI
HIGH SIDE	2 ½ X AMBIENT
DUCT AIR	½ AMBIENT
HIGH HUMIDITY 70 – 100%	
LOW SIDE	30 –40 PSI
HIGH SIDE	2 ½ - 3 X AMBIENT
DUCT AIR	2/3 AMBIENT

R-12

HIGH SIDE PRESSURE TO DISCHARGE LINE TEMPERATURE

150 PSI	118 DEGREES
170 PSI	125 DEGREES
200 PSI	138 DEGREES
220 PSI	145 DEGREES
265 PSI	160 DEGREES
310 PSI	175 DEGREES
355 PSI	190 DEGREES
400 PSI	205 DEGREES

R-134a

HIGH SIDE PRESSURE TO DISCHARGE LINE TEMPERATURE

150 PSI	112 DEGREES
170 PSI	120 DEGREES
200 PSI	130 DEGREES
220 PSI	135 DEGREES
250 PSI	150 DEGREES
300 PSI	160 DEGREES
350 PSI	172 DEGREES
400 PSI	184 DEGREES

BECAUSE MANY VEHICLES DO NOT HAVE A SERVICE PORT IN THE DISCHARGE LINE, (BETWEEN COMPRESSOR AND THE CONDENSER) IT IS NECESSARY TO READ THE TEMPERATURE OF THE INLET TO THE CONDENSER AND THE OUTLET OF THE CONDENSER. ON A SYSTEM WORKING CORRECTLY, A NORMAL TEMPERATURE DROP ACROSS THE CONDENSER IS 25 – 35 DEGREES. A TEMPERATURE DROP OF 50 DEGREES OR MORE INDICATES A RESTRICTED CONDENSER.