



SAFETY AUDIT / ASSESSMENT TOOL INDUSTRIAL GAS AND LIQUID PLANT

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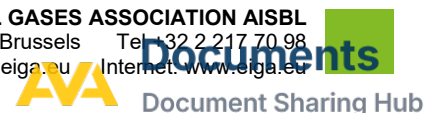


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Amendments to Doc 102/08

All	Revision of Doc.102/08 Appendix C4
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
<i>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.</i>					

4 Industrial Gas and Liquid Plant – Question Set

- 1 General safety
- 2 Main air compressor and surrounding area
- 3 Air refrigeration equipment
- 4 Air condensate separators/molecular sieves/switch valves
- 5 Cold box and surrounding area
- 6 ASU
- 7 Control room
- 8 Avoidance of hydrocarbon concentration
- 9 Oxygen pumps
- 10 Expansion turbines
- 11 Argon and nitrogen compressors
- 12 Oxygen compressors
- 13 Cooling towers
- 14 Cooling water treatment
- 15 Emergency equipment/procedures
- 16 Argon purification plant
- 17 Hydrogen system
- 18 Product and disposal vaporisers for liquid nitrogen, oxygen and argon

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	General/Safety								
1.1	Is the standard of housekeeping adequate								
1.2	Is there safety reference literature available on site on the following material categories: acetylene/acetylides ammonia freon argon chloride/chlorine hydrogen nitrogen oxygen miscellaneous gases (eg NO, NO ₂ , F, HF, H ₂ S)								
1.3	Is an approved procedure in use for authorising modifications of plant and process control circuits etc								
1.4	Are electrical personnel certificated/ authorised to carry out work related to high, medium and low voltage equipment								
1.5	Is there a program covering mechanical integrity								
1.6	Is a lock out/tag out procedure in place								
1.7	Is a permit to work procedure in place								

	Question	Yes	No	N/A	Comment	Agreed Action	By Whom	Dates	
								Target	Compl
1.8.1	Are operating procedures issued for all plant and equipment								
1.8.2	Are all operating procedures kept up-to-date								
1.9.1	Are cleaning specifications and acceptance standards for production plants clearly defined								
1.9.2	Do these cleaning specifications differentiate between the requirements for: gases air liquid air/enriched air oxygen clean etc								
1.10	Is an authorised material list available for oxygen service which is used when replacing joints, sealing rings and component parts								
1.11	Are pressure gauges for oxygen service clearly identified								
1.12	Is a process in place to address coldbox leaks, like root cause analysis, mitigation, risk assessment.								
1.13	Are there written emergency procedures in place relating to a large liquid spill from a tank, tanker or container								

	Question	Yes	No	N/A	Comment	Agreed Action	By Whom	Dates	
								Target	Compl
1.14	Are maximum periods between air separation unit thawings defined and followed								
1.15	Are plant pressure systems, condensate separators and carbon steel pipework adequately inspected (for corrosion/erosion etc) and proper records kept								
1.16	Is a management system of change in place for additions, revisions or modifications to computer hardware/software								
1.17	Are rules established for inspection and pressure testing of relief valves (refer to IGC Doc 24/83)								
1.18.1	Are consolidated rules laid down for inspection and maintenance of gas transmission lines (internal to factory and external to customers) (see DOC 235/21)								
1.18.2	Do these rules cover: pipeline surveillance pipeline repairs pipeline reporting periodic checks cathodic protection monitoring								

	Question	Yes	No	N/A	Comment	Agreed Action	By Whom	Dates	
								Target	Compl
1.19	Are adequate flow sheet/drawings available for all plant and ancillary services/equipment, eg instrument air, seal gas, cooling water etc								
1.20	Are personal atmospheric monitors available, if prescribed by site regulation								
1.21	Are visual alarms well visible from relevant positions								
2.0	Main Air Compressor & Surrounding Area								
2.1	Is the sign 'Entry Permit Required' mounted on the air inlet duct inspection door/filter house door								
2.2	Is the floor grating surrounding the compressor securely mounted on supports								
2.3	Is the area free of tripping/slipping hazards								
2.4	Are appropriate guards fitted over machine couplings								
2.5	Are noise warning signs posted in appropriate areas								
2.6	Is the sign 'Danger – Do Not Stand in Front of Cabinet While Motor is being Started' mounted on starter capacitor box								

	Question	Yes	No	N/A	Comment	Agreed Action	By Whom	Dates	
								Target	Compl
2.7	Is the emergency stop button functionally tested at regular intervals								
2.8	Are operating instructions available								
2.9	Are intercooler/aftercooler vents, drains and bursting discs piped to a safe location								
2.10	Are alarms and trip values defined and implemented								
2.11	Is there a preventative maintenance system in use for regular inspection/calibration of: pressure gauges all instrumentation alarm/trip functions temperature indicators major machine components filters and valves electrical motors electrical systems safety devices vibration monitors etc								
2.12	Is technical data provided by compressor manufacturer available								
2.13	Are relevant process data logged								
2.14	Is a system in place to check the recorded data								