HARP INTERNATIONAL

Harp® Hydrocarbon Refrigerants

(R600a, R290 & 1270)

Harp® hydrocarbon refrigerants are a range of organic based, naturally occurring, non-ozone depleting and environmentally friendly refrigerants with negligible global warming potential. They are suitable for use in a wide spectrum of domestic, commercial and industrial applications and in certain types of air conditioning systems. The Harp® range of hydrocarbon refrigerants is comprised of three single component refrigerants:

Harp® 600a (iso-butane – R600a)
Harp® 290 (propane – R290)
Harp® 1270 (propylene – R1270)

APPLICATION

Harp® 600a is pure iso-butane and is primarily used in domestic refrigerators that previously used R134a. Operating pressures are significantly lower than those of R134a and its evaporating temperature is significantly higher. It's neither possible or safe to retrofit existing R134a equipment to Harp® 600a due to the substantially increased compressor displacement requirements and its extreme flammability, which makes it impossible to use safely in existing R134a refrigeration equipment.

Harp® 290 is pure propane and is primarily used in commercial and industrial refrigeration systems and chiller applications that previously would have used refrigerants such as R22 or R404A. It exhibits similar pressures and refrigeration capacity to both R22 and R404A with discharge temperatures significantly lower than R22 allowing single stage compression down to approximately -40°C as typically found in R404A systems. Equipment must be specifically designed for its use to.

Harp® 1270 is pure propylene and is primarily used in commercial and industrial refrigeration systems and chiller applications that previously would have used refrigerants such as R22 or R404A. Harp® 1270 has a higher volumetric refrigerating capacity than Harp® 290 and is of particular interest in the area of medium and low-temperature chiller systems in supermarkets. Higher pressure levels (>20% more than R290) and slightly higher discharge temperatures may restrict its usage in certain applications. Equipment must be specifically designed for its use.

Harp® hydrocarbon refrigerants do not exhibit temperature glide and can be vapour or liquid charged into suitable refrigeration systems. All three Harp® hydrocarbon refrigerants result in system charge weights significantly lower than comparable HCFC/HFC systems, with reductions typically around 40% by mass.

Under no circumstances should non-hydrocarbon refrigeration systems be topped up with hydrocarbon refrigerants. Hydrocarbon refrigerants must not be recovered into the same recovery cylinders as HCFCs/HFCs or mixed in cylinders with HCFCs/HFCs. Dedicated hydrocarbon recovery cylinders must be used.

LUBRICATION

Harp® hydrocarbon refrigerants can be used with most commonly used refrigeration lubricants and are particularly suited to mineral oils and alkyl benzene lubricants. Polyalphaolefins (POA) and Polyalkyleneglycol (PAG) are also acceptable for use where approved by the compressor manufacturer. However solubility tends to be increased with hydrocarbon refrigerants and it may be necessary to select a higher grade viscosity than for HFCs. This is particularly the case with Polyolester (POE) lubricants. Consult the compressor manufacturer for recommendation.

Harp International The Complete Worldwide Refrigerant Service
email harp@harpintl.com Web www.harpintl.com

Harp® Hydrocarbon Refrigerants

RETROFITTING

For safety reasons Harp® hydrocarbon refrigerants MUST NEVER be retrofitted into an existing non-hydrocarbon designed refrigeration system.

REFRIGERANT GRADE HYDROCARBONS

Only refrigerant grade hydrocarbons should be used for refrigeration and heat pump systems. Commercial/fuel grade hydrocarbons contain significant impurities (sulphur, moisture that contribute to oil degradation and will shorten compressor life. Also unlike commercial/fuel grade hydrocarbons, refrigerant grade hydrocarbons contain no odoursing agent and therefore have no smell.

REFRIGERANT GRADE HYDROCARBONS

Only refrigerant grade hydrocarbons should be used for refrigeration and heat pump systems. Commercial/fuel grade hydrocarbons contain significant impurities (sulphur, moisture etc.) that contribute to oil degradation and will shorten compressor life. Also unlike commercial/fuel grade hydrocarbons, refrigerant grade hydrocarbons contain no odoursing agent and therefore have no smell.

Harp® 600a, Harp® 290 AND Harp® 1270 BASIC PROPERTIES

	Harp® 600a	Harp® 290	Harp® 1270
Chemical formula	$CH(CH_3)_3$	C_3H_8	C_3H_6
Molecular weight	58.13	44.10	42.09
Boiling point at 1 atmosphere	-11.6°C	-41.9°C	-47.5°C
Latent heat of evaporation at 1 atm.	362.6 kJ/kg	426.0 kJ/kg	440.1 kJ/kg
Critical temperature	135.0°C	96.7°C	91.8°C
Critical pressure	36.5 bar abs.	42.5 bar abs.	46.2 bar abs.
Flammability limits in air (%v/v)	1.8 to 8.5	2.1to 9.5	2.5 to 10.1
Ozone Depletion Potential (ODP)	0	0	0
Global Warming Potential (GWP)	3	3	3

ELASTOMERIC COMPATIBILITY

Whilst testing has been conducted on a number of selected materials with refrigerant and oil combinations, it should be noted that there are numerous different grades available in the market and for this reason compatibility should be carefully checked with the equipment or component manufacturer. Below gives general compatibility details for commonly used elastomeric materials.

MATERIAL	SUITABILITY
Neoprene	✓
Neoprene & Harp® 1270	✗
Viton	✓
Natural rubber	✗
EPDM	✗
Silicone	✗
Nitrile rubber	Dependant upon grade
PTFE	✓
Nylon	✓

Harp International Limited
Gellihirion Industrial Estate, Pontypridd, Rhondda
Cynon Taff, CF37 5SX United Kingdom

Telephone +44 (0) 1443 842255 **Freephone** 0800 134 404 (UK only)
Facsimile +44 (0) 1443 841805
email harp@harpintl.com **Web** www.harpintl.com