

**NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND  
TRAINING**



**JANUARY 2023**

**PROPOSED OCCUPATIONAL STANDARDS**

**OCCUPATION: WELDING TECHNICIAN**

**LEVEL: NTA 4**

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## **ABBREVIATIONS**

|                |                                                                      |
|----------------|----------------------------------------------------------------------|
| <b>AC</b>      | Alternating Current                                                  |
| <b>CBET</b>    | Competency Based Education and Training                              |
| <b>DC</b>      | Direct Current                                                       |
| <b>EWD</b>     | Electrode-to-wire Distance                                           |
| <b>EWPD</b>    | Electrode-to-welded Part Distance                                    |
| <b>ET</b>      | Eddy current Testing                                                 |
| <b>MAG</b>     | Metal Active Gas Arc Welding                                         |
| <b>MIG</b>     | Metal Inert-gas Welding                                              |
| <b>MT</b>      | Magnetic Particle Testing                                            |
| <b>NACTVET</b> | National Council for Technical and Vocational Education and Training |
| <b>NDT</b>     | Non-destructive Testing                                              |
| <b>NOS</b>     | National Occupational Standards                                      |
| <b>OS</b>      | Occupational Standards                                               |
| <b>PT</b>      | Penetrant Testing                                                    |
| <b>RT</b>      | Radiographic Testing                                                 |
| <b>TET</b>     | Technical Education and Training                                     |
| <b>TIG</b>     | Tungsten Inert Gas Welding                                           |
| <b>TVET</b>    | Technical and Vocational Education and Training                      |
| <b>UT</b>      | Ultrasonic Testing                                                   |
| <b>VPPAW</b>   | Variable Polarity Plasma Welding                                     |
| <b>WFS</b>     | Wire Feed Rate                                                       |

## GLOSSARY OF TERMS

|                                        |                                                                                                                                                                                                                                   |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Circumstantial Knowledge:</b>       | Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.                                                                                                               |
| <b>Competence:</b>                     | The ability to use knowledge, understanding, practical, and thinking skills to perform effectively to the workplace standards required in employment.                                                                             |
| <b>Competency:</b>                     | A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.                                                                                                            |
| <b>Competency-based Education:</b>     | An instructional programme that derives its content from validated tasks and bases assessment on the learner's performance.                                                                                                       |
| <b>Curriculum:</b>                     | A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; A product that states the "intended learning outcomes".                                    |
| <b>Educational/Training Programme:</b> | The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.                                                                    |
| <b>Occupation:</b>                     | A specific position requiring the performance of specific tasks - essentially the same tasks are performed by all employees having the same title. (Example: Welding Technician)                                                  |
| <b>Occupational Area:</b>              | This is a broad grouping of related jobs. (Example: food service).                                                                                                                                                                |
| <b>Occupational Standards:</b>         | Specific requirements of competences for personnel in a particular occupational area, including knowledge and relevant attitudes. They also act as performance tools of assessment of the prescribed outcomes.                    |
| <b>Occupational/Job Analysis:</b>      | A process used to identify the tasks that are important to employees in any given occupation.                                                                                                                                     |
| <b>Performance Criteria:</b>           | Indicate expected end results or outcomes in the form of evaluative statements.                                                                                                                                                   |
| <b>Skills:</b>                         | The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor. |
| <b>Standards:</b>                      | A set of statements, which, if proved true under working conditions, means that an individual is meeting an expected level and type of performance.                                                                               |

|                                 |                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Task Analysis:</b>           | The process of analysing each task to determine the steps, circumstantial knowledge, attitudes, performance criteria, tools and materials needed, as well as safety concerns required for the employees performing it.                                                                             |
| <b>Task:</b>                    | A work activity that has a definite beginning and ending, is observable or measurable, consists of two or more definite steps, and leads to products, service, or decisions.                                                                                                                       |
| <b>Underpinning Knowledge:</b>  | Crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.                                                                                                                                                              |
| <b>Verification Process:</b>    | The process of having experts review and confirm the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation. |
| <b>Occupational Competence:</b> | The application of knowledge and skills that consistently meet the standards required by the working conditions.                                                                                                                                                                                   |

## 1.0. INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's *Development Vision 2025* intends to raise the country's economy to a middle-income status. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical and Vocational Education and Training of Tanzania has begun the job of drafting Occupational Standards that will eventually be adopted as National Occupational Standards for TET in order to ensure that it meets the needs of the labour market and the country's economic agenda.

National Occupational Standards (NOS) are performance criteria that are matched with labour market demands. Each National Occupational Standard describes functions, performance standards, and knowledge/understanding for one important function or task. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruiting, supervision, and appraisal, as well as TET standards. They're also helpful for benchmarking and harmonizing qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current and consistent in delivery across all public and private institutions.

However, it must be noted that, Occupational Standards and Training standards/qualifications standards are different. Occupational Standards are defined in terms of activities performed by a person in a selected occupation (e.g. an welding technician determines welding process parameters, performs pre-welding cleaning, etc.) and they are usually defined by employers following procedures agreed upon by all stakeholders. Education and training standards are developed from the activities defined in occupational standards, and they include learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him or her to function at an agreed level in an occupation. Education and Training standards are used to define curricula in training institutions. It is however critical that there must be a direct link between the Occupational Standards and the training standards to respond to demands of the labour market.

In TET delivery, Tanzania adopted the Competence Based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the Occupational Standards. Occupational Standards are thus the starting point for developing competency-based training (CBET) programmes. TET institutions will be required to benchmark their curricula with relevant Occupational Standards.

Occupational Standards are developed based on a given occupation's current and future demands. As a

result, they serve as a means of bridging the gap between the worlds of employment and technical education and training (TET).

The Welding Technician Occupation has its own set of occupational standards. The document explains how the Occupational Standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

## **2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS**

The Occupational Standards development process began with an examination of major documents that guide Tanzanian skill development. The *10-year National Skills Development Strategy (2016-2026)* was one of the documents reviewed, and it outlined six (6) economic sectors that should be prioritized when developing skills development programmes.

These sectors include: Transport and Logistics, Tourism and Hospitality, Agribusiness, Construction, Energy and ICT. NACTE labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a workshop comprised of experts and educators with substantial knowledge and experience in the occupation conducted an occupational analysis utilizing the DACUM approach to produce the occupational profile. The analysis resulted in DACUM Charts, which are attached as **Appendix 1** to this document.

The Occupational Standards were then developed. Experts in Occupational Analysis and the Development of Occupational Standards facilitated the workshop. Interviews, online surveys, and a stakeholder forum were used to validate the Occupational Standards. Engineers, supervisory technicians on the job, and experienced Welding Technicians were key informants in the survey to discover occupational trends. The information was used to gain insight from the workplaces regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation. A total of ..... online surveys were completed by experts from the labour market across the country. Apart from the survey aiding in defining the scope for the occupational analysis, they also served to engage a wide cross-section of experts in the occupation. Apart from this, the stakeholders' forum was attended by ... participants from different parts of the country representing various companies.

## **3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR WELDING TECHNICIANS**

The standards cover a broad range of duties and tasks that can be performed by a Welding Technician. However, the occupational standards are not meant to replace individual job descriptions. Instead, they are to be used for guidance in defining skill levels and knowledge for the technician in specific

settings or positions. The Welding Technician may perform tasks in a number of key areas of the Occupational Standards, but not necessarily in all areas. For example, in large operations, other individuals may be employed or designated to perform specific tasks.

The Welding Technician shall weld and inspect welded joints in various engineering structural parts in a safe environment under the supervision of engineers. In the workshop, technicians complete various welding and inspection tasks, ranging from simple manual shielded metal arc welding of flat butt joints to gas welding of all positions, developing welding procedures, and inspecting welding defects. Generally, the Welding Technicians perform the following duties:

- a) Implementation of welding safety operation
- b) Formulation of simple welding process
- c) Inspection and maintenance of welding equipment
- d) Manual Shielded Metal Arc Welding (SMAW) of flat butt joint
- e) Manual Shielded Metal Arc Welding (SMAW) of horizontal butt joint
- f) Manual Shielded Metal Arc Welding (SMAW) of vertical butt joint
- g) Gas Metal Arc Welding (GMAW) of flat butt joint with consumable electrode and gas shield
- h) Gas Metal Arc Welding (GMAW) of horizontal butt joint with consumable electrode and gas shield
- i) Gas Metal Arc Welding (GMAW) of vertical butt joint with consumable electrode and gas shield
- j) Manual tungsten inert gas welding of flat butt joint
- k) Horizontal and vertical manual tungsten inert gas welding
- l) Gas welding of flat fillet joint
- m) Gas welding of flat butt joint
- n) All-position gas welding
- o) Brazing of low carbon steel
- p) Inspection of welding defects

The Occupational Standards have been clustered into NTA qualification levels, i.e. NTA 4, 5 and 6.

#### **4.0. VALIDITY PERIOD**

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards being developed based on current trends of the labour market.

**5.0. OCCUPATIONAL STANDARDS**

## 5.1 OCCUPATIONAL STANDARDS FOR WELDING TECHNICIAN - NTA4

|                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| OCCUPATION                                                                                                                                                                                                                                                                                                                                                            | WELDING TECHNICIAN                                                                                                                                                                                                                                                                    | OCCUPATION CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                            | SAFETY OPERATION OF WELDING                                                                                                                                                                                                                                                           | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 401  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                            | CONDUCTING PERSONAL PROTECTION                                                                                                                                                                                                                                                        | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4011 |
| PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                  | The person performing this task must be able to prepare and complete corresponding safety protection according to the specific welding operation.                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| RANGE STATEMENT                                                                                                                                                                                                                                                                                                                                                       | The task can be performed in the welding workshop under the supervision of welding engineers or mechanical engineers.<br>The tools and equipment to be used include:<br>1. Safety shoes;<br>2. Protective suits;<br>3. Welding gloves;<br>4. Welding masks;<br>5. Protective goggles. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| PRACTICAL OPERATION                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                       | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |
| The person performing this task must be able to do the following:<br>1. Comply with health and safety precautions for welding operations;<br>2. Select appropriate tools, equipment, and safety protective equipment;<br>3. Use and maintain protective equipment;<br>4. Deal with safety accidents and take corresponding measures;<br>5. Store tools and equipment. |                                                                                                                                                                                                                                                                                       | <b>Detailed knowledge about:</b><br><b>1.0 Methods</b><br>The person performing this task must be able to explain how to:<br>1.1 Use various protective tools;<br>1.2 Implement corresponding emergency treatment of accidents.<br><br><b>2.0 Principle</b><br>The person performing this task must be able to explain the following principles:<br>2.1 Safety inspection principles of welding protective equipment;<br>2.2 Emergency treatment principles of corresponding safety protection appliances.<br><br><b>3.0 Theories</b><br>The person performing this task must be able to explain the following:<br>3.1 Risk factors existing in welding process and precautions for occupational hazards;<br>3.2 Safety protection standards of protective equipment;<br>3.3 Methods of properly wearing personal safety protection equipment.<br><br><b>4.0 Essential Skills</b> |      |

|                                                 |                                                                                                                                                                                    |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                 | 4.1 Communication skills;<br>4.2 Management skills;<br>4.3 Teamwork skills;<br>4.4 Accident emergency handling skills.                                                             |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b> | Protective equipment that meets the requirements are selected and worn according to technical standards and welding procedures.                                                    |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                 | <b>Detailed knowledge about:</b> <ol style="list-style-type: none"> <li>1. Occupational health and safety;</li> <li>2. Safety operation and use of equipment and tools.</li> </ol> |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                             | WELDING TECHNICIAN                                                                                                                                                                                                                                                              | OCCUPATION CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SAFETY OPERATION OF WELDING                                                                                                                                                                                                                                                     | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 401  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SELECTING OF THE WELDING ENVIRONMENT                                                                                                                                                                                                                                            | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 4012 |
| PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                   | The person performing this task must be able to prepare and select the welding environment according to the specific welding operation.                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |
| RANGE STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The task can be performed in the welding workshop under the supervision of welding engineers or mechanical engineers.<br>The tools and equipment to be used include:<br>1. Thermometer;<br>2. PH/temperature detector;<br>3. Windproof shed;<br>4. Dehumidification instrument. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                 | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |
| The person performing this task must be able to do the following:<br>1. Comply with health and safety precautions for welding operations;<br>2. Select appropriate tools, equipment, and safety protective equipment;<br>3. Use and maintain protective equipment;<br>4. Choose the operating environment;<br>5. Use instruments to improve the operating environment;<br>6. Deal with safety accidents and take corresponding measures; 7. Store tools and equipment. |                                                                                                                                                                                                                                                                                 | <b>Detailed knowledge about:</b><br><b>1.0 Methods</b><br>The person performing this task must be able to explain how to:<br>1.1 Operate related instruments to detect environmental parameters;<br>1.2 Use instruments and equipment for adjusting environmental conditions.<br><br><b>2.0 Principle</b><br>The person performing this task must be able to explain the following principles:<br>2.1 Principles for the use of environmental testing instrument;<br>2.2 The reason why welding requires that the environment must reach a certain parameter.<br><br><b>3.0 Theories</b><br>The person performing this task must be able to explain the following:<br>3.1 Welding environment and reasons required by different welding methods;<br>3.2 Requirements for regulating environment of instruments and equipment.<br><br><b>4.0 Essential Skills</b><br>4.1 Communication skills;<br>4.2 Management skills;<br>4.3 Teamwork skills. |      |

|                                                 |                                                                                                                                                                                    |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b> | The welding environment that meets the requirements is selected according to the technical standards and welding procedures.                                                       |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                 | <b>Detailed knowledge about:</b> <ol style="list-style-type: none"> <li>1. Safety operation and use of equipment and tools;</li> <li>2. Occupational health and safety.</li> </ol> |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | WELDING TECHNICIAN                                                                                                                                                                                                                                                                                                                    | OCCUPATION CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | FORMULATION OF SIMPLE WELDING PROCESS                                                                                                                                                                                                                                                                                                 | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 402  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SELECTING OF WELDING METHOD                                                                                                                                                                                                                                                                                                           | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4021 |
| PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The person performing this task must be able to select the appropriate welding method according to the specific welding conditions and requirements.                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |
| RANGE STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The task can be performed in the welding workshop under the supervision of welding engineers or mechanical engineers.<br>The tools and equipment to be used include:<br>1. Safety shoes;<br>2. Protective suits;<br>3. Welding gloves;<br>4. Welding masks;<br>5. Protective goggles;<br>6. Welding power supply;<br>7. Straightedge. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                       | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |
| The person performing this task must be able to do the following:<br>1. Comply with health and safety precautions for welding operations;<br>2. Select appropriate tools, equipment, and safety protective equipment;<br>3. Use and maintain protective equipment;<br>4. Identify and read welding requirements and welding positions;<br>5. Select the welding method;<br>6. Prepare instruments and equipment to complete welding;<br>7. Deal with safety accidents and take corresponding measures;<br>8. Store tools and equipment. |                                                                                                                                                                                                                                                                                                                                       | Detailed knowledge about:<br><b>1.0 Methods</b><br>The person performing this task must be able to explain how to:<br>1.1 Select welding method;<br>1.2 Prepare welding equipment.<br><br><b>2.0 Principle</b><br>The person performing this task must be able to explain the following principles:<br>2.1 Various performance standards of welding base metal;<br>2.2 Influence of different workpiece thickness and welding position on the selection of welding method.<br><br><b>3.0 Theories</b><br>The person performing this task must be able to explain the following:<br>3.1 Identification and understanding of welding requirements under different conditions;<br>3.2 Welding methods applicable to different welding parts.<br><br><b>4.0 Essential Skills</b> |      |

|                                                 |                                                                                                                                                                                    |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                 | 4.1 Communication skills;<br>4.2 Management skills;<br>4.3 Teamwork skills.                                                                                                        |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b> | The welding methods that meet the existing requirements are selected according to the technical standards and welding procedures.                                                  |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                 | <b>Detailed knowledge about:</b> <ol style="list-style-type: none"> <li>1. Occupational health and safety;</li> <li>2. Safety operation and use of equipment and tools.</li> </ol> |

|                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                               | WELDING TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                   | OCCUPATION CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                               | FORMULATION OF SIMPLE WELDING PROCESS                                                                                                                                                                                                                                                                                                                                                                                                | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 402  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                               | SELECTING OF WELDING MATERIALS                                                                                                                                                                                                                                                                                                                                                                                                       | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4022 |
| PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                     | The person performing this task must be able to select the appropriate welding materials according to the specific welding conditions and requirements.                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| RANGE STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                          | The task can be performed in the welding workshop under the supervision of welding engineers or mechanical engineers.<br>The tools and equipment to be used include:<br>1. Safety shoes;<br>2. Protective suits;<br>3. Welding gloves;<br>4. Welding masks;<br>5. Protective goggles;<br>6. Welding power supply;<br>7. Straightedge;<br>8. Welding materials (welding rod, flux, welding wire, gas, etc.);<br>9. Welding rod dryer. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                      | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |
| The person performing this task must be able to do the following:<br>1. Comply with health and safety precautions for welding operations;<br>2. Select appropriate tools, equipment, and safety protective equipment;<br>3. Use and maintain protective equipment;<br>4. Prepare welding materials;<br>5. Store of welding materials;<br>6. Pretreat welding material;<br>7. Deal with safety accidents and take corresponding measures. |                                                                                                                                                                                                                                                                                                                                                                                                                                      | Detailed knowledge about:<br><b>1.0 Methods</b><br>The person performing this task must be able to explain how to:<br>1.1 Select welding materials;<br>1.2 Store and take welding materials.<br><br><b>2.0 Principle</b><br>The person performing this task must be able to explain the following principles:<br>2.1 Various performance standards of welding materials;<br>2.2 Selection principles of welding materials for different welding methods.<br><br><b>3.0 Theories</b><br>The person performing this task must be able to explain the following:<br>3.1 Welding requirements under different conditions;<br>3.2 Requirements of welding materials used in different welding methods; |      |

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|                                                 | <p>3.3 Storage requirements of auxiliary materials.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Communication skills;</p> <p>4.2 Management skills;</p> <p>4.3 Teamwork skills.</p>                                                                                                          |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b> | The welding materials that meet the requirements are selected according to the technical standards and welding procedures.                                                                                                                                                                     |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                 | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation and use of equipment and tools;</li> <li>2. Safety operation and use of testing tools.</li> <li>3. Occupational health and safety;</li> <li>4. Waste and waste disposal methods.</li> </ol> |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | WELDING TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | OCCUPATION CODE                                                                                                                                                                                                                                                                                                                                                                                     |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MANUAL SHIELDED METAL ARC WELDING (SMAW) OF FLAT BUTT JOINT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                            | 403  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | FLAT SHIELDED METAL ARC WELDING OF CORNER JOINT OR T JOINT OF LOW CARBON STEEL OR LOW ALLOY STEEL PLATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                            | 4031 |
| PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The person performing this task must be able to complete the flat shielded metal arc welding of corner joint or T joint of low carbon steel or low alloy steel plate according to the specific welding process.                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| RANGE STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The task can be performed in the welding workshop under the supervision of welding engineers or mechanical engineers.<br>The tools and equipment available include:<br>1. Welding power supply for shielded metal arc welding;<br>2. Welding cable;<br>3. Welding tong;<br>4. Ground clamp;<br>5. Welding rod;<br>6. Welding rod drying box;<br>7. Welding rod insulation barrel;<br>8. Weldment;<br>9. Welding console (frame);<br>10. Angle grinder;<br>11. Chipping hammer;<br>12. Steel ruler;<br>13. Wire brush;<br>14. Labor protection articles (welding masks (protective glasses), welder gloves, work clothes, insulated shoes, etc.). |                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                              |      |
| The person performing this task must be able to do the following:<br>1. Comply with safety regulations and take safety precautions;<br>2. Select appropriate operation tools and equipment for this task;<br>3. Carry out equipment inspection;<br>4. Prepare weldment groove;<br>5. Clean before welding;<br>6. Conduct assembly and positioned welding;<br>7. Carry out corner joint or backing welding;<br>8. Carry out filling welding;<br>9. Carry out covering welding; |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Detailed knowledge about:<br>1.0 Methods<br>The person performing this task must be able to explain how to:<br>1.1 Carry out safety inspection of equipment, tools and clamps;<br>1.2 Carry out groove cleaning, assembly and positioned welding;<br>1.3 Reserve the reverse deformation of weldments;<br>1.4 Determine welding parameters;<br>1.5 Carry out arc ignition, welding and arc closing; |      |

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| <p>10. Clean the tools, equipment and the workplace;</p> <p>11. Store the tools and equipment.</p> | <p>1.6 Carry out root cleaning treatment on the back of weld bead at the root of double-sided welding;</p> <p>1.7 Clean the surface of welded joint;</p> <p>1.8 Carry out self-inspection on the external quality of welded joints.</p> <p><b>2.0 Principle</b><br/>The person performing this task must be able to explain the following principles:</p> <p>2.1 Basic principles of shielded metal arc welding</p> <p>2.2 Principles of stable combustion of welding arc</p> <p>2.3 Determination principle of welding current</p> <p><b>3.0 Theories</b><br/>The person performing this task must be able to explain the following:</p> <p>3.1 Standard for determining welding process parameters of flat w shielded metal arc welding for corner joint or T joint of low carbon steel or low alloy steel plate;</p> <p>3.2 Welding appearance inspection methods and requirements;</p> <p>3.3 Welding operation essentials of flat shielded metal arc welding for corner joint or T joint of low carbon steel or low alloy steel plate.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Communication skills;</p> <p>4.2 Management skills;</p> <p>4.3 Report writing skills;</p> |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b>                                                    | The weld seam meeting quality requirements is welded according to technical standards and welding procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                                                                    | <p><b>Detailed knowledge about:</b></p> <p>1. Safety operation and use of equipment and tools;</p> <p>2. Safety operation and use of testing tools.</p> <p>3. Occupational health and safety;</p> <p>4. Waste and waste disposal methods.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                    | WELDING TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | OCCUPATION CODE                                                                                                                                                                                                                                                                                                                                                                                     |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MANUAL SHIELDED METAL ARC WELDING (SMAW) OF FLAT BUTT JOINT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                            | 403  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                    | FLAT BUTT WELDING OF LOW CARBON OR LOW ALLOY STEEL PLATES USING SHIELDED METAL ARC WELDING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                            | 4032 |
| PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                          | The person performing this task must be able to complete the butt flat welding electrode arc welding of low carbon steel or low alloy steel plate according to the specific welding process.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| RANGE STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                               | The task can be performed in the welding workshop under the supervision of welding engineer or mechanical engineer.<br>The tools and equipment to be used include:<br>1. Welding power supply for shielded metal arc welding;<br>2. Welding cable;<br>3. Welding tong;<br>4. Ground clamp;<br>5. Welding rod;<br>6. Welding rod drying box;<br>7. Welding rod insulation barrel;<br>8. Weldment;<br>9. Welding console (frame);<br>10. Angle grinder;<br>11. Chipping hammer;<br>12. Steel ruler;<br>13. Wire brush;<br>14. Labor protection articles (welding masks (protective glasses), welder gloves, work clothes, insulated shoes, etc.). |                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                              |      |
| The person performing this task must be able to do the following:<br>1. Comply with safety regulations and take safety precautions;<br>2. Select appropriate operation tools and equipment for this task;<br>3. Carry out equipment inspection;<br>4. Prepare weldment groove;<br>5. Clean before welding;<br>6. Conduct assembly and positioned welding;<br>7. Carry out backing welding;<br>8. Carry out filling welding;<br>9. Carry out covering welding; |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Detailed knowledge about:<br>1.0 Methods<br>The person performing this task must be able to explain how to:<br>1.1 Carry out safety inspection of equipment, tools and clamps;<br>1.2 Carry out groove cleaning, assembly and positioned welding;<br>1.3 Reserve the reverse deformation of weldments;<br>1.4 Determine welding parameters;<br>1.5 Carry out arc ignition, welding and arc closing; |      |

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| <p>10. Clean the tools, equipment and the workplace;</p> <p>11. Store the tools and equipment.</p> | <p>1.6 Carry out root cleaning treatment on the back of weld bead at the root of double-sided welding;</p> <p>1.7 Clean the surface of welded joint;</p> <p>1.8 Carry out self-inspection on the external quality of welded joints.</p> <p><b>2.0 Principle</b><br/>The person performing this task must be able to explain the following principles:</p> <p>2.1 Basic principles of shielded metal arc welding;</p> <p>2.2 Principles of stable combustion of welding arc;</p> <p>2.3 Determination principle of welding current.</p> <p><b>3.0 Theories</b><br/>The person performing this task must be able to explain the following:</p> <p>3.1 Standard for determining welding process parameters of low carbon steel or low alloy steel plate butt shielded metal arc welding;</p> <p>3.2 Welding appearance inspection methods and requirements;</p> <p>3.3 Welding operation essentials of flat butt welding of low carbon or low alloy steel plates using shielded metal arc welding.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Communication skills;</p> <p>4.2 Management skills;</p> <p>4.3 Report writing skills;</p> |
| <p><b>DESCRIPTION OF THE END PRODUCT / SERVICE</b></p>                                             | <p>The weld seam meeting quality requirements is welded according to technical standards and welding procedures.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p><b>CIRCUMSTANTIAL KNOWLEDGE</b></p>                                                             | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation and use of equipment and tools.</li> <li>2. Safety operation and use of testing tools.</li> <li>3. Occupational health and safety;</li> <li>4. Waste and waste disposal methods.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                        | WELDING TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | OCCUPATION CODE                                                                                                                                                                                                                                                                                                                             |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                        | GAS METAL ARC WELDING (GMAW) OF FLAT BUTT JOINT WITH CONSUMABLE ELECTRODE AND GAS SHIELD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | DUTY NO.                                                                                                                                                                                                                                                                                                                                    | 404  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                        | GAS METAL ARC WELDING (GMAW) OF FLAT BUTT JOINT WITH CONSUMABLE ELECTRODE AND GAS SHIELD OF CORNER JOINT OR T JOINT OF LOW CARBON STEEL OR LOW ALLOY STEEL PLATE                                                                                                                                                                                                                                                                                                                                                                                                                                   | TASK NO.                                                                                                                                                                                                                                                                                                                                    | 4041 |
| PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                                                              | The person performing this task must be able to complete the Gas Metal Arc Welding (GMAW) of flat butt joint with consumable electrode and gas shield of corner joint or T joint of low carbon steel or low alloy steel plate according to the specific welding process.                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                             |      |
| RANGE STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                   | The task can be performed in the welding workshop under the supervision of welding engineer or mechanical engineer.<br>The tools and equipment to be used include:<br>1. Welding power source for Gas Metal Arc Welding (GMAW);<br>2. Wire feeder;<br>3. Welding gun;<br>4. Control system;<br>5. Gas supply and water supply system;<br>6. Weldment;<br>7. Welding console (frame);<br>8. Angle grinder;<br>9. Chipping hammer;<br>10. Steel ruler;<br>11. Wire brush;<br>12. Labor protection articles (welding masks (protective glasses), welder gloves, work clothes, insulated shoes, etc.). |                                                                                                                                                                                                                                                                                                                                             |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                             |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                      |      |
| The person performing this task must be able to do the following:<br>1. Comply with safety regulations and take safety precautions; 2. Select appropriate operation tools and equipment for this task;<br>2. Carry out equipment inspection;<br>3. Prepare weldment groove;<br>4. Clean the surface of weldment and welding wire;<br>5. Conduct assembly and positioned welding;<br>6. Carry out backing welding; |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Detailed knowledge about:<br>1.0 Methods<br>The person performing this task must be able to explain how to:<br>1.1 Carry out safety inspection of equipment, tools and clamps;<br>1.2 Carry out groove cleaning, assembly and positioned welding;<br>1.3 Reserve the reverse deformation of weldments;<br>1.4 Determine welding parameters; |      |

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| <p>7. Carry out filling welding;<br/> 8. Carry out covering welding;<br/> 9. Clean the tools, equipment and the workplace;<br/> 10. Store the tools and equipment.</p> | <p>1.5 Carry out arc ignition, welding and arc closing;<br/> 1.6 Carry out root cleaning treatment on the back of weld bead at the root of double-sided welding;<br/> 1.7 Clean the surface of welded joint;<br/> 1.8 Carry out self-inspection on the external quality of welded joints.</p> <p><b>2.0 Principle</b><br/> The person performing this task must be able to explain the following principles:<br/> 2.1 Basic principle of gas shielded welding;<br/> 2.2 Selection principle of welding wire;<br/> 2.3 Principle of determining the distance from nozzle to weldment.</p> <p><b>3.0 Theories</b><br/> The person performing this task must be able to explain the following:<br/> 3.1 Standard for determining welding parameters of Gas Metal Arc Welding (GMAW) of flat butt joint with consumable electrode and gas shield of corner joint or T joint of low carbon steel or low alloy steel plate;<br/> 3.2 Welding appearance inspection methods and requirements;<br/> 3.3 Welding operation essentials of Gas Metal Arc Welding (GMAW) of flat butt joint with consumable electrode and gas shield of corner joint or t joint of low carbon steel or low alloy steel plate.</p> <p><b>4.0 Essential Skills</b><br/> 4.1 Communication skills;<br/> 4.2 Management skills;<br/> 4.3 Report writing skills;</p> |
| <p><b>DESCRIPTION OF THE END PRODUCT / SERVICE</b></p>                                                                                                                 | <p>The weld seam meeting quality requirements is welded according to technical standards and welding procedures.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p><b>CIRCUMSTANTIAL KNOWLEDGE</b></p>                                                                                                                                 | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation and use of equipment and tools</li> <li>2. Safety operation and use of testing tools</li> <li>3. Occupational health and safety</li> <li>4. Waste and waste disposal methods</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                           | WELDING TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | OCCUPATION CODE                                                                                                                                                                                                                                                                                                                                                                                     |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                           | GAS METAL ARC WELDING (GMAW) OF FLAT BUTT JOINT WITH CONSUMABLE ELECTRODE AND GAS SHIELD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                            | 404  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                           | GAS METAL ARC WELDING (GMAW) OF FLAT BUTT JOINT WITH CONSUMABLE ELECTRODE AND GAS SHIELD OF LOW CARBON STEEL OR LOW ALLOY STEEL PLATE                                                                                                                                                                                                                                                                                                                                                                                                                                                              | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                            | 4042 |
| PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                 | The person performing this task must be able to complete the Gas Metal Arc Welding (GMAW) of flat butt joint with consumable electrode and gas shield of low carbon steel or low alloy steel plate according to the specific welding process.                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| RANGE STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                      | The task can be performed in the welding workshop under the supervision of welding engineer or mechanical engineer.<br>The tools and equipment to be used include:<br>1. Welding power source for Gas Metal Arc Welding (GMAW);<br>2. Wire feeder;<br>3. Welding gun;<br>4. Control system;<br>5. Gas supply and water supply system;<br>6. Weldment;<br>7. Welding console (frame);<br>8. Angle grinder;<br>9. Chipping hammer;<br>10. Steel ruler;<br>11. Wire brush;<br>12. Labor protection articles (welding masks (protective glasses), welder gloves, work clothes, insulated shoes, etc.). |                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                              |      |
| The person performing this task must be able to do the following:<br>1. Comply with safety regulations and take safety precautions;<br>2. Select appropriate operation tools and equipment for this task;<br>3. Carry out equipment inspection;<br>4. Prepare weldment groove;<br>5. Clean the surface of weldment and welding wire;<br>6. Conduct assembly and positioned welding;<br>7. Carry out backing welding; |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Detailed knowledge about:<br>1.0 Methods<br>The person performing this task must be able to explain how to:<br>1.1 Carry out safety inspection of equipment, tools and clamps;<br>1.2 Carry out groove cleaning, assembly and positioned welding;<br>1.3 Reserve the reverse deformation of weldments;<br>1.4 Determine welding parameters;<br>1.5 Carry out arc ignition, welding and arc closing; |      |

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| <p>8. Carry out filling welding;<br/> 9. Carry out covering welding;<br/> 10. Clean the tools, equipment and the workplace;<br/> 11. Store the tools and equipment.</p> | <p>1.6 Carry out root cleaning treatment on the back of weld bead at the root of double-sided welding;<br/> 1.7 Clean the surface of welded joint;<br/> 1.8 Carry out self-inspection on the external quality of welded joints.</p> <p><b>2.0 Principle</b><br/> The person performing this task must be able to explain the following principles:<br/> 2.1 Basic principle of gas shielded welding;<br/> 2.2 Selection principle of welding wire;<br/> 2.3 Principle of determining the distance from nozzle to weldment.</p> <p><b>3.0 Theories</b><br/> The person performing this task must be able to explain the following:<br/> 3.1 Standard for determining welding parameters of Gas Metal Arc Welding (GMAW) of flat butt joint with consumable electrode and gas shield of low carbon steel or low alloy steel plate;<br/> 3.2 Welding appearance inspection methods and requirements;<br/> 3.3 Operation essentials of Gas Metal Arc Welding (GMAW) of flat butt joint with consumable electrode and gas shield of low carbon steel or low alloy steel plate.</p> <p><b>4.0 Essential Skills</b><br/> 4.1 Communication skills;<br/> 4.2 Management skills;<br/> 4.3 Report writing skills;</p> |
| <p><b>DESCRIPTION OF THE END PRODUCT / SERVICE</b></p>                                                                                                                  | <p>The weld seam meeting quality requirements is welded according to technical standards and welding procedures.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>CIRCUMSTANTIAL KNOWLEDGE</b></p>                                                                                                                                  | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation and use of equipment and tools.</li> <li>2. Safety operation and use of testing tools.</li> <li>3. Occupational health and safety;</li> <li>4. Waste and waste disposal methods.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | WELDING TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | OCCUPATION CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | GAS WELDING FLAT FILLET WELDING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 405  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | GAS WELDING OF CORNER JOINTS OF LOW CARBON STEEL OR LOW ALLOY STEEL PLATES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4051 |
| PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The person performing this task must be able to complete the gas welding of corner joints of low carbon steel or low alloy steel plates according to the specific welding process.                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |
| RANGE STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | The task can be performed in the welding workshop under the supervision of welding engineer or mechanical engineer.<br>The tools and equipment to be used include:<br>1. Oxygen bottle;<br>2. Acetylene gas bottle;<br>3. Pressure reducer;<br>4. Gas hose;<br>5. Welding wire;<br>6. Welding torch;<br>7. Firing gun;<br>8. Flash-back preventer;<br>9. Weldment;<br>10. Welding console (frame);<br>11. Angle grinder;<br>12. Chipping hammer;<br>13. Steel ruler;<br>14. Wire brush;<br>15. Labor protection articles (welding masks (protective glasses), welder gloves, work clothes, insulated shoes, etc.). |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| The person performing this task must be able to do the following:<br>1. Comply with safety regulations and take safety precautions;<br>2. Select appropriate operation tools and equipment for this task;<br>3. Carry out equipment inspection;<br>4. Prepare the weldment groove and clean the weldment;<br>5. Preheat;<br>6. Positioned welding and positioned welded seam;<br>7. Carry out backing welding;<br>8. Carry out filling welding;<br>9. Carry out covering welding;<br>10. Clean the tools, equipment and the workplace;<br>11. Store the tools and equipment. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Detailed knowledge about:<br>1.0 Methods<br>The person performing this task must be able to explain how to:<br>1.1 Clean workpieces and welding wires;<br>1.2 Carry out safety inspection of equipment, tools and clamps;<br>1.3 Select the materials;<br>1.4 Reserve the reverse deformation of weldments;<br>1.5 Select flame energy rate, nozzle dip angle, flame height and welding speed;<br>1.6 Carry out gas welding ignition, flameout and tempering treatment;<br>1.7 Determine the position of solder joints and start welding, welding and finishing;<br>1.8 Clean the joint surface;<br>1.9 Carry out self-inspection on the external quality of the joints. |      |

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|                                                 | <p><b>2.0 Principle</b></p> <p>The person performing this task must be able to explain the following principles:</p> <p>2.1 Basic principle of gas welding;</p> <p>2.2 Selection principle of welding gas;</p> <p>2.3 Principle of determining flame energy rate.</p> <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Standard for determining welding parameters of gas welding of corner joints of low carbon steel or low alloy steel plates;</p> <p>3.2 Welding appearance inspection methods and requirements;</p> <p>3.3 Essentials of gas welding of corner joints of low carbon steel or low alloy steel plates.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Communication skills;</p> <p>4.2 Management skills;</p> <p>4.3 Report writing skills;</p> |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b> | The weld seam meeting quality requirements is welded according to technical standards and welding procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                 | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation and use of equipment and tools.</li> <li>2. Safety operation and use of testing tools.</li> <li>3. Occupational health and safety;</li> <li>4. Waste and waste disposal methods.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | WELDING TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | OCCUPATION CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | GAS WELDING FLAT FILLET WELDING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 405  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | GAS WELDING OF T- JOINTS OF LOW CARBON STEEL OR LOW ALLOY STEEL PLATES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4052 |
| PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                              | The person performing this task must be able to complete the gas welding of T-joints of low carbon steel or low alloy steel plates according to the specific welding process.                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |
| RANGE STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | The task can be performed in the welding workshop under the supervision of welding engineer or mechanical engineer.<br>The tools and equipment to be used include:<br>1. Oxygen bottle;<br>2. Acetylene gas bottle;<br>3. Pressure reducer;<br>4. Gas hose;<br>5. Welding wire;<br>6. Welding torch;<br>7. Firing gun;<br>8. Flash-back preventer;<br>9. Weldment;<br>10. Welding console (frame);<br>11. Angle grinder;<br>12. Chipping hammer;<br>13. Steel ruler;<br>14. Wire brush;<br>15. Labor protection articles (welding masks (protective glasses), welder gloves, work clothes, insulated shoes, etc.). |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |
| The person performing this task must be able to do the following:<br>1. Comply with safety regulations and take safety precautions;<br>2. Select appropriate operation tools and equipment for this task;<br>3. Carry out equipment inspection;<br>4. Prepare the weldment groove and clean the weldment;<br>5. Preheat;<br>6. Positioned welding and positioned welded seam;<br>7. Carry out backing welding;<br>8. Carry out filling welding;<br>9. Carry out covering welding; |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Detailed knowledge about:<br>1.0 Methods<br>The person performing this task must be able to explain how to:<br>1.1 Clean workpieces and welding wires;<br>1.2 Carry out safety inspection of equipment, tools and clamps;<br>1.3 Select the materials;<br>1.4 Reserve the reverse deformation of weldments;<br>1.5 Select flame energy rate, nozzle dip angle, flame height and welding speed;<br>1.6 Carry out gas welding ignition, flameout and tempering treatment; |      |

|                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <p>10. Clean the tools, equipment and the workplace;</p> <p>11. Store the tools and equipment.</p> | <p>1.7 Determine the position of solder joints and positioned welding, start welding, welding and finishing;</p> <p>1.8 Clean the joint surface;</p> <p>1.9 Carry out self-inspection on the external quality of welded joints.</p> <p><b>2.0 Principle</b><br/>The person performing this task must be able to explain the following principles:</p> <p>2.1 Basic principle of gas welding;</p> <p>2.2 Selection principle of welding gas;</p> <p>2.3 Principle of determining flame energy rate.</p> <p><b>3.0 Theories</b><br/>The person performing this task must be able to explain the following:</p> <p>3.1 Standard for determining welding parameters of gas welding of T joints of low carbon steel or low alloy steel plates;</p> <p>3.2 Welding appearance inspection methods and requirements;</p> <p>3.3 Essentials of gas welding of T joints of low carbon steel or low alloy steel plates.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Communication skills;</p> <p>4.2 Management skills;</p> <p>4.3 Report writing skills.</p> |
| <p><b>DESCRIPTION OF THE END PRODUCT / SERVICE</b></p>                                             | <p>The weld seam meeting quality requirements is welded according to technical standards and welding procedures.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p><b>CIRCUMSTANTIAL KNOWLEDGE</b></p>                                                             | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation and use of equipment and tools.</li> <li>2. Safety operation and use of testing tools.</li> <li>3. Occupational health and safety;</li> <li>4. Waste and waste disposal methods</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

**TABLE 1: DACUM CHARTS FOR WELDING TECHNICIAN - NTA 4**

| <b>DUTIES</b>                             | <b>TASKS</b>                              | <b>ENABLERS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.0 Safety operation of welding           | 1.1 Conducting personal protection.       | <p><b>General skills and knowledge</b></p> <ul style="list-style-type: none"> <li>• Cooperating with others using communication skills and report to the superiors</li> <li>• Health and safety prevention knowledge</li> <li>• Emergency treatment of corresponding accidents</li> <li>• Cleaning of the tools, equipment and workplace</li> <li>• Correct storage of tools and equipment</li> <li>• Determination of the environmental requirements such as temperature, humidity and wind force required for safe welding</li> </ul> <p><b>Tools and equipment</b></p> <ul style="list-style-type: none"> <li>• Safety shoes</li> <li>• Protective suits</li> <li>• Welding gloves</li> <li>• Welding masks</li> <li>• Goggles</li> <li>• Windproof shed</li> <li>• Dehumidifying instrument</li> </ul> <p><b>Requirements for employees</b><br/>Teamwork spirit, honesty, pursuit of excellence, meticulous and earnest, good time management, and keeping promises</p> |
|                                           | 1.2 Selecting of the welding environment. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2.0 Formulation of simple welding process | 2.1 Selecting of welding method.          | <p><b>General skills and knowledge</b></p> <ul style="list-style-type: none"> <li>• Cooperating with others using communication skills and report to the superiors</li> <li>• Health and safety prevention knowledge</li> <li>• Emergency treatment of corresponding accidents</li> <li>• Cleaning of the tools, equipment and workplace</li> <li>• Correct storage of tools and equipment</li> <li>• Correct taking and storing welding materials</li> <li>• Selecting welding method according to requirements and conditions</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                           | 2.2 Selecting of welding materials.       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| DUTIES                                                          | TASKS                                                                                                        | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                 |                                                                                                              | <p><b>Tools and equipment</b></p> <ul style="list-style-type: none"> <li>• Safety shoes</li> <li>• Protective suits</li> <li>• Welding gloves</li> <li>• Welding masks</li> <li>• Goggles</li> <li>• Welding power supply</li> <li>• Straightedge</li> <li>• Welding rod dryer</li> </ul> <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>• Electrode, flux, wire, gas</li> </ul> <p><b>Requirements for employees</b><br/>Teamwork spirit, honesty, pursuit of excellence, meticulous and earnest, good time management, and keeping promises</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3.0 Manual Shielded Metal Arc Welding (SMAW) of flat butt joint | 3.1 Flat shielded metal arc welding of corner joint or T joint of low carbon steel or low alloy steel plate. | <p><b>General skills and knowledge</b></p> <ul style="list-style-type: none"> <li>• Cooperating with others using communication skills and report to the superiors</li> <li>• Health and safety prevention knowledge</li> <li>• Emergency treatment of corresponding accidents</li> <li>• Cleaning of the tools, equipment and workplace</li> <li>• Correct storage of tools and equipment</li> <li>• Reading and understanding drawings</li> <li>• Reserving the reverse bending deformation of weldments correctly</li> <li>• Methods and skills of Manual Shielded Metal Arc Welding (SMAW) of flat butt joint</li> </ul> <p><b>Tools and equipment</b></p> <ul style="list-style-type: none"> <li>• Welding power supply for shielded metal arc welding</li> <li>• Welding power cables</li> <li>• Welding tong</li> <li>• Ground clamp</li> <li>• Welding rod drying box</li> <li>• Welding rod insulation barrel</li> <li>• Welding console (frame)</li> <li>• Angle grinder</li> <li>• Chipping hammer</li> <li>• Steel ruler</li> <li>• Wire brush</li> </ul> |
|                                                                 | 3.2 Flat butt welding of low carbon or low alloy steel plates using shielded metal arc welding.              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| DUTIES                                                          | TASKS                                                                                                                                                                | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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|                                                                 |                                                                                                                                                                      | <ul style="list-style-type: none"> <li>• Labor protection articles (welding masks (protective glasses), welder gloves, work clothes, insulated shoes, etc.)</li> </ul> <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>• Electrode, weldment, electric power</li> </ul> <p><b>Requirements for employees</b><br/>Teamwork spirit, honesty, pursuit of excellence, meticulous and earnest, good time management, and keeping promises</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 4.0 Manual Shielded Metal Arc Welding (SMAW) of flat butt joint | 4.1 Gas Metal Arc Welding (GMAW) of flat butt joint with consumable electrode and gas shield of corner joint or T joint of low carbon steel or low alloy steel plate | <p><b>General skills and knowledge</b></p> <ul style="list-style-type: none"> <li>• Cooperating with others using communication skills and report to the superiors</li> <li>• Health and safety prevention knowledge</li> <li>• Emergency treatment of corresponding accidents</li> <li>• Cleaning of the tools, equipment and workplace</li> <li>• Correct storage of tools and equipment</li> <li>• Reading and understanding drawings</li> <li>• Reserving the reverse bending deformation of weldments correctly</li> <li>• Cleaning of the surface of welding head</li> </ul> <p><b>Tools and equipment</b></p> <ul style="list-style-type: none"> <li>• Welding power source for Gas Metal Arc Welding (GMAW)</li> <li>• Wire feeder</li> <li>• Welding gun</li> <li>• Control system</li> <li>• Gas and water supply system</li> <li>• Welding console (frame)</li> <li>• Angle grinder</li> <li>• Chipping hammer</li> <li>• Steel ruler</li> <li>• Wire brush</li> <li>• Labor protection articles (welding masks (protective glasses), welder gloves, work clothes, insulated shoes, etc.)</li> </ul> <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>• Welding wire, weldment, shielding</li> </ul> |
|                                                                 | 4.2 Gas Metal Arc Welding (GMAW) of flat butt joint with consumable electrode and gas shield of low carbon steel or low alloy steel plate.                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| DUTIES                              | TASKS                                                                           | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     |                                                                                 | <p>gas, electricity, water</p> <p><b>Requirements for employees</b><br/>Teamwork spirit, honesty, pursuit of excellence, meticulous and earnest, good time management, and keeping promises</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 5.0 Gas welding flat fillet welding | 5.1 Gas welding of corner joints of low carbon steel or low alloy steel plates. | <p><b>General skills and knowledge</b></p> <ul style="list-style-type: none"> <li>• Cooperating with others using communication skills and report to the superiors</li> <li>• Health and safety prevention knowledge</li> <li>• Emergency treatment of corresponding accidents</li> <li>• Cleaning of the tools, equipment and workplace</li> <li>• Correct storage of tools and equipment</li> <li>• Reading and understanding drawings</li> <li>• Reserving the reverse bending deformation of weldments correctly</li> <li>• Carrying out self-inspection on the appearance quality of joints</li> </ul> <p><b>Tools and equipment</b></p> <ul style="list-style-type: none"> <li>• Oxygen cylinder</li> <li>• Acetylene gas bottle</li> <li>• Pressure reducer</li> <li>• Gas hose</li> <li>• Torch</li> <li>• Ignition gun</li> <li>• Flash-back preventer</li> <li>• Welding console (frame)</li> <li>• Angle grinder</li> <li>• Chipping hammer</li> <li>• Steel ruler</li> <li>• Wire brush</li> <li>• Labor protection articles (welding masks (protective glasses), welder gloves, work clothes, insulated shoes, etc.)</li> </ul> <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>• Welding wire, weldment, oxygen, acetylene, electricity</li> </ul> <p><b>Requirements for employees</b><br/>Teamwork spirit, honesty, pursuit of excellence, meticulous and earnest,</p> |
|                                     | 5.2 Gas welding of T- joints of low carbon steel or low alloy steel plates.     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| <b>DUTIES</b> | <b>TASKS</b> | <b>ENABLERS</b>                            |
|---------------|--------------|--------------------------------------------|
|               |              | good time management, and keeping promises |