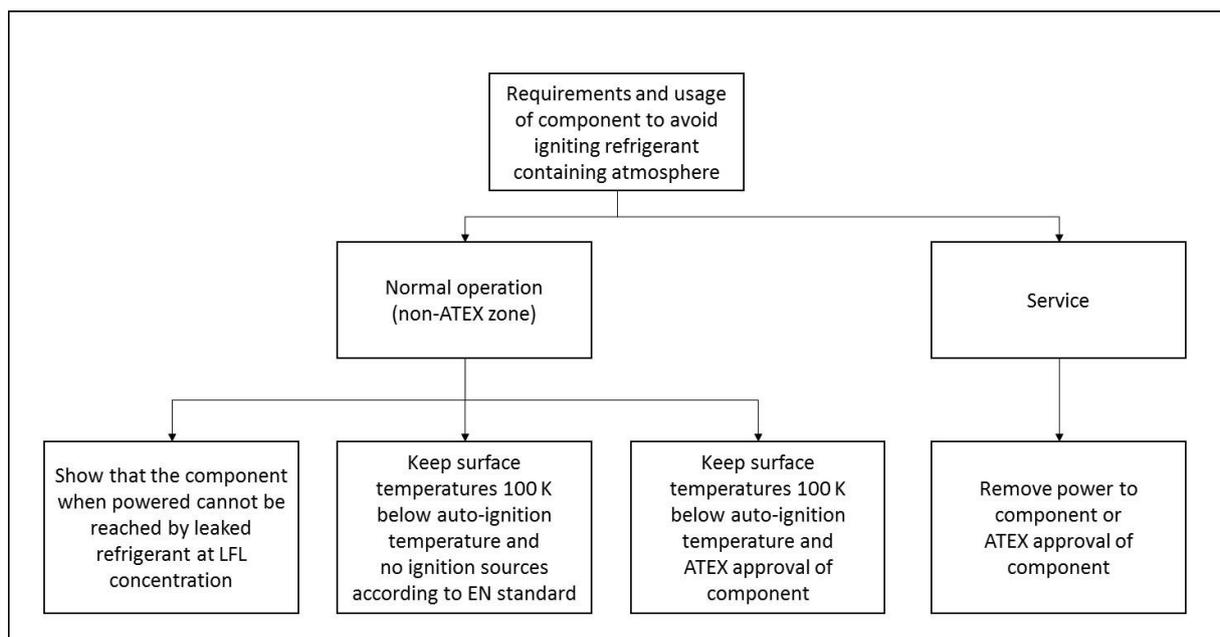


Components for use with flammable refrigerants

The purpose of this statement is to outline the conditions and frames for usage of components in vapour compression circuits comprising flammable refrigerants. This statement covers components used in normal systems operating under normal conditions. The detailed background for this statement can be found in the detailed document 'Safety standards and components for flammable refrigerants'

Introduction: The phase down of high GWP fluorinated refrigerants has resulted in a search for low GWP alternative refrigerants. Refrigerants are affecting the safety and efficiency of systems and a generic non-flammable, non-toxic and energy efficient refrigerant at a low cost does not exist. As flammable refrigerants are cost and energy efficient they are already for decades used in millions of household appliances and their usage is necessary for future low GWP appliances. The Industry and the related service sectors are challenged as the increased usage also will demand higher - and potential dangerous - charge sizes if not handled correctly. In that respect a total industry is moving beyond its traditional area of comfort and even though safety standards are well documenting how systems are build, installed and serviced a lot of uncertainty still remains in the market.

Statement: Components qualified, and conformity declared by the manufacturer for a specific flammable refrigerant or a group of flammable refrigerants can be applied taking into account the specific demands for installation and usage. The system builder always has to make a risk assessment for the system which normally implies he/she has to design the system according to the safety demands described in the application specific safety standards or alternatively he/she has to make a comprehensive and detailed risk assessment.



STATEMENT

Last update: December 2018



To support the understanding on how to specify demands for components the above figure can be used. There are two main situations; the normal operation mode and the system service mode. During normal operation electrical and electromechanical components are powered and three different situations can be assumed by the system builder. The easiest way to comply is to demonstrate that a powered component cannot be reached by a leaked refrigerant in a concentration between LFL and MFL. In case this cannot be demonstrated components need to comply with the demand of max temperature below 100K of the auto ignition temperature at the LFL and also not containing an ignition source. Alternatively, an ATEX approved component may be used to prove the absence of ignition sources. The service mode is different and does as such not relate to the components powered by normal operation of the system. It is necessary that the system builder ensures that components are either turned off during service or approved for ATEX zone 2.

Safety standards are considering the location and occupancy in relation to the system characteristics i.e. charge size and flammability level of the refrigerant. Safety standards set requirements on avoiding ignition sources where there is a risk of leaked refrigerant, however they generally do not require ATEX approval of components. A notable exception being the case where the system is made for operation in an externally imposed ATEX zone. In such case the system builder must ensure a system approval for the specified ATEX zone which again will deploy down to specific demands for components.

Revision Index

Revision	Change	Date
A	Initial issue	
B	Final approval	
C		

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 liability with respect to any measures - acts or omissions - taken on the basis of these recommendations.

Further *ASERCOM* Statements and Guidelines:

- Hydrocarbon Refrigerants in Refrigerating Systems
- Carbon Dioxide (CO₂) in Refrigeration and Air-Conditioning Systems (RAC)
- Containment of Refrigerant Compressors
- Electromagnetic Compatibility Directive 2014/30/EC
- Energy Efficiency Rating
- Recommended liquid line filter dryers and moisture indicators for refrigeration and air conditioning systems with HFCs refrigerants and POE lubricants
- Machinery Directive 2006/42/EC
- Pressure Equipment Directive 2014/68/EU
- Capacity Rating of Thermostatic Expansion Valves
- R22 Phase-Out
- Recommendations for using frequency Inverters with positive displacement Refrigerant Compressors
- *ASERCOM* guidelines for the design of multiple compressor racks using frequency inverters
- Refrigerant Glide and Effect on Performances Declaration
- *ASERCOM* cyber-security guideline for connected HVAC/R equipment



For more information, please refer to *ASERCOM*'s website www.asercom.org

About *ASERCOM*

ASERCOM, the Association of European Refrigeration Component Manufacturers, is the platform for addressing scientific and technical challenges, promoting standards for performance and safety, encouraging better environmental protection, and supporting the refrigeration and air conditioning industry and its customers.

Further information is available at: www.asercom.org