



## Qualification Specification for:

**OCN NI Level 4 Certificate in Hydraulic and Pneumatic Systems**

➤ **Qualification No: 603/6626/6**

## Qualification Regulation Information

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### **OCN NI Level 4 Certificate in Hydraulic and Pneumatic Systems**

Qualification Number: 603/6626/6

Operational start date: 01 October 2020

Operational end date: 30 September 2025

Certification end date: 30 September 2029

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.

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## Foreword

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

→ **OCN NI Level 4 Certificate in Hydraulic and Pneumatic Systems**

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](http://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

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### **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 1<sup>st</sup> 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

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### Sector Subject Area

#### 4.1 Engineering

This qualification relates to the following National Occupations Standards:

[NOS - Hydraulic and Pneumatic Systems](#)

### Qualification Aim

The OCN NI Level 4 Certificate in Hydraulic and Pneumatic Systems qualification will provide learners with the knowledge and skills to design, build, test and maintain hydraulic and pneumatic systems.

### Qualification Objectives

The objectives of this qualification are to enable learners to develop the knowledge and skills to:

- principles of fluid power, components and control methods
- control system drawings and symbols
- design, build and test hydraulic and pneumatic systems
- fault finding and maintenance of hydraulic and pneumatic systems

### Grading

Grading for this qualification is pass/fail.

### Qualification Target Group

This qualification is targeted at learners who either wish to gain employment or are currently employed in engineering and related occupations.

### Progression Opportunities

The OCN NI Level 4 Certificate in Hydraulic and Pneumatic Systems enables progression into higher level qualifications and/or further learning in this area or into employment.

### **Entry Requirements**

Learners will be expected to be at least 18 years of age.

Learners will be expected to have five GCSEs including Mathematics and English and either level 3 qualifications in Engineering, Science, Computer Systems or similar or two A levels at grade C including Maths and/or Physics. However, learners with substantial relevant industry experience may also undertake this qualification.

### **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

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### 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 have qualifications to at least level 5 or above in an engineering or related area.

### Assessors

The qualifications are assessed within the centre and are 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 and have qualifications to at least level 5 or above in an engineering or related area
- have a minimum of three years' relevant 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 three years' 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

In order to achieve the OCN NI Level 4 Certificate in Hydraulic and Pneumatic Systems learners must successfully complete the one unit – 20 credits.

Total Qualification Time (TQT) for this qualification: 200 hours  
 Guided Learning Hours (GLH) for this qualification: 72 hours

Unit Reference Number	OCN NI Unit Code	Unit Title	TQT	Credit Value	GLH	Level
<a href="#">R/618/4678</a>	CBE981	Hydraulic and Pneumatic Systems	200	20	72	Four

## Unit Details

Title	Hydraulic and Pneumatic Systems
Level	Four
Credit Value	20
Guided Learning Hours (GLH)	72
OCN NI Unit Code	CBE981
Unit Reference No	R/618/4678
<i>Unit purpose and aim(s):</i> This unit will enable the learner to understand how to design, build, test and maintain hydraulic and pneumatic systems.	
Learning Outcomes	Assessment Criteria
1. Understand fluid power principles and their application in the construction and safe operation of industrial pneumatic and hydraulic systems.	1.1. Analyse the application of fluid power using at least one example for each of the following: <ul style="list-style-type: none"> <li>a) manufacturing and processing industries</li> <li>b) transportation systems</li> <li>c) utilities</li> <li>d) construction plant and equipment</li> </ul> 1.2. Research and analyse the behaviour of air and hydraulic fluids in at least five different industrial systems.           1.3. Research and analyse the construction, operation and technical characteristics of industrial pneumatic and hydraulic systems.           1.4. Summarise the features and characteristics of electro-pneumatic and hydraulic systems in terms of their: <ul style="list-style-type: none"> <li>a) flexibility</li> <li>b) reliability</li> <li>c) controllability</li> <li>d) productivity</li> <li>e) safety</li> </ul> 1.5. Summarise the safety procedures and relevant legislation applicable to design, maintenance and use of electro-pneumatic and hydraulic equipment and systems.
2. Be able to design electro-pneumatic and hydraulic components, devices and equipment.	2.1. Summarise the key information commonly used in symbols for electrical/electronic, pneumatic and hydraulic components, devices and equipment including: <ul style="list-style-type: none"> <li>a) directional control valves</li> <li>b) flow control valves</li> <li>c) pressure relief valves</li> <li>d) actuators</li> <li>e) limit sensing</li> <li>f) motors</li> <li>g) mobile components</li> <li>h) mounting arrangements</li> </ul> 2.2. Perform fluid power calculations to analyse the performance and behaviour of electro-pneumatic and hydraulic systems using appropriate units, standards and nomenclature.           2.3. Analyse and interpret the layout and function of fluid power schematic drawings, symbols and specifications of control systems.

	<p>2.4. Demonstrate the correct use of circuit diagrams, block diagrams, system layout diagrams, displacement step diagrams for the design of electro-pneumatic and hydraulic systems taking account of the following:</p> <ul style="list-style-type: none"> <li>a) component and equipment data sheets</li> <li>b) functional charts</li> <li>c) operating instructions</li> <li>d) installation and maintenance manuals</li> <li>e) relevant standards</li> </ul>
<p>3. Understand the application and installation of air generation and distribution system components within electro-pneumatic and hydraulic systems.</p>	<p>3.1. Examine the application and installation of the following air generation and distribution components to the design and construction of air generation and distribution systems within electro-pneumatic and hydraulic systems:</p> <ul style="list-style-type: none"> <li>a) compressors</li> <li>b) coolers and dryers</li> <li>c) receivers</li> <li>d) air service units including Filter Regulator and Lubricators (FRL)</li> <li>e) pipework</li> <li>f) fittings</li> <li>g) drainage points</li> <li>h) seals</li> </ul>
<p>4. Understand the application and installation of hydraulic supply system components within electro-pneumatic and hydraulic systems.</p>	<p>4.1. Examine the application and installation of the following hydraulic supply system components to the design and construction of hydraulic supply systems within electro-pneumatic and hydraulic systems:</p> <ul style="list-style-type: none"> <li>a) supply tank/pump</li> <li>b) accumulators</li> <li>c) hoses/pipework and fittings</li> <li>d) seals</li> <li>e) hydraulic fluids</li> </ul>
<p>5. Understand the application and installation of electrical power systems within electro-pneumatic and hydraulic systems.</p>	<p>5.1. Examine the application and installation of regulated power supply units with ac and dc outputs to the design and construction of electro-pneumatic and hydraulic systems</p>
<p>6. Understand the application and installation of pneumatic circuit systems within electro-pneumatic and hydraulic systems.</p>	<p>6.1. Examine the application and installation of pneumatic circuit systems to the design and construction of electro-pneumatic and hydraulic systems including:</p> <ul style="list-style-type: none"> <li>a) direct and pilot control</li> <li>b) logical control</li> <li>c) simple multi- cylinder circuits</li> <li>d) pulsed signals</li> <li>e) circuits with repetitive movements</li> <li>f) latching circuits</li> <li>g) three-position directional control valves</li> <li>h) cascade circuits</li> <li>i) pressure and time dependent control</li> <li>j) signal overlapping</li> </ul>

7. Understand the application and installation of hydraulic circuit systems within electro-pneumatic and hydraulic systems.	7.1. Examine the application and installation of hydraulic circuit systems to the design and construction of electro-pneumatic and hydraulic systems including: a) multi-cylinder circuits b) regenerative circuits c) counterbalance circuits d) Meter-In and Meter-out circuits e) bleed-off circuits f) circuits with hydraulic motors g) emergency and fail-safe circuits.
8. Understand the application and installation of programmable electronic devices and systems for the control of fluid power circuits within electro-pneumatic and hydraulic systems.	8.1. Examine the application and installation of programmable electronic devices and systems to the design and construction of electro-pneumatic and hydraulic systems including: a) centralised control b) distributed control c) input/output arrangements d) solenoid valve arrangements
9. Be able to use Computer Aided Design (CAD) to design pneumatic and hydraulic circuits.	9.1. Design pneumatic and hydraulic circuits for at least three given applications using CAD. 9.2. Use computer-based simulation to test designs developed in AC 9.1 to ensure they function as required.
10. Be able to build and test industry based pneumatic and hydraulic systems.	10.1. Build and test pneumatic and hydraulic systems for at least three given applications ensuring they function as required.
11. Be able to maintain, inspect, test, fault-find and rectify electro-pneumatic and hydraulic components, devices and systems.	11.1. Perform standard maintenance procedures on electro-pneumatic and hydraulic components, devices and systems, including inspection and functional testing, in line with manufacture's and operational guidelines. 11.2. Perform fault finding, identification and rectification functions on electro-pneumatic and hydraulic components, devices and systems in line with manufacture's and operational guidelines.

#### 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
Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

## Quality Assurance of Centre Performance

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### 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

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### 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.

## **OCN NI Level 4 Certificate in Hydraulic and Pneumatic Systems**

**Qualification Number: 603/6626/6**

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