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THE DANGEROUS SUBSTANCES AND EXPLOSIVE ATMOSPHERES REGULATIONS (DSEAR/ATEX) 2002

Self-assessment checklist for ammonia systems

Guidance Notes:

Introduction

This self-assessment form has been prepared by the Technical and Safety Committee of the Food Storage and Distribution Federation (FSDF) with assistance from the Technical Committee of the Institute of Refrigeration (IoR). It is intended to give owners of ammonia charged¹ refrigeration systems a quick indication of whether their system is likely to be technically compliant with the Dangerous Substances and Explosive Atmosphere Regulations (2002). It does not address issues related to or the hazards arising from the toxicity of ammonia. These are not covered by DSEAR (2002), but they do need to be considered to ensure compliance with the regulations listed below.

This self-assessment is not a substitute for the formal risk assessment required by DSEAR (2002) nor is it a substitute for the annual inspection required under the Pressure Systems Safety Regulations (2000).

If **ALL** the ammonia is in the machinery room and the room meets the requirements of EN378:2008 or later then it is more likely to be a simple task to show that it complies with the requirements of DSEAR (2002).

Likewise if there are **NO** flanges, valves or equipment **in enclosed spaces** such as a roof void or the cold space it is also more likely to be compliant. However if there are non-permanent joints outside the machinery room then additional steps may be required to meet the requirements of DSEAR (2002).

Scoring - How to interpret the results of your Self-assessment

- Section 1:** multiply the refrigerant charge in tonnes by the number of compressors and the number of evaporators
- Section 2:** if the answer to any of these questions is **"NO"** then a formal assessment of the machinery room is required.
- Section 3:** if the answer to any of the last four questions is **"YES"** then a formal assessment of the evaporator installation is required.
- Section 4:** if the answer to any of the last four questions is **"YES"** then a formal assessment of the valve station installation is required.
- Section 5:** if the answer to any of the questions is **"Moderate"** or **"Severe"** then a formal assessment of the valve station installation is required. If the answer to any of the questions is **"Slight"** and the score in Section 1 is greater than 20 then a formal assessment of the valve station installation is recommended.

¹ The contents of this document apply solely to refrigeration systems that are charged with ammonia.

Possible cost impact

Section 2: if the answer to any of these questions is “**NO**” then the cost of compliance may be significant.

Section 3&4: If however, the answer to all of the first three questions in Section 3 and Section 4 is “**YES**” then compliance costs are likely to be low.

In addition to DSEAR (2002) this guidance for ammonia systems is set out against a background of legislation in force in the UK at the time of its publication. These include for example:

- * Environmental Protection Act (1990)
- * Health and Safety at Work etc. Act (1974)
- * Construction (Design and Management) Regulations (2007)
- * Control of Substances Hazardous to Health Regulations (2002)
- * Electricity at Work Regulations (1989)
- * Management of Health and Safety at Work Regulations (1999)
- * Regulatory Reform (Fire Safety) Order (2005)
- * Pressure Systems (Safety) Regulations (2000)

It is therefore recommended that an Ammonia Hazard Study & Risk Assessment as required by DSEAR (2002) and the Management of Health & Safety at Work Regulations (1999) and other relevant legislation should be covered in one document.

When must the DSEAR/ATEX workplace requirements be met?

In areas where dangerous quantities and concentrations of flammable ammonia gas or vapour may arise, protective measures must be applied in order to reduce the risk of explosions in order to comply with DSEAR (2002).

The specific DSEAR (2002) requirements dealing with explosive atmospheres come into effect at different times depending on when the equipment (or system) is first used. The exact dates are as follows:

- * All equipment in use before July 2003 must be compliant with DSEAR (2002) by July 2006
- * Equipment installed before July 2003 that has been modified before July 2006 must be compliant from the time the modification was carried out
- * All equipment installed after June 2003 must be compliant from the time it comes into use

Hazardous Area Classification

The International Standard IEC 60079 Part 10-1: Classification of areas – Explosive gas atmospheres sets out the essential criteria against which the ignition hazards can be assessed, and gives guidance on the design and control parameters which can be used in order to reduce such a hazard.

The FSDF guidance document **HAZARDOUS AREA CLASSIFICATION OF REFRIGERATION PLANTS USING AMMONIA (R717) AS THE REFRIGERANT²** complements IEC 60079-10-1 as it provides detailed requirements for hazardous area classification of permanent and temporary refrigeration plants using ammonia as the refrigerant charge.

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² Copies of all FSDF Technical Bulletins, Guides and all other publications are available to members free of charge. There can also be purchased by others direct from the FSDF subject to payment of the appropriate fee.

System Name		Location	
Assessed by:		Date:	DD/MM/YY

1. System Information				
Type of System	Cold Store	Chill Store	Production	Other
Original date of installation	DD/MM/YY	Date of last major modification	DD/MM/YY	
Total system charge	Kgs	Number of compressors		
Number of pumps		Number of evaporators		
Defrost Type		Number of condensers		

2. Machinery Room					
Ammonia detection system	YES	NO	Date of last calibration	DD/MM/YY	
Emergency Ventilation	YES	NO	Date of last functional check	DD/MM/YY	
Ventilators correctly sited	YES	NO	Date of last functional check	DD/MM/YY	
Relief Lines vent outside room	YES	NO	PRV Discharge in low risk area	YES	NO
Separate Electrical Room	YES	NO	Electrical Room Pressurised	YES	NO
Automatic electrical breaker	YES	NO	No Sources of ignition in room	YES	NO

3. Evaporators					
Ammonia detection system	YES	NO	Date of last calibration	DD/MM/YY	
Emergency Ventilation	YES	NO	Date of last functional check	DD/MM/YY	
Automatic electrical breaker	YES	NO	Date of last functional check	DD/MM/YY	
Flanges in room	YES	NO	Mechanical equipment in room	YES	NO
Valves in room (inc. solenoids)	YES	NO	Strainers/Drains in room	YES	NO

4. Valve Stations					
Indoor or outdoor	OUT	IN	In store or roof void	Store/Void	
Ammonia detection system	YES	NO	Date of last calibration	DD/MM/YY	
Emergency Ventilation	YES	NO	Date of last functional check	DD/MM/YY	
Automatic electrical breaker	YES	NO	Date of last functional check	DD/MM/YY	
Flanges in room	NO	YES	Mechanical equipment in room	NO	YES
Valves in room (inc solenoids)	NO	YES	Strainers/Drains in room	NO	YES

5. Physical Condition				
Is there rust on exposed pipe	None	Slight	Moderate	Severe
Is there ice on insulated pipe	None	Slight	Moderate	Severe
Ammonia smell in machinery room	None	Slight	Moderate	Severe
Leaks around liquid pumps	None	Slight	Moderate	Severe
Ammonia smell in roof void	None	Slight	Moderate	Severe
Ammonia smell at evaporators	None	Slight	Moderate	Severe
Any banging/knocking during defrost	None	Slight	Moderate	Severe
Describe any instances of rust or ice that have been assessed as moderate or severe. Use additional pages if necessary. Treat each instance separately so that their repair can be scheduled and confirmed.				

Recommended date for next assessment	DD/MM/YY	Signed:	
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