



Low Temperature Hydrofreezer



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Model : LHF/5/40

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1.0- System Description

Low Temperature Hydrofreezer consists of a semi-hermetic compressor, air-cooled condenser, liquid receiver complete with its own evaporator refrigeration circuit, Secondary Refrigerant circulation pump and a custom-made starter and control panel fitted on a common skid for a fully automated operation.

High pressure R 404A (HFC) refrigerant gas is supplied to the condenser unit whereby the air over the condenser acts as a condensing media within the heat exchanger to condense the refrigerant from gas to liquid state.

High-pressure liquid refrigerant is later circulated via a liquid receiver to an expansion device. High-pressure liquid refrigerant turns into low-pressure cold gas within the evaporator heat exchanger and the cold gas returns back to the compressor suction to complete the refrigeration cycle.

Secondary Refrigerant solution is received from the holding tank to the pump suction and the pump pushes warmer Secondary Refrigerant solution through the heat exchanger back to the pressure chamber to complete the hydraulic circuit. Secondary Refrigerant enters the evaporator from the top and it leaves from the bottom and the cold Secondary Refrigerant supplied by the heat exchanger is returned back to the system.

Secondary Refrigerant Low Temperature loop is specifically designed to provide infinitive capacity control via a hand regulating valve.

A manual control switch provides automatic start signal, which in return initiates the chiller cooling side. The rest of the cooling operation and internal controls are provided via an internal Secondary Refrigerant Low Temperature flow temperature controller.

All the necessary internal safety switches and functions are provided in accordance with BS 4434 for a safe and reliable operation.

The unit is supplied fully charged with oil and refrigerant. It is ready to start as long as the tank is filled with Secondary Refrigerant fluid to the level indicated inside the tank. An internal pump contact protects the chiller against pump failure and against a no flow condition. Unless a sufficient rate of Secondary Refrigerant flow is provided the chiller controller holds back the refrigeration circuit as an anti-freeze protection.

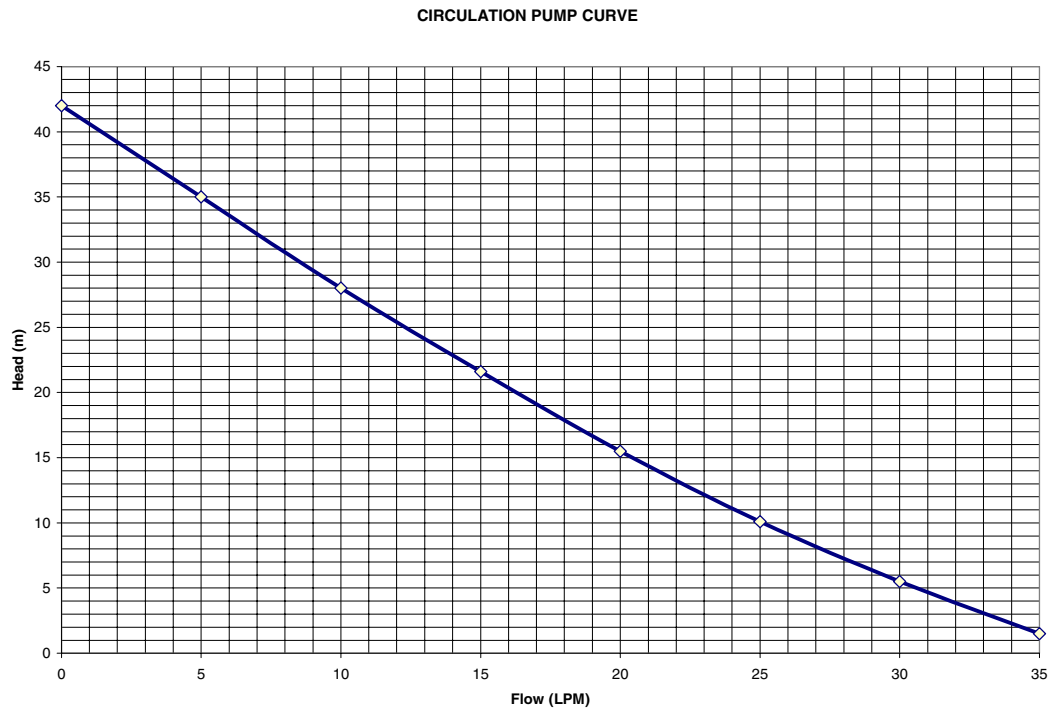
2.0- System Components

Semi-hermetic Compressor; 2 cylinder semi-hermetic reciprocating type fully unloaded start compressor.

Air Cooled Condenser; A copper tube / aluminum fins plate heat exchanger type condenser complete with fan is included as part of the package.

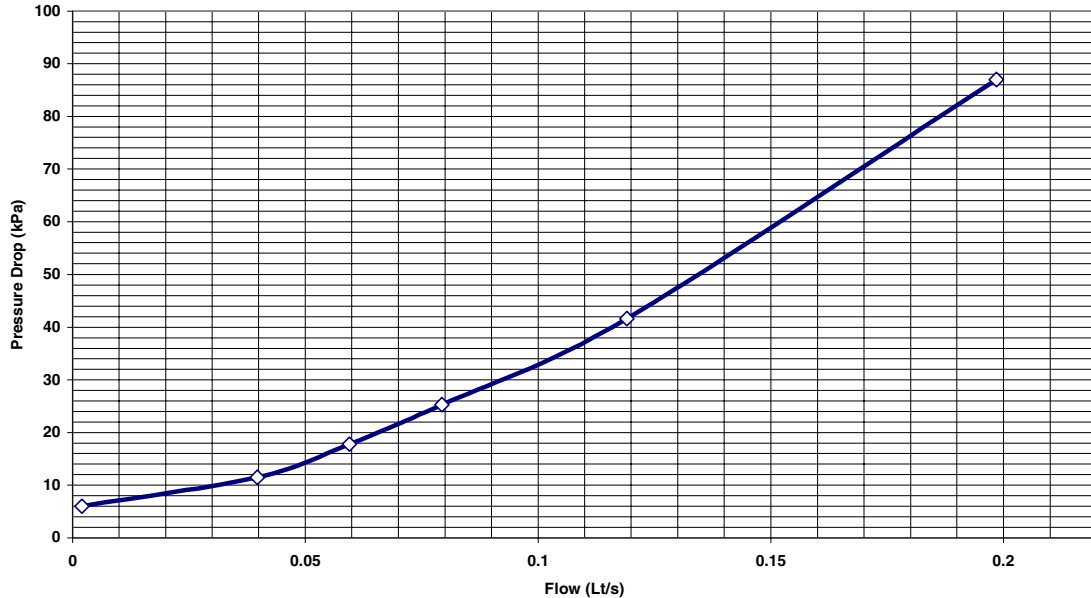
Liquid Receiver; 12 Lt. capacity liquid receiver complete with isolating valve and safety relief device is also incorporated as part of the package.

Circulation Pump; A single-stage centrifugal pump complete with associated strainer, flow switch, temperature probes, flow regulator and isolating valves are incorporated as part the skid mounted package and the flow characteristics are as follows.



Evaporator; A stainless steel plate type heat exchanger evaporator is incorporated as part of the package and the relevant design flow rate and pressure drop curve is as follows.

EVAPORATOR PRESSURE DROP (Tyfoxit 1.24 @ -32C)



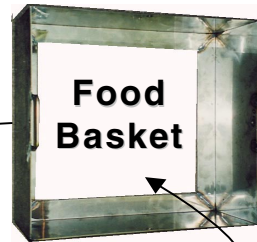
Main Control Panel; Houses all the necessary starter & control units for both pump and refrigeration unit. A digital operator adjustable temperature controller on the face of the panel is provided for the system control. A manual selector switch initiates the circulation pump initially and as soon as the pump is in operation the condensing units solenoid valve is energised to provide cooling for the hydrofreezer refrigeration circuit. A combined low temperature and high-pressure safety switch provides the necessary protection.

Once the selector switch is turned off an adjustable timer holds the circulation pump and shuts-off the solenoid valve, and at the end of pump down a low pressure switch shuts down the compressor.

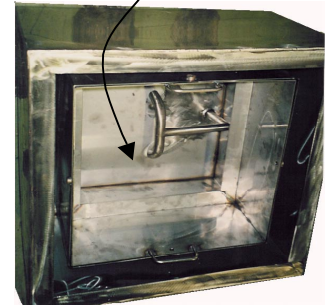
Holding Tank; 700 mm x 700 mm is designed to hold sufficient (approx. 90 litres) cold circulation fluid and the same base houses the pressurization chamber. A food holding basket is positioned within this chamber to create a hydrofreezing effect by means of a perforated bottom plate. The food basket must be secured using top fixing bolts for a satisfactory solution jet pattern. It is essential to secure the top clear cover sheet before turning the machine on.



Control Panel



Food Basket



Pressure Chamber



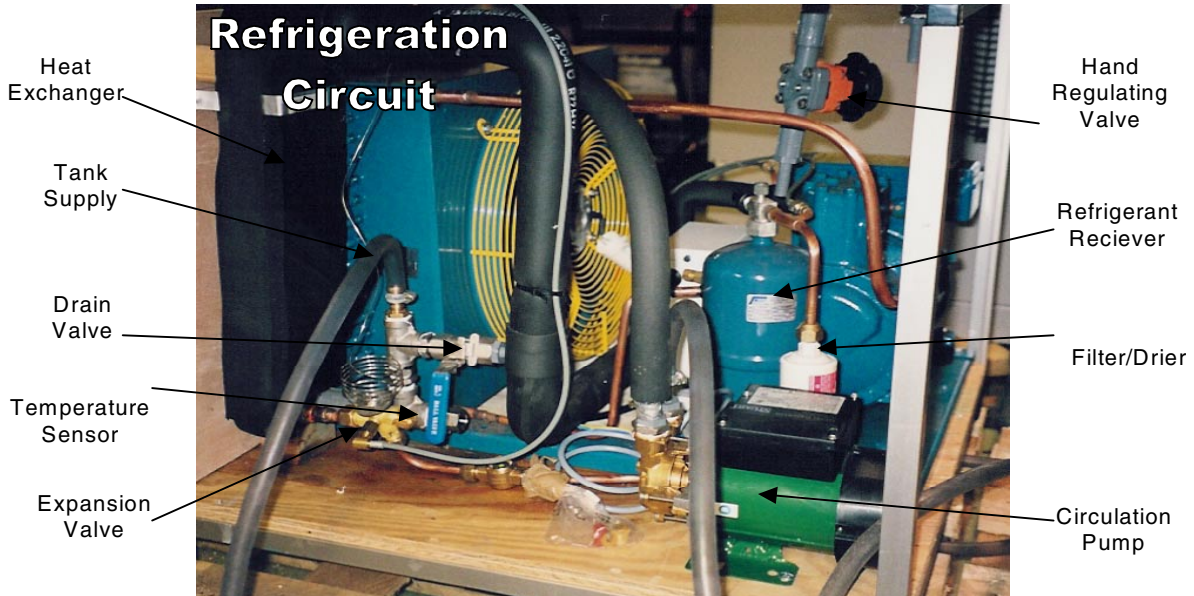
Holding Tank

General Layout

Compressor

Condenser

HP/LPA Switch



Refrigeration Circuit

Heat Exchanger

Tank Supply

Drain Valve

Temperature Sensor

Expansion Valve

Hand Regulating Valve

Refrigerant Receiver

Filter/Drier

Circulation Pump

3.0- Operational Data

Under normal operational conditions the following limits can be checked to ensure that system operating correctly.

Design Specifications;

Model	:	LHF/5/40
Nominal Capacity	:	1.0 kW (Cooling)
Refrigerant	:	R404a (HFC)

Condenser;

Cooling Air Inlet	:	32 °C
Cooling Pressure	:	45 °C
Flow Rate	:	2500 m ³ /h

Evaporator;

Flow Inlet	:	-27 °C
Flow Outlet	:	-32 °C
Flow Rate	:	0.072 kg/s
Evaporation	:	-40 °C
Solution	:	Secondary Refrigerant (Tyfoxit)

Dimensional Details;

Length (mm)	:	750
Width (mm)	:	750
Height (mm)	:	1200
Weight	:	300 kg (Shipping) 450 kg (Operating)

Electrical Details;

Supply	:	230 V/1Ph/50Hz
Running Current	:	10.6 Amps (Cooling Mode)
LRA	:	50.3 Amps
Refrigerant Type	:	R404a
Refrigerant Charge	:	1.5 kg

SECONDARY REFRIGERANT CIRCULATION PUMP;

Flow Rate (kg/s)	:	0.35
Head (kPa)	:	200
Supply	:	230/3/50
Electric Motor (kW)	:	0.37
FLA (Amps)	:	2.4