SAFETY AUDIT / ASSESSMENT TOOL
CRYOGENIC BULK STORAGE AT PRODUCTION SITES

Doc 102.04/22

Revision of Doc 102/08 Appendix C3

EUROPEAN INDUSTRIAL GASES ASSOCIATION AISBL

AVENUE DE L'ASTRONOMIE 30 • B – 1210 BRUSSELS
Tel: +32 2 217 70 98
E-mail: info@eiga.eu • Internet: www.eiga.eu

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Prepared by WG-16 Worker Safety and WG-3 Process Equipment

Disclaimer

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Amendments to Doc 102/08

All	Revision of Doc.102/08 Appendix C3
All	New format of Safety Audit / Assessment Tool

1 Introduction

Auditing is a proactive management tool for use by an organisation or activity as a part of its management responsibilities. It is used to proactively confirm compliance, detect potential issues and facilitate future improvement

EIGA Doc. 102 *Audit Guidelines* provides an overview of audit and self-assessment processes, identifies different types of audits and lists the key points for ensuring success.

Sections 8.2 and 8.4 of Doc. 102 refers to EIGA's audit tools document series that can be used in verification of findings and evidence collection and in action plans and follow up to audits.

This publication is part of that series.

2 Scope and purpose

2.1 Scope

This publication provides a checklist focusing on a specific area of safety, health and environment, management systems and technical practices within the industrial and medical gas industry.

This checklist does not incorporate all the requirements of local or national legislation. These should be taken into consideration when planning any audit or developing audit checklists.

The tool or combination of tools used can depend upon the type of audit and the organisation, location or site characteristics.

2.2 Purpose

Each Safety Audit / Assessment tool contains a list of questions that may be used by the auditor in the format shown in 3.1. Each question has a sequential reference number, the question itself and where relevant a reference to the EIGA publication or external publication that provides guidance on that specific topic.

These question sets may then be used at different stages of the audit process, by combining them with additional information columns in a manual or automated audit system, depending on company systems.

Section 3.2 shows the format of how the question set may be used for collection of evidence and development of findings.

Section 3.3 shows the format of how the question set may be used for management of actions arising from the audit.

Forms may be adapted or combined depending on audit and action monitoring systems used by a company.

The Auditor should not ask the questions on this list in isolation but should read them in conjunction with EIGA Doc 102 and the referenced technical document.

3 Formats for Audit Checklists

3.1 Format for Audit / Assessment Tool Questions

Question reference	Question	Document Section Reference
Use sequential numbering system within each section. E.g. 1.2, 1.3. *Try to avoid multiple clustered questions under the same number, but describe them as separate questions.*		*In EIGA reference document or external reference document*

3.2 Typical Format for collection of evidence and development of findings

Question reference	Question	Document Section Reference	Yes No N/A	Description of Evidence / Comments *(Ref…)*	Findings *(Ref…)*	Recommendations for improvement *(Ref Doc xxx 8.2.6*	Action Required Yes/No
Use sequential numbering system within each section. E.g. 1.2, 1.3. *Try to avoid multiple clustered questions under the same number, but word them as separate questions.*		*In EIGA reference document or external reference document*	*Answer is yes or no or question is not applicable*				

3.3 Typical format for management of actions arising from the audit

Question reference	Findings	Action(s)	By Whom	Dates	
				Target	Complete
Use sequential numbering system within each section. E.g. 1.2, 1.3. *Try to avoid multiple clustered questions under the same number, but word them as separate questions.*					

4 Cryogenic Bulk Storage at Production Sites – Question Set

1 Tanks

2 Cryogenic fill points

Note This questionnaire is not exhaustive and may need to be complemented/adapted in order to cover all the procedures, plant and equipment on site.

	Question	Yes	No	N/A	Comment	Agreed Action	By Whom	Dates	
								Target	Compl
1.0	**Tanks** **See IGC Documents 127/20**								
1.1	Is the manufacturer's name-plate legible								
1.2	Is there a P&ID available								
1.3	Is the remote emergency shut-off valve at each main liquid outlet of the tank regularly tested and in good working condition								
1.4	Can the emergency shut-off valve still be operated under power failure conditions and/or on instrument gas failure								
1.5	Are the associated emergency push buttons tested regularly and outside of a risk zone								
1.6	Are the pressure controlling devices fitted on the annular space of the tank inspected at regular intervals								
1.7.1	Have checks been carried out to ensure that all safety devices on the tank are correctly sized to relieve vapours created by tanker flash-off in the worst possible condition								

	Question	Yes	No	N/A	Comment	Agreed Action	By Whom	Dates	
								Target	Compl
1.7.2	Are procedures for transfer of mobile tankers liquid into low pressure bulk storage tanks followed								
1.8	Are the safety valves checked and maintained at regular intervals								
1.9	When changeover valves upstream of safety valves are provided, are they adjusted to the middle position so that both safety valves are in their operating condition								
1.10	Is the automatic tank vent valve checked and maintained regularly								
1.11	Are the exhaust pipes from safety valves and vent valves kept free from any obstruction such as foreign material, ice etc								
1.12	Are there established procedures for the inspection and overhaul of tank safety devices								
1.13	Are provisions made and kept in good condition to avoid fall of ice blocks from tank vent outlets (e.g. baskets on outlets)								
1.14	Is the purge gas available to maintain the required pressure in the annular space.								

	Question	Yes	No	N/A	Comment	Agreed Action	By Whom	Dates	
								Target	Compl
1.15	If existing, is the manually operated vent valve of the tank easily accessible								
1.16	Are all alarm/trip functions that are provided (e.g. :minimum pressure,maximum pressure, high level etc.) checked regularly.								
1.17	Is the liquid level indicator checked and calibrated at regular intervals								
1.18	Are the liquid level limit switches checked at regular intervals								
1.19	Are valve identifications maintained in good condition and legible								
1.20	Are all live sections where liquid product can be trapped equipped with thermal relief valves								
1.21	Are thermal relief valves checked and maintained at regular intervals								
1.22.1	Is the automatic tank pressure build-up system checked and maintained regularly								
1.22.2	Is the vacuum protection system on the tank checked regularly								
1.23	Is the instrument gas system inspected and maintained regularly								

	Question	Yes	No	N/A	Comment	Agreed Action	By Whom	Dates	
								Target	Compl
1.24	Is the remote emergency stop for the transfer/tanker filling pump checked regularly								
1.25	Are an adequate number of product identification and safety signs posted, for example 'No Smoking', 'use of PPE' etc								
1.26	Are warning signs posted at ducts and valve pits related to permit to work procedures and/or confined space requirements								
2.0	**Cryogenic Fill Points**								
2.1	Are pressure transmitters on suction and discharge of transfer pump checked and maintained regularly								
2.2	Are the pump pressure safety valves inspected and overhauled at regular intervals								
2.3	Is the remote emergency stop device for the transfer pump regularly tested								
2.4	Are filling procedures available								
2.5	Is a up to date flow sheet of the fill point available								
2.6	Are identification signs of fill point valves legible								

	Question	Yes	No	N/A	Comment	Agreed Action	By Whom	Dates	
								Target	Compl
2.7	Are the filling hoses at regular intervals inspected and maintained, also pressure tested, if required								
2.8	Are filling hose supports in good working condition								
2.9	Are filling hoses kept free from any dirt or other foreign materials								
2.10	Are precautions taken not to damage filling hoses during operation or storage.								
2.11	Is the tanker loading area at LOX fill points free from oil, grease and any organic compounds for example asphalt etc								
2.12	Are warning signs and/or anti-towaway devices used to avoid tanker towaways								
2.13	Is each fill point clearly identified								
2.14	Are transfer pumps' protections against cavitation maintained in good working condition								
2.15	Do the filling procedures clearly identify the responsibility of operating personnel and tanker drivers								

	Question	Yes	No	N/A	Comment	Agreed Action	By Whom	Dates	
								Target	Compl
2.16	Are personal safety protection signs posted at each filling point, for example safety glasses safety shoes safety gloves								
2.17	Are different EIGA couplings used for the various products being filled								
2.18	Is there a procedure to report and remedy cryogenic leaks at the fill point								