



KENYA ACCREDITATION SERVICE

Document Title: **CRITERIA FOR THE ACCREDITATION OF INSPECTION BODIES IN PRESSURE VESSELS AND LIFTING EQUIPMENT INSPECTION**

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1 OVERVIEW CONTENT

1.1 Process Overview

The purpose of inspections is to determine the conditions of lifting equipment and pressure vessels for conformance with standards or other normative documents and/or general requirements.

The field of lifting equipment inspection covers the inspection of various types of lifting equipment and their accessories and pressure vessels. This criteria document should be read in conjunction with ISO/IEC 17020, ILAC-P15 "Application of ISO/IEC 17020:2012 for the Accreditation of Inspection Bodies" and the Occupational Safety and Health Act No. 15 of 2007.

Pressure differential is dangerous, and fatal accidents have occurred in the history of pressure vessel development and operation. Consequently, pressure vessel design, manufacture, and operation are regulated by engineering authorities backed by legislation.

1.2 Purpose

The purpose of inspection of lifting equipment, their accessories and pressure vessels is to ensure safety of their construction and installation.

1.3 Scope

The field of pressure vessels inspection covers the inspection of various types of pressure vessels and their accessories. It includes pipes and fittings used in the storage and transportation of fluids and gases under pressure. Supplementary information for specific areas of inspection may be published as other criteria.

1.4 Role(s) and Responsibilities

Role	Responsibility
Inspection and Verification Team	Periodic Review
Inspection Bodies	Compliance

2 DEFINITIONS/ABBREVIATIONS

The table below defines new or changed terms that are included in or associated with this process. In addition, the terms and definitions in ISO/IEC 17000 and ISO/IEC 17020 apply.

Term	Definition
Inspection	examination of a product, process, service, or installation or their design and determination of its conformity with specific requirements or, on the basis of professional judgment, with general requirements



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Lifting equipment	Work equipment for lifting and lowering loads. This includes lifting accessories and attachments used for anchoring.
Pressure vessel	A vessel in which the pressure is obtained from an indirect source or by the application of heat from an indirect source or a direct source.

3 PROCESS INSTRUCTIONS

3.1 FACILITIES AND EQUIPMENT

- 3.1.1 Facilities and equipment which affect results that is critical to the conclusion of the examination shall be appropriate for the particular inspection to be performed.
- 3.1.2 Inspectors shall ensure that all equipment, including equipment not under the charge of the inspection body, used during inspection work are calibrated and traceable to the SI unit. Calibration shall be performed by recognized accredited laboratories or the National Metrology Institute. The inspection body should where possible refer to the list of published accredited calibration laboratories from the KENAS website.
- 3.1.3 Sensitive equipment shall be verified for functionality after they are set up at the test or inspection site.

3.2 TESTING

- 3.2.1 Where analytical testing is required to support the evaluation, the inspection body shall ensure that the testing is performed by an accredited laboratory.
- 3.2.2 When an organisation is providing analytical testing and inspection for the same project, the organisation has to ensure that there is sufficient independence between the two activities (e.g. results of inspection activities and testing activities should not be approved by the same person).
- 3.2.3 Functional testing forms a normal part of the activities of an inspection body and is therefore within the scope of ISO/IEC 17020. Examples of functional testing are, load testing of a crane and hydrostatic test of pressure vessels.

3.3 INSPECTION PERSONNEL

3.3.1 STAFF

- 3.3.1.1 Inspection bodies shall ensure that their inspectors are medically fit for their scope of inspection.



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3.3.1.2 Inspectors shall be suitably qualified and have sufficient relevant experience in their scope of inspection. The categories of qualification for the various classes of equipment are specified in the subsequent subsections of this document.

3.3.1.3 Inspectors must have appropriate experience related to their scope of inspection. Example: in welding technology, welding inspection, manufacture and inspection, material technology, corrosion, knowledge in NDT, functionality of equipment and other related technologies. Inspectors having experience in design will be useful.

3.3.1.4 Inspectors must be familiar with the relevant standards or codes used in the inspection activities.

3.3.1.5 Inspection bodies shall ensure that inspectors who perform inspections and resolve technical issues encountered during inspections are suitably qualified as specified in various tables listed in the classification of equipment.

3.3.1.6 Inspection bodies shall note that qualification requirements of inspectors listed in clause 5.1, and clause 5.2 may be superseded or limited by the regulatory requirements of the countries where the equipment eventually resides.

3.3.1.7 Inspection bodies shall maintain records of inspectors' qualifications, training and experience. The records shall include how and when each inspector is authorized by the inspection bodies to perform specific inspection or testing. The records shall also include class of equipment and area of inspection that the inspectors are authorized to inspect.

3.3.1.8 For Class A equipment/system, inspection bodies shall have sufficient number of Category 1 inspectors to inspect and/or supervise the inspection of the equipment.

3.3.1.9 For Class B equipment/system, inspection bodies shall have sufficient number of inspectors of at least Category 2 level to inspect and/or supervise the inspection of the equipment.

3.3.1.10 For Class C equipment/system, inspection bodies shall have sufficient number of inspectors of at least Category 2 level to inspect and/or supervise the inspection of the equipment.

3.3.1.11 All inspectors shall be assessed by the assessment team prior to award of accreditation. Subsequent assessment will consist of sampling of inspectors.

3.3.1.12 Only inspectors qualified under category 1 can be nominated as approved signatories for Class A equipment and below. Category 2a can be nominated as approved signatories for Class B equipment and below.

3.3.1.13 The assessment team will assess the nominated approved signatories. Those assessed to be competent in their area of inspection will be submitted to the KENAS Accreditation Committee for endorsement as approved signatories.



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3.3.1.14 Approved signatories are to sign on endorsed inspection report for inspection performed by themselves or where they have direct supervision of the inspection work.

3.2 QUALIFICATION CATEGORIES FOR INSPECTORS

Category 1a

Professional Engineer registered with the Engineer's Board of Kenya (EBK) including at least 3 years of working experience in the engineering discipline related to lifting equipment/pressure vessels.

Category 1b

Engineer having degree in relevant engineering discipline from an institute of learning recognised by the relevant regulatory authority, graduate registration with the Engineer's Board of Kenya (EBK) with 5 years of working experience in inspection of lifting equipment/pressure vessels.

Category 1c

Engineering Technician with diploma in relevant engineering discipline from an institute of learning recognised by the relevant regulatory authority, with 15 years working experience in the relevant engineering discipline. At least 10 years of the working experience must be related to lifting equipment/ pressure vessels.

Category 2a

Engineer having degree in relevant engineering discipline from an institute of learning recognised by the relevant regulatory authority, with 5 years working experience in the relevant engineering discipline. At least 2 years of the working experience must be related to lifting equipment/ pressure vessels.

Category 2b

Engineering Technician with diploma in relevant engineering discipline from an institute of learning recognised by the relevant regulatory authority, with 5 years working experience in the relevant engineering discipline. At least 3 years of the working experience must be related to lifting equipment/ pressure vessels.

Category 3



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Engineering Technician having industrial trade certificates in the relevant engineering discipline with 5 years of working experience in the relevant engineering discipline of which at least 3 years is related to lifting equipment/pressure vessels.

Note: Category 1 inspector refer to Category 1a and/or 1b, 1c inspectors. The same applies to Category 2 inspectors.

4. CLASSIFICATION OF EQUIPMENT

4.1 CLASSIFICATION OF LIFTING EQUIPMENT

4.1.1 Class A: Powered Lifting Equipment

Lifting equipment - including attachments for fixing, anchoring or supporting equipment - that operate by means of motive power such as electric, hydraulic or pneumatic or other powered means. Examples are gantry cranes and truck mounted mobile crane.

Inspector's category	Supervision needed	Inspection boundary
1a	Not required but constant updating of regulatory requirements and inspection method needed.	Inspection of equipment or associated activities outside the field of expertise is not allowed.
1b, 1c	Not required but constant updating of regulatory requirements and inspection method needed.	The above constraint plus prohibition on any non-routine repair, modifications, changes to operating parameters, changes to inspection methods and calculations not defined in recognized standards.
2	To be in regular contact with the category 1 inspector.	The above constraint.
3	To be in regular contact with the category 1 or 2 inspector.	Permitted to test and examine for identification of defects in equipment within the limits as authorized by the inspection body.

4.1.2 Class B: Manual Lifting Equipment

Lifting equipment - including attachments for fixing, anchoring or supporting equipment - that operate solely by means of the operator without any powered assistance. Examples are manual hoist and manual chain block.



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Inspector's category	Supervision needed	Inspection boundary
1a	Not required but constant updating of regulatory requirements and inspection method needed.	Inspection of equipment or associated activities outside the field of expertise is not allowed.
1b, 1c	Not required but constant updating of regulatory requirements and inspection method needed.	The above constraint plus prohibition on any non-routine repair, modifications, changes to operating parameters, changes to inspection methods and calculations not defined in recognized standards.
2	To be in regular contact with the category 1 inspector.	The above constraint.
3	To be in regular contact with the category 1 or 2 inspector.	Permitted to test and examine for identification of defects in equipment within the limits as authorized by the inspection body.

4.1.3 Class C: Lifting Accessories

Accessories used for attaching loads to both powered lifting equipment and manual lifting equipment. Examples are wire ropes, chains and hooks.

Inspector's category	Supervision needed	Inspection boundary
1 and 2	Not required but constant updating of regulatory requirements and inspection method needed.	Inspection of equipment or associated activities outside the field of expertise is not allowed.
3	To be in regular contact with the category 1 or 2 inspector.	Permitted to test and examine for identification of defects in equipment within the limits as authorized by the inspection body.

4.2 CLASSIFICATION OF PRESSURE VESSELS

4.2.1 Class A: Major Systems

Systems, which because of size, complexity or hazardous contents require the highest level of expertise in determining their conditions. They include steam generating systems where the



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individual capacities of the steam generators are more than 10 MW, any pressure storage system where the pressure-volume product for the largest pressure vessel is more than 10^6 bar litres (100 MPa m³) and any manufacturing or chemical reaction system where the pressure-volume product for the largest pressure vessel is more than 10^5 bar litres (10 MPa m³). Pipelines are included if they constitute a major hazard.

Inspector's category	Supervision needed	Inspection boundary
1a	Not required but constant updating of regulatory requirements and inspection method needed.	Inspection of equipment or associated activities outside the field of expertise is not allowed.
Inspector's category	Supervision needed	Inspection boundary
1b, 1c	Not required but constant updating of regulatory requirements and inspection method needed.	The above constraint plus prohibition on any non-routine repair, modifications, changes to operating parameters, changes to inspection methods and calculations not defined in recognized standards.
2	To be in regular contact with the category 1 inspector.	The above constraint.
3	To be in regular contact with the category 1 or 2 inspector.	Permitted to test and examine for identification of defects in equipment within the limits as authorized by the inspection body.

4.2.2 Class A: Intermediate Systems

Intermediate systems include the majority of storage systems and process systems, which do not fall into either of the other categories. Pipelines are included unless they come within the major system category.

Inspector's category	Supervision needed	Inspection boundary
1a	Not required but constant updating of regulatory requirements and inspection method needed.	Inspection of equipment or associated activities outside the field of expertise is not allowed.
1b, 1c	Not required but constant	The above constraint plus



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	updating of regulatory requirements and inspection method needed.	prohibition on any non-routine repair, modifications, changes to operating parameters, changes to inspection methods and calculations not defined in recognized standards.
2	To be in regular contact with the category 1 inspector.	The above constraint.
3	To be in regular contact with the category 1 or 2 inspector.	Permitted to test and examine for identification of defects in equipment within the limits as authorized by the inspection body.

4.2.3 Class C: Minor Systems

Systems containing non-corrosive and non-flammable liquids, steam, pressurized hot water, compressive air, inert gases or fluorocarbon refrigerant which are small and present few engineering problems. The pressure shall be less than 20 bar (2.0 MPa) above atmospheric pressure except in systems with a direct-fired heat source, when it shall be less than 2 bar (200 KPa). The pressure-volume product for the largest vessel shall be less than 2×10^5 bar litres (20 MPa.m³). The temperatures in the system shall be between -20°C and 250°C except in the case of smaller refrigeration systems operating at lower temperatures which will fall into this category. No pipelines are included in this category.

Inspector's category	Supervision needed	Inspection boundary
1 and 2	Not required but constant updating of regulatory requirements and inspection method needed.	Inspection of equipment or associated activities outside the field of expertise is not allowed.
3	To be in regular contact with the category 1 or 2 inspector.	Permitted to test and examine for identification of defects in equipment within the limits as authorized by the IB

5. INSPECTION METHODS AND PROCEDURES

5.1 The inspection body shall have detailed procedures and instructions for the application of the appropriate regulations, codes of practice, standards, specifications, guidance documents and customer requirements.



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5.2 Where risk assessment techniques are used to establish the nature and frequency of inspections, the inspection body shall document the techniques used in procedures including a demonstrable justification for using the technique.

5.3 Codes, standards and other technical literature applicable to the design, construction, operation, inspection and repair of lifting equipment, pressure systems and their components within the accredited scope shall be maintained up to date and be readily available to the staff.

6. REFERENCE AND RELATED DOCUMENTS

Ref	Document Identifier	Document Title
1.	ISO/IEC 17020	General criteria for the performance of various types of bodies performing inspection
2.	OSHA Act	The Occupational Safety and Health Act, No. 15 of 2007
3.	ILAC P15	Application of ISO/IEC 17020:2012 for the Accreditation of Inspection Bodies
4.	UKAS RG 2	Accreditation for In-Service Inspection of Pressure Systems / Equipment.
5.	UKAS RG 6	Accreditation for In-Service Inspection of Lifting Equipment

7. TRAINING

No training required. CABS are required to familiarize themselves with this document as applied in the respective field of accreditation.

8. REVISION HISTORY

Date	Ver	Revised By	Reason For Revision
17/02/2016	01	Inspection and Verification TC	New