

Refrigeration & Air-Conditioning Lab

Subject overview:

Refrigeration may be defined as the process of achieving and maintaining a temperature below that of the surroundings, the aim being to cool some product or space to the required temperature. One of the most important applications of refrigeration has been the preservation of perishable food products by storing them at low temperatures. Refrigeration systems are also used extensively for providing thermal comfort to human beings by means of air conditioning. Air Conditioning refers to the treatment of air so as to simultaneously control its temperature, moisture content, cleanliness, odour and circulation, as required by occupants, a process, or products in the space.



Refrigeration Test Rig:

The trainer consists of a hermetically sealed compressor; forced convection air-cooled condenser, filter / drier, flow meter, expansion device and shell & coil type evaporator. Separate pressure gauges are provided to record suction and discharge pressures and digital temperature indicators for various temperatures. The refrigerant used is R-134a, which is environment friendly. The calorimeter consists of an insulated stainless steel tank in which heater is fixed.



Absorption Refrigeration Test Rig (Electrolux) :



“Vapour Absorption Refrigerator” earlier known as “Electrolux” refrigerator is a self contained refrigerator working on absorption technology. The system is pre-charged with three fluids namely water, ammonia and hydrogen. Hydrogen is used as an “inert gas” and does not undergo any phase change and heat transfer processes. Its purpose is to keep the pressure of the system constant.

Air to Water Heat Pump Test Rig :

The apparatus consist of refrigeration system with forced convection air-cooled evaporator and water-cooled shell coil type condenser. A hermetically sealed compressor using R-134a refrigerant, compresses the refrigerant and sends to the condenser. Liquid refrigerant from the condenser passes through flow meter and drier/filter to capillary tube, where it is throttled to low pressure and temperature.



Water to Water Heat Pump Test Rig :

It consists of cooling system with water-cooled shell coil type evaporator and condenser. A hermetically sealed compressor using R-134a refrigerant, compresses the refrigerant and sends to the condenser. Liquid refrigerant from the condenser passes through flow meter and drier/filter to capillary tube, where it is throttled to low pressure and temperature.



Automobile Air-Conditioning Test Rig :

Vehicle air conditioning systems are used to cool down the vehicle interior. They usually work on the basis of the recirculation air principle and aspirate the air to be cooled from the interior. The cold air generated in the air conditioning system is transported by a fan into the vehicle interior. All system components are typical elements used in vehicle technology.



Computerized Air-Conditioning Test Rig :



To accomplish psychrometric processes, heating elements and humidification arrangement is provided. To vary the air flow, air dampers are provided. The computer interface is provided through serial port. The data acquisition is displayed in Excel sheet format. All the signals of temperatures, pressures, energy meter are converted into digital form by suitable transducers. All the parameters are indicated in dedicated display in addition to that logged in excel sheet.