

**REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**MECHANICAL PIPING FABRICATOR**

**KNQF LEVEL 4**

**PROGRAMME CODE: 0715354A**

# FOREWORD

The provision of quality education and training is fundamental to the government’s overall strategy for social economic development. Quality education and training will contribute to achievement of Kenya’s development blueprint, Vision 2030 and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution of Kenya 2010 and this resulted in the formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No. 4 of 2016). A key feature of this policy is the radical change in the design and delivery of the TVET training.

This policy document requires that training in TVET institutions be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery to allow for multiple entry and exit in TVET programmes. These reforms demand that industry takes a leading role in occupational standards development to ensure it addresses competence needs.

It is against this background that these Occupational Standards have been developed for a competency-based Mechanical Piping Fabricator Standard. These Occupational Standards will also be the basis for assessment of an individual for competence certification.

It is my conviction that these Occupational Standards will play a key role towards development of competent human resource for the engineering sector’s growth and development.

# PREFACE

Kenya Vision 2030 aims to transform the country into “a newly industrializing, middle-income country providing a high-quality life to all its citizens by the year 2030”. Kenya intends to create a globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through life-long education and training. TVET has a responsibility of facilitating the process of inculcating knowledge, skills and attitudes necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace competency-based education and training (CBET).

The Technical and Vocational Education and Training (TVET) Act Cap 210A and Sessional Paper No. 4 of 2016 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET in order to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

Incumbent mechanical piping fabrication industry experts in conjunction with expert subject trainers and other related stakeholders have developed these Occupational Standards for Mechanical Piping Fabricator Level 4. These standards will be the basis for development of competency-based curriculum for Mechanical Piping Fabrication Level 4.

The Occupational Standards are designed and organized with clear performance criteria for each element of a unit of competency. These standards also outline the required knowledge and skills as well as evidence guide.

I am grateful to everyone who participated in the development of these Occupational Standards.

# ACRONYMS

CPU Central Processing Unit

DVI Digital Visual Interface

HDMI High-Definition Multimedia Interface

KNQF Kenya National Qualifications Framework

MIG Metal Inert Gas

MMAW Manual Metal Arc Welding

RAM Random Access Memory

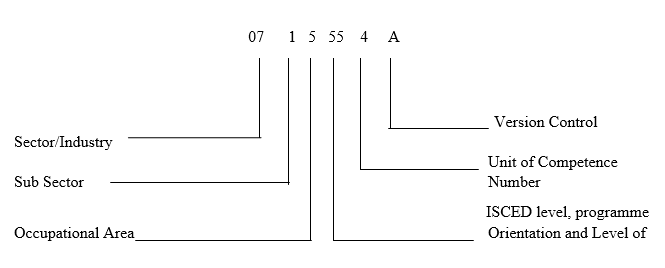
TIG Tungsten Inert Gas

SMS Short Message Service

USB Universal Serial Bus

VGA Video Graphics Array

# KEY TO UNIT CODE



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# OVERVIEW

This document contains occupational standards designed to prescribe competencies required for the qualification of Mechanical Piping Fabricator Level 4. These competences are required in order to perform pipe fabrication, welding, installation and maintenance.

The occupational standards consist of core units of competency as indicated hereafter.

**SUMMARY OF UNITS OF LEARNING**

|  |  |
| --- | --- |
| **CORE UNITS OF LEARNING** | |
| **Unit Code** | **Unit Title** |
| 0715 351 01A | Perform Pipe Fabrication |
| 0715 351 02A | Perform Pipe Welding |
| 0715 351 03A | Perform Pipes Installation |
| 0715 351 04A | Perform Piping Maintenance |

# CORE UNITS OF COMPETENCY

# PERFORM PIPE FABRICATION

**UNIT CODE:** 0715 351 01A

**UNIT DESCRIPTION**

This unit specifies competences required by a Mechanical Piping Fabricator to perform pipe fabrication. The competences include carrying out pipe cutting, shaping and edge preparation.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **PERFORMANCE CRITERIA**  These are assessable statements which specify the required level of performance for each of the elements  ***(Bold and italicized terms are elaborated in the range)*** |
| 1. Carry out pipe cutting | * 1. Pipe cutting safety requirements are observed as per task requirements   2. Working drawing is interpreted as per task requirement   3. ***Pipe cutting methods*** are selected as per task requirement   4. ***Pipe cutting tools*** are selected as per task requirement   5. Pipe marking out is carried out as per task requirement   6. Pipe is secured as per task requirement   7. ***Pipe cutting activities*** are carried out as per task requirement   8. ***Post cutting operations*** are carried out as per task requirement   9. ***Housekeeping*** is carried out as per task requirement |
| 1. Carry out pipe shaping | * 1. Pipe shaping safety requirements are observed as per task requirements   2. Working drawing is interpreted as per task requirement   3. ***Pipe shaping methods*** are selected as per task requirement   4. ***Pipe shaping tools*** are selected as per task requirement   5. Pipe marking out is carried out as per task requirement   6. Pipe is secured as per task requirement   7. Pipe shaping procedure carried out as per task requirement   8. Housekeeping is carried out as per task requirement |
| 1. Carry out pipe edge preparation | * 1. Pipe edge preparation safety requirements are observed as per task requirements   2. Working drawing is interpreted as per task requirement   3. ***Pipe edge preparation methods*** are selected as per task requirement   4. ***Pipe edge preparation tools*** are selected as per task requirement   5. Pipe marking out is carried out as per task requirement   6. Pipe is secured as per task requirement   7. Pipe edge preparation activitiesare carried out as per task requirement   8. Housekeeping is carried out as per task requirement |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range**  **May include but not limited to;** |
| 1. Pipe cutting methods | * 1. Manual Methods   2. Thermal Methods   3. Mechanical Methods |
| 1. Pipe cutting tools | * 1. Hand tools   2. Power tools   3. Thermal Cutting Tools   4. Abrasive Tools   5. Plastic-Specific Tools |
| 1. Pipe cutting activities | * 1. Manual Cutting   2. Power Tool Cutting   3. Thermal Cutting   4. Cold Cutting |
| 1. Post cutting operations | * 1. Deburring   2. Cleaning |
| 1. Housekeeping | * 1. Work area organization   2. Cleaning   3. Waste management |
| 1. Pipe shaping methods | * 1. Bending   2. Swaging   3. Flanging   4. Grooving   5. Notching   6. Cutting   7. Coiling   8. Flattening   9. Piercing   10. Beading |
| 1. Pipe shaping tools | * 1. Pipe bending tools   2. Cutting and notching tools   3. Swaging and expanding tools   4. Bevelling tools   5. Threading tools   6. Deburring tools   7. Flanging tools   8. Coiling tools   9. Grooving tools |
| 1. Pipe edge preparation methods | * 1. Bevelling   2. Squaring   3. Chamfering   4. Deburring   5. Flanging   6. Grinding   7. Coping   8. Cutting   9. Heat treatment   10. Notching   11. Tapering   12. Tapping   13. Welding   14. Scarfing |
| 1. Pipe edge preparation tools | * 1. Bevelling tools   2. Pipe cutting tools   3. Deburring tools   4. Chamfering tools   5. Flanging tools   6. Pipe end squaring tools   7. Pipe grinders   8. Pipe threading tools   9. Pipe tapping tools |

**REQUIRED KNOWLEDGE AND SKILLS**

This section describes the knowledge and skills required for this unit of competency.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Workplace procedures
* Safety procedures
* Pipe cutting methods
* Pipe cutting tools

**Required Skills**

The individual needs to demonstrate the following skills:

* Critical thinking
  + Time management
  + Interpreting working drawings
  + Materials optimization
  + Workshop processes

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Interpreted working drawing as per task requirement   2. Carried out pipe cutting activities as per task requirement   3. Carried out post cutting operations as per task requirement   4. Carried out pipe shaping activities as per task requirement   5. Carried out pipe edge preparation activities as per task requirement |
| 1. Resource implications | The following resources should be provided:   * 1. Appropriately simulated environment where assessment can take place   2. Access to relevant work environment   3. Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   1. Practical 2. Projects 3. Third party report 4. Written tests |
| 1. Context of assessment | Competency may be assessed in the workplace or simulated workplace |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# PERFORM PIPE WELDING

**UNIT CODE:** 0715 351 02A

**UNIT DESCRIPTION**

This unit specifies competences required by a Mechanical Piping Fabricator to perform pipe welding. It involves carrying out Manual Metal Arc Welding (MMAW), Oxy-fuel gas welding, Metal Inert Gas (MIG) welding and Tungsten Inert Gas (TIG) welding.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**  These describe the key outcomes which make up workplace functions | **PERFORMANCE CRITERIA**  These are assessable statements which specify the required level of performance for each of the elements  ***(Bold and italicized terms are elaborated in the range)*** |
| --- | --- |
| 1. Carry out Manual Metal Arc Welding (MMAW) | * 1. MMAW safety procedures are applied as per work requirement   2. Working drawing is interpreted as per work requirement   3. ***Arc welding machines, tools and equipment*** are assembled as per work requirement   4. Welding ***material preparation*** is carried out as per job requirement   5. ***Arc*** ***welding parameters*** are set as per work requirement   6. Arc welding of ***pipes*** is performed in all positions as per work requirement.   7. Arc welded pipe ***finishing*** is performed as per job requirement   8. Housekeeping is carried out as per workplace procedure |
| 1. Carry out oxy-fuel gas welding | * 1. Oxy-fuel welding safety procedures are applied as per work requirement   2. Working drawing is interpreted as per work requirement   3. ***Oxy-fuel gas welding machines, tools and equipment*** are assembled as per work requirement   4. Welding material preparation is carried out as per job requirement   5. ***Oxy-fuel welding parameters*** are set as per work requirement   6. Oxy-fuel welding of pipes is performed in all positions as per work requirement.   7. Oxy-fuel welded pipefinishing is performed as per job requirement   8. Housekeeping is carried out as per workplace procedure |
| 1. Carry out Metal Inert Gas (MIG) Welding | * 1. MIG safety procedures are observed as per work requirement   2. Working drawing is interpreted as per task requirement   3. ***MIG welding machines, tools and equipment*** are assembled as per work requirement   4. Weldingmaterial preparation is carried out as per job requirement   5. ***MIG welding parameters*** are set as per work requirement   6. MIG welding of pipes is performed in all positions as per job requirement   7. MIG welded pipefinishing is performed as per job requirement   8. Housekeeping is carried out as per work procedure |
| 1. Carry out Tungsten Inert Gas (TIG) Welding | * 1. TIG safety procedures are observed as per work requirement   2. Working drawing is interpreted as per job requirement   3. ***TIG welding machines, tools and equipment*** are assembled as per work requirement   4. Welding material preparation is carried out as per job requirement   5. ***TIG welding parameters*** are set as per work requirement   6. TIG welding of pipes is performed in all positions as per job requirement   7. TIG welded product finishing is performed as per job requirement   8. Housekeeping is carried out as per work procedure |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

| **Variable** | **Range**  **(May include but is not limited to :)** |
| --- | --- |
| 1. Arc welding machines, tools and equipment | * 1. Machines and equipment      1. Transformer based      2. AC/DC machines      3. Inverter welding machine      4. Shields and helmets      5. Aprons      6. Welding curtains      7. Fume extractors   2. Welding tools      1. Chipping hammers      2. Wire brushes      3. Welding positioners      4. Tongs |
| 1. Material preparation | * 1. Pipe cleaning   2. Pipe cutting   3. Pipe edge preparation   4. Preheating   5. Back gouging |
| 1. Arc welding parameters | * 1. Current   2. Arc length   3. Travel speed   4. Arc force   5. Electrode size and type   6. Welding position |
| 1. Pipes | 1. Steel pipes 2. Copper pipes 3. Aluminium pipes |
| 1. Finishing | 1. Chipping 2. Grinding 3. Polishing 4. Surface cleaning 5. Heat treatment 6. Coating/painting |
| 1. Oxy-fuel gas welding machines, tools and equipment | * 1. Machines and equipment      1. Gas cylinders      2. Welding torch      3. Regulators      4. Flashback arrestors      5. Welding hoses      6. Lighter      7. Googles      8. Aprons   2. Tools      1. Tongs      2. Tip cleaner      3. Clamps |
| 1. Oxy-fuel welding parameters | * 1. Pressure   2. Flame type   3. Torch travel speed   4. Filler material size and type   5. Welding position |
| 1. MIG welding machines, tools and equipment | * 1. Machines and equipment      1. MIG welding machine      2. MIG torch      3. Gas cylinders      4. Cables      5. Helmets and shields   2. Tools      1. Tongs      2. Clamps |
| 1. MIG welding parameters | * 1. Current   2. Wire speed   3. Shielding gas   4. Wire size   5. Gun angle   6. Arc length   7. Pulse settings |
| 1. TIG welding machines, tools and equipment | * 1. Machines and equipment      1. TIG welding machine      2. TIG torch      3. Gas cylinders      4. Cables      5. Helmets and shields   2. Tools      1. Tongs      2. Clamps |
| 1. TIG welding parameters | * 1. Current   2. Electrode type and size   3. Shielding gas   4. Filler material   5. Torch angle   6. Travel speed   7. Pulse setting   8. Arc length |

**REQUIRED KNOWLEDGE AND SKILLS**

This section describes the knowledge and skills required for this unit of competency.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Workplace procedures
* Pipe welding equipment
* Applications of pipe welding

**Required Skills**

The individual needs to demonstrate the following skills:

* + Interpreting working drawings
* Joint preparation
  + MMAW, Oxy-fuel, TIG, MIG welding

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Performed arc welding of pipes in all positions as per work requirement.   2. Performed arc welded pipe finishing is performed as per job requirement   3. Performed oxy-fuel welding of pipes in all positions as per work requirement.   4. Performed oxy-fuel welded pipe finishing as per job requirement   5. Performed MIG welding of pipes in all positions as per job requirement   6. Performed MIG welded pipe finishing as per job requirement   7. Performed TIG welding of pipes in all positions as per job requirement   8. Performed TIG welded product finishing as per job requirement |
| 1. Resource implications | The following resources should be provided:   * 1. Appropriately simulated environment where assessment can take place   2. Access to relevant work environment   3. Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   1. Project 2. Practical tests 3. Portfolio of evidence 4. Third party report 5. Oral questioning 6. Written tests |
| 1. Context of assessment | Competency may be assessed in the workplace or simulated workplace |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# PERFORM PIPES INSTALLATION

**UNIT CODE:** 0715 351 03A

**UNIT DESCRIPTION**

This unit specifies competences required by a Mechanical Piping Fabricator to perform pipe installation. It involves carrying out pipe fitting, assembly and surface treatment.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**  These describe the key outcomes which make up workplace functions | **PERFORMANCE CRITERIA**  These are assessable statements which specify the required level of performance for each of the elements  ***(Bold and italicized terms are elaborated in the range)*** |
| --- | --- |
| 1. Carry out pipe fitting | * 1. Pipe fitting safety requirements are observed as per task requirements   2. Working drawing is interpreted as per task requirement   3. Pipe fitting methods are selected as per task requirement   4. Pipe fitting tools are selected as per task requirement   5. Pipe alignment is carried out as per task requirement   6. Pipe is secured as per task requirement   7. Pipe fitting activities are carried out as per task requirement   8. Housekeeping is carried out as per task requirement |
| 1. Carry out pipe assembly | * 1. Pipe assembly safety requirements are observed as per task requirements   2. Working drawing is interpreted as per task requirement   3. ***Pipe assembly methods*** are selected as per task requirement   4. ***Pipe assembly accessories*** are selected as per job requirement.   5. ***Pipe assembly tools*** are selected as per task requirement   6. Pipe assembly activities are carried out as per task requirement   7. Housekeeping is carried out as per task requirement |
| 1. Carry out surface treatment | * 1. Pipe surface treatment safety requirements are observed as per task requirements   2. Working drawing is interpreted as per task requirement   3. ***Pipe surface treatment methods*** are selected as per task requirement   4. ***Pipe surface treatment tools and materials*** are selected as per task requirement   5. Pipe surface treatment activities are carried out as per task requirement   6. Housekeeping is carried out as per task requirement |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

| **Variable** | **Range**  **(May include but is not limited to :)** |
| --- | --- |
| 1. Pipe assembly methods | * 1. Threaded pipe fitting   2. Welded pipe fitting   3. Flanged pipe fitting   4. Compression pipe fitting   5. Soldered pipe fitting   6. Push-Fit pipe fitting   7. Butt fusion pipe fitting   8. Clamped pipe fitting |
| 1. Pipe assembly accessories | * 1. Pipe connectors   2. Directional fittings   3. Pipe end fittings   4. Valves and control accessories   5. Threaded and compression fittings   6. Specialized fittings   7. Pipe hangers and supports   8. Gaskets and seals   9. Welding and soldering accessories   10. Flare and groove fittings |
| 1. Pipe assembly tools | * 1. Pipe cutters   2. Pipe benders   3. Pipe threading tools   4. Pipe reamers   5. Pipe flaring tools   6. Pipe wrenches   7. Tube expander   8. Pipe vices   9. Pipe boring tools   10. Pipe support tools   11. Pipe jointing machines |
| 1. Pipe surface treatment methods | * 1. Coating and lining   2. Hot-Dip Galvanizing   3. Chemical cleaning   4. Heat treatment |
| 1. Pipe surface treatment tools and materials | * 1. Galvanizing equipment   2. Heat treat furnace   3. Chemical sprayers |

**REQUIRED KNOWLEDGE AND SKILLS**

This section describes the knowledge and skills required for this unit of competency.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Workplace procedures
* Pipe fitting tools
* Pipe fitting methods
* Piping assembly tools
* Piping assembly methods

**Required Skills**

The individual needs to demonstrate the following skills:

* + Interpreting working drawings
  + Piping alignment
  + Pipe surface treatment

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Carried out pipe alignment as per task requirement   2. Secured pipe as per task requirement   3. Carried out pipe fitting activities as per task requirement   4. Selected pipe assembly accessories as per job requirement.   5. Carried out pipe assembly activities as per task requirement   6. Carried out pipe surface treatment activities as per task requirement |
| 1. Resource implications | The following resources should be provided:   * 1. Appropriately simulated environment where assessment can take place   2. Access to relevant work environment   3. Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   1. Practical 2. Project 3. Portfolio of evidence 4. Third party report 5. Written tests 6. Oral questioning |
| 1. Context of assessment | Competency may be assessed in the workplace or simulated workplace |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# PERFORM PIPING MAINTENANCE

**UNIT CODE:** 0715 351 04A

**UNIT DESCRIPTION**

This unit specifies competences required by a Mechanical Piping Fabricator to perform piping maintenance. It involves carrying out dimensional inspection, leak tests, non-destructive tests and performing piping repair work.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**  These describe the key outcomes which make up workplace functions | **PERFORMANCE CRITERIA**  These are assessable statements which specify the required level of performance for each of the elements  ***(Bold and italicized terms are elaborated in the range)*** |
| --- | --- |
| 1. Carry out dimensional inspection | * 1. Inspection safety standards are observed as per work requirement   2. ***Dimensional inspection parameters*** are identified as per work requirement   3. ***Dimensional inspection tools*** are selected as per task requirement   4. Pipe to be inspected is prepared as per job requirement   5. Dimensional inspection is carried out as per job requirement   6. Housekeeping is carried out as per work procedure |
| 1. Carry out leak tests | * 1. Testing safety standards are observed as per work requirement   2. ***Leak test parameters*** are identified as per work requirement   3. Pipe to be inspected is prepared as per job requirement   4. ***Leak test***s are carried out as per job requirement   5. Housekeeping is carried out as per work procedure |
| 1. Carry out non-destructive tests | * 1. Testing safety standards are observed as per work requirement   2. ***Non-destructive test parameters*** are identified as per work requirement   3. Pipe to be inspected is prepared as per job requirement   4. ***Non-destructive tests*** are carried out as per job requirement   5. Housekeeping is carried out as per work procedure |
| 1. Perform piping repair work | * 1. Piping repair work safety standards are observed as per work requirement   2. ***Piping faults and defects*** are identified as per work requirement   3. ***Piping repair work*** is carried out as per job requirement   4. Housekeeping is carried out as per work procedure |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

| **Variable** | **Range**  **(May include but is not limited to :)** |
| --- | --- |
| 1. Dimensional inspection parameters | * 1. Pipe length   2. Pipe diameter   3. Wall thickness   4. Pipe alignment   5. Angle and orientation   6. Flange alignment   7. Offsets and distances   8. Weld joints and edges |
| 1. Dimensional inspection tools | * 1. Tape measure   2. Vernier calipers   3. Micrometer screw gauges   4. Feeler gauges   5. Plumb bob   6. Spirit level   7. Straight edge   8. Protractor   9. Pipe alignment clamps |
| 1. Leak test parameters | * 1. Test medium   2. Test pressure   3. Test duration   4. Temperature |
| 1. Leak tests | * 1. Pressure test   2. Vacuum test   3. Dye test   4. Bubble test |
| 1. Non-destructive test parameters | * 1. Visual inspection   2. Dye penetrant |
| 1. Non-destructive tests | * 1. Visual inspection   2. Dye penetrant testing |
| 1. Piping faults and defects | * 1. Corrosion   2. Cracks   3. Leaks   4. Misalignment   5. Blockages and clogs   6. Welding defects   7. Deformation |
| 1. Piping repair work | * 1. Leak repairs   2. Corrosion repair   3. Cracked or broken pipe repair   4. Joint repair   5. Misalignment repair   6. Unblocking and unclogging   7. Pipe replacement |

**REQUIRED KNOWLEDGE AND SKILLS**

This section describes the knowledge and skills required for this unit of competency.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Workplace procedures
* Dimensional inspection
* Leak test
* Non-destructive tests

**Required Skills**

The individual needs to demonstrate the following skills:

* + Interpreting working drawings
  + Piping alignment
  + Material preparation
  + Material testing

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency | * 1. Prepared pipe to be inspected as per job requirement   2. Carried out dimensional inspection as per job requirement   3. Carried out leak test as per job requirement   4. Carried out non-destructive tests as per job requirement   5. Identified piping faults and defects as per work requirement   6. Carried out piping repair work as per job requirement |
| 1. Resource implications | The following resources should be provided:   * 1. Appropriately simulated environment where assessment can take place   2. Access to relevant work environment   3. Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   * 1. Practical   2. Project   3. Portfolio of evidence   4. Third party report   5. Written tests   6. Oral questioning |
| 1. Context of assessment | Competency may be assessed in the workplace or simulated workplace |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |