



## **Qualification Specification**

### **ProQual Level 2 Award in Understanding Drill Bit Technology and Applications**

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## Introduction

The Level 2 Award in Understanding Drill Bit Technology and Applications provides candidates with an understanding of drill bit technology used in oil and gas environments.

The Regulated Qualifications Framework (RQF) is the single framework for regulated qualifications, the regulatory body for this qualification is the Office of Qualifications and Examinations Regulation (Ofqual). This qualification is accredited onto the RQF.

## Entry Requirements

There are no formal entry requirements for this qualification. Centres should carry out an **initial assessment** of candidate skills and knowledge to identify any gaps and help plan the assessment.

## Qualification Profile

Qualification title	<b>ProQual Level 2 Award in Understanding Drill Bit Technology and Applications</b>
Ofqual qualification number	610/0541/1
Level	2
Total Qualification Time	30 hours (30 GLH)
Assessment	Pass or fail Internally assessed and verified by centre staff External quality assurance by ProQual verifiers
Qualification start date	28/2/2022
Qualification end date	

## Qualification Structure

Candidates must complete **ONE** Mandatory unit

J/650/1512 Understanding Drill Bit Technology and Applications

## Centre Requirements

Centres must be approved to offer this qualification. If your centre is not approved please complete and submit form **ProQual Additional Qualification Approval Application**.

### Staff

Staff delivering this qualification must be appropriately qualified and occupationally competent.

### Assessors/Internal Quality Assurance

For each competence-based unit centres must be able to provide at least one assessor and one internal quality assurance verifier who are suitably qualified for the specific occupational area. Assessors and internal quality assurance verifiers for competence-based units or qualifications will normally need to hold appropriate assessor or quality assurance verifier qualifications, such as:

- ProQual Level 3 Certificate in Teaching, Training and Assessing
- Award in Assessing Competence in the Work Environment
- Award in Assessing Vocationally Related Achievement
- Certificate in Assessing Vocational Achievement
- Award in the Internal Quality Assurance of Assessment Processes and Practices
- Certificate in Leading the Internal Quality Assurance of Assessment Processes and Practices

## Support for Candidates

Materials produced by centres to support candidates should:

- enable them to track their achievements as they progress through the learning outcomes and assessment criteria;
- provide information on where ProQual's policies and procedures can be viewed;
- provide a means of enabling Internal and External Quality Assurance staff to authenticate evidence

## Assessment

Candidates must demonstrate the level of knowledge and competence described in the unit. Assessment is the process of measuring a candidate's knowledge and understanding against the standards set in the qualification.

Each candidate is required to produce evidence which demonstrates their achievement of all of the learning outcomes and assessment criteria for each unit.

Evidence can include:

- assignments/projects/reports
- worksheets
- portfolio of evidence
- record of oral and/or written questioning

**Learning outcomes** set out what a candidate is expected to know, understand or be able to do.

**Assessment criteria** specify the standard a candidate must meet to show the learning outcome has been achieved.

*Learning outcomes and assessment criteria for this qualification can be found from page 7 onwards.*

## Internal Quality Assurance

An internal quality assurance verifier confirms that assessment decisions made in centres are made by competent and qualified assessors, that they are the result of sound and fair assessment practice and that they are recorded accurately and appropriately.

## Adjustments to Assessment

Adjustments to standard assessment arrangements are made on the individual needs of candidates. ProQual's Reasonable Adjustments Policy and Special Consideration Policy sets out the steps to follow when implementing reasonable adjustments and special considerations and the service that ProQual provides for some of these arrangements.

Centres should contact ProQual for further information or queries about the contents of the policy.

## Results Enquiries and Appeals

All enquiries relating to assessment or other decisions should be dealt with by centres, with reference to ProQual's Enquiries and Appeals Procedures.

## Certification

Candidates who demonstrate achievement of the qualification will be awarded a certificate giving the full qualification title -

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#### **Claiming certificates**

Centres may claim certificates for candidates who have been registered with ProQual and who have successfully achieved the required number of credits for a qualification. All certificates will be issued to the centre for successful candidates.

#### **Replacement certificates**

If a replacement certificate is required a request must be made to ProQual in writing. Replacement certificates are labelled as such and are only provided when the claim has been authenticated. Refer to the Fee Schedule for details of charges for replacement certificates.

# Learning Outcomes and Assessment Criteria

## Unit J/650/1512

### Understanding Drill Bit Technology and Applications

Learning Outcome: The learner will:		Assessment Criterion: The Learner can:		
1. Understand drill bit types, selection criteria and standard nomenclature	1.1	1.1	Explain drill bits application in oil and gas	
	1.2	1.2	Describe the 2 main categories of drilling bits currently used in the drilling industry in relation to their: <ol style="list-style-type: none"> <li>Sub-classes</li> <li>Structure and designs</li> <li>Critical functional part and</li> <li>Features</li> </ol>	
		1.3	1.3	Explain the standard nomenclature for drill bit classification by the International Association of Drilling Contractors (IADC)
		1.4	1.4	State and explain the conditions and factors to be considered when carrying out drill bit selection
		1.5	1.5	Describe the differences between Polycrystalline Diamond Cutter (PDC) bits and the Natural Diamond Drilling Bit including the differences in their: <ul style="list-style-type: none"> <li>Designs</li> <li>Features</li> <li>Applications</li> <li>Pros and cons</li> <li>Weight on Bit (WOB)</li> </ul>
			1.6	1.6
2. Understand drill bit hydraulics, its science and related technical information	2.1	2.1	Explain drill bit hydraulics	
	2.2	2.2	Highlight the risks and hazards associated with the use of drill bit hydraulics and how to minimize them	
	2.3	2.3	Explain the relationship between drill bit hydraulics, penetration rate and its relevance in eliminating the need to “drill the hole twice”	
	2.4	2.4	Explain how bit hydraulics, nozzle velocity and diameter may be optimized	
	2.5	2.5	Explain the significance of measurements and how to use them to own benefits	
3. Understand IADC drill bit dull grading system and its associated reporting system	3.1	3.1	Describe the process and the purpose of dull grading bits.	
	3.2	3.2	Describe dull grading methods used for different types of bits following the IADC grading system	
	3.3	3.3	Describe systems, structures and/or methods used for reporting dull bit conditions on bit records	
	3.4	3.4	Highlight the economic importance of dull grading bit	

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|  | 3.5 | Explain the key considerations for re-running decisions after a bit is retracted   |
| 4. Understand the factors to consider for drill bit selection                  | 4.1 | Explain the effect of the following common criteria on drill bit selection <ul style="list-style-type: none"> <li>• Balanced wear</li> <li>• Performance records</li> <li>• Past experience</li> <li>• Formation</li> <li>• Cost-per-foot analysis</li> </ul>  |
|  | 4.2 | Highlight the common elements that influence penetration rates (ROP)   |
|  | 4.3 | Identify the factors to consider when deciding the appropriate Weight on Bit (WOB) and speed for drill bits.   |
|  | 4.4 | Describe the effects of “tripping” on drill bits and steps that can be taken to prevent damages to the bits  |
| 5. Understand drill string and drill bit evaluation                            | 5.1 | Explain the importance of drill bit and drill string evaluation  |
|  | 5.2 | Explain the effects of the following factors on drill string and bit evaluation: <ul style="list-style-type: none"> <li>• Vibration</li> <li>• Temperature</li> <li>• Hole oversize</li> <li>• Surface roughness</li> <li>• Roundness</li> <li>• Thrust force</li> <li>• Torque</li> <li>• Damage area</li> <li>• Tool wear</li> </ul> |
|  | 5.3 | Describe the process of collection, interpretation and presentation of information obtained from evaluation exercise.  |
| 6. Appreciate advancements in drill bit technology including hybrid drill bits | 6.1 | Explain the impact of technological advancement on drill bit technology  |
|  | 6.2 | State the design features of a hybrid drill bit  |
|  | 6.3 | State the objectives and benefits of hybrid drill bits   |

## Assessment

There must be valid, authentic and sufficient for all the assessment criteria. However, one piece of evidence may be used to meet the requirements of more than one learning outcome or assessment criterion.

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