Qualification Specification for:

OCN NI Level 3 Award in Hydrogen Applications and Technologies

- **Qualification No: 610/1692/5**

Qualification Regulation Information

OCN NI Level 3 Award in Hydrogen Applications and Technologies
Qualification Number: 610/1692/5

Operational start date: 15 November 2022
Operational end date: 14 November 2027
Certification end date: 14 November 2030

Qualification operational start and end dates indicate the lifecycle of a regulated qualification. The operational end date is the last date by which learners can be registered on a qualification and the certification end date is the last date by which learners can claim their certificate.

All OCN NI regulated qualifications are published to the Register of Regulated Qualifications (**http://register.ofqual.gov.uk/**). This site shows the qualifications and awarding organisations regulated by CCEA Regulation and Ofqual.

OCN NI Contact Details

Open College Network Northern Ireland (OCN NI)
Sirius House
10 Heron Road
Belfast
BT3 9LE

Phone: 028 9046 3990
Web: **www.ocnni.org.uk**

Foreword

This document explains OCN NI's requirements for the delivery and assessment of the following regulated qualification:

→ **OCN NI Level 3 Award in Hydrogen Applications and Technologies**

This specification sets out:

- Qualification features
- Centre requirements for delivering and assessing the qualification
- The structure and content of the qualification
- Unit details
- Assessment requirements for the qualification
- OCN NI's quality assurance arrangements for the qualification
- Administration

OCN NI will notify centres in writing of any major changes to this specification. We will also publish changes on our website at **www.ocnni.org.uk**

This specification is provided online, so the version available on our website is the most up to date publication. It is important to note that copies of the specification that have been downloaded and printed may be different from this authoritative online version.

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About Regulation

OCN NI

Open College Network Northern Ireland (OCN NI) is a regulated Awarding Organisation based in Northern Ireland. OCN NI is regulated by CCEA Regulation to develop and award professional and technical (vocational) qualifications from Entry Level up to and including Level 5 across all sector areas. In addition, OCN NI is regulated by Ofqual to award similar qualification types in England.

The Regulated Qualifications Framework: an overview

The Regulated Qualifications Framework (RQF) was introduced on 1st October 2015: the RQF provides a single framework for all regulated qualifications.

Qualification Level
The level indicates the difficulty and complexity of the knowledge and skills associated with any qualification. There are eight levels (Levels 1-8) supported by three 'entry' levels (Entry 1-3).

Qualification Size
Size refers to the estimated total amount of time it could typically take to study and be assessed for a qualification. Size is expressed in terms of Total Qualification Time (TQT), and the part of that time typically spent being taught or supervised, rather than studying alone, is known as Guided Learning Hours (GLH).

Qualification Features

Sector Subject Area

5.2 Building and construction

This qualification related to the following National Occupational Standards:

NOS - Hydrogen Technologies

Qualification Aim

The OCN NI Level 3 Award in Hydrogen Applications and Technologies qualification will provide the learner with the skills and knowledge related to hydrogen and energy generation, storage and distribution.

Qualification Objectives

The objectives of the OCN NI Level 3 Award in Hydrogen Applications and Technologies are to enable the learner to develop an understanding of the following:

- operating principles of hydrogen
- how to use hydrogen safely
- hydrogen fuel cells in transportation
- hydrogen generation, storage and distribution

Grading

Grading for this qualification is pass/fail.

Qualification Target Group

This qualification is targeted at learners who currently work or wish to work in the motor vehicle sector, plumbing sector and/or green energy sector.

Progression Opportunities

The OCN NI Level 3 Award in Hydrogen Applications and Technologies will allow learners to progress to other higher-level qualifications in hydrogen technology related areas and/or into employment in the motor vehicle sector, plumbing sector and/or green energy sector.

Entry Requirements

There are no specific entry requirements for this qualification however learners must be at least 16 years of age.

Qualification Support

A Qualification Support pack is available for OCN NI centres within the login area of the OCN NI website (https://www.ocnni.org.uk/my-account/), which includes additional support for teachers, eg planning and assessment templates, guides to best practice, etc.

Delivery Languages

This qualification is available in English only at this time. If you wish to offer this qualification in Welsh or Irish (Gaeilge) then please contact OCN NI who will review demand and provide as appropriate.

Centre Requirements for Delivering the Qualification

Centre Recognition and Qualification Approval

New and existing OCN NI recognised centres must apply for and be granted approval to deliver the qualification prior to the commencement of delivery.

Centre Staffing

Centres are required to have the following roles in place as a minimum, although a member of staff may hold more than one role*:

- Centre contact
- Programme Co-ordinator
- Tutor
- Assessor
- Internal Verifier

*Note: A person cannot be an internal verifier for their own assessments.

Tutors

Tutors delivering the qualification should be occupationally competent and qualified to at least one level higher than the qualification and have a minimum of one year's relevant experience.

Assessors

The qualification is assessed within the centre and is subject to OCN NI's quality assurance processes. Units are achieved through internally set, internally assessed, and internally verified evidence.

Assessors must:

- be occupationally competent to at least one level higher than the qualification
- have a minimum of one year's experience in the area they are assessing
- have direct or related relevant experience in assessment
- assess all assessment tasks and activities

Internal Verification

OCN NI qualifications must be scrutinised through the centre's internal quality assurance processes as part of the recognised centre agreement with OCN NI. The centre must appoint an experienced and trained centre internal verifier whose responsibility is to act as the internal quality monitor for the verification of the delivery and assessment of the qualifications.

The centre must agree a working model for internal verification with OCN NI prior to delivery of the qualifications.

Internal Verifiers must:

- have at least one year's occupational experience in the areas they are internally verifying
- attend OCN NI's internal verifier training if not already completed

Internal verifiers are required to:

- support tutors and assessors
- sample assessments according to the centre's sampling strategy
- ensure tasks are appropriate to the level being assessed
- maintain up-to-date records supporting the verification of assessment and learner achievement

Structure and Content

OCN NI Level 3 Award in Hydrogen Applications and Technologies

To achieve the qualification learners must complete 3 credits - both mandatory units plus one of the optional units.

Total Qualification Time (TQT) for this qualification: 30 hours
Guided Learning Hours (GLH) for this qualification: 21 hours

Unit Reference Number	OCN NI Unit Code	Unit Title	Credit Value	GLH	Level
Mandatory units					
D/650/4643	CBG087	Using Hydrogen Safely	1	7	Three
F/650/4644	CBG088	Hydrogen Generation, Storage and Distribution	1	7	Three
Optional units					
H/650/4645	CBG089	Operating Principles of Hydrogen	1	7	Three
J/650/4646	CBG090	Hydrogen Fuel Cells for Transport	1	7	Three

Unit details

Title	Operating Principles of Hydrogen
Level	Three
Credit Value	1
Guided Learning Hours (GLH)	7
OCN NI Unit Code	CBG089
Unit Reference No	H/650/4645
Unit purpose and aim(s): This unit will enable the learner to understand how hydrogen can accomplish grid balancing and be phased into the domestic gas boiler system.	

Learning Outcomes	Assessment Criteria
1. Understand the need for grid balancing and different energy units.	1.1. Explain different energy units and the need for grid balancing. 1.2. Evaluate the capacity factor of a given energy production method.
2. Understand the use of hydrogen within an existing gas network infrastructure.	2.1. Explain the current local gas network infrastructure. 2.2. Analyse the challenges of using hydrogen in the current gas network infrastructure. 2.3. Develop possible solutions for injecting hydrogen into the current gas network.
3. Understand hydrogen use in a domestic boiler system and the application of Combined Heat and Power (CHP).	3.1. Summarise the changes required to use hydrogen in a domestic boiler system. 3.2. Explain the use of a CHP system. 3.3. Evaluate the efficiency gained from CHP implementation using hydrogen.
4. Understand the use of hydrogen in high-pressure and low-pressure systems.	4.1. Explain the use of hydrogen in high-pressure and low-pressure systems.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

Assessment Method	Definition	Possible Content
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log

Title	Using Hydrogen Safely
Level	Three
Credit Value	1
Guided Learning Hours (GLH)	7
OCN NI Unit Code	CBG087
Unit Reference No	D/650/4643
Unit purpose and aim(s): This unit will enable the learner to understand the importance of current safety codes, standards and risks when handling hydrogen. The learners will also demonstrate how to safely handle hydrogen and hydrogen cylinders, detect for leaks, and employ best practice to prevent metal embrittlement.	
Learning Outcomes	**Assessment Criteria**
1. Understand safety codes and standards when using and storing hydrogen.	1.1. Summarise the regulations and standards for hydrogen. 1.2. Summarise safety risks associated with hydrogen gas cylinders and relevant warning signs. 1.3. Summarise safety signs applicable to hydrogen cylinders and how to mitigate potential risk 1.4. Explain how to safely store hydrogen cylinders and how regulators are used for hydrogen storage.
2. Be aware of the risks and dangers associated with handling hydrogen.	2.1. Explain the dangerous properties of hydrogen. 2.2. Analyse the safety risks when handling hydrogen gas. 2.3. Summarise how hydrogen safety has improved since it was discovered.
3. Understand best practice in handling hydrogen and hydrogen gas cylinders.	3.1. Explain best practice methods for handling the following: a) hydrogen b) hydrogen gas cylinders
4. Know the signs of metal embrittlement and leak detection methods.	4.1. Summarise what is meant by metal embrittlement and how it is exacerbated by hydrogen gas. 4.2. Summarise different methods of leak detection and prevention. 4.3. Explain sensor calibration procedures.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

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Title	Hydrogen Fuel Cells for Transport
Level	Three
Credit Value	1
Guided Learning Hours (GLH)	7
OCN NI Unit Code	CBG090
Unit Reference No	J/650/4646
Unit purpose and aim(s): This unit will enable the learner to understand the design of fuel cell stacks, fuel cell systems and fuel cell control units.	
Learning Outcomes	**Assessment Criteria**
1. Understand the use of fuel cells in transport.	1.1. Illustrate how a fuel cell can be used in transportation. 1.2. Classify different types of fuel cells used in transportation. 1.3. Analyse the use of hydrogen technology in upcoming transportation vehicles.
2. Understand the design, assembly and applications of fuel stacks.	2.1. Summarise different types of fuel cell stacks and their purpose. 2.2. Illustrate a standard individual fuel cell as part of a fuel cell stack. 2.3. Analyse which fuel cell stack is most appropriate for a given application.
3. Be aware of the correct operating conditions for different fuel cells.	3.1. Explain the different operating conditions taken into consideration in fuel cell technology. 3.2. Describe the operating conditions of different fuel cells. 3.3. Assess which fuel cell is most appropriate for a desired application given its operating conditions.
4. Know the components and operation of a fuel cell control unit.	4.1. Summarise a fuel cell control unit and how it affects a fuel cell. 4.2. Explain the different subsystems of a fuel cell control unit. 4.3. Summarise the different elements of a Fuel Cell Control-Unit (FCCU) in an electric vehicle set-up.
5. Be able to design a fuel cell system.	5.1. Illustrate the common components of a fuel cell system. 5.2. Analyse different conditions to be considered when designing a fuel cell. 5.3. Design a fuel cell system justifying the use of specialised components.
6. Understand fuel cell maintenance.	6.1. Compare and contrast the advantages of fuel cells to batteries and combustion engines. 6.2. Identify methodologies and techniques used to diagnose and resolve common fuel cell maintenance problems.

Assessment Guidance		
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Title	Hydrogen Generation, Storage and Distribution
Level	Three
Credit Value	1
Guided Learning Hours (GLH)	7
OCN NI Unit Code	CBG088
Unit Reference No	F/650/4644
Unit purpose and aim(s): This unit will enable the learner to understand hydrogen, its history and classification.	

Learning Outcomes	Assessment Criteria
1. Understand hydrogen including how it is used and generated.	1.1. Explain different ways in which hydrogen may be used. 1.2. Summarise how the physical properties of hydrogen relate to its uses. 1.3. Illustrate how hydrogen's chemical reactivity is utilised in electrolysis and fuel cells.
2. Understand the historical importance of hydrogen's discovery, production and uses.	2.1. Explain the historical discovery of hydrogen. 2.2. Summarise the historical production and use of hydrogen. 2.3. Explain current and future uses of hydrogen and its production.
3 Understand the classification of hydrogen.	3.1. Explain what is meant by the rainbow of hydrogen. 3.2. Summarise the colours of hydrogen including: a) the significance of each classification b) how they relate to hydrogen generation methods
4. Understand the operation of an electrolyser.	4.1. Explain the key structure of an electrolyser and its uses. 4.2. Explain the chemical reactions which occur within an electrolyser.
5. Understand the microscale and macroscale storage techniques of hydrogen.	5.1. Explain why hydrogen behaves as it does. 5.2. Compare the different effects on hydrogen under different pressures and temperatures. 5.3. Summarise different ways hydrogen can be stored in both small and large-scale applications. 5.4. Explain with examples, the chemical and physical bonding of hydrogen in the chemical storage process.

Assessment Guidance		
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E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Quality Assurance of Centre Performance

External Verification

All OCN NI recognised centres are subject to External Verification. External verification visits and monitoring activities will be conducted annually to confirm continued compliance with the conditions of recognition, review the centre's risk rating for the qualifications and to assure OCN NI of the maintenance of the integrity of the qualifications.

The External Verifier will review the delivery and assessment of the qualifications. This will include the review of a sample of assessment evidence and evidence of the internal verification of assessment and assessment decisions. This will form the basis of the EV report and will inform OCN NI's annual assessment of centre compliance and risk. The External Verifier is appointed by OCN NI.

Standardisation

As a process, standardisation is designed to ensure consistency and promote good practice in understanding and application of standards. Standardisation events:

- make qualified statements about the level of consistency in assessment across centres delivering a qualification
- make statements on the standard of evidence that is required to meet the assessment criteria for units in a qualification
- make recommendations on assessment practice
- produce advice and guidance for the assessment of units
- identify good practice in assessment and internal verification

Centres offering units of an OCN NI qualification must attend and contribute assessment materials and learner evidence for standardisation events if requested.

OCN NI will notify centres of the nature of sample evidence required for standardisation events (this will include assessment materials, learner evidence and relevant assessor and internal verifier documentation). OCN NI will make standardisation summary reports available and correspond directly with centres regarding event outcomes.

Administration

Registration

A centre must register learners within 20 working days of commencement of a qualification.

Certification

Certificates will be issued to centres within 20 working days of receipt of correctly completed results marksheets. It is the responsibility of the centre to ensure that certificates received from OCN NI are held securely and distributed to learners promptly and securely.

Charges

OCN NI publishes all up to date qualification fees in its Fees and Invoicing Policy document. Further information can be found on the centre login area of the OCN NI website.

Equality, Fairness and Inclusion

OCN NI has considered the requirements of equalities legislation in developing the specification for these qualifications. For further information and guidance relating to access to fair assessment and the OCN NI Reasonable Adjustments and Special Considerations policies, centres should refer to the OCN NI website.

Retention of Evidence

OCN NI has published guidance for centres on the retention of evidence. Details are provided in the OCN NI Centre Handbook and can be accessed via the OCN NI website.

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