

**REPUBLIC OF KENYA**

**OCCUPATIONAL STANDARDS**

**FOR**

**WELDER**

**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 welding and fabrication 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 Welding sector’s growth and development.

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Principal Secretary,

State Department for Technical and Vocational Education and Training,

# 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 No. 29 of 2013 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 welding and fabrication industry experts in conjunction with expert subject trainers and other related stakeholders have developed these Occupational Standards for Welder Level 4. These standards will be the basis for development of competency-based curriculum for Welder 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.

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Cabinet Secretary,

Ministry of Education, Science & Technology

# ABBREVIATIONS

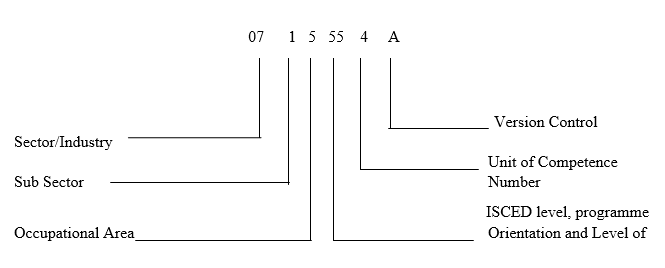
KNQF Kenya National Qualifications Framework

MIG Metal Inert Gas Welding

MMAW Manual Metal Arc Welding

TIG Tungsten Inert Gas Welding

# KEY TO UNIT CODE



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# OVERVIEW

This document contains occupational standards designed to prescribe competences required for the qualification of Welder Level 4. These competences are required in order to Perform Fabrication Processes I, Arc Welding Processes I, Gas welding, Soldering and brazing processes, Metal Inert Gas Welding and Tungsten Inert Gas Welding. The occupational standards consist of basic and core units of competency as indicated hereafter.

# SUMMARY OF UNITS OF COMPETENCY

|  |  |
| --- | --- |
| **CORE UNITS OF COMPETENCY** | |
| 0715 251 01A | Perform Fabrication Processes I |
| 0715 251 02A | Perform Arc Welding Processes I |
| 0715 251 03A | Perform Gas welding, Soldering and brazing processes |
| 0715 351 04A | Perform Metal Inert Gas Welding |
| 0715 351 05A | Perform Tungsten Inert Gas Welding |

# CORE UNITS OF COMPETENCY

# PERFORM FABRICATION PROCESSES I

**UNIT CODE:** 0715 251 01A

**UNIT DESCRIPTION**

This unit specifies competences required to perform fabrication processes I. The competences include carrying out bench work, sheet metal work and maintaining fabrication tools, machines and equipment.

**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 bench work | * 1. Health and safety procedures are applied as per work requirement   2. Drawing is interpreted as per work requirement   3. Fabrication tools and equipmentare assembled as per work requirement   4. Fabrication ***material preparation*** is carried out as per job requirement   5. Work pieces up to 6 mm thickness are fitted as per task requirement   6. Housekeeping is carried out as per work place procedure. |
| 1. Carry out sheet metal work | * 1. Health and safety procedures are applied as per work requirement   2. Drawing is interpreted as per work requirement   3. Sheet metal tools and equipmentare assembled as per work requirement   4. Pattern development is performed as per task requirement   5. ***Sheet metal products*** are produced as per task requirement   6. Housekeeping is carried out as per work place procedure. |
| 1. Maintain fabrication tools, machines and equipment | * 1. Health and safety procedures are applied as per work requirement   2. Fabrication machines, tools and equipment for maintenance are identified as per work requirement   3. Fabrication machines, tools and equipment preventive maintenance is conducted as per manufacturer’s manual   4. Fabrication machines, tools and equipment are repaired as per manufacturer’s manual   5. Housekeeping is carried out as per work place 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 not limited to;** |
| 1. Material preparation | * 1. Measuring   2. Marking out   3. Cutting   4. Surface preparation |
| 1. Sheet metal products | * 1. Doors   2. Windows   3. Gates |

**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
* Templates development
* Health and safety
* Workplace housekeeping

**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. Applied health and safety procedures as per work requirement   2. Carried outmaterial preparation as per job requirement   3. Fitted work pieces as per task requirement   4. Performed pattern development as per the task requirement   5. Produced sheet metal products as per task requirement   6. Conducted fabrication machines, tools and equipment preventive maintenance as per manufacturer’s manual   7. Carried out housekeeping as per work place procedure |
| 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 ARC WELDING PROCESSES I

**UNIT CODE:** O715 251 02A

**UNIT DESCRIPTION**

This unit specifies competences required to perform arc welding processes I. The competences include carrying out manual metal arc welding, arc cutting process and maintaining arc welding machines, tools and equipment.

**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 | * 1. Health and safety procedures are applied as per work requirement   2. 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 identified as per work requirement   6. Arc welding of metallic materials up to 6 mm thickness is performed in flat and horizontal positions as per work requirement.   7. Housekeeping is carried out as per workplace procedure |
| 1. Carry out arc cutting process | * 1. Health and safety procedures are applied as per work requirement   2. Drawing is interpreted as per work requirement   3. ***Machines, tools and equipment*** are assembled as per work requirement   4. Arc cutting material preparation is carried out as per job requirement   5. Arc cutting parameters are identified as per work requirement   6. Arc cutting of metallic materials up to 6 mm thickness is performed in flat and horizontal positions as per work requirement   7. Arc cut product finishing is performed as per job requirement   8. Housekeeping is carried out as per workplace procedure |
| 1. Maintain arc welding machines, tools and equipment | * 1. Health and safety procedures are applied as per work requirement   2. Arc welding machines, tools and equipment preventive maintenance is conducted as per manufacturer’s manual   3. Faulty arc welding tools are repaired as per manufacturer’s manual   4. Housekeeping is carried out as per workplace 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 not limited to;** |
| 1. Arc welding machines, tools and equipment include but not limited to: | * 1. Arc welding machines * AC arc welding machine * DC arc welding machine * AC/DC welding machine   1. Arc welding tools and equipment * Welding screens * Chipping hammer * Wire brushes * Fire extinguishers * Welding jigs and fixtures |
| 1. Material preparation include but not limited to: | * 1. Measuring   2. Marking out   3. Cutting   4. Edge preparation |
| 1. Arc welding parameters include but not limited to: | 1. Current 2. Arc length 3. Arc force |

**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:

* MMAW welding techniques
* Health and safety
* Workplace housekeeping
* Maintenance of welding machines
* Workplace procedures

**Required Skills**

The individual needs to demonstrate the following skills:

* + Critical thinking
  + Time management
  + Interpreting working drawings
  + Joint preparation
  + MMAW 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. Applied health and safety procedures as per work requirement   2. Carried out welding material preparation as per job requirement   3. Performed arc welding procedure as per work requirement.   4. Performed arc cutting procedure as per work requirement   5. Conducted arc welding machines, tools and equipment preventive maintenance as per manufacturer’s manual |
| 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 BRAZING, SOLDERING AND GAS WELDING

**UNIT CODE:** 0715 251 03A

**UNIT DESCRIPTION**

This unit specifies competences required to perform brazing, soldering and gas welding. It involves carrying out gas welding, gas cutting, brazing, soldering and maintaining brazing, soldering and gas welding machines, tools and equipment.

**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 gas welding | * 1. Occupational health and safety standards are observed as per work requirement   2. Working drawing is interpreted as per drawing standards   3. ***Gas welding machines, tools and equipment*** are assembled as per work requirement   4. Welding ***material preparation*** is carried out as per job requirement   5. Gas welding ***parameters*** are identified as per work requirement   6. Gas welding ofmetallic materials up to 16 mm thickness is performed in all positions as per job requirement   7. Gas weld ***inspection*** is carried out as per job requirement   8. Gas welded product finishing is performed as per job requirement   9. ***Housekeeping*** is carried out as per work procedure |
| * 1. Carry out gas cutting | * 1. Occupational health and safety standards are observed as per work requirement   2. Working drawing is interpreted as per drawing standards   3. Gas cutting tools and equipment are assembled as per work requirement   4. Gas cutting ***material preparation*** is carried out as per job requirement   5. ***Gas cutting parameters*** are identified as per work requirement   6. Gas cuttingof metallic materials up to 16 mm thickness ***is*** performed in all positions as per job requirement   7. Gas cutting ***inspection*** is carried out as per job requirement   8. Gas cut product ***finishing*** is performed as per job requirement   9. ***Housekeeping*** is carried out as per work procedure |
| 1. Carry out brazing | * 1. Occupational health and safety standards are observed as per work requirement   2. Working drawing is interpreted as per job requirement   3. Brazing tools and equipmentare assembled as per work requirement   4. Brazing material preparation is carried out as per job requirement   5. Brazing ***parameters*** are identified as per work requirement   6. Brazing of metallic materialsup to 16 mm thickness is performed in all positionsas per job requirement   7. Brazing ***inspection*** is carried out as per job requirement   8. Brazing product finishing is performed as per job requirement   9. ***Housekeeping*** is carried out as per work procedure |
| 1. Carry out soldering | * 1. Occupational health and safety standards are observed as per work requirement   2. Working drawing is interpreted as per job requirement   3. ***Soldering tools and equipment*** are assembled as per work requirement   4. Soldering ***material preparation*** is carried out as per job requirement   5. Soldering parameters are identified as per work requirement   6. Soldering of metallic materialsup to 16 mm thickness ***is*** performed in all positionsas per job requirement   7. Soldering ***inspection*** is carried out as per job requirement   8. Soldered product finishing is performed as per job |
| 1. Maintain brazing, soldering and gas welding machines, tools and equipment | * 1. Brazing, soldering and gas welding machines, tools and equipment for maintenance are identified as per work requirement   2. ***Preventive maintenance*** is conducted as per work procedure   3. ***Broken brazing, soldering and gas welding tools*** are repaired as per manufacturer’s manual   4. Preventive maintenance report is prepared 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** |
| --- | --- |
| * + - 1. Gas welding machines, tools and equipment include but are not limited to: | 1.1 Gas welding equipment   * Oxygen cylinders * Acetylene cylinder * Propane cylinder * Gas welding torch   1.2 Gas welding tools   * + Fire extinguishers   + Welding jigs and fixtures   + Hoses   + Gas regulators   + Gauges   + Nozzle cleaner   1.3 Materials   * + Gas welding PPE   + Filler rods   + Plates   + Pipes   + Tubes |
| * + - 1. Material preparation includes but are not limited to: | * 1. Measuring   2. Marking out   3. Cutting   4. Edge preparation   5. Joint preparation |
| * + - 1. Parameters include but are not limited to: | * 1. Working pressure   2. Oxygen-fuel ratio   3. Temperature |
| * + - 1. Inspection include but not limited to: | 5.1 Non-destructive   * Visual inspection * Ultrasonic inspection * Magnetic particle induction * Radiography inspection * Dye penetrant * Eddy current testing   5.2 Destructive   * Tensile test * Impact test * Corrosion test * Macro etching |
| * + - 1. Finishing includes but is not limited to: | * 1. Buffing   2. Polishing   3. Grinding   4. Blueing   5. Varnishing   6. Oil blacking   7. Bluing   8. Deburring   9. Electroplating   10. Enamelling   11. Painting |
| * + - 1. Housekeeping include but not limited to: | * 1. Hazard identification   2. Cleaning of the work area   3. Return of the tools to the storage area |
| * + - 1. Soldering tools and equipment include but are not limited to: | 19.1 Equipment   * Soldering gun * Propane gun * Soldering iron   19.2 Materials   * Soldering wire * Flux |
| * + - 1. Preventive maintenance | * 1. Cleaning of the external surfaces of the machine   2. Inspecting cables, connectors and power sources   3. Lubricating of moving parts   4. Replace consumables and spare parts   5. Ensuring proper cooling and ventilation |
| * + - 1. Broken brazing, soldering and gas welding tools | * 1. Soldering gun   2. Propane gun   3. Soldering iron |

**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
* Gas welding and soldering equipment
* Joint preparation
* Gas welding and soldering techniques
* Welded joint standards
* Gas cutting techniques

**Required Skills**

The individual needs to demonstrate the following skills:

* + Interpreting working drawings
  + Preparing joints
  + Gas welding and soldering
  + Brazing
  + Gas cutting
  + Maintenance of gas welding machines

**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 gas welding material preparation as per job requirement   2. Performed gas welding of metallic materials up to 16 mm thickness in all positions as per job requirement   3. Carried out gas cutting material preparation as per job requirement   4. Performed gas cutting of metallic materials up to 16 mm thickness in all positions as per job requirement   5. Carried out brazing material preparation as per job requirement   6. Performed brazing of metallic materials up to 16 mm thickness in all positions as per job requirement   7. Carried out soldering material preparation as per job requirement   8. Performed soldering of metallic materials up to 16 mm thickness in all positions as per job requirement   9. Conducted preventive maintenance as per work procedure |
| 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. Oral questioning   2. Portfolio of evidence   3. Practical test   4. Third party report   5. Written tests   6. Project work |
| 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 and workplace job role is recommended. |

**PERFORM METAL INERT GAS WELDING**

**UNIT CODE:** 0715 351 04A

**UNIT DESCRIPTION**

This unit specifies competencies to perform Metal Inert Gas (MIG) welding operations. It involves drafting working drawing, carrying out Metal Inert Gas (MIG) welding and maintaining metal inert gas welding machines, tools and equipment

**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. Draft working drawing | * 1. Work drawings are drafted according to work requirement   2. Dimensions are established as per job requirements   3. Welding symbols are established as per the welding standards   4. Operation procedure is developed as per the job requirement |
| 1. Carry out Metal Inert Gas (MIG) welding | * 1. 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. Welding ***material preparation*** is carried out as per job requirement   5. ***MIG welding parameters*** are set as per work requirement   6. MIG welding of metallic materials up to 10 mm thickness is performed in flat, horizontal and vertical positions as per job requirement   7. MIG welded product ***finishing*** is performed as per job requirement   8. Housekeeping is carried out as per work procedure |
| 1. Maintain MIG welding machines, tools and equipment | * 1. MIG welding machines, tools and equipment for maintenance are identified as per work requirement   2. ***Preventive maintenance*** is conducted as per work procedure   3. MIG welding tools are repaired as per manufacturers manual |

**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** |
| --- | --- |
| 1. Metal inert gas welding machines, tools and equipment include but are not limited to: | 1.1 MIG welding machines   * AC machine * DC machine * AC/DC machine * Diesel generators   1. MIG welding tools   + Driers   + Welding screens   + Fire extinguishers   + Welding jigs and fixtures   1.3 Materials   * + MIG welding PPE   + Electrodes   + Plates   + Pipes   + Tubes |
| 1. Material preparation include but are not limited to: | * 1. Measuring   2. Marking out   3. Cutting   4. Edge preparation   5. Joint preparation |
| 1. Metal inert gas welding parameters include but are not limited to: | * 1. Current   2. Arc force |
| 1. Finishing includes but are not limited to: | 1. Buffing 2. Polishing 3. Grinding 4. Blueing 5. Varnishing 6. Oil blacking 7. Bluing 8. Deburring 9. Painting |
| 1. Preventive maintenance includes but are not limited to: | * 1. Cleaning of the external surfaces of the machine   2. Inspecting cables, connectors and power sources   3. Lubricating of moving parts   4. Replace consumables and spare parts   5. Ensuring proper cooling and ventilation |

**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
* MIG welding equipment
* Joint preparation
* Applications of MIG Welding
* Workplace housekeeping procedures

**Required Skills**

The individual needs to demonstrate the following skills:

* + Interpreting working drawings
  + Maintenance of metal inert gas welding machines
  + Preparing joints
  + Gas Metal Arc 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. Developed operation procedure as per the job requirement   2. Observed safety procedures are observed as per work requirement   3. Interpreted working drawing as per task requirement   4. Carried out welding material preparation as per job requirement   5. Performed MIG welding of metallic materials up to 10 mm thickness in flat, horizontal and vertical positions as per job requirement   6. Performed MIG 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 TUNGSTEN INERT GAS WELDING

**UNIT CODE:** 0715 351 05A

**UNIT DESCRIPTION**

This unit specifies competencies required perform Tungsten Inert Gas (TIG) welding operations. It involves drafting working drawing, carrying out Tungsten Inert Gas (TIG) welding, and maintaining gas metal arc welding equipment

**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. Draft working drawing | * 1. Work drawing is drafted according to work requirement   2. ***Welding symbols*** are interpreted as per the welding standards   3. Operation procedure is developed as per job requirement |
| 1. Carry out Tungsten Inert Gas (TIG) welding | * 1. 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 metallic materials up to 10 mm thickness is performed in flat, horizontal and vertical 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 |
| 1. Maintain TIG welding machines, tools and equipment | * 1. TIG welding machines, tools and equipment for maintenance are identified as per work requirement   2. ***Preventive maintenance*** is conducted as per work procedure   3. Fabrication machines, tools and equipment are repaired as per manufacturers manual   4. Preventive maintenance report is prepared 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** |
| --- | --- |
| 1. Material preparation includes but are not limited to: | * 1. Measuring   2. Marking out   3. Cutting   4. Edge preparation   5. Joint preparation |
| 1. TIG welding parameters include but are not limited to: | * 1. Current   2. Arc force   3. Voltage |
| 1. Finishing includes but are not limited to: | * 1. Buffing   2. Polishing   3. Grinding   4. Blueing   5. Varnishing   6. Oil blacking   7. Bluing   8. Deburring   9. Painting |
| 1. Preventive maintenance includes but are not limited to: | * 1. Cleaning of the external surfaces of the machine   2. inspecting cables, connectors and power sources   3. Lubricating of moving parts   4. Replace consumables and spare parts   5. Ensuring proper cooling and ventilation |

**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
* TIG welding equipment
* Joint preparation
* Applications of TIG welding

**Required Skills**

The individual needs to demonstrate the following skills:

* + Interpreting working drawings
  + Preparing joints
  + Tungsten inert gas welding
  + Workplace housekeeping procedures
  + Maintenance of TIG welding machines

**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. Developed operation procedure as per the job requirement   2. Observed safety procedures are observed as per work requirement   3. Interpreted working drawing as per task requirement   4. Carried out welding material preparation as per job requirement   5. Performed TIG welding of metallic materials up to 10 mm thickness in flat, horizontal and vertical positions as per job requirement   6. 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. Observation 2. Portfolio of evidence 3. Oral questioning 4. Third party report 5. Written tests |
| 1. Context of assessment | Competency may be assessed:  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. |