NEW REFRIGERATION INSTALLATION USING ENGAS M40 AND ENGAS M50 HYDROCARBON REFRIGERANT FOR ELITE FOOD COMPANY MALAGA INDUSTRIAL AREA PERTH, W.A.

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NEW INSTALLATION OF COLD ROOM, AND FREEZER ROOM FOR
ELITE FOOD COMPANY
MALAGA INDUSTRIAL AREA, PERTH, WA

The new cold room and freezer room were installed to give additional storage facilities for cold food storage (0 Deg C to 4 Deg C) and frozen food storage (-21 Deg C).

The rooms are constructed of 100mm (cold room) 150 mm (freezer) thick, pre-fabricated panels, sitting on a concrete base. A purpose built machine room to house the compressors was also constructed at the same time.

COLD ROOM

The cold room is 9m x 8.4m x 5.0m high, and is fitted with 2 x Muller MHD 173 Evaporators, utilizing Danfoss R22 TX Valves.

Linked to these evaporators is a Copeland Semi Hermetic compressor, Model No. 3DS 150E TFD, with a nameplate rating of RLA 29.0.

The compressor was connected to a roof mounted Buffalo Trident Condenser, Model RC 273B

FREEZER ROOM

The freezer room is 8.4 m x 6.0 m x 5 m high and fitted with 2 x Buffalo Trident EBBT 037 Evaporators utilizing Danfoss R404a TX Valves.

Linked to these evaporators is a Bitzer Semi Hermetic Compressor, Model No. 4P 15 2Y with a nameplate rating of RLA 29.

The compressor was connected to a roof mounted Buffalo Trident Condenser, Model RC 160B.

PLANT/COMPRESSOR ROOM

The purpose built plant room, which houses the two compressors, plus an exhaust system (in the case of a leak), plus leak detectors, sealed pressure switches (oil and refrigerant), plus isolating solenoids.

The staff only access door is properly ventilated, allowing the flow of fresh air. Please note the control panel on the right of the door. This houses all the controls, timers and relays – external to the plant room.

Inside the plant room, shows the two compressors, the exhaust fans, and ductwork. Should a leak be detected in the plant room (or in fact either the cold room or freezer room) the solenoid valves will close, pumping down the refrigerant into the roof top condensers, plus it will also activate the exhaust fan.

There are a total of 3 sensors fitted to the system, which all have rechargeable battery backup.

A brushless/flame proof, floor mounted, exhaust fan, with a 560 mm diameter blade, offering 1583 l/s is connected to metal ductwork rising to external roof level. In the unlikely event of refrigerant leakage the volume of air in the room is evacuated in a maximum of 30 seconds.

INSTALLATION

Following the installation of the evaporators, condensers, and compressors, following standard procedures, the exhaust system was installed, and then the sensors and alarm system.

Both systems were de-hydrated – and then charged to optimum levels using ENGAS Hydrocarbon Refrigerants.

The cold room system was charged with 20 kg's of Engas M40, and the Freezer room system was charged with 20 kg's of Engas M50. If these systems were using chemical refrigerants they would have needed approximately 60 kg's per system.

With the systems up and running the following readings were taken:

	MEASURED	EXPECTED WHEN ON CHEMICAL REF	IMPROVEMENT PERCENTAGE
COLD ROOM M40			
Amps	**18 amps**	**24 amps**	**25%**
Low Pressure	**55 psi**	**55 psi**	**-**
High Pressure	**225 psi**	**275 psi**	**18.2%**
Ref Charge	**20 kg**	**60 kg**	**66%**
FREEZER M50			
Amps	**15 amps**	**23 amps**	**35%**
Low Pressure	**20 psi**	**20 psi**	**-**
High Pressure	**225 psi**	**275 psi**	**18.2%**
Ref Charge	**20 kg**	**60 kg**	**66%**

ANNUAL SAVINGS

Based on current electrical costs, which obviously will rise in the future, the typical annual running costs for these units when running on Chemical refrigerants are as follows :-

	CHEMICAL	**NATURAL**	**MIN SAVINGS PA**
Cold Room	$21,027.65	$15,330.00	$5,697.65
Freezer	$20,146.17	$13,145,47	$7,000.70
TOTAL			**$12,698.35**

GENERAL OBSERVATIONS

It is very clear that these systems are operating much more efficiently than if they would be if running on chemical refrigerants (R22 and R404a).
The systems run cooler, the compressors run quieter, and as you can see from the amps, the power consumed is greatly reduced.

Control/Set point temperatures are maintained effortlessly.

SAFETY

Great attention to detail has been taken with this installation, as in fact it should be with all installations, with carefully selected refrigerant sensors, that detect down to 5000 ppm, have a rechargeable battery backup, and no volt contacts to control solenoid valves, audible alarm, and exhaust fans, to the fitting of suitable exhaust fans, location of control panels etc.,

All the units are suitable labelled indicating very clearly that hydrocarbon refrigerants are in use.

Local staff have been trained on the procedures in case of alarms. This facility is not open to the public.

From the above data it can be seen that each system holds approximately 20 kg's of refrigerant. Engineered safety systems have been installed to eliminate any risk due to the unlikely event of a refrigerant leak. At this facility (see photo below) there are 20 boxes of spray cooking oil, that use HC's as a propellant.

20 boxes x 12 cans x approximately 100 grams of HC propellant = 24 kg's of HC's – more than is contained in each cooling system that is protected by sensors, alarms, solenoid valves and exhaust fans, whilst these boxes of cans – just sit on the shelf unprotected.

For further information contact CoolQuip on 0417 958 309 www.coolquip.com.au or Engas Australasia on 1300 463 642 www.engas.com.au or email engas@engas.com.au.