



## Subject: Supply conditions for HEX compressor ranges

The following supply conditions shall constitute an agreement between:

- Officine Mario Dorin S.p.A. (hereinafter defined as "Seller Company" or "Seller")

and

- ----- (hereinafter defined as "Purchaser Company" or "Purchaser")

on the use of Propane (R290) and Propylene (R1270) with reciprocating compressors manufactured by the seller company.

It is provided that the Seller agrees with the contents of ASERCOM statement in relation to the use of hydrocarbon (HC) refrigerants, sent as a separate attachment.

Furthermore, the seller company delivers semi-hermetic compressor to the purchaser company which is designed according to the safety requirements imposed for the use in flammable risky areas (zone 2, gas group IIB), as defined in ATEX 94/9/CE, featuring electric component conforming to such directive (exception made for INT69, CPM3 and condensers/relay kit needed for single phase compressors: those shall be placed in a safe area). However, the Purchaser shall produce a relevant and dedicated corresponding zone allocation which shall be registered in the explosion protection document.

The operation of such compressors in so-called closed plants is subject to the safety regulations on flammable / explosive substances for hazard zone 2.

The design of the compressor models concerned by this agreement differs from the seller standard version for HCFC and or HFC refrigerants, as described in Seller literature named 1LTZ012 & 1LTG667.

The interaction between compressor and other equipment and the environment shall be taken into proper consideration by the Purchaser, with particular regard to potential ignition phenomena.

The Purchaser Company is aware of the fact that other NON-flammable refrigerants are actually available in the market featuring equivalent characteristics to Propane (R290) and Propylene (R1270).

### SPECIAL AGREEMENTS BETWEEN SELLER AND PURCHASER COMPANIES

1) The purchaser company engages to comply with all the local and international applicable safety regulations including but not limited to the ones concerning machinery operation in explosion proof ambient.

2) The designers and/or installers of such systems, as well as servicing contractors, have to prove certified qualification for the handling of flammable refrigerants. The purchaser company will provide the operating and servicing personnel with instructions according to the appropriate safety regulations.

3) The seller company provides a warranty for the said compressors only to the extent of provable manufacturing defects. A warranty for evident manufacturing failures can be recognized only for defects appearing within one year as from the sale, once the Seller has verified in its production facility that it is a matter of a manufacturing defect. This warranty does not apply if the purchaser himself has caused damages to the compressor and/or to the system by inappropriate use or in disregard of the relevant safety regulations.

It is also understood and agreed by the Parties that:

- damages caused by refrigerant flammability will never be included in the warranty scope
- the purchaser shall be the sole party liable in such regard
- the seller company is therefore released from any such liability

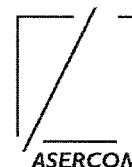
The terms of this contract apply to compressor with serial number:

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Company name / Representative / Signature -----

# STATEMENT

Last update: Oct-2003



## Hydrocarbon (HC) Refrigerants in Refrigerating Systems

### 1 General

Hydrocarbons have proven to be suitable refrigerants in several applications - regarding thermodynamics and reliability. *ASERCOM* member companies have collected experience with their use in different fields and are engaged in standardization work to enable appliance and system manufacturers to use HCs as refrigerants in a safe but restricted way (see below). The flammability of the materials adds significantly to the safety responsibility compared to non flammable refrigerants.

This statement focuses on applications in European countries where uniform standards are used to a wide extent. But with reference to hydrocarbons as refrigerants even the European market is fragmented. Ecological groups in some of the EU Member States promote flammable refrigerants with the support of the governments concerned, whereas in other European Member States governmental regulations restrict their use.

In most of the European countries a consensus exists to allow HCs in the following applications:

- systems with a maximum charge of 150 g
- large commercial and industrial systems designed according to ATEX directive 94/9/EU

It should be noted that some countries are insisting on the phase out HFCs and/or have heavily taxed these refrigerants, and careful consideration of product liability is necessary before specifying flammable alternatives.

### 2 Product Liability

As a result of the EU Product Liability Directive, product liability law in Europe has been harmonized, however, in view of certain discretion granted by the Directive to the Member States in connection with its implementation and due to the fact that such implementing legislation is embedded in the traditional and widely different tort law in existence in the various countries, there is no uniform product liability law even throughout the EU Member States. Consequently, it is inevitable that, despite EU efforts, even within the EU product liability claims would be treated and decided upon differently depending on where they are brought forward.

For this reason it must be pointed out that even compliance with the applicable regulations and standards (like ATEX 100) does not necessarily release the system manufacturer from liability. This is especially an issue with flammable refrigerants because alternate non-flammable refrigerants are available on the market for the same applications. This may also be a fact to be considered with reference to criminal laws in case of accidents.

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## 3 Limited warranty

The level of experience with HCs is presently very limited in commercial refrigerating systems, and for air conditioning and heat pump applications. This is why *ASERCOM* members may see the need to limit their warranty obligations.

## 4 Major applications – *ASERCOM* position

### 4.1 Hydrocarbons (HCs) in household and similar appliances (refrigerators, freezers, bottle coolers etc.):

- extremely small leakage rate due to the hermetically sealed system
- factory assembly (adaptations for HC technology)
- small refrigerant charge (<150 g)

resulting in **acceptable safety**. **Approved compressors are available, therefore both technologies (HC and HFC) coexist.**

### 4.2 Hydrocarbons (HCs) in commercial refrigeration, air conditioning and heat pump systems:

- potentially higher leakage rates necessitate improvements of system design/installation regardless of refrigerant
- significant product liability issues exist due to the safety risk associated with the flammability of hydrocarbons
- clear and complete safety regulations still have to be established on a legally binding and preferably harmonized basis
- components approved by the manufacturer have to be available for use with HCs (**NOTE:** the possibility for higher PED category must be recognized !)
- intensive training of personnel (for design, engineering, manufacturing, installation, operation, maintenance and disposal) must become compulsory to achieve the necessary qualification in handling flammable refrigerants

**Only if the above-mentioned requirements are fulfilled can hydrocarbons be seen as an alternative to the HFCs presently used. However, the electric energy efficiency should be calculated as in some cases the environmental benefits of HCs are lost or partly lost due to lower efficiency of systems caused by the necessity of secondary circuits for safety reasons.**

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## 4.3 Hydrocarbons (HCs) in large commercial and industrial applications:

- Only units designed and approved for HCs must be used.
- Outdoor installation of units is preferred.
- Engineering, installation and service must be carried out by competent (certified) personnel.
- Equipment/tooling suitable for HCs must be used for installation and service.

HCs may be used in large commercial and industrial applications **if all safety aspects are considered and relevant regulations and standards are applied.**

*ASERCOM* will continue to monitor the scientific and technical developments relevant in connection with the subject matter of this summary. *ASERCOM* will endeavour to provide - without assuming an obligation to this effect - updates whenever, due to changing criteria and/or new aspects have to be considered, *ASERCOM* might change its position with respect to the recommendations contained herein.

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These recommendations are addressed to professionals, industrial, commercial and domestic refrigeration system manufacturers/installers. They have been drafted on the basis of what *ASERCOM* believes to be the state of scientific and technical knowledge at the time of drafting, however, *ASERCOM* and its member companies cannot accept any responsibility for and, in particular, cannot assume any reliability with respect to any measures - acts or omissions - taken on the basis of these recommendations.

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