AIRPORTS COMPANY
SOUTH AFRICA

Standards and Guidelines for Instrument Landing System

AREA OF APPLICABILITY
ALL AIRPORTS

Division
Capital Infrastructure & Asset Management
(Infrastructure Asset Management)

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AIRPORTS COMPANY SOUTH AFRICA

Standards and Guidelines for Instrument Landing Systems

Public

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Public

1. Purpose

The standards and guidelines for Instrument Landing Systems document has been prepared to provide guidance on the minimum requirements for the design, installation, commissioning, and maintenance of the Instrument Landing Systems at Airports Company South Africa SOC Limited.

These standards and guidelines are to be used in conjunction with other requirements and recommendations set forth in the latest applicable codes, applicable regulations, industry standards and approach tailored to the specific project. It is important to note that any omissions in this manual does not rule out the need to comply to the above-mentioned requirements. Where the standards and guidelines manual is in conflict with the latest applicable codes, applicable regulations, industry standards, the latest applicable codes, applicable regulations, industry standards shall take precedence.

The management and development of Instrument Landing System and associated systems is highly regulated and prescribed by International Civil Aviation Organization (ICAO) and South African Civil Aviation Authority (SACAA). The Instrument Landing System (ILS) is a navigational aid as required by ICAO Annex10 and SACAA CATS 139 for safety and guidance of aircraft during bad weather conditions and low visibility operations. It is a precision approach system that provides guidance to the pilots to align the aircraft with the runway and ensures that the aircraft is descending at the correct angle. The ILS technology has greatly enhanced aviation safety by enabling pilots to conduct instrument approaches with a high level of accuracy. It allows for reliable and consistent landings, reducing the risk of runway incursions, and increasing operational efficiency.

The standards and guidelines manual for Instrument Landing System is intended to provide a suitable and uniform approach to Instrument Landing System throughout the Company. It also seeks to ensure to that the certain level of Instrument Landing System standardisation throughout the Company airports. The adoption of a uniform approach and standardisation is aimed at achieving the following:

- Life cycle management (cradle-to-grave journey of assets) – acquisition, operation, maintenance, and retirement.
- Technology Management - Framework for the management of assets which refers to the policies, procedures, and tools required to efficiently assess, optimise, and use assets.
- Ease on maintenance activity
- Ease on operator training and maintenance training. This also lends itself to specialisation and effective troubleshooting.
- Equipment performance predictability by ensuring high standards and compliant equipment selection criteria.

1.1 Scope of the Standard

These Standards and Guidelines manual apply to Instrument Landing Systems and associated systems (among others DME, Power Supplies) at airports owned by the Airports Company South Africa SOC Limited.

2. Definitions and Abbreviations

2.1 Definitions

Category I (CAT I) Operation
Means a precision instrument approach and landing with a decision height not lower than 200 feet (60 meters) and with either a visibility of not less than 800 meters or a RVR of not less than 550 meters.

Category II (CAT II) Operation
Means a precision instrument approach and landing with a decision height lower than 200 feet (60 meters) but not lower than 100 feet (30 meters) and a RVR of not less than 350 meters.

Category IIIA (CAT IIIA) Operation
Means a precision instrument approach and landing with a decision height lower than 100 feet (30 meters) or no decision height, and a RVR of not less than 200 meters.

Category IIIB (CAT IIIB) Operation
Means a precision instrument approach and landing with a decision height lower than 50 feet (15 meters) or no decision height, and a RVR of less than 200 meters but not less than 50 meters.

Category IIIC (CAT IIIC) Operation
means a precision instrument approach and landing with no decision height and no RVR limitations.

Continuity
The quality that relates to the rarity of radiated signal interruptions during any approach. The level of Continuity of Service (CoS) of the localizer and/or the glidepath is expressed in terms of the probability of not losing the radiated guidance signals.

Decision Altitude/Height
means a specified altitude or height in a precision approach or approach with vertical guidance at which a missed approach shall be initiated if the required visual reference to continue the approach has not been established.

ILS Critical Area
It is an area defined by dimensions concerning the localiser and glide path antennas where vehicle and aircrafts are excluded during all ILS operation. This critical area is protected because the presence of vehicles and aircraft inside its boundaries shall cause unacceptable disturbances to the ILS signal-in-space.

ILS Sensitive Area
It is an area where the parking and movement of vehicles, as well as aircrafts is controlled to prevent the possibility of unacceptable interference to the ILS signal during ILS operations. The sensitive area is protected against interference caused by large moving objects outside the critical are but still normally within the airfield boundary.

Integrity
The quality that relates to the trust that can be placed in the correctness of the information supplied by the facility. The level of integrity of the localizer and/or the glidepath is expressed in terms of the probability of not radiating false guidance signals.

Precision Approach
Means an instrument approach for landing in which precision azimuth guidance and precision glide path guidance are provided in accordance with the minima prescribed for the category of operation.

Tenderer
Refers to the person or organisation who is submitting a bid for the ILS project.

Contractor
Refers to the person or organisation who has been awarded the project.

2.2 Abbreviations

Abbreviation	Description
BS	British Standards
CMMS	Computerised Maintenance Management System
DME	Distance Measuring Equipment
ECSA	Engineering Council of South Africa
FMEA	Failure Modes and Effects Analysis
ICAO	International Civil Aviation Organisation
ILS	Instrument Landing System
RVR	Runway Visual Range
SACAA	South African Civil Aviation Authority
SARP	Standards and Recommended Practices

3. Design Basis & Considerations

3.1 Design Basis

- Radio navigation precision approach and landing during bad weather conditions and low visibility operations.

3.2 Design Considerations

The following shall be considered for the design, supply, installation, commissioning, and maintenance of the Instrument Landing System:

- ICAO regulations: ICAO Annex 10, ICAO Doc 8071
- Site Specific requirements (End User requirements)
- Municipal by-laws
- SACAA Regulations and Technical Standards
- ATNS Requirements

The contractor shall ensure that they are adequately appraised of the objectives of the systems, ATNS requirements, Site Specific Requirements, and any other information or requirement key for the implementation of ILS solution at each site.

3.3 Performance Requirements

The performance requirements for Instrument Landing Systems are as follows and based on prior experience at the Company. During procurement, the OEM shall be required to specify this information based on lifecycle costing:

- Minimum Availability: 99.8 %
- Life span: 15 years including after sales support and spares requirements.

3.4 Functional Requirements

The ILS solution as a minimum shall be compliant with standards and recommended practices (SARPs) specified in the latest ICAO Annex 10. The minimum functional requirements for the ILS solution are specified in the table below. It remains the responsibility of the contractor to ensure and to provide evidence that the ILS solution meets the ICAO Annex 10 standards and recommended practices.

ID	Requirement Description	Ref
Req.1	The ILS system shall be compliant with the Standards and Recommended Practices (SARPs) specified in the ICAO Annex 10 relevant to the site required Facility Performance Category ILS.	

Req.2	The ILS shall comprise the following basic components: a) VHF localizer equipment, associated monitor system, remote control and indicator equipment. b) UHF glide path equipment, associated monitor system, remote control and indicator equipment. c) an appropriate means to enable glide path verification checks. All these components combined shall work coherently to enable radio navigation precision approach and landing during bad weather conditions and low visibility operations	ICAO Annex 10
Req.3	The distance to threshold information to enable glide path verification checks shall be provided by distance measuring equipment (DME).	ICAO Annex 10
Req.4	The DME shall be compliant to the relevant SARPs specified in the ICAO Annex 10.	ICAO Annex 10
Req.5	The VHF localizer and associated monitor shall be compliant to the relevant SARPs specified in the ICAO Annex 10.	ICAO Annex 10
Req.6	The UHF glide path equipment and associated monitor shall be compliant to the relevant SARPs specified in the ICAO Annex 10.	ICAO Annex 10
Req.7	The control tower shall be provided without delay with information on the operational status of ILS essential for approach, landing, and take-off at the aerodrome(s) with which they are concerned.	ICAO Annex 10
Req.8	The ILS and associated communication systems shall be equipped with a secondary power supply and means to ensure continuity of service appropriate to the needs of the service provided.	ICAO Annex 10
Req.9	The ILS secondary power supply shall be able to provide secondary supply for a minimum of four (4) hours.	ICAO Annex 10
Req.10	The ILS system shall have the localizer far field monitoring equipment	ICAO Annex 10
Req.11	The ILS system shall have the localizer and glide path near field monitoring equipment.	ICAO Annex 10
Req.12	The ILS system shall have the Remote-Control Status Unit (RCSU) and Control Tower Unit (CTU)	
Req.13	The ILS system shall a replica of the Remote-Control Status Unit (RCSU) and Control Tower Unit (CTU) which shall be interlocked to ensure that it only operates from ATC.	
Req.14	The ILS shall have a control tower status indicator with integrated ILS change over switch.	
Req.15	Back indication to the equipment room and control Tower shall be via fibre link which is connected in a redundant ring with automatic loop back in case of a fibre break	

Table 1: Functional Requirements

3.5 Evidence of System Performance Requirements

The minimum requirements for evidence of system performance are described in below.

ID	Requirement Description
Req.16	The tenderer shall provide evidence that the system meets all the non-site-specific requirements for the system. This shall be a combination of demonstration results and theoretical analysis to demonstrate compliance with ICAO Annex 10 SARPs.
Req.17	The tenderer shall provide an analysis showing that the theoretical Continuity of Service is compliant with the one specified in the ICAO Annex 10 SARPs for the site specific.
Req.18	The tenderer shall provide a guarantee based on evidence of other installations, technology performance, and global footprint that the Continuity of Service is compliant with the one specified in the ICAO Annex 10 SARPs for the site specific.
Req.19	The tenderer shall provide an analysis showing that the integrity of the system meets the requirement for the intended category of use. As integrity cannot be verified by field tests, it is essential that this is verified by detailed analysis.
Req.20	The tenderer shall provide evidence of compliance with ICAO Annex 10 SARPs of their previous ILS installations of the same system.

Table 2: Evidence of System Performance Requirements

3.6 Environmental Requirements

The minimum environmental requirements for the ILS are specified below.

The contractor shall provide evidence to demonstrate due consideration of environmental conditions at the designated site or airport. Weather data for various sites can be requested from the South African Weather Services (SAWS).

ID	Requirement Description
Req.21	The ILS indoor equipment shall be able to operate at an ambient temperature range of -10°C to +55°C.
Req.22	The ILS indoor equipment shall be able to operate at a relative humidity of up to 95% in the range -10°C to +35°C.
Req.23	The ILS indoor equipment shall be able to operate at a relative humidity of up to 60% in the full temperature range.
Req.24	The ILS equipment shall be placed in a controlled and air-conditioned environment with redundancy.
Req.25	The ILS outdoor equipment and material shall withstand without any damage or deformation the ambient temperature of -40°C to +70°C.
Req.26	The ILS outdoor equipment and material shall withstand without any damage or deformation the relative humidity of up to 100%.

Req.27	The ILS shelter and antenna structures shall withstand without any damage the ice loads of up to 5cm/50mm.
Req.28	The ILS outdoor elements, structures, shelters and others shall be designed and constructed to withstand site typical effects as salt, rain, hail, thunderstorms, attacks of small to medium animals (e.g. dogs, rabbits), without damage or noticeable deformation.
Req.29	All equipment shall operate within their specifications (without damage or malfunction) during Temperature variation of up to 20°C within 24 hrs.
Req.30	The ILS antenna structures shall be designed for operation with wind velocities up to 160 km/h.
Req.31	The ILS antenna structures shall survive to a wind velocity of 200 Km/h with a 15mm ice thickness.

Table 3: Environmental Requirements (Ref: ATNS)

3.7 Reliability, Availability, and Maintainability Requirements

The minimum Reliability, Availability, and Maintainability requirements are specified below.

ID	Requirement Description
Req.32	The tenderer shall provide the reliability statics and targets values for ILS equipment based on the anticipated availability during tender stage and shall as minimum contain the following information: • Availability • Mean Time Before Failure (MTBF) • Mean Time To Repair (MTTR)
Req.33	The tenderer shall provide evidence that the ILS have a minimum availability figure of 99.8%.
Req.34	The contractor shall provide maintenance training and certify maintenance contractor personnel on the new ILS system.
Req.35	The contractor shall provide operator training to the Air Traffic Controller personnel on the new ILS installation.
Req.36	The tenderer or bidder shall provide assurance that they shall be able to enter a back-to-back maintenance contract with the maintenance contractor to provide after sales support to achieve the target availability and reliability metrices.
Req.37	The tenderer shall provide an assurance letter indicating support to the maintenance contractor throughout the life span of the equipment.
Req.38	The tenderer shall provide a guarantee/assurance that the equipment shall be supported for a period of 15 years.

Table 4: Reliability, Availability, and Maintainability requirements

3.8 Quality Requirements

ID	Requirement Description
Req.39	The tenderer shall provide evidence of certification for a universally accepted Quality Management system such as ISO 9000 Quality Management System.
Req.40	The tenderer shall provide evidence that manufacturing, or production of ILS equipment was done under a universally accepted Quality Management system such as ISO 9000 Quality Management System.
Req.41	The tenderer/contractor shall provide evidence that the ILS components have underdone burn-in tests or similar type of tests required for such critical systems during production

Table 5: Quality Requirements

3.9 Warranty Requirements

ID	Requirement Description
Req.42	The tenderer shall provide a one (1) year warranty for the ILS installations which warranty shall include any cost related to early equipment failures.

Table 6: Warranty Requirements

3.10 Site Integration General Requirements

The site integration requirements applicable to all sites for integration and installation of the ILS solutions are described in the table below.

ID	Requirement Description
Req.43	The topography of the terrain preceding the airfield and any other obstruction have a strong influence on the quality of the navigation signals interpreted by the airborne receiver during the glide path descent. The ideal airfield site has a smooth terrain without any obstructions. Therefore, the contractor shall conduct geographical and positioning survey study on each site to cater for terrain variation.
Req.44	The ILS system configuration shall be guided by outcome of the site survey
Req.45	The ILS system configuration shall be designed to eliminate the influence of the terrain and obstructions.
Req.46	The contractor shall provide a detailed survey report
Req.47	The contractor shall conduct assessment on site-specific factors that shall be considered, including AGL, other navigational aids, equipment sitting, scalloping, ground test procedures and flight verification procedures. All identified obstacles shall be factored in the design to eliminate the system signal disturbances.

Req.48	The contractor shall mark and paint the obstacles with the durable paint, and the required obstruction lights where the protrusion of the mast or erected structure violate Obstacle Limitation Surfaces.
Req.49	The contractor shall Identify the new obstacles which shall violate Obstacles Limitation Surfaces and notify the Aerodrome for rectification for reporting to SACAA.
Req.50	The ILS equipment that are installed within 900m from threshold on either side of the runway shall be frangible as specified in ICAO Doc 9157, where it is not practically possible, the exemption approval from SACAA shall be sought by the service provider and approval handed to the Company for record purposes.
Req.51	The contractor shall be responsible for all the berthing civil works for the shelters, structures and laying of the associated cabling to realise a fully functional ILS.
Req.52	It is desirable that the existing position of the ILS localisers and ILS Glide Path be maintained to minimise the approval process through the municipality for erection of the fixed structure as per municipal bylaws.
Req.53	The contractor shall submit the obstacles approval based on World Geodetic System (WGS) coordinates to SACAA for approval prior the planting of the antennas and ILS subsystems.
Req.54	The obstacles as a results ILS System installation shall be marked as per ICAO Annexure 14 requirements.
Req.55	The equipment shelter shall have its floor covered with an antistatic material which is connected to the grounding systems to protect maintenance personnel from electric shock and to avoid electronic equipment damage.
Req.56	The inner sides of the shelter shall be painted white, and the outer sides of the shelter shall be painted with warning colours as per ICAO annex 14.

Table 7: Site Integration Requirements

3.11 ILS Critical and Sensitive Areas

The guidance material on how to define critical and sensitive areas are found in ICAO Annex 10, Volume 1.

For each ILS installation, the contractor together with the OEM and other relevant stakeholders such as ATNS shall establish the dimensions of the critical and sensitive areas.

The LCA and LSA shall be established by the responsible service provider by following the guidelines provided in Annex 10, volume 1, as well as the OEM recommendations, and through site specific survey or assessments.

The established critical and sensitive areas shall be managed in accordance with ICAO Annex 10, Volume 1 and shall be kept free from obstacles and moving objects to ensure that the required quality of ILS signal is maintained. To restrict moving objects in the critical areas, the critical areas shall be demarcated with non-RF reflected material.

In a situation where it is not practical to keep these areas completely free from infringements, it is necessary to manage such infringements so that the acceptable balance between optimising runway capacity and ensuring the safety of aircraft using the ILS signal in space is achieved.

3.12 Obstacles

Any communications structure, building or other structure, whether temporary or permanent, which has the potential to endanger aviation in navigable airspace, or has the potential to interfere with the operation of navigation or surveillance systems or Instrument Landing Systems, including meteorological systems for aeronautical purposes, is considered an obstacle, and shall be submitted to the Commissioner for Civil Aviation for evaluation (refer)

The contractor shall conduct a complete aerodrome perimeter survey to identify any obstacles that has the potential to interfere with the operation of Instrument Landing Systems due to the new installation or upgrade of the ILS installation.

The contractor shall notify the Aerodrome (Company's site representative) on new obstacles which shall violate Obstacles Limitation Surfaces for reporting to SACAA. It remains the responsibility of the contractor to ensure that ATNS is notified for an assessment whether it an obstacle or not. SACAA shall be notified based on the outcome of the assessment of the ILS Systems obstacles within the aerodrome for evaluation in accordance with SA-CAR Part 139.01.30.

3.13 Aeronautical Information

The SACAA Aeronautical Information Service (AIS) is responsible for the collection, validation, verification, approval, maintenance and distribution of Aeronautical Information and Aeronautical data concerning the entire territory of South Africa in accordance with ICAO's standards and recommended practices (SARPS).

The publication of aeronautical data is done through the following means:

- Aeronautical Information Circulars (AICs)
- Notice to Airmen Plain Language Summaries (NOTAM Summaries)
- Aeronautical Information Publication (AIP)
- Aeronautical Information Publication Amendments – AIP amendments
- AIP supplements - AIP SUPP

The contractor shall ensure compliance with ICAO Annex 15 during the implementation of the ILS solution by ensuring that the aerodrome promulgate/disseminate relevant Aeronautical Information essential for the safety, regularity and efficiency of air navigation using the correct method/approach (such as Aeronautical Information Publications, NOTAMS) through the SACAA Aeronautical Information Service.

3.14 Disposal

The disposal of ILS components shall be done in accordance with the relevant regulations, relevant codes, best practices, as well as any relevant Company policies and procedures.

4. Guidelines for Design Trade-Offs

The following maybe the basis for design trade-offs:

- Capital and operational costs
- Requirements against OEM recommendations/ Simulations/theoretical analysis/Subject Matter Experts Recommendations without compromising compliance requirements.

5. Preferred Equipment Requirements

5.1 Electrical Requirements

5.1.1 General

The electrical circuits of the ILS and DME shall conform to the requirements of SANS 10142-1.
The contractor shall ensure that adequate power surge and power upstream protection devices are provided as per equipment rating.

The contractor shall ensure that adequate earthing system is provided for earth fault protect.

The contractor shall ensure adequate lightning protection devices are for each field and equipment room devices as per SANS 1063 and 10142-1.

The earthing ground resistance shall take into consideration the soil characteristics of each site and shall be in compliant with the SANS 10142-1.

5.1.2 Main Power Supply

The equipment shall be equipped with an integrated power supply, accepting a power source with the following characteristics:

Parameter	Specification
Voltage	230 VAC ±10%
Frequency	50 Hz ±1%

The power supply circuits to the ILS and DME shall conform to the requirements of SANS 10142-1.

5.1.3 Backup Power Supply

The ILS secondary power supply shall be able to provide secondary supply for a minimum of four (4) hours as per ICAO Annex 10.

The power supply shall have enough output power to guarantee the equipment operation while recharging the batteries.

The backup power supply shall have automatic protection against battery deep discharging.

The ILS equipment power supply shall have redundancy by using two (2) independent power supply units.

The two (2) independent power supply units shall share the charging of the common battery set and the equipment load from a common bus bar.

5.2 Mechanical Requirements

The ILS electronic equipment shall be enclosed in one cabinet.

6. Deliverable Design Information or Minimum Design Outputs

The following information shall be deliverable at the end of ECSA Stage 3 and 4:

- Evidence of System Compliance with Annex 10 (Also to be provided at tendering stage).
- Evidence of System Performance as per Annex 10. (Also, to be provided at tendering stage).
- Point-to-point statement of compliance with this specification. (Also, to be provided at tendering stage).
- Detailed Design & Operating philosophy.
- Minimum spare holding requirements.
- Guarantee of OEM recommended critical spares holding to support their installed base for the life of the equipment.
- Exact number of spares required for the life span of the equipment based on their other installations.
- Maintenance schedule for equipment.
- Operating guidelines or manual for equipment.
- Qualifications, experience, and skills of persons operating and maintaining equipment.
- Electrical drawings.
- Civil engineering designs and drawings where applicable.

7. Commissioning, Maintenance and Handover Requirements

7.1 Installation and Commissioning Requirements

The minimum testing requirements for the ILS are described in the table below.

ID	Requirement Description
Req.57	The contractor shall conduct testing and commissioning of each ILS installation in accordance with the latest ICAO Doc 8071, which provides general guidance on the extent of testing and inspection carried out to ensure that radio navigation systems meet the Standards and Recommended Practices (SARPs) in Annex 10.
Req.58	The contractor shall conduct factory tests at the manufacture's factory before commencing the installation of any equipment. The test shall be witnessed by the customer's representative and if not possible the test results shall be approved by the manufacturer's designated quality representative
Req.59	The contractor shall conduct ground and flight tests on each facility in accordance to the guidelines for conducting these tests provided in the ICAO Doc 8071. In addition to these signal-in-space checks, additional tests are required including an evaluation of the continuity of service performance of the system at the chosen site.
Req.60	The tender shall provide evidence of at least one (1) previous installation where the ground tests and flight tests were conducted in accordance with the ICAO Doc 8071 to ensure compliance with Standards and Recommended Practices (SARPs) in Annex 10.

Table 8: Testing Requirements

7.2 Maintenance and Handover Requirements

The requirements at project close out phase for any Instrument Landing Systems project are tabulated below.

Item No	Description of Handover requirement	Requirement Met	
		Yes	No
1	As-built drawings signed-off by a Professional Electronic Engineer or Professional Electronic Technologist.		
2	Soft copies of drawings in DWG format		
3	Installation Certificate		
4	Commissioning certificate		
5	Acceptance certificate		
6	FMEA Report		

7	Maintenance and Operating Manuals		
8	List of Critical Spares (with OEM names and OEM part numbers)		
9	Warranty Documentation		
10	Certificates of Compliance		
11	CMMS Data & Proof of asset loading in CMMS		
12	Training records of Operator & Maintenance Personnel		
13	PDF Datasheets of all equipment installed		
14	PDF schedule of all equipment installed		

Table 9: Maintenance and Handover Requirements

The CMMS Data is the information required for each asset you install, as assets shall be reduced to the maintainable assets. The CMMS data format shall be as follows:

- Asset information
  - Description
  - Model
  - Manufacturer
  - Serial number [if you do not have serial number, then some means to uniquely identify – if there is not, then let me know so that I can arrange the barcodes for you
  - Building [for example CTB, Western Precinct, Control Tower etc.]
  - Installation location [for example ground floor, GPS location is also a good idea]

- Failure information
  - Failure description
  - Failure cause
  - Failure resolution

- Maintenance information
  - Maintenance type [for example inspection, maintenance, calibration, certification etc.]
  - Frequency [for example daily, weekly, on a Monday etc.]
  - List of tasks to perform the maintenance: for each task
    - Describe the task [for example check oil levels and top up if required]
    - Skills required [for example electrician, fitter, plumber etc.]
    - Time estimate in minutes to complete the task
    - Tool(s) required

8. Process for Monitoring

The effective implementation and monitoring of this procedure shall be done through relevant committees and reviews. Self-assessment by Maintenance Engineering (level 1) and Operational Governance (level 2) shall be conducted to determine compliance, implementation and effectiveness of this procedure. In order to ensure compliance to statutory requirements, audits on annual basis or per audit plan shall be conducted to determine compliance status.

MONITORING CONTROLS	PURPOSE	RESPONSIBLE	FREQUENCY
COE Oversight Compliance Matrix	Oversight compliance	Chief Electrical Engineer	Ad-hoc
Internal Audits	Determine the effectiveness of the procedure and test the outcome of the manual.	Internal Audit	Annually
Operations Management Manco	Measure adequacy and implementation of the manual	Operations Management	Planned Interval

Note: This manual shall be reviewed in three (3) years cycle and if there is a need to review the manual before three (3) years cycle laps due to any circumstances being legal requirements, changes in the businesses, the need to reflect current practices or activities, the procedure shall be unlocked for review accordingly.

Disclaimer: In instances where document links are not accessible, directly access the documents on the Policy Management Document Store on the Airports Company South Africa SOC Limited intranet.

9. Accountabilities and Responsibilities

9.1 Accountabilities

The overall accountability for the development of this standard and guidelines lies with the Group Executive: Capital Infrastructure & Asset Management with the support of the Lead: Infrastructure Asset Management. However, in the absence the designated person the acting person shall assume responsibility as per delegation of authority. The overall accountability for the effective implementation and adherence of this procedure lies with the Group Executive: Operations Management with the support of the Senior Manager: Maintenance Engineering. However, in the absence the designated person the acting person shall assume responsibility as per delegation of authority.

Authorities	Lead: Infrastructure Asset Management	Regional General Manager	Group Executive: Capital Infrastructure & Asset Management	Group Executive: Operations Management	Senior Site Manager: Maintenance Engineering	Employees (Standard role players)
Has overall accountability for development of this standard	*Responsible*	-	*Accountable*	-	*Consulted*	*Consulted*
Has overall responsibility for implementation and adherence of this standard	-	*Responsible*	-	*Accountable*	*Responsible*	*Responsible*
Consulted at the time of an exception and adherence of this standard.		*Consulted*	*Consulted*	*Consulted*	*Accountable*	*Responsible*
Has overall responsibility for adherence, implementation and performance of a given task.	*Consulted*	-	-	-	*Accountable*	*Responsible*
Has responsibility for approval and authorization of budget	*Responsible*	*Informed*	*Accountable*	*Accountable*	*Informed*	-
Communicate the standard to all impacted stakeholders or employees.	*Accountable*	*Responsible*	-	-	*Responsible*	*Informed*

9.2 Roles and Responsibilities

Senior Site Manager

- Line Manager shall ensure that all works adhere to this standard

Employees

- The representative of an employee can be the Company team member, approved consultant, or design engineer.
- Ensure that all work (new design or retrofit) adhere to the minimum requirements of this standard and guidelines.
- Ensure that all works conforms to the relevant sections of this document before commissioning.
- Handover checklist to be signed off as per section 7.2 of this document.

10. Reporting of Non-Conformance

Any deviation from this manual shall be identified and registered with corrective and preventative measures for continual improvement in accordance with Reporting of Non-Conformance Procedure Document - Z001 001M.

11. Related Policy Documents

Document Control Procedure - Z001 006M
Record Keeping Requirements Procedure - Z001 008M

12. Related Legislation and Standard

ICAO Annex 10, Volume 1, Part 1 - ICAO International Standards and Recommended Practices, Radio Navigation Aids
ICAO- Annex 10, Volume 1, Part 2 - ICAO International Standards and Recommended Practices, Radio Navigation Aids
ICAO Annex 14, Volume 1 - ICAO International Standards and Recommended Practices
ICAO DOC 8071, Volume 1 - Chapter 4: Instrument landing system
ICAO DOC 9157, Part 6 - Chapter 4: Design for frangibility & Chapter 6: Numerical simulation methods for evaluating frangibility

13. Change Control and Verification Procedure

This manual shall only be verified and changed with the authorisation of the Group Executive: Strategy & Sustainability and in accordance with Change Control and Verification Procedure – Z001 003M.

14. Records

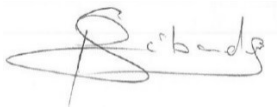
Each Process Owner as identified is responsible for maintaining, storage and protection of their respective documents. Records shall be identifiable, easily retrievable and shall follow retention times as regulated or required by the organisation, statutory or regulatory requirements. Refer Record Keeping Requirements Procedure – Z001 008M

Record Name	Storage Location	Record Number	Responsible Person	Retention Time
Assurance Letter	EAM Department	N/A	Chief Engineer	Five (5) Years
Standards & Guidelines	Master in Policy Management Storage Room	U010 001P	Policy Assurance Officer	Five (5) Years

15. Revision History

Date Last Revised	Revision Status	Compiler	Summary of changes
12th August 2024	Version: 1	**Chief Engineer:** Electrical Engineer **Name and Surname** Tabane Montwedi	1st Issue

16. Endorsement (See Master in Policy Management Storage Room)

Activity	Name	Signature	Date
Compiler	**Chief Engineer:** Electrical **Name and Surname** Tabane Montwedi		12 May 2024
Quality Assurance Department	**Specialist:** Policy & Assurance **Name and Surname** Thabana Mahlo		16 August 2024
Supported by	**Group Manager:** Maintenance Engineering **Name and Surname** Peter Sibande		20 August 2024
Supported by	**Acting Lead:** Infrastructure Asset Management **Name and Surname** Riaaz Essack		10 Sept 2024
Authorised by	**Group Executive:** Capital Infrastructure & Asset Management **Name and Surname** Charles Shilowa		04 October 2024