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| Title | **Perform submerged arc welding (SAW) operations** | | |
| Level | **2** | **Credits** | **10** |

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| Purpose | This Competency Standard identifies the competencies required to perform Submerged Arc Welding (SAW) operations at workplace by welder in accordance with the organization’s approved guidelines and procedures. You will be expected to organize the workplace for welding, prepare the base metal for welding, perform operations related to Submerged Arc Welding (SAW) and perform post welding operations at the workplace. Your underpinning knowledge regarding Submerged Arc Welding (SAW) operations will be sufficient to provide you the basis for your work. |

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| Classification ISCED | 0715 Mechanics and metal trades |

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| Available grade | Competent / Not yet competent |

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| Modification history | N/A |

| **Unit of Competency** | **Performance Criteria** | **Knowledge** | **Tools & Equipment** |
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| F1. Organize the workplace | **Trainee will be able to:**  P1. Arrange the workplace according to the requirement of the job   * Welding machine and accessories * Electric supply * Jigs and fixtures * Lighting   P2. apply the safety measures as per work permit   * Ventilation * Fire extinguishers * First Aid box * Emergency alarm/light * Ambulance * Personal protective equipment   P3. Prepare the required welding machine as per job requirement   * Type of current (AC/DC) * Current polarity * Travel speed | **Trainee will be able to:**  K1. Describe the requirements of a workplace for welding the specific job  K2. Describe the organizational safety rules and guidelines  K3. Describe the preparation of welding machine including   * Type of current (AC/DC) * Current polarity * Travel speed | Welding machine with accessories, flux drying oven,grinder, chipping hammer, wire brush, jigs and fixtures, lights, exhaust fans, fire extinguishers, first aid box, PPE |
| F2. Prepare the base metal for welding | **Trainee will be able to:**  P1. Arrange tools and cleaning chemicals required for the job  P2. Prepare joint as per drawing   * Joint preparation * Joint cleaning   P3. Follow the welding procedure specification (WPS) / instruction sheet for welding  P3. Apply specific safety precautions associated with welding job | **Trainee will be able to:**  K1. Describe the usage of tools required for the job  K2. Describe the importance of joint preparation, cleaning and tacking  K3. Define welding procedure specification (WPS) / instruction sheet  K4. Apply specific safety precautions associated with welding job | Grinders, cutters, beveling machine, file, measuring tools, WPS/ instruction sheet, PPE |
| F3. Perform operations related to Submerged Arc Welding (SAW) Operations | **Trainee will be able to:**  P1. Arrange the wire spool and flux as per welding procedure specification (WPS) / instruction sheet  P2. Arrange pre-heating equipment as per welding procedure specification (WPS) / instruction sheet  P3. Adjust welding parameters as per welding procedure specification (WPS) / instruction sheet   * Voltage * Amperes * Travel speed * Type of Polarity * Stickout   P4. Perform welding as per welding procedure specification (WPS) / instruction sheet   * Pre heat the job, if required * Perform welding operation * Inter-pass cleaning * Inter-pass inspection * Maintain inter-pass temperature   P5. Apply specific safety precautions associated with welding job/process | **Trainee will be able to:**  K1. Determine the specifications/ classification of wire-flux combination required for the job  K2. Read and interpret instructions of WPS/ instruction sheet  K3. State the importance of pre heating  K4. Describe how to adjust welding parameters and their effects on weld  K5. Demonstrate welding operation as per WPS/instruction sheet  K6. Apply specific safety precautions associated with welding job/process | Welding equipment with accessories, wire spool, flux, pre-heating equipment, grinders, wire brush, wire cutter, chipping hammer, temple sticks, flux drying oven, PPE, WPS/ instruction sheet |
| F4. Perform post welding operations | **Trainee will be able to:**  P1. Apply post weld cleaning of the job following the process   * Removal of unused flux * Removal of slag * Removal of jigs and fixtures   P2. Perform visual inspection of weld area  P3. Perform post-heating of the job as per WPS/ instruction sheet, if required  P4. Apply specific safety precautions associated with welding job/process | **Trainee will be able to:**  K1. State the importance of post weld cleaning of the job  K2. Identify visually, imperfections of weld  K3. Describe the purpose of post-heating  K4. Apply specific safety precautions associated with welding job/process | post-heating equipment, grinders, wire brush, chipping hammer, PPE, WPS/ instruction sheet |