



GUIDANCE NOTE 25

**GUIDANCE ON ASSESSING THE
COMPETENCY OF PERSONNEL
UNDERTAKING PERIODIC INSPECTION
AND TESTING OF GAS CYLINDERS**

REVISION 1: 2021

British Compressed Gases Association

GUIDANCE NOTE 25

GUIDANCE ON ASSESSING THE COMPETENCY OF PERSONNEL UNDERTAKING PERIODIC INSPECTION AND TESTING OF GAS CYLINDERS

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PREFACE

The British Compressed Gases Association (BCGA) was established in 1971, formed out of the British Acetylene Association, which existed since 1901. BCGA members include gas producers, suppliers of gas handling equipment and users operating in the compressed gas field.

The main objectives of the Association are to further technology, to promote safe practice and to prioritise environmental protection in the supply, use, storage, transportation and handling of industrial, food and medical gases, and we produce a host of publications to this end. BCGA also provides advice and makes representations on behalf of its Members to regulatory bodies, including the UK Government.

Policy is determined by a Council elected from Member Companies, with detailed technical studies being undertaken by a Technical Committee and its specialist Sub-Committees appointed for this purpose.

BCGA makes strenuous efforts to ensure the accuracy and current relevance of its publications, which are intended for use by technically competent persons. However, this does not remove the need for technical and managerial judgement in practical situations. Nor do they confer any immunity or exemption from relevant legal requirements, including by-laws.

For the assistance of users, references are given, either in the text or Appendices, to publications such as British, European and International Standards and Codes of Practice, and current legislation that may be applicable but no representation or warranty can be given that these references are complete or current.

BCGA publications are reviewed, and revised if necessary, at five-yearly intervals, or sooner where the need is recognised. Readers are advised to check the Association's website to ensure that the copy in their possession is the current version.

This document has been prepared by BCGA Technical Sub-Committee 6. This document replaces BCGA Guidance Note 25, 2015. It was approved for publication at BCGA Technical Committee 163. This document was first published on 15/01/2021. For comments on this document contact the Association via the website www.bcgaco.uk.

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* Throughout this publication the numbers in ^[] brackets refer to references in Section 5. Documents referenced are the edition current at the time of publication, unless otherwise stated.

TERMINOLOGY AND DEFINITIONS

Assessment (of a person)	The process of measuring a person's competence to safely, reliably and diligently perform specific acts, measured by one or more means.
Assessor (A)	An appropriately skilled person who is designated to carry out the assessment of a person.
Auditor	A person who conducts third party independent evaluation of activities to measure compliance with relevant legislation and technical standards.
Coach	Internal / external provider of appropriate information, instruction, training, coaching and mentoring, but not supervision.
Competence	The ability to apply and combine the necessary practical and theoretical experience, knowledge, skills and personal attributes, to reliably perform safe and effective inspections. NOTE: BCGA define competence in Guidance Note 23 ^[24] , <i>Gas safety. Information, instruction and training</i> .
Gas cylinder	A transportable pressure receptacle of a water capacity not exceeding 150 litres. For the purpose of this document the term 'cylinder' also refers to other pressure receptacles.
Inspector (I/O)	The Inspector is responsible for carrying out periodic inspection and test activities and makes judgements following the inspection and test. The Inspector may be assisted by an Operator.
May	Indicates an option available to the user of this Guidance Note.
Pressure receptacle	This is a collective term that includes cylinders, tubes, pressure drums, closed cryogenic receptacles, metal hydride storage systems, bundles of cylinders and salvage pressure receptacles.
Shall	Indicates a mandatory requirement for compliance with this Guidance Note and may also indicate a mandatory requirement within UK law.
Should	Indicates a preferred requirement but is not mandatory for compliance with this Guidance Note.
Supervisor	A competent and responsible person who supervises another person or an activity, on behalf of an organisation.
Technical Manager (TM)	A senior person qualified, competent and experienced in the cylinder inspection and testing operations of their company and who has overall responsibility for ensuring the competency of technical personnel, including compliance with the relevant cylinder inspection and testing regulations.

GUIDANCE NOTE 25

GUIDANCE ON ASSESSING THE COMPETENCY OF PERSONNEL UNDERTAKING PERIODIC INSPECTION AND TESTING OF GAS CYLINDERS

1. INTRODUCTION

Gas cylinders contain large amounts of stored energy. It is a requirement that they are made to appropriate standards and are then regularly inspected and maintained to ensure the safety of those who transport, fill, handle, store, use or may otherwise be in proximity to them.

In Great Britain, transportable gas cylinders shall comply with the *Carriage of Dangerous Goods and use of Transportable Pressure Equipment Regulations* ^[2], these Regulations implement the *Agreement concerning the International Carriage of Dangerous Goods* (ADR) ^[5]. ADR ^[5] requires that transportable gas cylinders are inspected and tested on a periodic basis. This provides assurance that each cylinder which remains in service is fit for continued use.

For transportable gas cylinders, initial and subsequently periodic inspection and testing, (unless they have an exemption from the Regulations) shall only be carried out by an Inspection Body authorised by a National Competent Authority. In Great Britain the Competent Authority for transportable gas cylinders is the Secretary of State for Transport, within the *Department for Transport* (DfT).

In Great Britain, DfT has set up a scheme to appointment Inspection Bodies in order to meet these obligations. The scheme is operated by the *Vehicle Certification Agency* (VCA). DfT has appointed the *United Kingdom Accreditation Service* (UKAS) as the delegated ‘accreditation’ body. Appointments are made by VCA following an assessment and recommendation by UKAS. Successful applicants are issued an approval by the VCA, the conditions of which are defined by their individual Schedule of Accreditation. Details of the Inspection Bodies who have been appointed to undertake various functions in connection with the inspection of tanks and / or pressure equipment are published on the VCA website.

Alternatively, where gas cylinders are used in a non-transport related application in Great Britain, they may come under the scope of the *Pressure Equipment (Safety) Regulations* ^[3]. Conformity assessment is carried out by a body appointed by the *Department for Business, Energy & Industrial Strategy* (BEIS). For information on examination, inspection and maintenance of this pressure equipment, refer to BCGA Code of Practice 39 ^[23], *In-service requirements of pressure equipment (Gas storage and gas distribution systems)*.

Where transportable gas cylinders are transported from / to other countries the requirements of ADR ^[5] will apply, however, compliance may be required with local National Regulations and within Europe, the *Transportable Pressure Equipment Directive* ^[4].

This BCGA Guidance Note provides guidance on the levels of competency that are required to meet industry standards for persons carrying out periodic inspection and testing of gas cylinders in Great Britain. This document should be used as part of a documented quality

system, it can also be used as part of a competence development programme, assessment and qualification process.

2. SCOPE

The purpose of this document is to:

- provide a consistent and fair process for gathering the required evidence to demonstrate competency of those personnel undertaking periodic inspection and testing of gas cylinders;
- provide guidance to Assessors and Auditors, including UKAS, and those seeking approval, on assessing competency of persons carrying out periodic inspection and testing of gas cylinders safely;
- provide a guide for organisations to ensure competent personnel are providing safe products for a period of further use;
- be used within an audit as part of a documented quality system;
- be used to describe industry best practice as part of an assessment and competence development programme;
- ensure that only competent personnel undertake periodic inspection and testing of gas cylinders;
- provide a framework to assist continued professional development and record keeping.

This document excludes cylinder manufacturers during the process of cylinder manufacture.

3. GENERAL REQUIREMENTS

Everyone should have the necessary competence to carry out their job safely and shall receive appropriate information, instruction and training, including induction and continuation / refresher training. Competence development methods shall include theoretical and practical elements. It is the duty of the employer to ensure that all persons who operate on their behalf are competent.

It is recommended that a competence development and assurance programme is carried out under a formalised system where an acceptable level of competency shall be demonstrable. The programme shall make provision for periodic competence re-assessment.

Various regulations, documents and standards identify the need and the requirement for ensuring the competency in the workplace of personnel who undertake periodic inspection and testing of gas cylinders and the recording of that information.

Before first performing any task (including the use of any equipment) personnel shall receive information, instruction and training in the task (including the safe use of the equipment).

BCGA generally considers three years to be a reasonable timescale for competence re-assessment for activities in-scope of this Guidance Note, but this reassessment period will depend on individual factors. The degree and frequency of re-assessment will depend on the individual level of competence, their performance, their familiarity with the work and their frequency of use of the equipment. Such reassessment may need to be periodically refreshed or supplemented to take into account changes in regulations, practices or equipment or in the event of incidents occurring (including near-misses and quality incidents).

Comprehensive initial and subsequent competency assessment may not have to be completed as a single event. An individual may undertake competence development for a discreet set of skills, then gain experience whilst working under close supervision. Such an approach progressively allows the individual to gain competency and allows the Supervisor to determine the level of supervision and further competence development required. Mentor, coaching and similar arrangements may be considered. This shall be followed by an assessment, where (assuming it is successful) the required level of competency is demonstrated to the satisfaction of both the individual and Supervisor.

Full competency in all activities may not be appropriate for all personnel and, in such cases, assessments can be split into individual competencies. Such an approach enables individuals to work without supervision within their established competence on limited tasks.

There should be a traceable line of technical knowledge, authority and competence at all stages from the highest level within the Organisation to those performing the activities needed to carry out the period inspection and testing of gas cylinders.

Under ADR ^[5], Chapter 1.3, personnel are required to be competent, and have general awareness, function specific and safety training appropriate to their responsibilities and duties.

Documentation shall be available to demonstrate competence; to this end, the qualifications, training and assessment records should be recorded and retained.

The standard to which Inspection Bodies are assessed is ISO/IEC 17020 ^[20], *General criteria for the operation of various types of bodies performing inspection*. UKAS provides guidance for those requirements in ISO/IEC 17020 ^[20] which need interpretation. UKAS guidance publications include:

- UKAS RG0 ^[6], *Guidelines on the competence of personnel undertaking engineering inspections*.
- UKAS RG2 ^[7], *Accreditation for in-service inspection of pressure systems / equipment*.
- UKAS RG3 ^[8], *Accreditation for in-service inspection of Transportable Pressure Receptacles (TPRs)*.

European Industrial Gases Association (EIGA) 79 ^[22], *Cylinder retest stations*, provides information on testing cylinders, it includes requirements that:

- personnel involved in the testing of gas cylinders shall be suitably qualified;
- there shall be a training scheme in place to ensure that all personnel are adequately trained for the tasks to be carried out;
- there shall be periodic competency checks of all personnel;
- records on the training of personnel shall be maintained, including the competence level achieved.

There are several standards for periodic inspection and testing, some of which are referenced within ADR ^[5]. These standards include:

- BS EN 1802 ^[11], *Transportable gas cylinders. Periodic inspection and testing of seamless aluminium alloy gas cylinders*. ADR ^[5] (6.2.4.2) applicable until 31 December 2022;
- BS EN 1803 ^[12], *Transportable gas cylinders. Periodic inspection and testing of welded carbon steel gas cylinders*. ADR ^[5] (6.2.4.2) applicable until 31 December 2022;
- BS EN 1968 ^[13], *Transportable gas cylinders. Periodic inspection and testing of seamless steel gas cylinders*. ADR ^[5] (6.2.4.2) applicable until 31 December 2022;
- ISO 6406 ^[14], *Periodic inspection and testing of seamless steel gas cylinders*. ADR ^[5] (6.2.2.4.);
- BS EN ISO 10460 ^[15], *Gas cylinders. Welded aluminium-alloy, carbon and stainless steel gas cylinders. Periodic inspection and testing*. ADR ^[5] (6.2.2.4.). ADR ^[5] (6.2.4.2) EN ISO 10460: 2018 ^[15] mandatory from 1 January 2023;
- ISO 10461 ^[16], *Seamless aluminium-alloy gas cylinders. Periodic inspection and testing*. ADR ^[5] (6.2.2.4.). ADR ^[5] (6.2.4.2);
- BS EN ISO 10462 ^[17], *Gas cylinders. Acetylene cylinders. Periodic inspection and maintenance*. ADR ^[5] (6.2.2.4.). ADR ^[5] (6.2.4.2);
- ISO 11513 ^[18], *Gas cylinders. Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene). Design, construction, testing, use and periodic inspection*. ADR ^[5] (6.2.2.4.);
- BS EN ISO 11623 ^[19], *Transportable gas cylinders. Periodic inspection and testing of composite gas cylinders*. ADR ^[5] (6.2.2.4.). ADR ^[5] (6.2.4.2);

- BS EN ISO 18119 ^[21], *Gas cylinders. Seamless steel and seamless aluminium-alloy gas cylinders and tubes. Periodic inspection and testing.* ADR ^[5] (6.2.4.2) applicable from 1 January 2021, mandatory from 1 January 2023;

When inspecting a valve for potential re-use following a periodic inspection and test, refer to BCGA TIS 46 ^[26], *Transportable gas cylinders. Valve life.*

4. COMPETENCY ASSESSMENT

The assessment of the competency of the Inspector / Operator may be ascertained using a variety of procedures and techniques. It is the responsibility of the Technical Manager to ensure all Assessors and assessment methods are suitable.

The Assessor should:

- possess relevant, suitable and pertinent technical knowledge;
- have experience in performance assessment;
- have knowledge in the competence and skill being assessed.

For all involved this process of competency assessment should be a positive learning experience. This process should aim to:

- enable the Inspector / Operator to prove their competency;
- recognise and record achievement and competence;
- identify any areas which require further competence development, training and supervision;
- provide opportunity for continued career development;
- maintain confidentiality between the company, the Assessor and all persons involved in the process.

Chart 1 shows a flowchart detailing the typical process which should be followed.

Appendix 1, Table 1, shows a Competency Assessment Plan that identifies a staged plan for the competency assessment. Typical attendees are shown.

The completion of the activities in Table 1 enables the demonstration of an objective and formalised approach, using plans which are Specific, Measurable, Achievable, Realistic and Time bound, (SMART).

This competency assessment schedule should be:

- shared with the participants in advance;

- adjusted according to individual job responsibilities and / or organisational needs;
- agreed with the participants prior to the assessment.

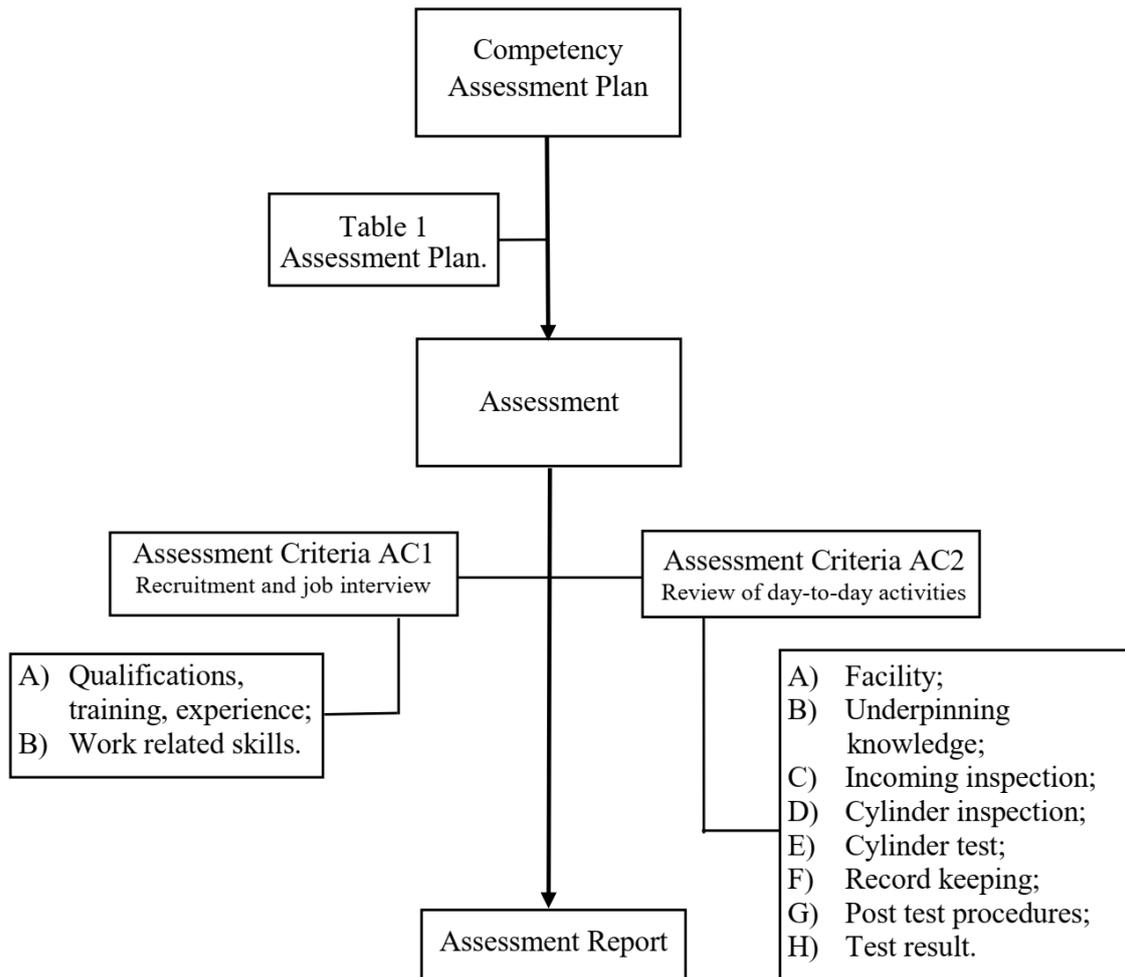


Chart 1: Process flowchart

Before the start of the assessment a constructive, two-way conversation shall take place to ensure the candidate understands the process, understands the possible outcomes and has the opportunity to ask questions and raise concerns. The Assessor should explain the duration, the method and what happens on completion of the process, including the writing of a report.

The assessment should be undertaken in line with the assessment criteria detailed in Section 4.1.

Evidence shall be gathered, refer to Section 4.2.

A competency judgement shall be made by the Assessor from the evidence collected, refer to Section 4.3.

The following actions should be carried out on completion of the assessment:

- (i) feedback shall be given to the candidate and should be:

- specific;
 - constructive;
 - impartial, fair and objective;
 - balanced – highlight positive and negative aspects.
- (ii) the candidate's own opinion of their assessment performance should be sought;
- (iii) the Assessor should provide praise and should indicate areas for improvement, along with possible corrective suggestions;
- (iv) the Assessor should provide any required clarification and respond to the candidate's input, for example, their questions, comments and suggestions;
- (v) the Assessor should inform the candidate of the result of the assessment and what happens next:
- if the candidate has successfully passed the assessment, the Assessor should confirm this with the candidate and explain what this means in terms of authorisations or limitations.
 - if the candidate has not passed the assessment, the Assessor should advise what the next actions are, for example, further competence development, request further supervision, further coaching / practice, gaining more experience, specific instruction, etc., which may lead to re-assessment.
- (vi) the Assessor shall produce a report on the assessment, refer to Section 4.4.

4.1 Assessment criteria

The assessment should be undertaken by the Assessor (with reference to Appendix 1, Table 1) in line with the following assessment criteria:

Assessment Criteria 1 (AC 1)

AC 1 is an initial assessment typically undertaken during recruitment and job interview. AC 1 has two sub-sections. These sub-sections are detailed in Appendix 2.

- A Qualifications, training, experience;
- B Work related skills.

Further evidence does not generally need to be gathered in subsequent assessments, however, if advised by the candidate, then any changes, for example, new qualifications gained, should be recorded.

Review at future assessments, if appropriate.

Competence development, training, authorisation and assessment details, dates and limitations should be recorded in the individuals' personnel records along with copies of certificates and supporting evidence.

Identify all relevant competencies and limitations. The Assessor should state clearly where he has used his assessment judgement in determining competence level. Include all relevant signatures, digital sign-offs, dates and other relevant details.

Specify the default re-assessment interval, noting that events may occur (including changes to guidance, advice from the Technical Manager, etc.) that may require an early re-assessment or other necessary action.

Assessment Criteria 2 (AC 2)

AC 2 is a review of day-to-day job related activities and may include a review of AC 1.

AC 2 has eight sub-sections. These sub-sections are detailed in Appendix 3.

- A Facility;
- B Underpinning knowledge;
- C Incoming inspection;
- D Cylinder inspection;
- E Cylinder test;
- F Record keeping;
- G Post test procedures;
- H Test result.

4.2 Evidence

Evidence of competence and competence assessment should be retained, be auditable and sufficient.

Assessment criteria checklists AC 1 and AC 2 provide suggestions where sources of evidence may be located.

AC 1 and AC 2 provide specific questions which may be used to collect evidence from the Inspector / Operator.

Evidence should be recorded in the appropriate boxes of the assessment criteria checklists.

Additional evidence may be recorded and retained in an appropriate way, for example, scanned, cross-referenced from another source, etc., and filed in appendices, referenced in each box.

4.3 Competency judgements

Competency judgements shall be made by the Assessor from the evidence collected in Section 4.2.

The grade of dependency achieved by the candidate will be determined by the Assessor using the information provided in Appendix 1, Table 2 - Dependence indicators.

4.4 Final report

After consideration of all the evidence, the Assessor shall complete and issue a final report with competency judgements. Judgements may be made by the Assessor alone or by collaborative discussion with the Technical Manager.

The final report shall include:

- the Competency Assessment Plan;
- Assessment criteria AC 1 and AC 2, as relevant;
- all evidence;
- recommended actions, for example, further development, directed supervision, coaching, instruction on specific topics, further experience, additional practice, etc.;
- next default assessment date, subject to the need for an earlier assessment if required by events;
- the name of the Assessor, signed as appropriate, and the date of the assessment.

The final report is a confidential document. Amongst other controls, the report contents shall only be disclosed in approved circumstances, for example, only to persons assessed as legitimately requiring the information for genuine business purposes.

The final report contains personal data which shall be managed in line with the company's data management policy. The retention of personal data shall comply with the requirements of the *Data Protection Act* ^[1].

The report should be kept as evidence and reviewed at appropriate timescales and no longer than 12 monthly.

5. REFERENCES

Document Number	Title
1.	The Data Protection Act 2018.
2. SI 2009 No. 1348	Carriage of Dangerous Goods and use of Transportable Pressure Equipment Regulations 2009 (as amended).
3. SI 2016 No. 1105	The Pressure Equipment (Safety) Regulations 2016.
4. European Directive 210/35/EU	Directive 2010/35/EU of the European Parliament and of the Council of 16 June 2010 on Transportable Pressure Equipment (TPED).
5. ECE/TRANS/300	Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) (as amended).
6. UKAS RG0	Guidelines on the competence of personnel undertaking engineering inspections.
7. UKAS RG2	Accreditation for in-service inspection of pressure systems / equipment.
8. UKAS RG3	Accreditation for In-Service Inspection of Transportable Pressure Receptacles (TPRs).
9. BS EN 837	Pressure gauges.
10. BS EN 1089 Part 3	Transportable gas cylinders. Gas cylinder identification (excluding LPG). Colour coding.
11. BS EN 1802	Transportable gas cylinders. Periodic inspection and testing of seamless aluminium alloy gas cylinders.
12. BS EN 1803	Transportable gas cylinders. Periodic inspection and testing of welded carbon steel gas cylinders.
13. BS EN 1968	Transportable gas cylinders. Periodic inspection and testing of seamless steel gas cylinders.
14. ISO 6406	Periodic inspection and testing of seamless steel gas cylinders.
15. BS EN ISO 10460	Gas cylinders. Welded aluminium-alloy, carbon and stainless steel gas cylinders. Periodic inspection and testing.
16. ISO 10461	Seamless aluminium-alloy gas cylinders. Periodic inspection and testing.
17. BS EN ISO 10462	Gas cylinders. Acetylene cylinders. Periodic inspection and maintenance.

- | | | |
|-----|-------------------------------------|--|
| 18. | BS ISO 11513 | Gas cylinders. Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene). Design, construction, testing, use and periodic inspection. |
| 19. | BS EN ISO 11623 | Transportable gas cylinders. Periodic inspection and testing of composite gas cylinders. |
| 20. | ISO / IEC 17020 | General criteria for the operation of various types of bodies performing inspection. |
| 21. | BS EN ISO 18119 | Gas cylinders. Seamless steel and seamless aluminium-alloy gas cylinders and tubes. Periodic inspection and testing. |
| 22. | EIGA 79 | Cylinder retest stations. |
| 23. | BCGA Code of Practice 39 | In-service requirements of pressure equipment (Gas storage and gas distribution systems). |
| 24. | Guidance Note 23 | Gas safety. Information, instruction and training |
| 25. | BCGA Technical Information Sheet 6 | Cylinder identification. Colour coding and labelling requirements. |
| 26. | BCGA Technical Information Sheet 46 | Transportable gas cylinders. Valve life. |

Further information can be obtained from:

UK Legislation	www.legislation.gov.uk
Health and Safety Executive (HSE)	www.hse.gov.uk
British Standards Institute (BSI)	www.bsigroup.co.uk
International Organization for Standardization (ISO)	www.iso.org
European Industrial Gases Association (EIGA)	www.eiga.eu
British Compressed Gases Association (BCGA)	www.bcgaco.uk
Department for Transport (DfT)	www.dft.gov.uk
Department for Business, Energy & Industrial Strategy (BEIS).	www.beis.gov.uk
United Kingdom Accreditation Service (UKAS)	www.ukas.com
Vehicle Certification Agency (VCA)	www.dft.gov.uk/vca

TABLE 1: COMPETENCY ASSESSMENT PLAN

1	2	3	4
Persons involved	Agreed actions	Assessment methods used	Agreed date / time of action
I/O, A, TM	Introductory explanation by A of the aims of the assessment process. Agree appropriate timescales to meet objectives.	Recognition of Prior Learning (RPL)	
I/O, A, TM	Review and adjust where appropriate: AC 1 (Appendix 2). Skills, knowledge and understanding. AC 2 (Appendix 3). Inspection and testing of cylinders.	Personal statements Observation Examination of work products Oral questioning	
I/O, A, TM	Agree and highlight the evidential methods of the assessment process. <i>(Listed in Column 3).</i> Identify assessment standard(s) used.	Discussion Written questioning Witness verification/ statements	
I/O, A	Agree collection date of AC 1 (Appendix 2). Range of scope of activities to be assessed. Skills, knowledge and understanding.	Video, oral, photographic records	
I/O, A	Agree date for completion of AC 2 (Appendix 3). Inspection and testing of cylinders.	Assignments/ Projects / Case scenarios	
A, (I/O)	Report by A to be completed with competency judgements made with / without designated TM input as appropriate. Report to include all evidence gathered to support checklists and identified competence development needs.	Skills	
I/O, A	Feedback to I/O. Opportunity for I/O to provide additional comments, and information to include personal career aspirations. All contributions to be recorded and included in the final report.		
A, TM	Assessor report feedback to TM and sign off of competence development needs.		

Key:

A – Assessor

I/O – Inspector / Operator

TM – Technical Manager

TABLE 2: DEPENDENCE INDICATORS

Grade	Performance Criteria	Quality of Performance	Assistance Required
1. Independent	Level of practice is of a high and safe standard.	<ul style="list-style-type: none"> • Sound level of theoretical knowledge applied effectively. • Coordinated and adaptable when performing skills. • Achieves intended purpose. • Proficient and performs within expected time frame. • Initiates actions independently and / in cooperation with others to ensure safe delivery. 	No supporting cues needed.
2. Supervised	Level of practice is of a safe standard but with some areas of improvement required.	<ul style="list-style-type: none"> • Correlates theoretical knowledge to practice most of the time. • Coordinated and adaptable when skills performed. • Achieves intended purpose. • Performs within a reasonable time frame. • Initiates actions independently most of the time and / in cooperation with others to ensure safe delivery. 	Requires occasional supportive cues.
3. Assisted	Level of practice is of a safe standard but with many areas of improvement required.	<ul style="list-style-type: none"> • Demonstrates limited correlation of theoretical knowledge to practice. • At times lacks coordination when performing skills. • Achieves intended purpose most times but needs occasional prompt. • Performs within a delayed time period. • Lacks initiative and foresight. 	Requires frequent supportive cues and direction.
4. Dependent	Level of practice is unsafe if left unsupervised.	<ul style="list-style-type: none"> • Unable to correlate theoretical knowledge to practice. • Lacks coordination when performing skills. • Unable to achieve intended purpose without prompt. • Unable to perform within a delayed time period. • No initiative or foresight. 	Requires continuous supervision and direction.

ASSESSMENT CRITERIA – AC 1

Sub-Section A: Qualifications, training, experience.

Criteria area of competence	Description	Success criteria / evidence source	Typical questions	Assessment method	Evidence (numbered reference) / comments
General education/ Qualifications.	Secondary including maths and English. University / College.	Detailed CV. Personal statement. Qualifications & certificates.	Did you achieve any attainment qualifications at school? Did you go into further education?	Witness verification. Discussion. Personal statement.	
Personal attributes.	Communication skills. Visual acuity. Written skill. Problem solving. Decision making.	Able to communicate and be understood. Eyesight tests / use of vision correction aids. Able to write clearly. Understands significance of checks.		Witness verification. Discussion.	
Experience.	Time served within a particular role. Competency achieved.	Detailed CV. Personal statement. Generic log for CPD. References.	Briefly describe your previous places of work and your roles within them.	Witness verification. Discussion. Personal statement.	

APPENDIX 2

Sheet 2 of 4

Criteria area of competence	Description	Success criteria / evidence source	Typical questions	Assessment method	Evidence (numbered reference) / comments
Current role / responsibility.	Job description as in work contract.	Detailed job description. Personal statement. Log for Continuous Professional Development or other competence development.	What does your current workplace do? What are your roles & responsibilities? Who do you report to?	Witness verification. Discussion.	
Competence development, including training.	In relevant engineering field (Necessity in all areas within the plant 1 x week per job).	Information, instruction, training competence and supervision records / certificates / Operator skill matrix/ competencies defined (including limitations).	What information, instruction and training have you had? What supervision do you receive? Do you and your workplace keep competence records? Are there any areas that you feel you require further support or competence development?	Witness verification. Management.	

ASSESSMENT CRITERIA – AC 1

Sub-Section B: Work related skills.

Area of Competence	Description	Success criteria / Evidence Source	Typical questions	Assessment Method	Evidence (numbered reference) / Comments	Dependence indicator (1 to 4) <small>NOTE</small>
Organisation.	Ability to operate within company hierarchy, culture & reporting structures.	Organisation of workload. Work Tables / schedules. Time management efficiency.	How do you plan your workload? Are there routines that are adhered to? Are there opportunities for improving your time management efficiency?	Witness/ Management verification.		
IT skills & administration (if appropriate).	Ability to use a computer to accurately document data, measurements, inspection results and tests.	Demonstrated ability Data capture and communication methods.	How do you capture and retrieve data? Are there document formats used for data communication? What are your methods of record keeping?	Observation.		

APPENDIX 2

Sheet 4 of 4

Area of competence	Description	Success criteria / Evidence source	Typical questions	Assessment Method	Evidence (numbered reference) / Comments	Dependence indicator (1 to 4) ^{NOTE}
Self-assessment.	Recognise ability limitations and act accordingly.	Demonstrate ability. Strengths & weaknesses. Seek support. Know source for information	Do you regard yourself as a contributor in the workplace? What are your strengths? Have you any areas you feel that need further development? Who do you go to when you need support or have questions?	Observation Interview/discussion. Witness verification.		

NOTE: The Dependence Indicators (refer to Appendix 1, Table 2) are: (1) Independent, (2) Supervised, (3) Assisted, (4) Dependent.

ASSESSMENT CRITERIA – AC 2

Sub-Section A: Facility.

Area of competence	Description	Success criteria / Evidence source	Questions	Evidence (numbered reference) / Comments
Workplace, ventilation, lighting, etc.	Safe, appropriately laid out and well managed workplace. Adequate ventilation. Lighting, suitable for inspection activities.	Is safe, suitable and comfortable. Does not inhibit inspections.		
Calibration.	Equipment calibrated.	Within calibration dates. Calibration logs present. All relevant items included.		
Testing equipment.	Regular maintenance and checking.	Regularity of Company maintenance procedures with records. Procedure documentation.	What action would you take if equipment fails / looks defective?	
Personal Protective Equipment (PPE).	Suitable PPE used including feet, hands, eyes, body protection.	Risk assessment and procedure documentation in place and implemented.	What PPE do you use within your roles and responsibilities?	

ASSESSMENT CRITERIA – AC 2

Sub-Section B: Underpinning knowledge

Area of Competence	Description	Success criteria / Evidence Source	Questions	Evidence (numbered reference) / Comments	Dependence indicator (1 to 4) <small>NOTE</small>
Competence development plan.	Review of ongoing plans.				
Gas cylinders.	Manufacture / properties.	Manual for reference. Knowledge of range of gas cylinders.	What cylinders do you inspect? Are there any specific/ additional considerations when inspecting / testing these cylinders? Are there other cylinder types?		
	Seamless steel cylinders (refer to Section 3).	Most commonly used high pressure gas cylinders.			
	Aluminium cylinders (refer to Section 3).	Heat treated alloys. Understands temperature limits. Potential for neck cracks. Lower torque for fitting valves. Cleaning solvent compatibility.			

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Area of Competence	Description	Success criteria / Evidence Source	Questions	Evidence (numbered reference) / Comments	Dependence indicator (1 to 4) ^{NOTE}
	Welded steel cylinders (refer to Section 3).	Does not apply to acetylene. Proof test only. Inspect foot ring and water entrapment areas. Check welds.			
	Composite cylinders (refer to Section 3).	Use manufacturer's recommendations May have shorter periodic test interval. Life limited Heat limits e.g. 70 °C for 24 hrs. Can be repaired if minor damage. Check for neck cracks. Torque for fitting valves. Cleaning solvent compatibility. Do not stamp –use labels.			
	Valves.	Variety.			

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	Transport / handling.	Health & Safety.	Do you know the regulations governing gas cylinder transportation / handling?		
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NOTE: The Dependence Indicators (refer to Appendix 1, Table 2) are: (1) Independent, (2) Supervised, (3) Assisted, (4) Dependent.

ASSESSMENT CRITERIA – AC 2

Sub-Section C: Incoming inspection

Area of Competence	Description	Success criteria / Evidence Source	Questions	Evidence (numbered reference) / Comments	Dependence indicator (1 to 4) <small>NOTE</small>
Identification and segregation of cylinders for periodic inspection and testing.	Parameters and procedures guiding selection and segregation.	<p>Procedure document.</p> <p>Knowledge of:</p> <ul style="list-style-type: none"> • cylinder owner; • history; • markings, label, colours, date rings; • manufacturing activity; • inspection interval/ frequency/ regulations; • identification of gas types e.g. liquefied, compressed, flammable, inert, toxic; • knowledge of gas properties. <p>H&S protocols adhered to i.e. no free standing cylinders, churning, trolley, forklift transportation.</p>	<p>Is there a company procedure for identification and segregation in place?</p> <p>Where is it kept / displayed?</p> <p>Who does the cylinder selection?</p> <p>What do you need to know about the cylinder?</p> <p>Why?</p> <p>What are the regulations for gas cylinder inspection?</p> <p>Where are the selected cylinders stored?</p> <p>How are they handled?</p> <p>Are there H&S procedures?</p> <p>Are they implemented?</p>		

NOTE: The Dependence Indicators (refer to Appendix 1, Table 2) are: (1) Independent, (2) Supervised, (3) Assisted, (4) Dependent.

ASSESSMENT CRITERIA – AC 2

Sub-Section D: Cylinder inspection

Area of Competence	Description	Success criteria / Evidence Source	Questions	Evidence (numbered reference) / Comments	Dependence indicator (1 to 4) <small>NOTE</small>
Venting and degassing.	Gases vented safely. Protection against accidental de-valving when pressurised.	Risk determined by the gas properties. Dangerous substances controlled safely. Whisper test and blocked valve checks. RPV identification and removal.			
De-valving.	Does not damage valve or cylinder. Cylinder security.	Grips / clamps adjustable. Safety cages. De-valving rigs and machines.	How do you set the grips for different cylinder materials and valve types? How do you know if the cylinder is fully depressurised? How do you remove RPV's?		
Cleaning.	Sufficient purging. Internal and external cleaning. Paint removal method.	Knowledge of appropriate methods for cleaning cylinders and valves. If chemicals are used, their hazards, effect (on gases, valves and cylinders) and suitable safety precautions.	How are hazardous gases checked prior to removal? Dependent on materials of construction: <ul style="list-style-type: none"> • How is paint removed? • What temperatures are used? Are grinders used (No)?		

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Area of Competence	Description	Success criteria / Evidence Source	Questions	Evidence (numbered reference) / Comments	Dependence indicator (1 to 4) <small>NOTE</small>
Valve overhaul / replacement.	Methods.	Requirement for dip tubes.			
Tare weight.	Scale adequate to accommodate cylinders.	Tare weight checks / corrections. Scale calibrated.	Weight limits? Action if underweight? Action if overweight?		
Visual external inspection.	Defect identification.	Tools available. Knowledge of defect types and rejection criteria.	What criteria are used? What are corrosion limits? Action if unsure?		
Visual internal inspection.	Use of inspection tools.	Tools available. Inspection light sufficient. Light type for flammable products.	What criteria are used? What are corrosion limits? Action if unsure?		
Repainting.		Knowledge of paint types and fume extraction, as relevant. Automated coating processes.	What colour to use? The purpose of painting? Temperatures allowed (dependent on material)?		

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Thread inspection.	Thread gauges. Use of inspection tools.	Inspection light sufficient. Light type for flammable products. Gauges in a good condition and calibrated.	Acceptable limits? Correct use of 'Go / No Go' gauge?		
Valve guard.	Correct fitting.	Removed before hydraulic test. In a suitable condition.			

NOTE: The Dependence Indicators (refer to Appendix 1, Table 2) are: (1) Independent, (2) Supervised, (3) Assisted, (4) Dependent.

ASSESSMENT CRITERIA – AC 2

Sub-Section E: Cylinder test

Area of Competence	Description	Success criteria / Evidence Source	Questions	Evidence (numbered reference) / Comments	Dependence indicator (1 to 4) ^{NOTE}
Hydraulic Test.	Connection of test connection.	Company procedure in place and adhered to. Start-up procedure known.			
	Calibration.	Gauges used e.g. BS EN 837 ^[9] compliance to standards.			
	Test procedure.	Knowledge of Company procedure which is in place.			
Filling.	Fluid used.	Water filling, 6061 aluminium alloy and composite cylinders, 2 hour limit. Recycling -removal of contaminants. pH checks. Filtration.			
	Pressure safety.	System design adequate. Over pressure protection method. Equipment failure modes identified.			

NOTE: The Dependence Indicators (refer to Appendix 1, Table 2) are: (1) Independent, (2) Supervised, (3) Assisted, (4) Dependent.

ASSESSMENT CRITERIA – AC 2

Sub-Section F: Record keeping

Area of Competence	Description	Success criteria / Evidence Source	Questions	Evidence (numbered reference) / Comments	Dependence indicator (1 to 4) ^{NOTE}
Test records.	Use of test log.	Data capture procedure. Consistent proforma usage. Accurate test record. In accordance with standards.			

NOTE: The Dependence Indicators (refer to Appendix 1, Table 2) are: (1) Independent, (2) Supervised, (3) Assisted, (4) Dependent.

ASSESSMENT CRITERIA – AC 2

Sub-Section G: Post test procedures

Area of Competence	Description	Success criteria / Evidence Source	Questions	Evidence (numbered reference) / Comments	Dependence indicator (1 to 4) ^{NOTE}
Drying.	Method does not overheat.	Check methods used. Time and temperature limits.	Heat limits for different cylinder types.		
Visual Inspection.	Final check tools and method.	Dry, no free moisture.	Action if water present.		
Marking.	Marking permanent, legible and correct.	Letter size correct. Use of labels for composite cylinders. Markings correctly identify test status.	Re-test periods correct?		
Re-valving.	Suitable equipment.	Torque wrench calibration. Correct torque used (for cylinder and valve type) Knowledge of PTFE taping.	Do you check the calibration?		
Painting.	Appropriate equipment.	Use of colour codes BS EN 1089-3 ^[10] & BCGA TIS 6 ^[24] .	Temperature limits for cylinder type?		

NOTE: The Dependence Indicators (refer to Appendix 1, Table 2) are: (1) Independent, (2) Supervised, (3) Assisted, (4) Dependent.

ASSESSMENT CRITERIA – AC 2

Sub-Section H: Test result

Area of Competence	Description	Success criteria / Evidence Source	Questions	Evidence (numbered reference) / Comments	Dependence indicator (1 to 4) ^{NOTE}
Defect acceptance.	<p>Knowledge of defect types.</p> <p>Use of equipment.</p> <p>Able to determine limits of acceptance.</p>	<p>Use of regulations / company procedures as a guide.</p> <p>Proficient with equipment.</p> <p>Can identify regulations relevant to checks performed and use pass / fail criteria.</p> <p>Knowledge of checks histories dates.</p> <p>Knowledge of actions on equipment defects.</p>	<p>Can you show me the Regulation for ...?</p> <p>What is the acceptable corrosion limit for ...?</p> <p>What action would you take if equipment fails / looks defective?</p> <p>Are there procedures in place for implementation of these actions?</p> <p>Identify a failure.</p>		
Return to service.	Suitable for next service period.	Cylinders not mixed with unserviceable cylinders.			
Render unserviceable.	Unable to be put back into service.	<p>Permanently destroyed.</p> <p>Methods include cutting, thread destruction, holes.</p>	How do you render cylinders unserviceable?		

NOTE: The Dependence Indicators (refer to Appendix 1, Table 2) are: (1) Independent, (2) Supervised, (3) Assisted, (4) Dependent.



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