




RISK ASSESSMENT **CHECKLISTS FOR** **REFRIGERATION** **SYSTEMS**

INTRODUCTION

When you design, assemble, commission, service, or repair a refrigeration system, you need to ensure that the potential technical, environmental, health, and safety risks are known, evaluated and appropriately mitigated. This is valid no matter which refrigerant you use, flammable or non-flammable. Honeywell's interactive checklist will help you conduct risk assessments for your refrigeration systems. When assessing risk, our checklist will also show you that using A2L refrigerants does not require significant additional effort when compared to the use of R-744 or other A1 refrigerants.



DESIGN PHASE	System assembled from components (including refrigerant piping) on site and charged on site	System factory charged, located outdoor	System factory charged, located in ventilated enclosure (e.g. water-cooled chiller)	System factory charged, located in machinery room (e.g. water-cooled chiller)	System factory charged, located indoor (e.g. plug-in cabinet, monobloc)
Does the design team have the final layout of the facility?					
For rooms featuring refrigerant containing parts: Are the access categories known?					
Is the system location defined?					
In case of refrigerant leak: Is refrigerant flow into the building prevented?					
Refrigerant charge of the system: Is it calculated and cross-checked according to the standard?					
Are the locations of designed pipe network coordinated with other systems within the facility?					
Sub point: Is the vicinity of pipe runs & valve stations with hot surfaces and ignition sources avoided?					
Are the locations of designed components coordinated with other systems/ structures within the facility?					
Sub point: Is the vicinity of system components with hot surfaces and ignition sources avoided?					
Sub point: Is the interference of refrigerant containing parts with stairways, entrances etc. avoided?					
If applicable: Is one additional measure for $QLMV < \text{charge} < QLAV$ defined?					
Sub point: Is the party responsible to install this additional measure defined?					

 Item valid for A2L only

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Do occupancies (presence of people) exist on the lowest underground floor?					
Sub point: Are measures to mitigate an excessive refrigerant concentration on the lowest underground floor defined?					
Sub point: Is the party responsible to install these mitigation measures defined?					
Are protection measures for people entering cold-rooms defined?					
Sub point: Is the party responsible to install these protection measures defined?					
Is the leak detection system inside the cold-rooms defined?					
Sub point: Is the party responsible to install the leak detection system inside the cold-rooms defined?					
For system location II (Compressors & pressure vessels in the machinery room): Are the requirements for the machinery room defined?					
Sub point: Are the parties responsible to fulfil these requirements defined?					
Sub point: Is an electrical shutting-off system, triggered at concentration <20% of LFL, in place for the machinery room?					
System location IV (All refrigerant-containing parts located in ventilated enclosures): Are the requirements for ventilation defined?					
Sub point: Is the party responsible to install the ventilation defined?					

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For charges >500 kg: Are the protection measures against the release of A2L refrigerant into the secondary coolant system defined and designed?					
Are shut-off devices defined and incorporated in the design?					
Are protecting devices defined and incorporated in the design?					
Are indication and measurement instruments defined and incorporated in the design?					
Design of electrical system: Does it clearly indicate that refrigerant belongs to A2L safety class?					
Are protection measures against fire and explosion hazards defined and designed?					
Electrical systems associated with refrigeration system: Do they accommodate for the requirements of A2L?					
Are pipe diameters evaluated?					
Sub point: Are the PED requirements for the piping assembled on-site defined?					
Is the design documentation shared with the building permission authorities and fire brigade?					

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COMPONENTS ORDERING PHASE	System assembled from components (including refrigerant piping) on site and charged on site	System factory charged, located outdoor	System factory charged, located in ventilated enclosure (e.g. water-cooled chiller)	System factory charged, located in machinery room (e.g. water-cooled chiller)	System factory charged, located indoor (e.g. plug-in cabinet, monobloc)
Selected system components: Are they rated by the respective OEM for A2L?					
Sub point: Is the product information about the A2L-rating available to the purchaser of the component?					
For PED-subjected components: Is the PED documentation provided by the respective OEM?					
Leak detectors: Are they calibrated for 20% of LFL?					
Are declarations of conformity for components/devices available from the respective OEM?					
Are system labels defined?					
Sub point: Is the party responsible to deliver these labels defined?					

ASSEMBLING PHASE:	System assembled from components (including refrigerant piping) on site and charged on site	System factory charged, located outdoor	System factory charged, located in ventilated enclosure (e.g. water-cooled chiller)	System factory charged, located in machinery room (e.g. water-cooled chiller)	System factory charged, located indoor (e.g. plug-in cabinet, monobloc)
Is the comprehensive design documentation handed over to the assembling team?					
Are the requirements for installing piping on site fulfilled?					
Are in-house PED modules for pipe assembling deployed?					
Are in-house EH&S assembling procedures defined?					
Is the tightness test for each system done and successful?					
Sub point: Is the tightness test protocol issued and signed by the Assembling Team Leader?					
Is the system pressurized with inert gas?					
Are the service access points labelled with the appropriate flammability symbol?					


COMMISSIONING PHASE	System assembled from components (including refrigerant piping) on site and charged on site	System factory charged, located outdoor	System factory charged, located in ventilated enclosure (e.g. water-cooled chiller)	System factory charged, located in machinery room (e.g. water-cooled chiller)	System factory charged, located indoor (e.g. plug-in cabinet, monobloc)
Is the commissioning team familiar with the Safety Datasheet of the refrigerant?					
Are in-house EH&S commissioning procedures defined?					
Sub point: Is the level of competency of the commissioning team members defined?					
Sub point: Are the appropriate work permits available for the commissioning team members?					
Sub point: Is the safety inspection check list for the refrigeration system defined?					
Sub point: Is the lock-out / tag-out procedure for electrical systems defined?					
Sub point: Is the appropriate Personal Protective Equipment defined?					
Sub point: Is a ventilation system for preventing formation of a flammable atmosphere in the charging phase available?					
Sub point: Is the equipment (vacuum pump, fire extinguisher, refrigerant detector, recovery machine, recovery cylinder) rated for A2L?					
Sub point: Is the charging procedure defined?					
Sub point: Are emergency procedures in place?					

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Is the protocol of the tightness test available?					
Is the leak detection system tested?					
Is the external visual inspection of the installation completed?					
Is the system assembled according to the design?					
Is the system charged according to the design specification?					
Sub point: Is the charging protocol, with charge values, issued and signed by the Commissioning Team Leader?					
Is the system functionality tested?					
Is the system labelled appropriately?					
Is the system documentation checked, corrected and complete?					
Is the system documentation handed over to the operator?					

SERVICING/REPAIRING PHASE	System assembled from components (including refrigerant piping) on site and charged on site	System factory charged, located outdoor	System factory charged, located in ventilated enclosure (e.g. water-cooled chiller)	System factory charged, located in machinery room (e.g. water-cooled chiller)	System factory charged, located indoor (e.g. plug-in cabinet, monobloc)
Is the system documentation available?					
Sub point: Is the system logbook up-to-date?					
Is the Servicing/Repairing Team familiar with the Safety Datasheet of the refrigerant?					
Are in-house EH&S servicing/repairing procedures defined?					
Sub point: Is the level of competency of the servicing/repairing team members defined?					
Sub point: Are the appropriate work permits available for the servicing/repairing team members?					
Sub point: Is the safety inspection check list for the refrigeration system defined?					
Sub point: Is the lock-out / tag-out procedure for electrical systems defined?					
Sub point: Is the appropriate Personal Protective Equipment defined?					
Sub point: Is a ventilation system for preventing formation of a flammable atmosphere during spot repairs available?					

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Sub point: Is the equipment (vacuum pump, fire extinguisher, refrigerant detector, recovery machine, recovery cylinder) rated for A2L?					
Sub point: Is a marking for the servicing/repairing zone available?					
Sub point: Is the charging procedure defined?					
Sub point: Are emergency procedures in place?					
Are in-house transport and handling procedures in place?					

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Risk Management Checklist | 10/20
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