UKAS
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RG 2

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Accreditation for in-service inspection of pressure systems/equipment

Contents

Changes since last edition

Reference/guidance documents updated to latest revision and new documents included. Reference to EA-4/15 G removed following withdrawal. Scope of accreditation clarified under section 2.5 and Appendix updated to reflect RG 0 update. Section 6 revised to refer specifically to testing and inspection standards rather than the broader ISO/IEC 17000 series. Minor textual changes to aid clarity.

1. Introduction

1.1 This publication has been produced by the United Kingdom Accreditation Service (UKAS) in conjunction with the UKAS Technical Advisory Committee for Engineering Inspection. It provides guidance to those requirements in ISO/IEC 17020 *Conformity assessment - Requirements for the operation of various types of bodies performing inspection* which need interpretation when applied by Inspection Bodies carrying out in-service inspection of pressure systems/pressure equipment. ISO/IEC 17020, as applied by UKAS in accordance with ILAC P15, remains the authoritative publication in cases of dispute or differences in interpretation.

1.2 The terms used in this publication have been drawn from ISO/IEC 17020 or defined within this publication. Where specific terms are drawn from other documents, such as the Pressure Systems Safety Regulations 2000 (PSSR), reference is made to those documents.

1.3 For the purposes of this publication the term **Inspection Body** shall be taken to mean an accredited Inspection Body.

1.4 For the purposes of this document the term pressure system/pressure equipment can also be taken to mean equipment used for storage/process of fluids falling outwith the PSSR.

1.5 Guidance for non-destructive testing performed by an Inspection Body to support the inspection of pressure systems/equipment is to be provided in a separate publication.

2. Scope - Inspection services covered by RG 2

2.1 This publication covers the accreditation of inspection bodies for equipment operated under pressure including all (mechanical, electrical and electronic) protective devices post commissioning. It excludes prime movers and driven machines.

2.2 Accreditation of Inspection Bodies that develop and certify written schemes of examination for the post commissioning inspection of pressure systems under PSSR or other relevant legislation may also be covered by this publication for that specific scope.

2.3 The pressure systems referred to in this publication will form part of installed or mobile plant including components that are temporarily attached to it and forming an integral part of that operational entity.

2.4 The field of in-service inspection for which accreditation is granted may be described in the accreditation schedule as major, intermediate, minor pressure systems as defined in Pressure Systems Safety Regulations 2000, Approved Code of Practice - L122 or by specific reference to the equipment (e.g. boilers, autoclaves etc).

2.5 The following activities can be included in the scope of accreditation for Inspection Bodies carrying out in-service inspections of pressure systems/equipment:

a) Development and certification of written schemes of examination;

b) Examination of equipment to detect actual and potential defects and making judgements on the significance of such defects in the maintenance of fitness for purpose;

c) Certification and/or Inspection of repairs and modifications.

3. Personnel
(ISO/IEC 17020 Clause 6.1)

3.1 The Inspection Body shall demonstrate that it has identified the competences required to undertake the range of inspection activities covered by its scope of accreditation and that it has processes in place to train, assess and monitor staff against those competences. UKAS Publication RG 0 *Guidelines on the Competence of Personnel Undertaking Engineering Inspections* provides a framework for a competence management system for inspection bodies. The qualification categories in Appendix 1 of this publication may also be used to develop competence criteria for inspection and supervision of inspection of pressure systems /equipment.

3.2 The Inspection Body shall have sufficient number of permanent management personnel with suitable experience in the design, manufacture, inspection, operation, repair or maintenance of pressure systems and their parts, and have the technical knowledge to make professional judgements on the range of safety related problems likely to arise from the accredited scope of inspection.

Such personnel shall be knowledgeable in the:

a) Problems likely to arise from the declared processes or mechanical conditions;

b) Mechanical design standards for pressure equipment;

c) Likely problems associated with various processes and fluids involved;

d) Effects of operating conditions on the mechanical integrity of systems including interactions with upstream and downstream plant;

e) Relevant legislative requirements and associated codes of practice; and

f) Inspection techniques associated with pressure systems/equipment.

3.5 The Inspection Body shall only use staff to carry out inspections of pressure systems/ equipment that have the necessary competence for the inspections to be carried out. The Inspection Body shall maintain records of qualifications, training and experience, and records to show how, and when, each member of staff was issued authorisation to perform specific examination and testing activities. These records shall, as a minimum, indicate the type of pressure systems/equipment as defined in Table 1 in Appendix 1 of this publication considered to be within the competence of the staff.

3.6 Where the Inspection Body personnel carry out calibration or specialised types of testing (e.g. NDT or Metallurgical testing) in connection with the inspection of pressure systems, records of their training, qualifications and experience shall be maintained. The Inspection Body shall also record details of who is authorised to perform specific calibrations or tests and to evaluate the results obtained.

4. Training
(ISO/IEC 17020 Clause 6.1.3)

4.1 The training provided by the Inspection Body shall provide a working knowledge of the plant, equipment and systems including design construction, operation, maintenance, significance of defects, typical problem areas and associated method of rectification.

4.2 The training shall include the safe conduct of the inspectors' duties, in particular safe practices applicable to pressure systems such as proper isolation of pressurised connections, certificates to enter confined spaces, permit to work systems, working at height and similar safe methods.

5. Inspection methods and procedures
(ISO/IEC 17020 Clauses 7.1.2, 7.1.3, 7.1.4)

5.1 The procedures and instructions used to develop/certify written schemes of examinations and inspection of pressure systems/equipment shall detail how the Inspection Body interprets and applies the appropriate regulations, codes of practice, standards, guidance documents and customer requirements.

5.2 Where risk-based inspection (RBI) 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 Reporting requirements including statutory requirements for reporting imminent danger shall be detailed in procedures.

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

6. Subcontracting
(ISO/IEC 17020 Clause 6.3)

6.1 Where the Inspection Body uses results of specialised testing techniques supplied by other organisations (e.g. Subcontractors) for making judgements on the integrity of the pressure system/equipment or for inclusion in inspection reports, the Inspection Body shall be able to demonstrate the competence of the testing / inspection organisation.

6.2 Inspection Bodies should endeavour to use results supplied by organisations that hold accreditation for those tests / inspections to ISO/IEC 17025 / ISO/IEC 17020 as appropriate from an accreditation body that is an ILAC MRA signatory (e.g. UKAS).

6.3 Where the subcontractor is not an accredited organisation, the Inspection Body shall demonstrate that its subcontractors are competent in accordance with guidance provided in section 6.3 of ILAC P15.

References

This list is not exhaustive, but the main legislation, standards, specifications and trade association codes pertinent to this document are listed below.

1 UK legislation and associated codes of practice

- Statutory Instrument No 128 Pressure Systems Safety Regulations 2000
- Statutory Instrument No 222 Pressure Systems Safety Regulations (Northern Ireland) 2004
- Safety of Pressure Systems, Pressure Systems Safety Regulations 2000, Approved Code of Practice - L122
- Written Schemes of Examination, Pressure Systems Safety Regulations 2000 - INDG 178
- Pressure Systems - Safety and You - INDG 261
- HSE INDG 436 Safe Management of Industrial Steam and Hot Water Boilers
- BG01 Guidance on Safe Operation of Boilers
- Safety requirements for autoclaves - PM 73
- Safety in Pressure Testing GS4
- A guide to the Pipelines Safety Regulations 1996. Guidance on Regulations - L82
- Safe use of work equipment - PUWER 98 Approved Code of Practice and Guidance - L22
- Approved Code of Practice, Safe work in confined spaces. Confined Spaces Regulations 1997. Regulations and Guidance - L101
- Compressed Air Safety - HSG 39
- A guide to the Control of Major Accident Hazards Regulations (COMAH) 2015 – L111

2 Relevant EU directives and associated UK legislation

- Pressure Equipment Directive 2014/68**/**EU
  - Statutory Instrument 2016 No. 1105 The Pressure Equipment (Safety) Regulations 2016
- Simple Pressure Vessel Directive 2014/29/EU
  - Statutory Instrument 2016 No. 1092 The Simple Pressure Vessels (Safety) Regulations 2016

3 Standards and related documents

- ISO/IEC 17020:2012 Conformity assessment - Requirements for the operation of various types of bodies performing inspection
- ILAC P15:05/2020 Application of ISO/IEC 17020:2012 for the Accreditation of Inspection Bodies
- ILAC P10:07/2020 ILAC Policy on Traceability of Measurement Results
- ILAC G27:07/2019 Guidance on measurements performed as part of an inspection process
- ISO 9712:2021 Non-destructive testing - Qualification and certification of NDT personnel

4 Industry guidance/publications

- Safety Assessment Federation (SAFed) PSG1 Pressure Systems: Guidelines on Periodicity of Examinations
- Joint HSE/CEA/SAFed Guidance BG01 Safe Operation of Boilers
- Safety Assessment Federation (SAFed) PSG3 Guidelines for the Operation of Hot Water Boilers
- Safety Assessment Federation (SAFed) PSG4 Guidelines for the Production of Written Schemes of Examination and the Examination of Pressure Vessels Incorporating Openings to Facilitate Ready Internal Access
- Safety Assessment Federation (SAFed) Guidelines for Users and Competent Persons Refrigeration Systems PSG17
- Safety Assessment Federation (SAFed) The Mechanical Integrity of Plant Containing Hazardous Substances (IMG01).
- Safety Assessment Federation (SAFed) Guidelines on the Examination of Electrically Heated Café Boilers PSG08
- Safety Assessment Federation (SAFed) Guidelines for Competent Persons – Repairs and Modifications PSG15
- Safety Assessment Federation (SAFed) Guidelines for Users and Competent Persons on Postponements of Examination PSG18
- Safety Assessment Federation (SAFed) Guidance for the Competent Person in relation to the examination for Relief Systems PSG23
- Safety Assessment Federation (SAFed) SBG1 Shell Boilers: Guidelines for the Examination of Shell-to Endplate and Furnace-to Endplate Welded Joints
- Safety Assessment Federation (SAFed) SBG2 Shell Boilers: Guidelines for the Examination of Longitudinal Seams of Shell Boilers
- Engineering Equipment and Materials Users Association (EEMUA) Publication 159, Users' Guide to the Inspection, Maintenance and Repair of Above Ground Flat Bottomed Storage Tanks
- Engineering Equipment and Materials Users Association (EEMUA) Publication 188, Guide for Establishing Operating Periods for Safety Valves
- Engineering Equipment and Materials Users Association (EEMUA) Publication 193, Managing competence assurance for personnel undertaking in-service inspection of pressure equipment
- Liquid Gas UK, Code of Practice 1, Bulk LPG Storage at Fixed Installations: Part 3: Examination and Inspection
- Liquid Gas UK User Information Sheet 015 Inspection and Maintenance of LPG Pipework at Commercial and Industrial Premises
- British Compressed Gases Association (BCGA) Code of Practice 39 - In-service requirements of pressure equipment (gas storage and gas distribution systems)

Appendix 1 - Qualification categories

Category 1. Chartered Engineer as defined by the Engineering Council or equivalent (e.g. appropriate degree with relevant experience, vocational qualification level 7 Engineering) including at least 3 years' experience within an engineering discipline associated with the relevant field of inspection.

Category 2. Incorporated Engineer as defined by Engineering Council or equivalent (e.g. appropriate HNC with relevant experience, (vocational qualification level 4) including at least 5years' experience within a relevant engineering discipline of which at least one year** shall have been spent working within an engineering discipline associated with the relevant field of inspection.

Category 3. Engineering Technician as defined by Engineering Council or equivalent (e.g. appropriate ONC with relevant experience, vocational qualification level 3) having a minimum of 5 years' experience within a relevant discipline of which at least one year shall have been spent working within an engineering discipline associated with the relevant field of inspection.

Category 4. Person trained* in a relevant engineering discipline with a recognised and documented engineering apprenticeship with a minimum of 5 years' experience within a relevant discipline of which at least one year shall have been spent working within an engineering discipline associated with the relevant field of inspection.

Category 5. Person with less than tradesman's apprenticeship but with a minimum of 5 years*** spent working with or within the industry associated with pressure systems and has general knowledge of the field of inspection. Personnel shall be placed on recognised training courses with appropriate documented tests in in-service inspection of pressure systems. The minimum age for this category is 21 years.

Category 6. Person subject to training in line with a recognised apprenticeship / Traineeship with less than 5 years' experience within a relevant discipline. Personnel shall be subject to appropriate documented training and monitoring including observing competent tradespersons.

The expected term of the training scheme shall not be less than 2 years resulting in a vocational qualification Level 4 or higher****. The minimum age for this Category is 18 years.

* Persons in Categories 4,5 shall pass a qualifying test, established by the Inspection Body, associated with the particular inspection activities relating to the relevant field of Inspection and this should cover relevant knowledge of the law, codes of practice and inspection techniques.

** Where a person meets the minimum requirement for a specific discipline and is to be trained in a second discipline, it may not be necessary to have experience of at least one year in the second discipline provided that the required competence can be demonstrated.

***For some routine, well-monitored activities this period may not be necessary.

**** A person on completion of a minimum 2-year term as a Category 6 having gained level 4 qualification shall be deemed to meet the requirements of Category 3, Where experience exceeds 4 years they shall meet the requirements of Category 2.

Equivalence defined by The European Qualifications Framework (EQF) or the Framework for Qualifications of the European Higher Education Area (FQ-EHEA) is accepted.

Table 1 - Requirements for qualifications and supervision of inspectors performing inspection of pressure systems

Pressure system	Qualification category	Supervision	Constraints
Major systems (including steam)	1	Occasional	Inspection or associated activities in technology outside the field of competence is prohibited except by formally documented consultation.
	2	Occasional	The above constraint plus prohibition on any non-routine repairs, modifications, changes to operating parameters, changes to inspection methods, calculations not defined in recognised standards except with specific approval by an appropriately qualified person. (e.g. Metallurgist, Designer, Process Engineer)
	3	Occasional	Permitted only for testing and examination to identify defects, within the limits specified by Category 1 or 2 person. Any decisions involving limits of acceptability, repairs or modifications shall be approved by authorised persons qualified to Category 1 or 2.
Intermediate systems (excluding steam)	1, 2, 3	Occasional	Same constraints as for major systems stated above for respective categories.
	4, 5	Frequent	Permitted only for carrying out routine, repetitive and well-defined examinations on a specific range of storage installations.
Intermediate systems (steam only)	1, 2, 3	Occasional	Same constraints as for major systems stated above for respective categories.
Minor systems (excluding steam and pipelines)	1, 2	Occasional	Same constraints as for major systems stated above for respective categories.
	3	Occasional	Same constraint as for Category 2 person stated above under major systems.
	4	Frequent	Same constraint as for category 3 persons stated above under major pressure systems.
	5	Frequent	Permitted only for carrying out routine, repetitive and well-defined examinations on a specific range of storage installations.
Minor systems (steam only)	1, 2	Occasional	Same constraints as for major systems stated above for respective categories.
	3	Occasional	Same constraint as for Category 2 person stated above under major systems.
	4	Frequent	Same constraint as for Category 3 persons stated above under major pressure systems.

Definition of supervision

Occasional - Formal, direct contact to review work with Supervisor at least annually. More frequent direct contact with Supervisor may be necessary. Authoritative technical support from personnel qualified to Category 1 or 2 to be readily available. For example, an Inspector working from home who has little direct contact with his Head Office.

Frequent - Direct contact with Supervisor at least weekly. Authoritative technical support from personnel qualified to Category 1, 2 or 3. For example, an Inspector whose work is based from a depot or office where the Supervisor is available.

Definition of Pressure Systems

Definitions of major, intermediate and minor pressure systems are given in HSE's Approved Code of Practice Reference L122, which accompanies PSSR.