

COMPONENTS FOR FLAMMABLE REFRIGERANTS

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TIMING AND STATUS

- *STARTED JAN 2018*
- *FINISHED JAN 2019 (1 GUIDELINE PAPER AND 1 ONE DETAILED BACKGROUND DOCUMENT)*
- *NEXT STEP – PUBLISH ON HOMEPAGE*

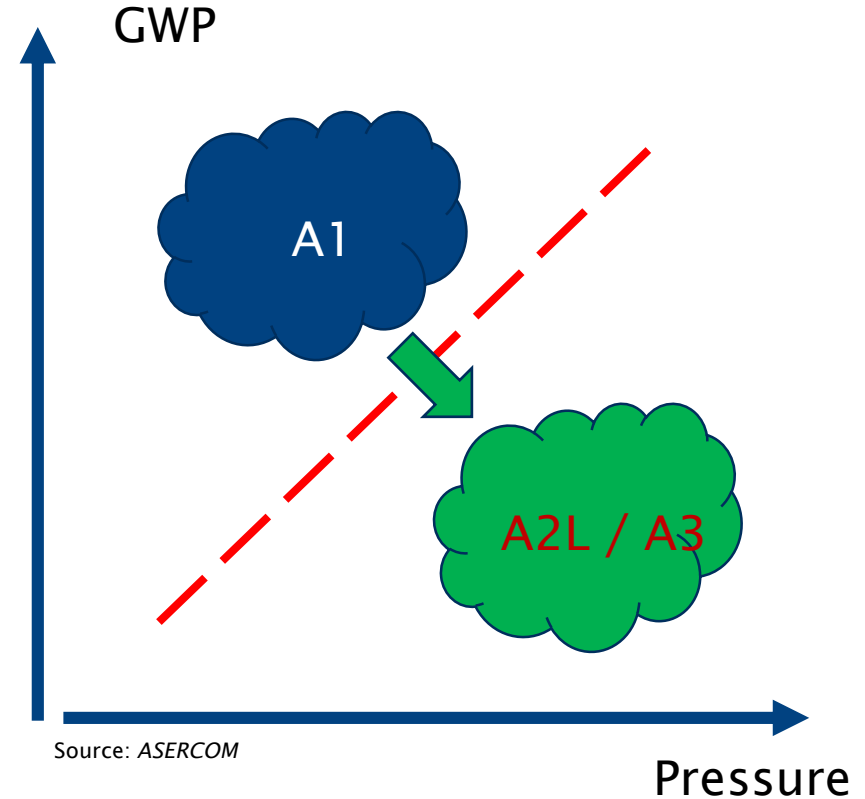
- *15 SKYPE MEETINGS - PARTICIPATION FROM VARIOUS MEMBERS*

- *PRESENTED AT AFF IN DECEMBER BY BACHIR BELLA*

THE BACKGROUND

- *Carbon chain based Low GWP refrigerants are needed and often flammable*
- *The market is often in doubt how act and apply components for systems using flammables*

We need a simple message !

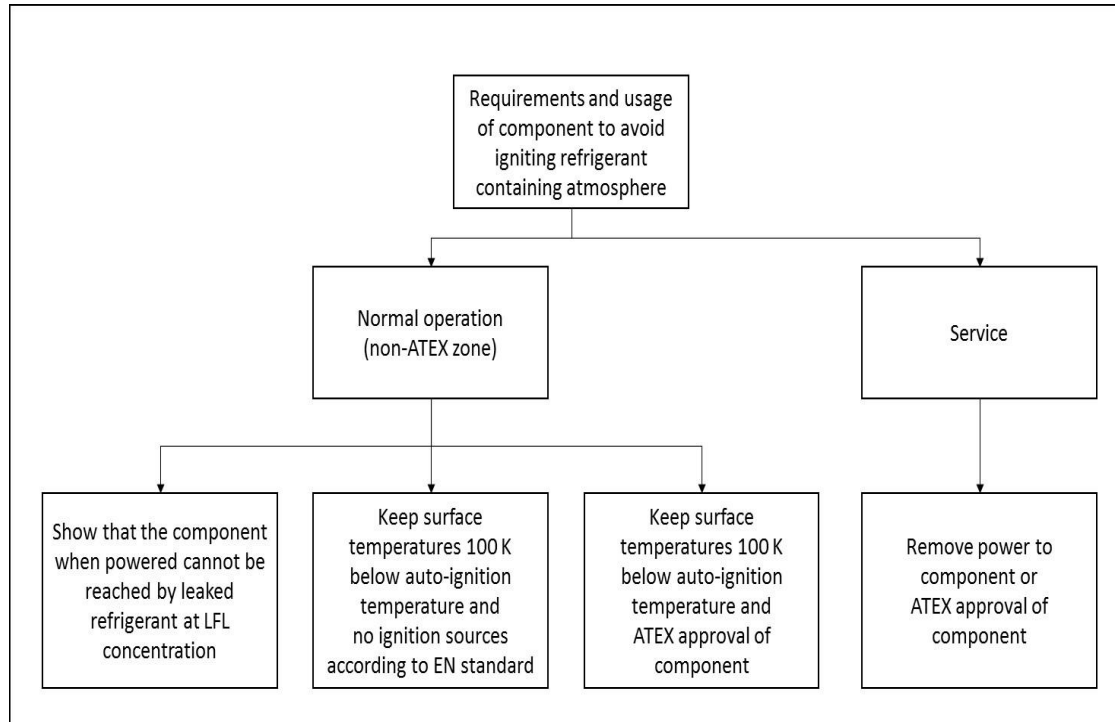


THE SIMPLE MESSAGE ...

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 A SYSTEM DESIGN ACCORDING TO THE SAFETY DEMANDS DESCRIBED IN THE APPLICATION SPECIFIC SAFETY STANDARDS. ALTERNATIVELY A COMPREHENSIVE AND DETAILED RISK ASSESSMENT HAS TO BE MADE.

DEMANDS ON COMPONENTS SEEN FROM THE SYSTEM BUILDER PERSPECTIVE



Source: ASERCOM

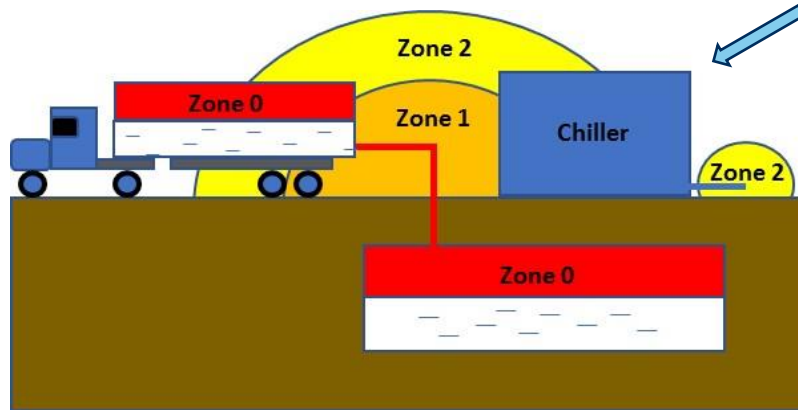
SAFETY STANDARDS TAKE CARE....

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.

WHEN EUROPEAN SYSTEM SAFETY STANDARDS SET REQUIREMENTS TO AVOID OTHER IGNITION SOURCES, THEY ARE GOING BEYOND THE REQUIREMENTS OF ATEX.

THE ATEX ZONES



Source: ASERCOM

Zone 0 is a place in which an explosive atmosphere is present continuously or for long periods or frequently

Zone 1 is a place in which an explosive atmosphere is likely to occur in normal operation occasionally,

Zone 2 is a place in which an explosive atmosphere is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

The vapor compression system is not the cause of the ATEX zones.

If the vapor compression system is placed in an ATEX zone the system builder must ensure ATEX compliance. But requirements will not depend on the refrigerant type in your system.

CONCLUSION

SYSTEMS USING FLAMMABLE REFRIGERANTS CAN USE COMPONENTS QUALIFIED BY THE COMPONENT MANUFACTURERS.

THE RECOGNISED SAFETY STANDARDS WILL ENSURE SAFE DESIGN, INSTALLMENT AND OPERATIONS OF SYSTEMS

THE FLAMMABLE REFRIGERANT IN A SYSTEM WILL NOT CAUSE AN ATEX ZONE DURING NORMAL OPERATION. SO ATEX APPROVAL FOR COMPONENTS IS GENERALLY NOT NECESSARY. HOWEVER, FOR CERTAIN PRODUCTS IT CAN BE THE MOST CONVENIENT CHOICE.

SERVICE SITUATIONS WHERE THE SYSTEM CIRCUIT IS OPENED AND THEREBY CAUSING AN ATEX ZONE 2 WILL CAUSE ELECTRICAL COMPONENTS TO BE POWERED OFF.

BACK-UP

OVERVIEW ON SAFETY STANDARDS

EN 60335-2-11:2015	Household and similar electrical appliances – Safety – Particular requirements for tumble dryers	Currently defines rules for up to 150 g of flammable refrigerant. Copies IEC 60335-2-11:2008 with minor modifications related to EU legislation. The general policy is to adopt latest IEC version with minor modifications.
EN 60335-2-24:2010	Household and similar electrical appliances – Safety – Particular requirements for refrigerating appliances, ice-cream appliances and ice makers	Currently defines rules for up to 150 g of flammable refrigerant. Copies IEC 60335-2-24:2010 with minor modifications related to EU legislation. The general policy is to adopt latest IEC version with minor modifications.
EN 60335-2-40:2013	Household and similar electrical appliances – Safety – Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers	Charge limits depends on refrigerant type and system architecture. Derived from 2002 version of IEC 60335-2-40 with amendments. Proposals to update to 2018 version.
EN 60335-2-89:2017	Household and similar electrical appliances – Safety – Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor	Copies IEC 60335-2-89 version 2010 and amendment 1 from 2012 with minor modifications related to EU legislation. Currently defines rules for up to 150 g of flammable refrigerant. There is a draft IEC standard defining rules for up to more charge, when that is approved then it is likely to be copied into EN 60335-2-89
EN 378:2016	Refrigerating systems and heat pumps — Safety and environmental requirements	Charge limits depends on system architecture, location of the system, who has access to the system and the purpose of the system.

IGNITION TEMPERATURES ARE TO BE CONSIDERED DESIGNING COMPONENTS

Refrigerant	Auto ignition temperature (°C)	Maximum temperature standards (°C)	in EN
R-32	648	548	
R-170	515	415	
R-290	470	370	
R-600a	460	360	
R-1234yf	405	305	
R-1234ze(E)	368	268	
R-1270	455	355	