Joint Accreditation System of Australia and New Zealand

Asset Management Systems Scheme (AMS Scheme)

Requirements for bodies providing audit and certification of Asset Management Systems

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Authority to Issue

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Contents

0 Introduction

0.1 Background

This asset Management Systems (AMS) Scheme sets down the requirements for certification bodies (CBs) conducting audits of asset management systems to ISO 55001, Asset management – Management systems - Requirements.

This Scheme was developed by the JAS-ANZ asset Management Systems Technical Committee comprising of a broad and balanced representation of relevant experts and other significantly interested parties.

0.2 Foreword

This Scheme contains requirements that supplement, but do not diminish, the requirements of ISO/IEC 17021:2011, which is the current International Standard for bodies providing audit and certification of management systems.

The clause numbers of this Scheme are consistent with the clause numbers of ISO/IEC 17021:2011. This will assist the reader to understand the combined requirements of these two normative references.

The clauses of this Scheme are prefixed with the letter 'J' to refer to the mandatory criteria developed by the JAS-ANZ Asset Management Systems Technical Committee.

The term **"should"** is used in this Scheme to indicate a recognised means of meeting a requirement of this Scheme. The CB shall meet a 'should' requirement, but it can do so in an equivalent way provided it can demonstrate equivalence to JAS-ANZ.

The term **"shall"** is used in this Scheme to indicate requirements that are mandatory.

0.3 Transition policy

0.3.1 Transition policy for CBs

Not applicable.

0.3.2 Transition policy for certified organisations

Not applicable.

1 Scope

No additional requirements

2 References

The following referenced documents are indispensable for the application of this scheme. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- GFMAM Competency Specification for an ISO 55001 Asset Management System Auditor/Assessor, First Edition, April 2014. Published by the Global Forum on Maintenance and Asset Management.

  The terms used in the GFMAM provide an understanding of the intent of the document as commonly applied to a range of sectors. Some of these terms may not be relevant to all sectors. Where a term used in the GFMAM is not relevant to a sector then any sector specific term that would satisfy the intent of the GFMAM for that sector should be considered applicable

- IAF MD 2:2007– IAF Mandatory Document for the Transfer of Accredited Certification of Management Systems, available at www.iaf.nu
- IAF MD 4:2008, IAF Mandatory Document for the use of Computer Assisted Auditing Techniques (CAAT) for Accredited Certification of Management Systems

- ISO 55000:2014, Asset management – Overview, principles and terminology
- ISO 55001:2014, Asset management – Management systems – Requirements
- ISO 55002:2014, Asset management – Management systems – Guidelines for the application of ISO 55001
- ISO/IEC 17021:2011, Conformity assessment – Requirements for bodies providing audit and certification of management systems
- ISO/IEC TS 17021-5:2013, Conformity assessment – Requirements for bodies providing audit and certification of management systems – Part 5: Competence requirements for auditing and certification of asset management systems

3 Terms and definitions

The terms and definitions used in the referenced documents also apply to this scheme with the following terms and definitions of particular significance to this Scheme:

Asset	An item, thing or entity that has potential or actual value to an organization. (Source: ISO 55000, 3.2.1).
Asset system	Set of assets that interact or are interrelated (Source: ISO 55000, 3.2.5)
Asset type	Assets having common characteristics that distinguish those assets as a group. (Source: ISO 55000, 3.2.6)
Critical asset	An asset having potential to significantly impact on the achievement of the organization's objectives. (Source: ISO 55000, 3.2.7) A critical asset may also refer to a system or group of assets where any individual asset by itself, is not critical, but collectively, they significantly impact on the achievement of the organization's objectives.
Strategic asset management plan (SAMP)	Documented information that specifies how organizational objectives are to be converted into asset management objectives, the approach for developing asset management plans, and the role of the *asset management system* in supporting achievement of the asset management objectives. (Source: ISO 55000, 3.3.2)
Major nonconformity	One or more elements of ISO 55001 are not met, or the outcome is ineffective.
Minor nonconformity	One or more requirements of ISO 55001 are not fully met, or the outcome is only partly effective.

4 Principles

No additional requirements

5 General requirements

No additional requirements

6 Structural requirements

No additional requirements

7 Resource requirements

7.1 Competence of management and personnel

7.1.2 Determination of competence criteria

J.7.1.2 The CB shall have a process for demonstrating that personnel involved in the management and performance of asset management system audits as described in ISO/IEC 17021, Annex A, Table A.1, satisfy the requirements of ISO/IEC TS 17021-5.

7.2 Personnel involved in the certification activities

J.7.2.5.1 In addition to J.7.1.2, the certification body shall ensure that the audit team, either one person or the team as a whole, has demonstrated the knowledge and comprehension specified in the GFMAM, Section 4, GFMAM Competency Specification for an ISO 55001 Asset Management System Auditor/Assessor.

Note: A Certified Asset Management Assessor (CAMA) certification is recognised by GFMAM Member bodies as demonstrating an auditor's knowledge and comprehension.

J.7.2.5.2 The CB shall have a process for ensuring that the audit team, either one person or the team as a whole, has sufficient skills to deal with the range, volume and complexity of the critical assets contained in the SAMP. Informative Annex D refers.

8 Information requirements

8.6.1 Information on the certification activity and requirements

J.8.6.1.1 The CB shall advise its clients that the normative requirements for certification include Annex C of this AMS Scheme – Normative requirements on the application of ISO 55001.

J.8.6.1.2 The CB shall advise the client prior to audit of the normative reporting requirements in Annex B of this AMS Scheme – Additional normative requirements on report content.

8.6.3 Notice of changes by a client

J.8.6.3 The CB shall also require the client to notify the CB at least one month prior to each scheduled audit of any significant changes to the Strategic Asset Management Plan (SAMP) to enable appropriate planning for the pending audit.

9 Process requirements

9.1 General requirements

9.1.2.3 Preparing the audit plan

J.9.1.2.3 The audit plan shall clearly identify:

a) the version of the SAMP and asset management policy being assessed;

b) the boundaries (the interface with externalities) including asset boundaries, information boundaries, process boundaries and contractual boundaries as applicable;

c) how components of the SAMP being fulfilled beyond the boundaries of the organization, (for example through outsourcing) are to be included in the audit plan; and

d) any exclusions that might otherwise normally have been expected to have been included in the scope of the audit.

9.1.4 Determining audit time

J.9.1.4 Audit durations shall be determined in accordance with Annex A.

9.1.5 Asset sampling

J.9.1.5 The certification body shall have documented procedures for ensuring that the sampling of assets is sufficient to reliably inform the audit opinion. The asset sampling methodology shall take account of the number, extent, diversity and inter-relationships of asset management activity and outsourcing options implemented by a client and the potential impact on forming a reliable audit opinion.

9.1.10 Audit report

J.9.1.10 The CB shall take account of Normative Annex B for the preparation of audit reports.

9.2 Initial audit and certification

9.2.1 Application

J.9.2.1 The application shall include a copy of the SAMP.

9.2.2 Application review

J.9.2.2.2 The CB shall handle applications for transfer of certification in accordance with IAF MD 2.

9.9 Records of applicants and clients

J.9.9.2 The certification body shall maintain records of the asset sampling methodology used for each AMS audit. The methodology must demonstrate how the sampling regime has been applied to reliably inform the audit opinion on the performance of the AMS as well as the performance of critical assets.

10 Management system requirements for certification bodies

No additional requirements

Annex A – Normative requirements for determining AMS Audit durations

A1 Introduction

Certification bodies shall use this normative annex to determine the amount of time required to audit an asset management system, taking into consideration its size and complexity. It is intended that this will enhance the level of consistency in the effectiveness of AMS audits.

A2 Methodology

The audit duration specified in Table A1 includes on site time at a client's premises and time spent off-site carrying out planning, document review, interacting with client personnel and report writing.

It is expected that the audit duration involved in these combined activities (irrespective of whether the activities are undertaken off-site or on-site) should not reduce the total on-site audit duration to less than 70% of the time calculated using Table A1.

A CB shall determine with the client organization the timing of the audit that will best demonstrate the full scope of the client activities, associated asset base and operational environment.

The audit duration may be adjusted for any significant factors that uniquely apply to the AMS being audited. The CB should exercise discretion to ensure that any variation in audit duration does not lead to a compromise on the effectiveness of audits. The justification for each deviation shall be documented.

Audit duration determinations using the tables or figures in Table A1 shall not include the time of “auditors-in-training” or the time of technical experts.

A3 Initial audit duration (Stage 1 plus Stage 2)

Audit duration involved in combined offsite activities should not reduce the total on-site audit duration to less than 70% of the time calculated following the methodology in A2. Where additional time is required for planning and/or report writing, this will not be justification for reducing on-site audit duration.

Certification audit duration may include remote auditing techniques such as interactive web-based collaboration; web meetings, teleconferences and/or electronic verification of the client’s processes (see IAF MD4). These activities shall be identified in the audit plan, and the time spent on these activities may be considered as contributing to the total “on-site audit duration”. If the CB plans an audit for which the remote auditing activities represent more than 30% of the planned on-site audit duration, the CB shall justify the audit plan and maintain the records of this justification which shall be available to JAS-ANZ for review. It is unlikely that the remote auditing activities represent more than 50% of the total on-site auditor time.

A4 Surveillance

During the initial three year certification cycle, surveillance audit duration for a given organization should be proportional to the time spent on initial certification audit (Stage 1 + Stage 2), with the total amount of time spent annually on surveillance being about 1/3 of the time spent on the initial certification audit. A review of significant changes to the SAMP shall occur when planning each surveillance audit to take into account any adjustments to the audit plan and audit duration that may be required.

A5 Recertification

A review of significant changes to the SAMP shall also occur when planning each recertification. The duration of the recertification audit should normally be approximately 2/3 of the time that would be required for an initial certification audit.

A6 Factors for adjustment of audit durations

The number, extent, diversity, complexity and inter-relationships of outsourced activities may increase audit duration.

A7 Complexity categories

The provisions specified in this document are based on four primary complexity categories of the nature and complexity of the asset base, operating environment and stakeholder requirements of an organization that fundamentally affect the auditor time. These are:

High – asset management aspects with complex and varied assets with high criticality. Factors for consideration may include current replacement cost, significant variations in age profiles, generation of value to the organization, regulatory requirements, and/or significant nature and gravity of operation, services or products to stakeholders. ;

Medium – asset management aspects with medium variation in assets, some with high criticality. Factors for consideration may include current replacement cost, generation of value to the organization, regulatory requirements, and/or significant nature and gravity in some aspects of operation, services or products to stakeholders.;

Low – asset management aspects with minimal variation in assets. Factors for consideration may include few with high criticality, current replacement cost, generation of value to the organization, regulatory requirements, and/or low nature and gravity in operation, services or products to stakeholders.;

Limited – asset management aspects with limited nature and gravity (typically organizations involving an office type environment);

Not all organizations in a specific sector will always fall into the same complexity category. For example, even though many businesses in the chemical sector should be classified as “high complexity”, an organization which would have only a mixing free from chemical reaction or emission and/or trading operation could be classified as “medium” or even “low complexity”.

A8 Methodology for determining audit duration

Table A1 provides a mechanism for determining the audit duration for an initial audit (Stage 1 and Stage 2) is based on the complexity and size of its asset base.

Table A1 – Initial audit durations for high, medium, low and limited complexity audits

Number of critical assets	Audit Duration Stage 1 + Stage 2 (days)			
	High	**Med**	**Low**	**Lim**
1	3	2.5	2.5	2.5
2-4	3.5	3	3	3
5-10	4.5	3.5	3	3
11-15	5.5	4.5	3.5	3
16-25	7	5.5	4	3
26-45	8	6	4.5	3.5
46-65	9	7	5	3.5
66-85	11	8	5.5	4
86+	Follow progression above			

Note 1 The numbers of different assets, groups or types in Table AMS 1 should be seen as a continuum rather than a stepped change.

Annex B – Additional normative requirements on report content

COMPLEXITY CATEGORY

EXECUTIVE SUMMARY

The Executive Summary should be no more than 2-3 pages in length. It should be balanced in providing commentary on exceptionally good processes and practices as much as on non-compliances and the need for improvement. Key items that should be addressed are noted below, but this list should not be considered exhaustive. A key function of the audit is to provide assurance to Top Management (both those who provide 'governance' or oversight, as well as those who provide explicit direction and control at the highest level) that the AMS, being in conformance with the Strategic Asset Management Plan and the requirements of ISO 55001. The items identified below are fundamental to Top Management being adequately informed in their leadership, decision making and performance management as part of the asset management system.

SYSTEM PERFORMANCE

GENERAL

- Summary on conformance against the specific requirements in terms of the methodologies, risks, practices, and activities of the organization.
- Commentary on identification of any critical/high risk gaps, non-conformances, deficiencies in performance of the Asset Management System (AMS), Asset Management, Assets or decision making (including criteria), attributable to deficiencies.
- Scope: Is the scope adequate? Are there other assets that might be considered critical for the organization's performance but not included in the scope?

INFORMATION

- The reliability, timeliness and appropriateness of information being provided to Top Management on the assets and their performance, addressing both monitoring information and information provided in support of requests for decisions to be made.
- The reliability and alignment of financial and non-financial information for decision making.

INFORMATION MANAGEMENT

- The effectiveness of information management processes and practices in ensuring, managing and maintaining asset and asset management information integrity, particularly with regard to uncertainty and reliability of decision making.

DECISION MAKING AND DERIVATION OF VALUE

- The reliability and effectiveness of the asset management decision making processes and criteria in deriving value from the assets over their lives, with particular regard to the principles around management of the whole of life of the asset(s) from conception to extinguishment of liability.
- The alignment of Assets, and their management, to organisational objectives and stakeholder needs and expectations, in particular in the derivation of value.

TOP MANAGEMENT

- Top Management's fulfilment of their specified requirements and their effectiveness in meeting these obligations.

IMPLEMENTATION

- The impacts of resource and support management decisions in derivation of value from the assets and any potential impact on asset life and capability targets in the long term.
- The integrity of the AMS in fulfilling the set of coordinated activities to derive value from assets.
- The coordination of activities occurring at different phases in the asset's life from conception to extinguishment of liabilities following disposal.
- Results achieved within the AMS – objectives, monitoring. Are the set objectives and monitoring and the considered time frame adequate to the AMS?

Relevant findings

Any other significant findings that are relevant to the audit conclusion – positive or negative. Detailed reporting of findings and observations (with associated opportunities for improvement where compliance is weak or gaps are non-critical) would be contained in the main report.

Strengths of the system

Situations with negative impact

Can be internal and external – including noting of any actual or future changes in organisational context that may affect the performance of the system in delivering against organisational objectives or stakeholder needs and expectations.

Formal audit conclusion/opinion

Diverging opinions

AUDIT SUMMARY

Analysis of the changes

What has happened in the organization with impact on the AMS since last audit?

Scope

Is the scope adequate? Are there other assets that might be considered critical for the organizations performance but not included in the scope? If yes, comment. Does the scope cover coordination of activities over all life stages of the assets from conception to extinguishment of all liabilities of ownership/utilization?

What is the impact of the included assets on the organisation's products and services?

Does the AMS address all the activities and assets covered by the scope?

Implemented actions (Actions implemented on the findings detected by previous audits)

Stakeholder engagement (including complaints handling)

Which is the used methodology? Who is considered? What are the major outputs? Is this updated, and handled in the AMS? Is feedback being given to the stakeholders on their needs and expectations?

Is there vertical alignment of value generation from asset level through to organisational objectives and what is the organisation's performance?

Risk management

Comment on the risk management methodology used by the organization: adequate, consistent and reproducible, reliable, satisfactory results? Is the risk management/analysis approach for assets aligned, consistent and integrated with the overarching organisational 'corporate' risk management system?

The integrity and reliability of the risk management and reporting to Top Management.

Results: major risks considered and actions to address them, opportunities tuned into reality?

Asset criticality -

Compliance system (assessment of compliance with legal, statutory, regulatory and other requirements and communication)

How does the organization identify and document these requirements? Is this process effective?

Is the organization complying with the identified and applicable requirements, including reporting?

Comment on the integrity and reliability of information used for reporting against regulatory obligations.

Asset related incidents or potential situations for which emergency response planning or business continuity planning should be addressed for identified risks

Has the organization made a good assessment of the potential emergency situations (these include product/service disruption, environmental, health and safety,…)? And developed adequate action plans? Have these been tested?

Comment on the incident investigation and evaluation methodology, whether some incident occurred. Major accidents (with losses) should be reported.

Internal Audit

Management review

Opportunities for continual improvement

Refer to the use of the ISO 55001 artifacts: non-conformity, monitoring, evaluation and analysis, preventive action, tendencies evaluation,…

Given the changes, conclude on the implementation, maintenance and continual improvement of the asset management system:

Use of trademarks (Use of trademarks and / or any other reference to certification):

Permissible exclusions

Not applicable

Sampling

Annex C – Additional normative requirements for the application of ISO 55000 and ISO 55002

C1 Clarification of requirements

The normative requirements provided in this Annex refers to specific clauses, or parts of clauses of ISO 55002 and ISO 55000 which are indispensable for the consistent application of ISO 55001.

The term **"should"** is used in this Annex to indicate that the client organization shall fully consider the potential application of these clauses and demonstrate to the CB that this Annex has been fully considered for adoption where considered applicable.

Table C1 - Additional normative requirements for the application of ISO 55000 and ISO 55002

Clauses of ISO 55001	Clauses of ISO 55002	Clauses, or parts of clauses of ISO 55000 and ISO 55002 included as normative requirements for the application of ISO 55001
4.1	4.1.1.1	The links between the organizational plan and the SAMP should be two-way, and should be developed through an iterative process. For example, the organizational objectives should not be developed in isolation from the organization's asset management activities. Asset capability and performance, as well as the outputs from asset management activities (e.g. the asset management plan(s)), are key inputs into establishing realistic and achievable organizational objectives.
	4.1.2.2	To evaluate the organization's external context, the evaluation should include, but not be limited to issues such as: 4.1.2.2, a) to c).
	4.1.2.3	To evaluate the organization's internal context, the evaluation should include, but not be limited to issues such as: 4.1.2.3, a) to o).
4.2	4.2.2	In determining the internal stakeholders that are relevant to the asset management system, the organization should consider the relevance of: 4.2.2, a) to c).
	4.2.3	In determining the external stakeholders that are relevant to the asset management system, the organization should consider the relevance of: 4.2.3, a) to h).
6.1	6.1	The organization should be able to demonstrate how it has evaluated the effectiveness of the actions that it has taken to manage the risks identified in relation to the organizational objectives and decision- making criteria. Of particular importance are asset-related incidents or emergency situations, for which emergency response planning and business continuity planning for identified risks should be addressed by the asset management system. (ISO 55000, 2.5.3.8)

Clauses of ISO 55001	Clauses of ISO 55002	Clauses, or parts of clauses of ISO 55000 and ISO 55002 included as normative requirements for the application of ISO 55001
6.2.2	6.2.2.2	When developing or reviewing asset management plan(s), the organization should consider: 6.2.2.2, a) to g).
7.1	7.1	When determining the resources needed to establish, implement, maintain and continually improve the asset management plan, the organization should consider: 7.1, the entire clause.
7.2	7.2.1 7.2.2	When determining the necessary competence of persons, the organization should consider: 7.2.1 and 7.2.2, the entire clauses.
8.1	8.1.4	Implementation should involve an iterative process to achieve a balance between cost, risk and performance, to resolve conflicts between what is planned and what can be achieved, while taking into account the constraints faced by the organization.
8.2	8.2.1 8.2.2	The management of the risks associated with changes should include a review of the consequences associated with both planned and unplanned changes and include taking the necessary actions to mitigate any foreseen adverse effects. Changes that should be considered include: 8.2.2, a) to h).
9.1	9.1.2.1	The organization should conduct evaluations of its assets and asset management activity in order to ensure their continuing suitability, adequacy and effectiveness.
9.3	9.3.1	Top management should review the organization's assets, asset management system and asset management activity, as well as the operation of its policy, objectives and plans, at planned intervals, to ensure their suitability, adequacy and effectiveness.
10.1	10.1.2	The organization should establish, implement and maintain processes (and their associated procedures) for the investigation of asset-related nonconformities and incidents. In doing so the organization should consider clause 10.1.2.
	10.1.3	The organization should establish, implement and maintain processes for implementing corrective actions. In doing so the organization should consider clause 10.1.3.
10.3	10.3.1	In considering opportunities for improvement, the organization should consider clause 10.3.1.

Annex D – Informative guidance on audit team competencies

Asset management systems knowledge and comprehension

J.7.2.5.1 of this scheme requires that that the audit team, either one person or the team as a whole, has demonstrated the knowledge and comprehension specified in the GFMAM, Section 4, GFMAM Competency Specification for an ISO 55001 Asset Management System Auditor/Assessor.

The Global Forum on Maintenance and Asset Management has indicated that the GFMAM asset management systems knowledge and comprehension competencies should be sufficient to:

- Provide knowledge from multiple disciplines and organizations to interpret integrated and diverse processes and systems;
- Evaluate technical and non-technical aspects of organisations' asset management system; and
- Interrogate and interpret a wide range of documents, systems and personnel.

In other words, a person that is proficient in the areas of knowledge contained in the GFMAM should be capable of contextualizing that knowledge across all sectors.

Developing an appreciation of the potential complexity of the critical assets being managed

J.7.2.5.2 goes on to state the CB shall have a process for ensuring that the audit team, either one person or the team as a whole, has sufficient skills to deal with the range, volume and complexity of the critical assets contained in the SAMP.

Typically the level of complexity will vary substantially depending on the structure of the organization and the range and complexity of the assets and the systems that are managing critical assets. Charles Perrow's research[1] into the causes of catastrophic failure introduces the notion of assessing the criticality and complexity of assets as a function of interactive complexity with tightly coupled sub-components.

Interactively complex refers to a system where two or more discrete failures can interact in unexpected ways. A sufficiently complex system can be **expected** to have many of these types of interactions making it vulnerable to accidents.

The sub-components of a system are tightly coupled if they can cause prompt and major impacts on each other.

The certification body should ensure that it has a realistic understanding of the range, volume and complexity of the critical assets to be contained in the SAMP before it allocates its team.

[1] Perrow, C.: Normal Accidents: Living with High Risk Technologies, 1999, ISBN: 9780691004129