

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR MINING INDUSTRY



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What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standard that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

Introduction

Qualifications Pack- Mine Welder

SECTOR: MINING

SUB-SECTOR: Open Cast and Underground Mines

OCCUPATION: Mechanical Maintenance

REFERENCE ID: MIN/Q 0423

ALIGNED TO: NCO-2004/7212.20

A Welder conducts end to end operations regarding welding of various elements and equipment in the mine

Brief Job Description: A mine welder is responsible for joining various types of metallic frames, structures, jigs, plates, sheets etc using heating and melting process created through electrical power and gaseous discharge, maintaining process parameters, conducting quality checks on output product and maintaining a safe & healthy working environment.

Personal Attributes: This job requires an individual to have technical knowledge of welding and metallurgy, ability to plan and prioritize, quality consciousness, sensitivity to problem solving, quick decision making, safety orientation, Reading, writing and communication skills, Dexterity and high precision, ability to use internal ERP systems

Job Details

Qualifications Pack Code	MIN/ Q 0423		
Job Role	Mine Welder		
Credits(NSQF)	TBD	Version number	1.0
Industry	Mining	Drafted on	15/12/2014
Sub-sector	Open Cast and Underground Mines	Last reviewed on	24/03/2015
Occupation	Mechanical Maintenance	Next review date	24/03/2017

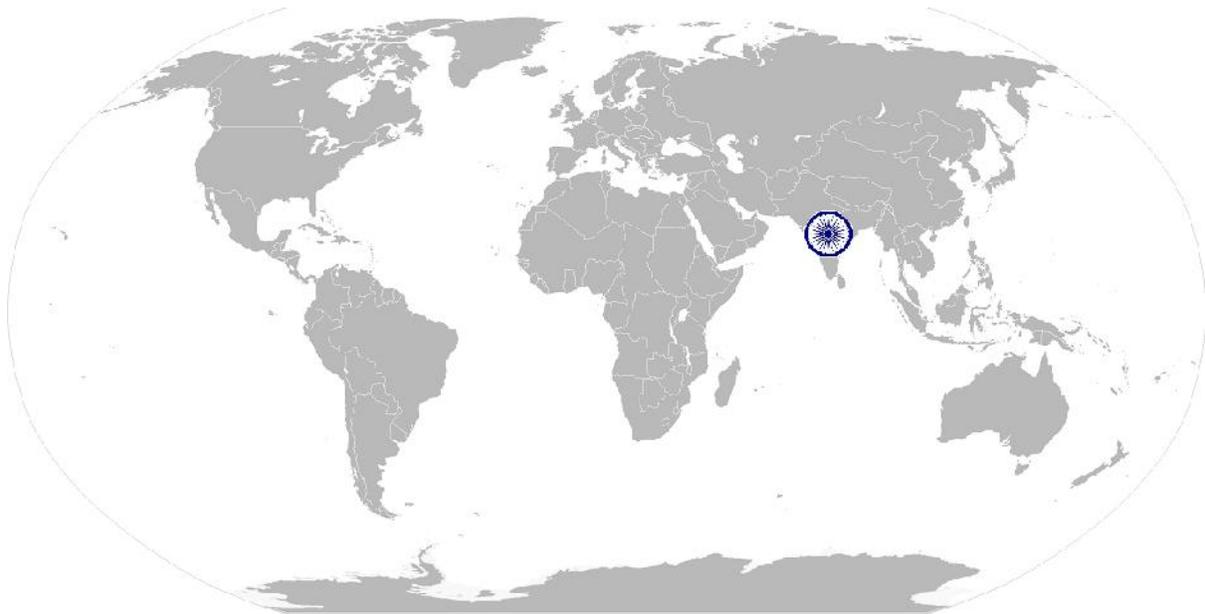
Job Role	Mine Welder
Role Description	A mine welder is responsible for joining various types of metallic frames, structures, jigs, plates, sheets etc using heating and melting process created through electrical power and gaseous discharge, maintaining process parameters, conducting quality checks on output product and maintaining a safe & healthy working environment
NSQF level	4
Minimum Educational Qualification	ITI – Mechanical/ Welding Technology NA
Maximum Educational Qualification	Not Applicable
Training (Suggested but not mandatory)	<ol style="list-style-type: none"> 1. Different Welding techniques used in organizations 2. 5S and Safety aspects 3. Quality Management Systems
Experience	1-10 years
Applicable National Occupational Standards	<p>Compulsory: Click on the hyperlink to read/download the required NOS</p> <ol style="list-style-type: none"> 1. MIN/ N0464 (Understand processes and equipment requirement to complete the task) 2. MIN/ N0465 (Prepare the machine, auxiliaries and work pieces for the welding process) 3. MIN/ N0466 (Conduct the Welding process and weld the work pieces) 4. MIN/ N0467 (Ensure completion of post operations activities like inspection, storage and maintenance) 5. MIN/ N0901 (Health and Safety) <p>Optional: Not applicable</p>
Performance Criteria	As described in the relevant OS units

Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standard of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standard are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standard which apply uniquely in the Indian context.
Qualification Pack Code	Qualification Pack Code is a unique reference code that identifies a qualification pack.
Qualification Pack	Qualification Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualification Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

Acronyms

Keywords /Terms	Description
SCMS	Skill council for Mining Sector
NOS	National Occupational Standard
NSQF	National Skill Qualification Framework
NVEQF	National Vocational Educational Qualification Framework
NVQF	National Vocational Qualification Framework
OS	Occupational Standard
PC	Performance Criteria
QP	Qualification Pack
SSC	Sector Skill Council

National Occupational Standard



Overview

This unit is about understanding the job requirement and hence understand the activities & equipment associated with the process to complete the task.

MIN/N 0464 Understand process and equipment requirement to complete the task

Unit Code	MIN/N 0464
Unit Title (Task)	Understand process and equipment requirement to complete the task
Description	This OS unit is about understanding the job requirement, what processes need to be executed, what equipment will be used for the project and what is the required output considering the standard specified
Scope	This unit/task covers the following: <ul style="list-style-type: none"> Understand the welding requirements, equipment and parameters
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Understand the welding requirements, welding equipment and parameters to be set for the process	<p>PC1. Understand the right welding methodology and process to be adopted for completing the work order through discussions with the supervisor and reading the process manuals/ Work Instructions/Standard Operating Procedures</p> <p>PC2. Understand the various welding parameters like temperature, pressure, electrode type, electrode distance, process cycle time etc before starting the welding process, as mentioned in the Work Instructions/ SOP manual</p> <p>PC3. Understand the material required and the equipment availability for executing the activity</p> <p>PC4. Understand the type of electrodes – material wise & dimension wise, type of filler material etc used for the welding process</p> <p>PC5. Correctly understand the type of electrode in terms of electrode material and thickness, filler material and flux which will be required for the selected welding process before the initiation of the welding process</p>
Knowledge and Understanding (K)	
A. Regulatory context (knowledge of safety guidelines specified by Director General of	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. Different types of mines and detail of the mine he is working in</p> <p>KA2. Mine Organisation, time keeping, need for discipline and punctuality</p> <p>KA3. Benching in quarries, Dressing of overhangs, Undercuts, Fencing, First aid and Hygiene</p> <p>KA4. Standing orders in force at the mine. Safety in the vicinity of machinery</p> <p>KA5. Shot-firing and Safety regulations. How and where to take shelter</p> <p>KA6. Duties of workmen</p>

MIN/N 0464 Understand process and equipment requirement to complete the task	
Mine Safety (DGMS))	KA7. Provision of wages, working hours and accident compensation as per Mines act KA8. Knowledge of mining safety procedures KA9. Impact of violation of safely procedures
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KB1. Relevant standard and procedures followed in the company KB2. Processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution
C. Technical / Domain Knowledge	The user/individual on the job needs to know and understand: KC1. Different types of welding processes and associated equipment KC2. Different types of joints KC3. The method of reading and interpreting sketches and engineering drawings KC4. How to visualize the final product output KC5. The impact of various physical parameters like temperature, pressure, electrode distance, electric current, voltage on the properties of final output product like durability, ductility, surface finish etc KC6. Basic principles of geometric and engineering drawing KC7. Hazards and safety aspects involved in welding activities, fire safety and usage of relevant PPEs KC8. Knowledge of oxygen cylinder, current, colour coding, pipe connections, safety aspects etc. KC9. Knowledge of working at height KC10. Knowledge of fire safety and fire equipment like type of extinguishers etc. KC11. Knowledge of cross section, measurement and its applications
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The user/ individual on the job needs to know and understand how to: SA1. Document information from the sketches and engineering drawings SA2. Prepare draft drawings for the final output product SA3. Note down observations (if any) related to the welding process

<p>MIN/N 0464</p>	<p>Understand process and equipment requirement to complete the task</p> <p>SA4. Write information documents to internal departments/ internal teams or enter the information in online ERP systems under guidance of the supervisor</p>
	<p>Reading Skills</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA5. Read and interpret engineering drawing and sketches</p> <p>SA6. Read and interpret symbols and measurements used in the drawings</p> <p>SA7. Read equipment manuals and process documents to understand the equipment and processes better</p> <p>SA8. Read internal information documents sent by internal teams</p>
	<p>Oral Communication (Listening and Speaking skills)</p>
<p>B. Professional Skills</p>	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA9. Discuss task lists, schedules and activities with the supervisor</p> <p>SA10. Effectively communicate with the team members</p> <p>SA11. Question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA12. Attentively listen with full attention and comprehend the information given by the speaker</p>
	<p>Plan and Organize</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. Plan and organize the work order and jobs received from the Operator</p> <p>SB2. Organize all process/ equipment manuals so that sorting/ accessing information is easy</p> <p>SB3. Support the supervisor in scheduling tasks for helper and assistant supervisor</p>
	<p>Judgment and Critical Thinking</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB4. Use common sense and make judgments during day to day basis</p> <p>SB5. Use reasoning skills to identify and resolve basic problems</p> <p>SB6. Use intuition to detect any potential problems which could arise during Operations</p>
	<p>Desire to learn and take initiatives</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB7. Follow instructions and work on areas of improvement identified</p>

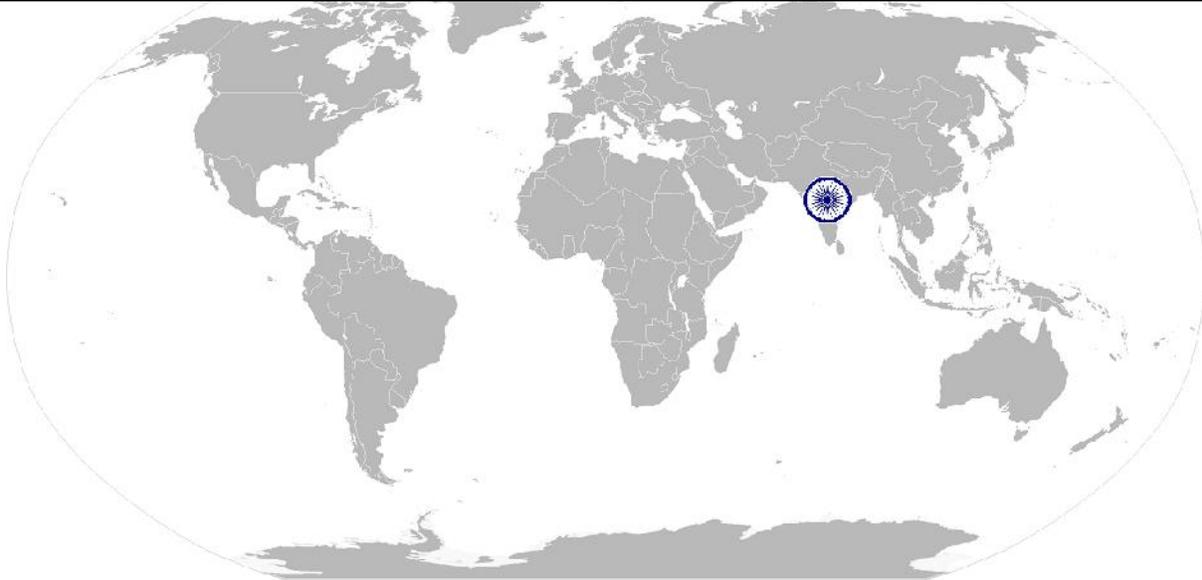
MIN/N 0464 Understand process and equipment requirement to complete the task

	<p>SB8. Complete the assigned tasks with minimum supervision</p> <p>SB9. Complete the job defined by the supervisor within timelines and quality norms</p>
	<p>Problem Solving and Decision making</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB10. Detect problems in day to day tasks</p> <p>SB11. Support supervisor in using specific problem solving techniques and detailing out the problems</p> <p>SB12. Discuss possible solution with the supervisor for problem solving</p> <p>SB13. Make decisions in emergency conditions in case the supervisor is not available(as per the authority matrix defined by the organization)</p>
	<p>Analytical Thinking</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB14. Use the existing data to arrive at specific data points</p> <p>SB15. Use the existing data points for improving the call resolution time</p> <p>SB16. Use the existing data points to generate required reports for business</p>
	<p>Critical Thinking</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB17. Apply, analyze, and evaluate the information gathered from observation, experience, reasoning, or communication, as a guide to thought and action</p>

MIN/N 0464 Understand process and equipment requirement to complete the task

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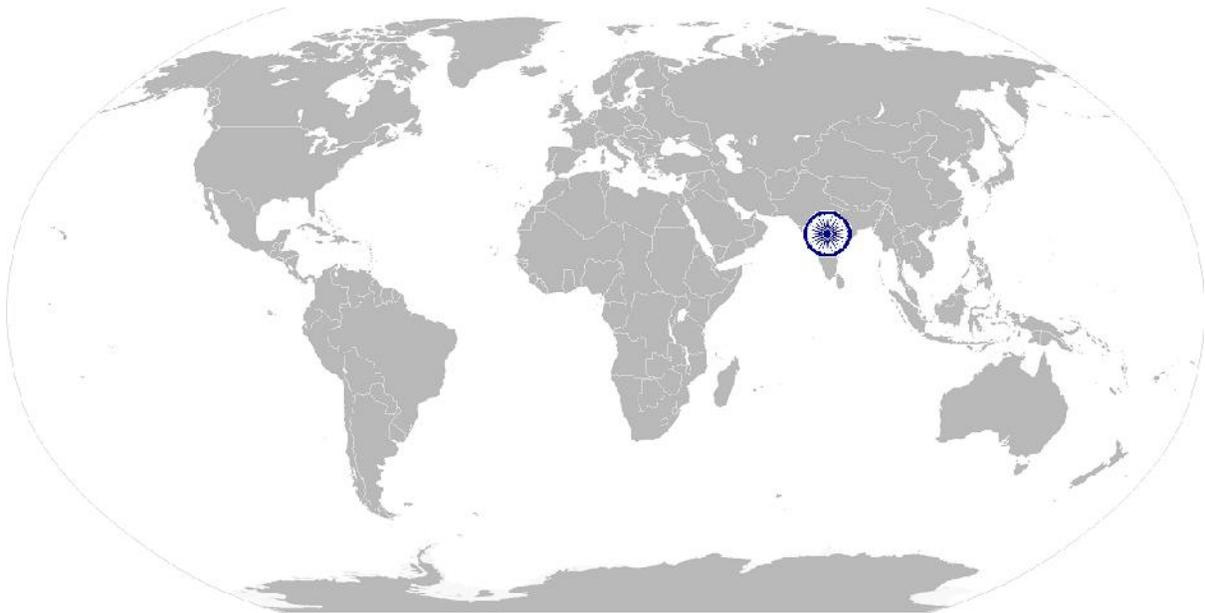
NOS Code	MIN/N 0464		
Credits(NSQF)	TBD	Version number	1.0
Sector	Mining	Drafted on	15/12/2014
Sub-sector	Open Cast and Underground Mines	Last reviewed on	24/03/2015
Occupation	Mechanical Maintenance	Next review date	24/03/2017



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MIN/ N 0465 Prepare the welding machine, auxiliary apparatus and metal work pieces for the welding process

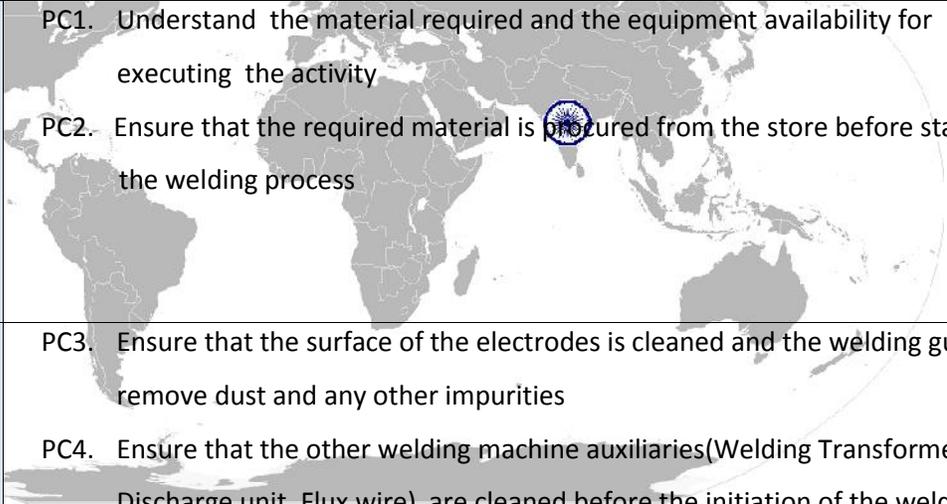
National Occupational Standard



Overview

This unit is about preparing the welding machine, auxiliary apparatus like transformers, gas cylinder, flux wires etc. and metal work pieces (jigs) for the welding process.

MIN/ N 0465 Prepare the welding machine, auxiliary apparatus and metal work pieces for the welding process

Unit Code	MIN/ N0465
Unit Title (Task)	Prepare the welding machine, auxiliary apparatus and metal work pieces for the welding process
Description	This OS unit is about preparing the surface of the metal parts by removing dust, moistures, rough edges etc, cleaning the welding apparatus and the electrodes and installing the metal parts (Jigs) and electrodes on the welding machine/ assembly block
Scope	This unit/task covers the following: <ul style="list-style-type: none"> • Arrange for the material and equipment for welding • Prepare the surface to be welded
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria
Arrange for availability of the electrodes, flux, filler material as per the requirement of the welding process	 <p>PC1. Understand the material required and the equipment availability for executing the activity</p> <p>PC2. Ensure that the required material is procured from the store before starting the welding process</p>
Clean the welding equipment before executing the welding process and setup the equipment	<p>PC3. Ensure that the surface of the electrodes is cleaned and the welding gun to remove dust and any other impurities</p> <p>PC4. Ensure that the other welding machine auxiliaries(Welding Transformer, Gas Discharge unit, Flux wire) are cleaned before the initiation of the welding process, as mentioned in the Work Instructions/ Standard Operating Procedures(SOP)</p> <p>PC5. Setup the welding apparatus as per the selected welding process and the internal SOPs/ Work Instructions and the setting standard for the machine</p>
Prepare the surface of the part (work pieces) on which welding needs to be conducted	<p>PC6. Ensure that the surface to the metal parts (work pieces) which need to be joint are cleaned</p> <p>PC7. Prepare the edge for the strongest possible weld using techniques like machining, chipping, grinding, oxy- acetylene cutting and carbon arc cutting</p> <p>PC8. Ensure that the parameters for edge parameters are as per the desired</p>

MIN/ N 0465 Prepare the welding machine, auxiliary apparatus and metal work pieces for the welding process

	specifications like speed, cost, adaptability etc
Knowledge and Understanding (K)	
A. Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. Different types of mines and detail of the mine he is working in</p> <p>KA2. Mine Organisation, time keeping, need for discipline and punctuality</p> <p>KA3. Benching in quarries, Dressing of overhangs, Undercuts, Fencing, First aid and Hygiene</p> <p>KA4. Standing orders in force at the mine. Safety in the vicinity of machinery</p> <p>KA5. Shot-firing and Safety regulations. How and where to take shelter</p> <p>KA6. Duties of workmen</p> <p>KA7. Provision of wages, working hours and accident compensation as per Mines act</p> <p>KA8. Knowledge of mining safety procedures</p> <p>KA9. Impact of violation of safely procedures</p>
B. Organizational Context (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. Relevant standard and procedures followed in the company</p> <p>KB2. Processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution</p>
C. Technical/ Domain Knowledge	<p>The user/individual on the job needs to know and understand:</p> <p>KC1. Different types of welding processes and associated equipment</p> <p>KC2. Different cleaning methods for electrodes, metal surfaces etc</p> <p>KC3. How to use measuring instruments like vernier calipers, micrometers</p> <p>KC4. Different types of joints</p> <p>KC5. How to read and interpret sketches and engineering drawings</p> <p>KC6. The impact of various physical parameters like temperature, pressure, electrode distance, electric current, voltage on the properties of final output product like durability, ductility, surface finish etc.</p> <p>KC7. Basic principles of geometric and drawing</p> <p>KC8. Basic principles of safety and 5S</p>

MIN/ N 0465 Prepare the welding machine, auxiliary apparatus and metal work pieces for the welding process

	KC9. Methods of edge preparation and associated equipment
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Writing Skills
	The user/ individual on the job needs to know and understand how to: SA1. Document information from the sketches and engineering drawings SA2. Prepare draft drawings for the final output product SA3. Note down observations (if any) related to the welding process SA4. Write information documents to internal departments/ internal teams or SA5. Enter the information in online ERP systems under guidance of the supervisor
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA6. Read and interpret engineering drawing and sketches SA7. Read and interpret symbols and measurements used in the drawings SA8. Read equipment manuals and process documents to understand the equipment and processes better SA9. Read internal information documents sent by internal teams
B. Professional Skills	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA10. Discuss task lists, schedules and activities with the supervisor SA11. Effectively communicate with the team members SA12. Question the supervisor in order to understand the nature of the problem and to clarify queries SA13. Attentively listen with full attention and comprehend the information given by the speaker
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB1. Plan and organize the work order and jobs received from the Operator SB2. Organize all process/ equipment manuals so that sorting/ accessing information is easy
	Analytical Thinking

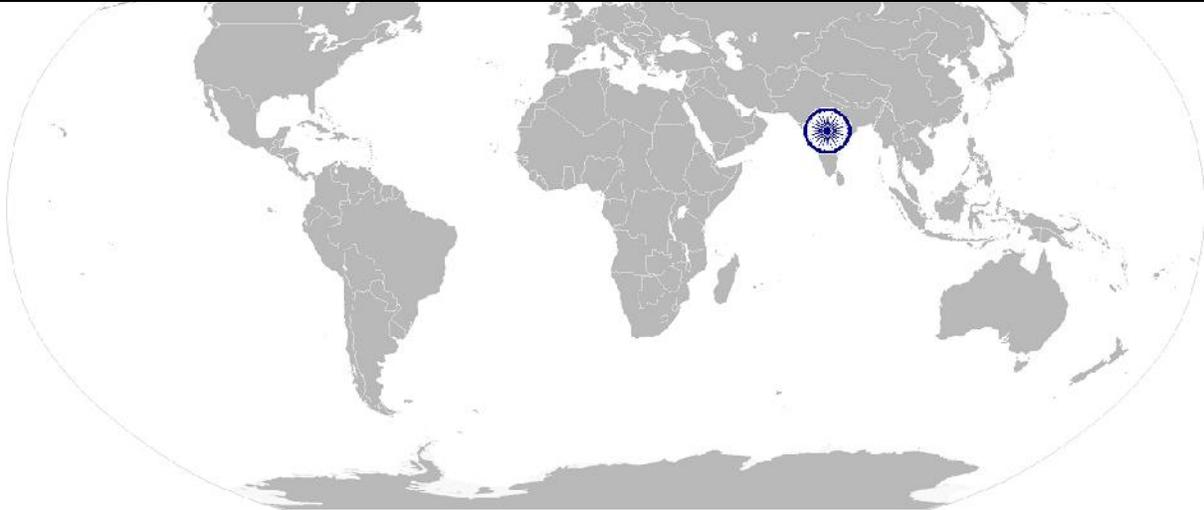
MIN/ N 0465 Prepare the welding machine, auxiliary apparatus and metal work pieces for the welding process

	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. Visualize the final job product after understanding the given drawing/ sketches</p> <p>SB4. Co-relate the type of job output required with the welding methodology to be used</p> <p>SB5. Identify the strengths and weakness of various welding process</p>
	<p>Judgment and Critical Thinking</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB6. Use common sense and make judgments during day to day basis</p> <p>SB7. Use reasoning skills to identify and resolve basic problems</p>
	<p>Desire to learn and take initiatives</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB8. Follow instructions and work on areas of improvement identified complete the assigned tasks with minimum supervision</p> <p>SB9. Complete the job defined by the supervisor within the timelines and quality norms</p> <p>SB10. Take self initiatives in driving small projects with the supervisor like operation improvement, training of helpers and assistant operators, 5S, Kaizen etc</p>

MIN/ N 0465 Prepare the welding machine, auxiliary apparatus and metal work pieces for the welding process

NOS Version Control

NOS Code	MIN/N 0465		
Credits(NSQF)	TBD	Version number	1.0
Sector	Mining	Drafted on	15/12/2014
Sub-sector	Open Cast and Underground Mines	Last reviewed on	24/03/2015
Occupation	Mechanical Maintenance	Next review date	24/03/2017



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Overview

This unit is about conducting the actual welding process for the selected work pieces (Jigs) as per the given work order and the standard specified by the organization.

MIN/ N 0466 Conduct the Welding Process

Unit Code	MIN/ N0466
Unit Title (Task)	Conduct the Welding Process
Description	This QP is about conducting Welding Operation as per the methodology selected for welding and the Standard Operating Procedures defined by the Organization and the outcome of the work order
Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> Installation of the work pieces and conduct of the welding process
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria
Install the welding work pieces on the welding apparatus	<p>PC1. Receive work permit from the supervisor</p> <p>PC2. Hold the parts (Jigs) which need to be welded together using a clamp and align them with the electrodes as per the job requirement so that the work pieces do not fall down/ turn</p> <p>PC3. Install the work pieces on the Welding apparatus keeping in mind the electrodes distance, contact area, pressure, temperature application etc as specified in the Welding SOP/ Control plan Documents/Work Instructions and instructed by the operator/ welder and the supervisor</p>
Check the operations of the welding machines and auxiliaries and conduct a test process	<p>PC4. Check for operation of core welding equipment like welding gun, welding transformer, gas cylinders and gas discharge guns (in case of MIG/ MAG welding) as per setup documentation</p> <p>Identify shift direction hazard</p> <p>PC5. Conduct destructive and non- destructive test activity to ensure conformance to the SOPs/ Work Instructions</p> <p>PC6. Inform supervisor to make modifications in the welding parameters as per the test activity outcomes and the prescribed standard for Destructive/ Non Destructive Tests</p>
Conduct the actual welding process	<p>PC7. Adjust the current/ voltage, temperature application as per the welding requirement and the activity test conducted earlier so that the desired heat can be created for the welding process</p> <p>PC8. Check for the positioning of the spot and the welding gun as per the work instructions and the work order/ hold the filler metal/ Flux material wire and</p>

MIN/ N 0466 Conduct the Welding Process

	<p>the Welding Gun at the recommended angle and distance mentioned in the setup document, keeping the work pieces stationary to ensure the required melting of base metal; Ensure the flow of filler material/ gas discharge as per the welding standard prescribed in the SOP/ Work Instructions</p>
<p>Monitor process parameters to ensure error free welding process</p>	<p>PC9. Monitor the welding process (Pressure, Temperature, gas discharge flow, electrode force, electrode distance etc) by observing the readings on the panels/ measuring instruments to prevent any harm to the work pieces due to overheating, burning, over melting, change in applied pressure etc</p> <p>PC10. Note down the observations in the prescribed format</p> <p>PC11. Observe and analyze any irregularity in the welding process and take preventive steps so that the overall quality of weld is as per the desired standard</p>
<p>Measure the two parts (work pieces) welded and remove welding inconsistency</p>	<p>PC12. Measure the final welded piece and compare the dimensions as prescribed in the work order engineering drawing</p> <p>PC13. In case the parts are not as per the given measurements, ensure that the assistant operators/ helpers remove extra material by using chippers, grinders etc.</p> <p>PC14. In case of any dents or bulges, ensure hammering of the bulges to give the work pieces the desired shape</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. Different types of mines and detail of the mine he is working in</p> <p>KA2. Mine Organisation, time keeping, need for discipline and punctuality</p> <p>KA3. Benching in quarries, Dressing of overhangs, Undercuts, Fencing, First aid and Hygiene</p> <p>KA4. Standing orders in force at the mine. Safety in the vicinity of machinery</p> <p>KA5. Shot firing and Safety regulations. How and where to take shelter</p> <p>KA6. Duties of workmen</p> <p>KA7. Provision of wages, working hours and accident compensation as per Mines act</p> <p>KA8. Knowledge of mining safety procedures</p> <p>KA9. Impact of violation of safely procedures</p>

MIN/ N 0466 Conduct the Welding Process

B. Organizational Context (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. Relevant manufacturing standard and procedures followed in the company</p> <p>KA2. Processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution</p> <p>KA3. Quality norms and standard prescribed in the Quality Manual by the organization for welding</p>
C. Technical/ Domain Knowledge	<p>The user/individual on the job needs to know and understand:</p> <p>KC1. Different types of welding processes and associated equipment</p> <p>KC2. Different types of joints used in welding</p> <p>KC4. Different cleaning methods for electrodes, metal surfaces etc</p> <p>KC5. The methods of using instruments like Vernier calipers, Micrometers, rulers and other inspection tools</p> <p>KC6. Various National and International welding standard used in Mining sector in India</p> <p>KC7. How to read and interpret sketches and engineering drawings</p> <p>KC8. How to visually represent the final product output and hence decide on the key steps to be followed for welding</p> <p>KC9. Different types of defects in welding and their impact</p> <p>KC10. Potential health and safety hazards and related Safety precautions to be undertaken during the welding process</p> <p>KC11. Basic chemical properties of material used for electrodes, flux, welding gases etc</p> <p>KC12. Basic knowledge of electrical laws and working of welding transformers, capacitors etc</p> <p>KC13. Knowledge of DC welding machines, checking voltage of machines etc</p> <p>KC14. Knowledge of welding gauges, different type of gauges etc</p>
Skills (S) [Optional]	
C. Core Skills/ Generic Skills	Writing Skills
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. Document information from the sketches and engineering drawings</p> <p>SA2. Note measurements, equipment panel readings for various</p>

MIN/ N 0466 Conduct the Welding Process

	process parameters in the required reporting formats
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA3. Read and interpret engineering drawing and sketches SA4. Read equipment manuals and process documents to understand the equipment and processes better SA5. Read internal information documents send by internal customers (other functions within the organization) the equipment in the plant area SA6. Read parameter reading on various types of monitoring panels
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA7. Discuss task lists, schedules and activities with the supervisor SA8. Effectively communicate with the team members and question the supervisor in order to understand the nature of the problem and to clarify queries SA9. Attentively listen with full attention and comprehend the information given by the speaker
D. Professional Skills	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB1. Plan and organize the work order and jobs received from the supervisor SB2. Organize all process/ equipment manuals so that sorting/ accessing information is easy SB3. Support the supervisor in scheduling tasks for helper and assistant operator
	Judgment and Critical Thinking
	The user/individual on the job needs to know and understand how to: SB4. Use common sense and make judgments during day to day basis SB5. Use reasoning skills to identify and resolve basic problems SB6. Use intuition to detect any potential problems which could arise during operations

MIN/ N 0466 Conduct the Welding Process

	Desire to learn and take initiatives
	The user/individual on the job needs to know and understand how to: SB7. Follow instructions and work on areas of improvement identified SB8. Complete the assigned tasks with minimum supervision SB9. Complete the job defined by the supervisor within the timelines and quality norms
	Problem Solving and Decision making
	The user/individual on the job needs to know and understand how to: SB10. How to detect problems in day to day activities SB11. Support supervisor in using specific problem solving techniques and detailing out the problems SB12. Discuss possible solution with the supervisor for problem solving SB13. Make decisions in emergency conditions in case the supervisor is not available(as per the authority matrix defined by the organization) SB14. Support the supervisor and master technique in problem solving using specific problem solving techniques
	Quality Consciousness
The user/individual on the job needs to know and understand how to: SB15. Identify defective parts in the manufacturing line by SB16. Comparing manufactured pieces with the specified work standard SB17. Guide the helper and the assistant operator in maintaining the quality SB18. Quality Standard as described in the internal Quality Manual SB19. Relate the impact of various processes and parameters the product quality	

MIN/ N 0466 Conduct the Welding Process

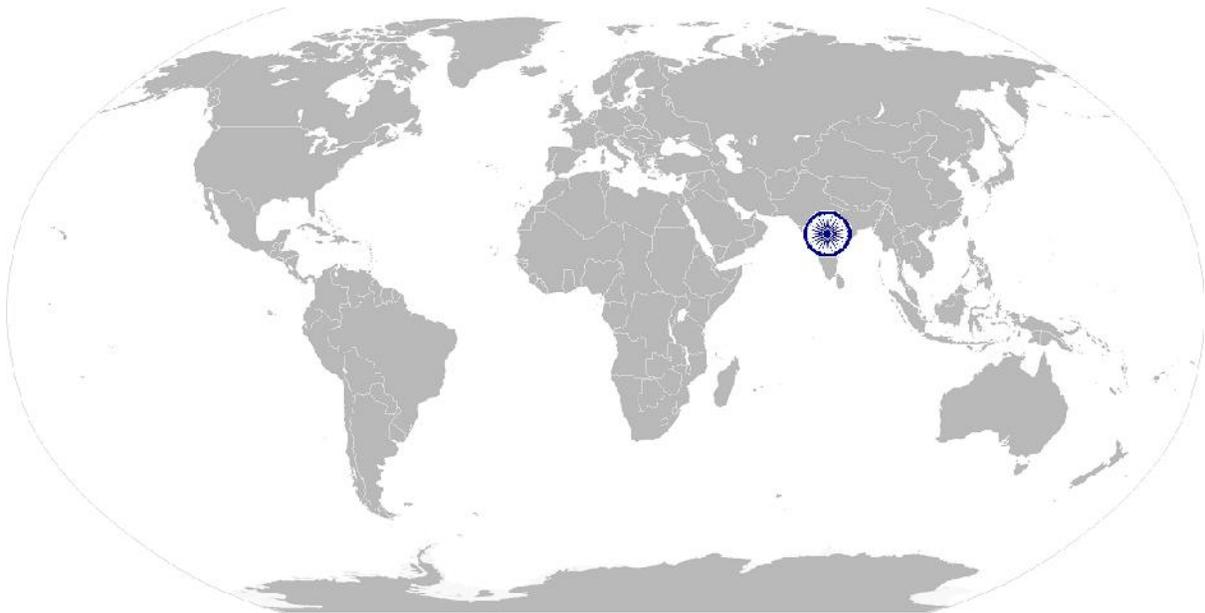
NOS Version Control

NOS Code	MIN/N 0466		
Credits(NSQF)	TBD	Version number	1.0
Sector	Mining	Drafted on	15/12/2014
Sub-sector	Open Cast and Underground Mines	Last reviewed on	24/03/2015
Occupation	Mechanical Maintenance	Next review date	24/03/2017

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MIN/ N 0467 Ensure completion of post operations activities like inspection, storage and maintenance

National Occupational Standard

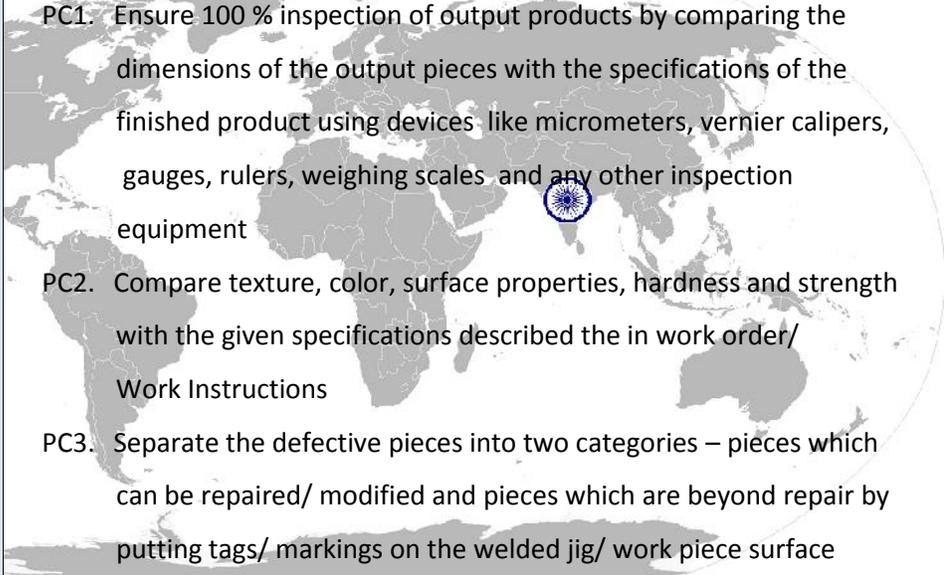


Overview

This unit is about conducting Quality Checks and inspection of the finished products produced and repair the bad quality items produced.

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Unit Code	MIN/ N0467
Unit Title (Task)	Ensure completion of post operations activities like inspection, storage and maintenance
Description	This OS unit is about inspecting the finished goods produced for any damages, deformities and Further repairing the parts produced so that the damaged/ defective pieces can be corrected
Scope	This unit/task covers the following: <ul style="list-style-type: none"> • Inspection of finished goods and maintaining records
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria
Inspection of finished goods to detect any deviations from the product design	 <p>PC1. Ensure 100 % inspection of output products by comparing the dimensions of the output pieces with the specifications of the finished product using devices like micrometers, vernier calipers, gauges, rulers, weighing scales and any other inspection equipment</p> <p>PC2. Compare texture, color, surface properties, hardness and strength with the given specifications described the in work order/ Work Instructions</p> <p>PC3. Separate the defective pieces into two categories – pieces which can be repaired/ modified and pieces which are beyond repair by putting tags/ markings on the welded jig/ work piece surface</p> <p>PC4. Ensure that the pieces which are not OK and not meeting the specified standard and cannot be repaired are discarded</p>
Maintain records for production and defective pieces	PC5. Maintain data records for quality defects and pieces which are beyond repair
Unload and store the Finished Goods	<p>PC6. Ensure that the output pieces is correctly clamped and lifted using suitable equipment like hoist, lifts, crane, etc</p> <p>PC7. Ensure that there is no damage to the lifted work pieces</p> <p>PC8. Carry the output product to the designated area using hangars, conveyor belts, cranes, forklifts etc</p>

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Ensure cleanliness and 5S is maintained at the workplace	<p>PC9. Ensure that all equipment is stored in a proper order as indicated in the equipment manual and the designated area</p> <p>PC10. Ensure that the equipment and the work place are regularly cleaned and that there is not accumulation of dust, moisture and waste material</p>
Conduct regular preventive maintenance of equipment	<p>PC11. Check the working of all bearing, rollers, shafts etc and oil all moving parts of the equipment on a periodic basis</p> <p>PC12. Check the working of non moving parts and periodically conduct preventive maintenance to prevent machine failure</p> <p>PC13. Periodically check the equipment calibration and report any errors to the maintenance teams for rectification</p>
Knowledge and Understanding (K)	
A. Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. Different types of mines and detail of the mine he is working in</p> <p>KA2. Mine Organisation, time keeping, need for discipline and punctuality</p> <p>KA3. Benching in quarries, Dressing of overhangs, Undercuts, Fencing, First aid and Hygiene</p> <p>KA4. Standing orders in force at the mine. Safety in the vicinity of machinery</p> <p>KA5. Shot firing and Safety regulations. How and where to take shelter</p> <p>KA6. Duties of workmen</p> <p>KA7. Provision of wages, working hours and accident compensation as per Mines act</p> <p>KA8. Knowledge of mining safety procedures</p> <p>KA9. Impact of violation of safely procedures</p>
B. Organizational Context (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. Basic process followed for inspection of the pieces</p> <p>KB2. The Quality Management policy and manual of the organization</p> <p>KB3. Relevant standard and procedures followed in the company for the process of maintenance and equipment storage</p> <p>KB4. Processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution</p>

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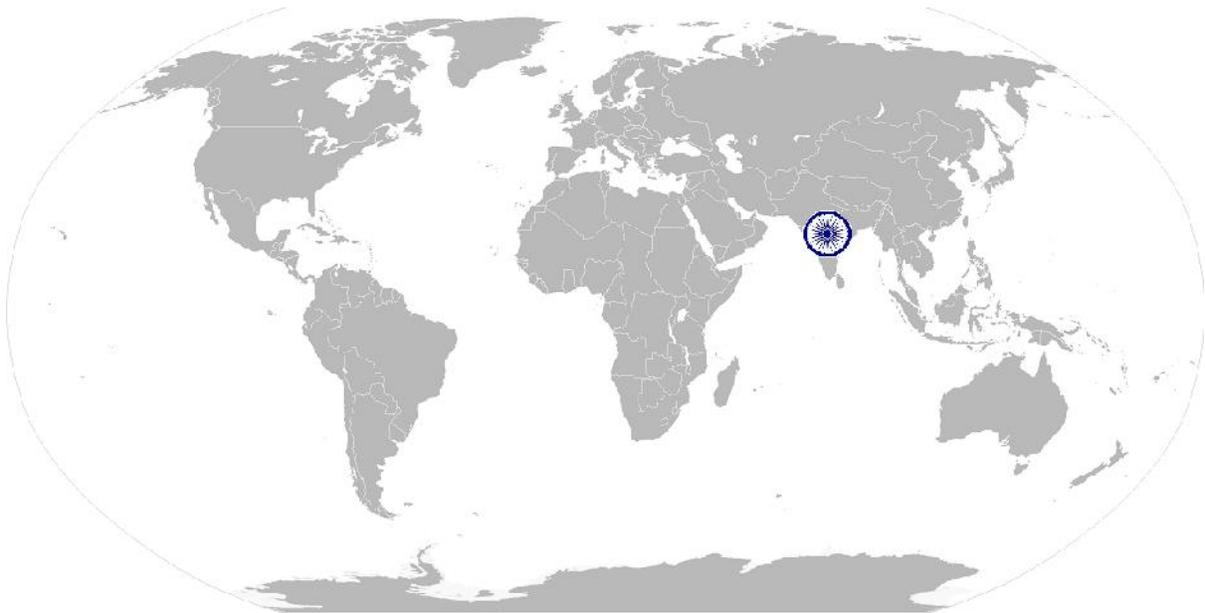
<p>C. Technical/ Domain Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KC1. Techniques of using measurement instruments like rulers, vernier calipers, micrometers, weighing scale, gauges and other inspection equipment</p> <p>KC2. Guidelines to identify quality defects in work pieces – visual/ test based</p> <p>KC3. methods used for cutting, shearing, hammering, drilling which can repair pieces with minor defects</p> <p>KC4. Basic level maintenance and cleaning techniques</p> <p>KC5. Various solvents, chemicals, lubricants etc used during the maintenance processes</p> <p>KC6. Procedure for arranging the equipment in the prescribed manner including tagging and numbering of machine parts</p> <p>KC7. Safety precautions to be taken during cleaning and maintenance activities</p> <p>KC8. Basic welding defects and corrective measures</p> <p>KC9. Basic level operations of lifting equipment like hoists, cranes, pulley etc.</p>
<p>Skills (S) [Optional]</p>	
<p>E. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. Document information from the sketches and engineering drawings</p> <p>SA2. Prepare draft drawings for the final output product note down observations (if any) related to the welding process</p> <p>SA3. Write information documents to internal departments/ internal teams or enter the information in online ERP systems under guidance of the supervisor</p> <p>Reading Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA4. Read and interpret engineering drawing and sketches</p> <p>SA5. read and interpret symbols and measurements used in the drawings</p> <p>SA6. Read equipment manuals and process documents to understand the equipment and processes better</p> <p>SA7. Read internal information documents sent by internal teams</p>

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	<p>Oral Communication (Listening and Speaking skills)</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SA8. Discuss task lists, schedules and activities with the supervisor SA9. Effectively communicate with the team members SA10. Question the operator/ supervisor in order to understand the nature of the problem and to clarify queries SA11. Attentively listen with full attention and comprehend the information given by the speaker
<p>F. Professional Skills</p>	<p>Plan and Organize</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB1. Plan and organize the work order and jobs received from the Operator SB2. Organize all process/ equipment manuals so that sorting/ accessing information is easy SB3. Support the supervisor in scheduling tasks for helper and assistant supervisor
	<p>Judgment and Critical Thinking</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB4. Use common sense and make judgments during day to day basis SB5. Use reasoning skills to identify and resolve basic problems SB6. Use intuition to detect any potential problems which could arise during operations
	<p>Desire to learn and take initiatives</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB7. Follow instructions and work on areas of improvement identified SB8. Complete the assigned tasks with minimum supervision SB9. Complete the job defined by the supervisor within the timelines and quality norms
	<p>Problem Solving and Decision making</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB10. Detect problems in day to day tasks

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	<p>SB11. Support supervisor in using specific problem solving techniques and detailing out the problems</p> <p>SB12. Discuss possible solution with the supervisor for problem solving</p> <p>SB13. Make decisions in emergency conditions in case the supervisor is not available(as per the authority matrix defined)</p>
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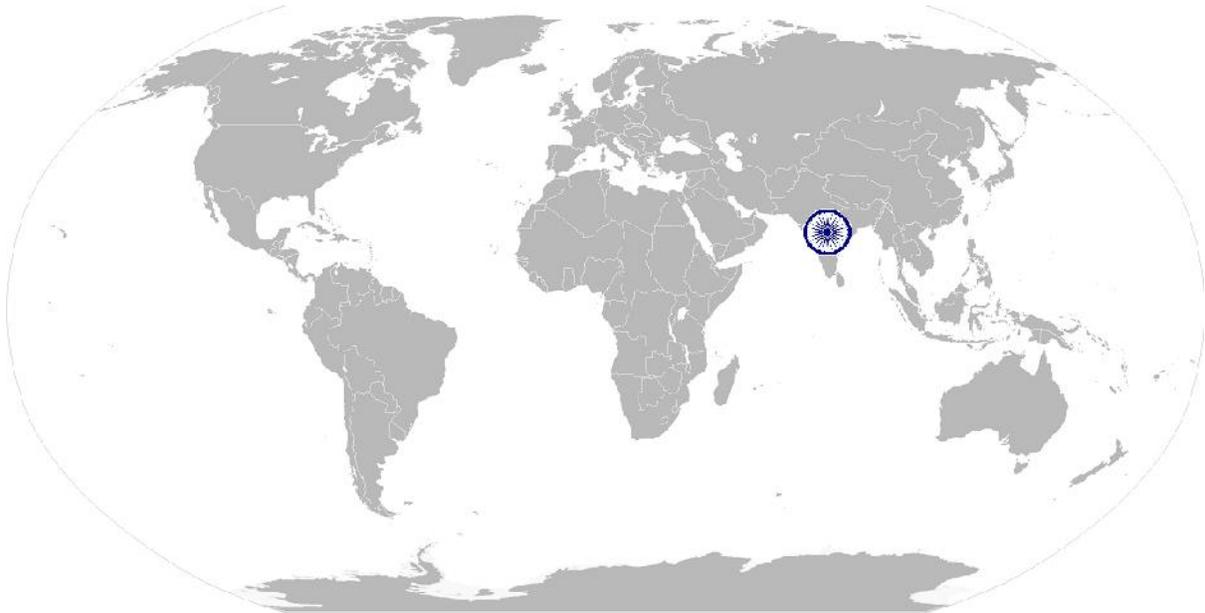
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Sector	Mining	Drafted on	15/12/2014
Sub-sector	Open Cast and Underground Mines	Last reviewed on	24/03/2015
Occupation	Mechanical Maintenance	Next review date	24/03/2017



National Occupational Standard



Overview

This unit is about health and safety measures critical in mines

Unit Code	MIN/N 0901
Unit Title (Task)	Health and Safety
Description	This unit is about health and safety measures critical in mines
Scope	<p>This OS unit/task covers the following:</p> <ul style="list-style-type: none"> Health and safety measures critical in mines
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria
Safety, Security and Administrative	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. Comply with occupational health and safety regulations adopted by the employer.</p> <p>PC2. Follow mining operations procedures with respect to materials handling and accidents</p> <p>PC3. Follow the correct safety steps in case of accident or major failure</p> <p>PC4. Comply with safety regulations and procedures in case of fire hazard.</p> <p>PC5. Operate various grades of fire extinguishers.</p> <p>PC6. Work responsibly and as safe and careful as possible so as not to put the health and safety of self or others at risk, including members of the public</p> <p>PC7. Perform storage and transport of hazardous materials compliant with safety guidelines prescribed by DGMS.</p> <p>PC8. Deal with misfires as per statutory requirement</p> <p>PC9. Identify characteristics of post-blast fumes and take necessary precautions.</p> <p>PC10. Wears safety gear such as hard hat, respiratory protection, eye protection, ear protection</p> <p>PC11. Follow the manufacturer’s instructions for care and safe operation of the equipment.</p>
Knowledge and Understanding (K)	

<p>A. Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))</p>	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> KA1. Benching in quarries, Dressing of overhangs, undercuts, Fencing KA2. First aid and Hygiene KA3. Code of traffic in specific areas of mine. Significance of fences KA4. Standing orders in force at the mine. Safety in the vicinity of machinery KA5. Shot-firing and Safety regulations. How and where to take shelter KA6. Knowledge of mining safety procedures KA7. Impact of violation of safety procedures KA8. Locally prepared Emergency Preparedness / Disaster Management Plan. KA9. Environmental impact of mining KA10. Sources of dust, noise and vibration and measures to minimise KA11. Hazardous material safety and security rules and regulations as prescribed by DGMS KA12. Code of practice for safe handling and transport of dangerous material and heavy equipment.
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NOS Version Control

NOS Code	MIN/N 0901		
Credits(NSQF)	TBD	Version number	1.0
Sector	Mining	Drafted on	15/12/2014
Sub-sector	Underground Mines	Last reviewed on	24/03/2015
Occupation	Mechanical Maintenance	Next review date	24/03/2017



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CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role Mine Welder

Qualification Pack MIN/ Q 0423

Sector Skill Council Mining

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on this criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

		Total Mark (100)	Out Of	Marks Allocation	
				Theory	Skills Practical
1. MIN/ N0464 (Understand processes and equipment requirement to complete the task)	PC1. Understand the right welding methodology and process to be adopted for completing the work order through discussions with the supervisor and reading the process manuals/ Work Instructions/Standard Operating Procedures	20	4	2	2
	PC2. Understand the various welding parameters like temperature, pressure, electrode type, electrode distance, process cycle time etc before starting the welding process, as mentioned in the Work Instructions/ SOP manual		4	2	2
	PC3. Understand the material required and the equipment availability for executing the activity		4	2	2
	PC4. Understand the type of electrodes – material wise & dimension wise, type of filler material etc used for		4	2	2

	the welding process				
	PC5. Correctly understand the type of electrode in terms of electrode material and thickness, filler material and flux which will be required for the selected welding process before the initiation of the welding process		4	3	1
		Total	20	11	9
2. MIN/ N0465 (Prepare the machine, auxiliaries and work pieces for the welding process)	PC1. Understand the material required and the equipment availability for executing the activity	20	2	1	1
	PC2. Ensure that the required material is procured from the store before starting the welding process		2	1	1
	PC3. Ensure that the surface of the electrodes is cleaned and the welding gun to remove dust and any other impurities		3	2	1
	PC4. Ensure that the other welding machine auxiliaries(Welding Transformer, Gas Discharge unit, Flux wire) are cleaned before the initiation of the welding process, as mentioned in the Work Instructions/ Standard Operating Procedures(SOP)		3	2	1
	PC5. Setup the welding apparatus as per the selected welding process and the internal SOPs/ Work Instructions and the setting standard for the machine		3	2	1
	PC6. Ensure that the surface to the metal parts (work pieces) which need to be joint are cleaned		3	2	1
	PC7. Prepare the edge for the strongest possible weld using techniques like machining, chipping, grinding, oxy- acetylene cutting and carbon arc cutting		2	1	1

	PC8. Ensure that the parameters for edge parameters are as per the desired specifications like speed, cost, adaptability etc		2	1	1
		Total	20	12	8
3. MIN/ N0466 (Conduct the Welding process and weld the work pieces)	PC1. Receive work permit from the supervisor	20	1	0.5	0.5
	PC2. Hold the parts (Jigs) which need to be welded together using a clamp and align them with the electrodes as per the job requirement so that the work pieces do not fall down/ turn		2	1.5	0.5
	PC3. Install the work pieces on the Welding apparatus keeping in mind the electrodes distance, contact area, pressure, temperature application etc as specified in the Welding SOP/ Control plan Documents/Work Instructions and instructed by the operator/ welder and the supervisor		2	1.5	0.5
	PC4. Check for operation of core welding equipment like welding gun, welding transformer, gas cylinders and gas discharge guns (in case of MIG/ MAG welding) as per setup documentation Identify shift direction hazard		1	0.5	0.5
	PC5. Conduct destructive and non- destructive test activity to ensure conformance to the SOPs/ Work Instructions		1	0.5	0.5
	PC6. Inform supervisor to make modifications in the welding parameters as per the test activity outcomes and the prescribed standard for Destructive/ Non Destructive Tests		1	0.5	0.5
	PC7. Adjust the current/ voltage, temperature application as per the welding requirement and the activity test conducted earlier so that the desired heat can be created for the welding process		2	1.5	0.5

	PC8. Check for the positioning of the spot and the welding gun as per the work instructions and the work order/ hold the filler metal/ Flux material wire and the Welding Gun at the recommended angle and distance mentioned in the setup document, keeping the work pieces stationary to ensure the required melting of base metal; Ensure the flow of filler material/ gas discharge as per the welding standard prescribed in the SOP/ Work Instructions		2	1.5	0.5
	PC9. Monitor the welding process (Pressure, Temperature, gas discharge flow, electrode force, electrode distance etc) by observing the readings on the panels/ measuring instruments to prevent any harm to the work pieces due to overheating, burning, over melting, change in applied pressure etc		2	1.5	0.5
	PC10. Note down the observations in the prescribed format		1	0.5	0.5
	PC11. Observe and analyze any irregularity in the welding process and take preventive steps so that the overall quality of weld is as per the desired standard		1	0.5	0.5
	PC12. Measure the final welded piece and compare the dimensions as prescribed in the work order engineering drawing		2	1.5	0.5
	PC13. In case the parts are not as per the given measurements, ensure that the assistant operators/ helpers remove extra material by using chippers, grinders etc.		1	0.5	0.5
	PC14. In case of any dents or bulges, ensure hammering of the bulges to give the work pieces the desired shape		1	0.5	0.5
		Total	20	13	7
4. MIN/ N0467 (Ensure completion of post operations)	PC1. Ensure 100 % inspection of output products by comparing the dimensions	20	1	0.5	0.5

activities like inspection, storage and maintenance)	of the output pieces with the specifications of the finished product using devices like micro meters, vernier callipers, gauges, rulers, weighing scales and any other inspection equipment				
	PC2. Compare texture, color, surface properties, hardness and strength with the given specifications described the in work order/ Work Instructions		1	0.5	0.5
	PC3. Separate the defective pieces into two categories – pieces which can be repaired/ modified and pieces which are beyond repair by putting tags/ markings on the welded jig/ work piece surface		2	1.5	0.5
	PC4. Ensure that the pieces which are not OK and not meeting the specified standard and cannot be repaired are discarded		2	1.5	0.5
	PC5. Maintain data records for quality defects and pieces which are beyond repair		1	0.5	0.5
	PC6. Ensure that the output pieces is correctly clamped and lifted using suitable equipment like hoist, lifts, crane, etc		2	1.5	0.5
	PC7. Ensure that there is no damage to the lifted work pieces		2	1.5	0.5
	PC8. Carry the output product to the designated area using hangars, conveyor belts, cranes, forklifts etc		2	1.5	0.5
	PC9. Ensure that all equipment is stored in a proper order as indicated in the equipment manual and the designated area		2	1.5	0.5
	PC10. Ensure that the equipment and the work place are regularly cleaned and that there is not accumulation of dust, moisture and waste material		1	0.5	0.5
	PC11. Check the working of all bearing, rollers, shafts etc and oil all moving parts of the equipment on a periodic basis		2	1.5	0.5
	PC12. Check the working of non moving parts and		1	0.5	0.5

	periodically conduct preventive maintenance to prevent machine failure				
	PC13. Periodically check the equipment calibration and report any errors to the maintenance teams for rectification		1	0.5	0.5
		Total	20	13.5	6.5
5. MIN/N 0901 (Health and Safety)	PC1. Comply with occupational health and safety regulations adopted by the employer.	20	2	1	1
	PC2. Follow mining operations procedures with respect to materials handling and accidents		2	1	1
	PC3. Follow the correct safety steps in case of accident or major failure		2	1	1
	PC4. Comply with safety regulations and procedures in case of fire hazard.		2	1	1
	PC5. Operate various grades of fire extinguishers.		2	1	1
	PC6. Work responsibly and as safe and careful as possible so as not to put the health and safety of self or others at risk, including members of the public		2	1	1
	PC7. Perform storage and transport of hazardous materials compliant with safety guidelines prescribed by DGMS.		2	1	1
	PC8. Deal with misfires as per statutory requirement		2	1	1
	PC9. Identify characteristics of post-blast fumes and take necessary precautions.		2	1	1
	PC10. Wears safety gear such as hard hat, respiratory protection, eye protection, ear protection		1	0.5	0.5
	PC11. Follow the manufacturer's instructions for care and safe operation of the equipment.		1	1	0
		Total	20	10.5	9.5