



National Competency Standards for “Senior Technician/Shot Firer in Mining Process Technology” Level 4



**National Vocational and Technical Training Commission (NAVTTTC),
Government of Pakistan**



ACKNOWLEDGEMENT

National Vocational and Technical Training Commission (NAVTTTC) extends its gratitude and appreciation to representatives of business, industry, academia, government agencies, provincial TEVTAs, sector skill councils and trade associations who spared time and extended their expertise for the development of National Vocational Qualifications for the trade of **Mining Process Technology**. This work would not have been possible without the technical support of the above personnel.

NAVTTTC initiated development of CBT&A based qualifications for 200 traditional / hi-tech trades, focusing on Development & Standardization of 200 Technical & Vocational Education & Training (TVET) Qualifications.

NAVTTTC efforts have received full support from the Ministry of Federal Education and Professional Training, which highly facilitated progress under this initiative.

It may not be out of place to mention here that all the experts of Industry, Academia, VET TEVTAs, BTEs and PVTC work diligently for making this qualification worthy and error free for which all credit goes to them. However, NAVTTTC accepts the responsibility of all the errors and omissions still prevailing in the qualification document.

Development of Skill Standards is a dynamic and ongoing process, and the developed skill standards need periodic review and updating owing to the constant technological advancements, development in scientific knowledge, and growing experience of implementation at the grass root level as well as the demand of industry. NAVTTTC will ensure to keep the qualifications abreast with the changing demands of both national and international job markets.

**Executive Director,
NAVTTTC**



Table of Contents

Introduction	4
Purpose of the Qualification.....	6
Date of Validation	6
Date of Review	6
Codes of Qualification	7
Members of Qualification Development Committee	7
Members of Qualification Development Committee	8
Members of Qualification Review Committee	9
ENTRY REQUIREMENTS	9
Regulation of the Qualification and schedule of units	9
Summary of Competency Standards	10
Details of Competency Standards	11
041700841A-Competency Standard: Monitor Workplace Policy and Procedures	11
724CO10B-Competency Standard: Perform Effective Communication Skills	14
724CO10C-Competency Standard: Maintain Occupational Health and Safety SoPs System	16
724MP14D-Maintain Professionalism at Workplace	19
724MP13E-Competency Standard: Develop 3D Drawing	21
724MP14F -Competency Standard: Design Blasting Operations	23
724MP14G -Competency Standard: Perform Underground Mining Technique	26
724MP14H -Competency Standard: Perform Surface Mining Technique	28
724MP14I -Competency Standard: Install Ground Support.....	31
724MP14J-Competency Standard: Ensure Explosives Chain of custody & Inventory Control after issuance	33
724MP14K-Competency Standard: Perform Basic Green Skills at Mining Site	35
COMPLETE LIST OF TOOLS AND EQUIPMENT	37



Introduction

Mining technology is extraction of valuable minerals ores like Manganese, tantalum, Cassiterite, copper, tin, nickel, bauxite, iron, gold, silver, and diamonds or other geological materials from the surface or under the earth. Usually these ore bodies in the form of lode, vein, seam, reef, or placer deposit. In other words, industrial activity removes rock from the Earth's crust and processes it to remove valuable minerals for us to use. This technology in a wider sense also includes extraction of any non-renewable resource such as petroleum, natural gas, or even water.

Primarily, there are two types of mining methods being used for the extraction of minerals and ores; surface/opencast mining and underground mining. The choice of method is largely determined by factors such as depth, geology of the mineral deposit and the cost of equipment. When evaluating mineral deposits, it is extremely important to keep profit in mind. The total quantity of mineral in a given deposit is referred to as the mineral inventory, but only that quantity that can be mined at a profit is termed ore reserves.

The overall sequence of activities in modern mining is often compared with the five stages in the life of a mine: prospecting, exploration, development, exploitation, and reclamation. In the first Prospecting stage; geophysical, geochemical procedures, Location of favourable loci (maps, literature, and old mines), Air source/aerial photography, airborne geophysics, satellite, Surface/ ground geophysics, geology and Spot anomaly is evaluated. Exploration (Ore body); Sample (drilling or excavation), assay, blasting, testing analysis, Estimation tonnage and grade, value deposit: present value, income cost, Feasibility study: make decision to abandon or develop. Development (Prospect); Acquire mining rights (purchase or lease), File environmental impact statement, technology, assessment, permit, Construct access roads, transport system, locate surface plant, construct facilities, excavate deposit (strip or sink shaft). Exploitation (Mine); Factors in choice of methods like geologic, geographic, economic, environmental, societal safety, Types of mining methods. Surface: open pit, open cast, etc. Underground: room and pillar, block caving, etc. Monitor costs and



National Competency Standards for “Senior Technician/Shot Firer in Mining Process Technology”



economic payback. Reclamation (Real estate); Removal of plant and buildings. Reclamation of waste and tailings dumps, Monitoring of discharges

Being cognizant of this fact, National Vocational & Technical Training Commission (NAVTTTC) developed competency standards for Mining and mineral technology training under National Vocational Qualifications Framework (NVQF). These competency standards have been developed by a Qualifications Development Committee (QDC) and validated by the Qualifications Validation Committee (QVC) having representation from the leading development in mining area of the country.



Purpose of the Qualification

The competency based NVQ has been developed to train the unskilled men and women of Pakistan on the technical and entrepreneurial skills to be employed / self-employed and inevitably set sustainable impact on their lives by enhancing their livelihood income.

The purpose of these qualifications is to set professional standards for upcoming experts, who will serve as key elements enhancing quality of Pakistan’s manufacturing sector. The specific objectives of developing these qualifications are as under:

- Ensure compliance with workplace policies and procedures to maintain operational efficiency.
- Demonstrate effective verbal and written communication in a mining context.
- Implement and follow occupational health and safety standard operating procedures.
- Exhibit professional behavior, ethics, and work discipline in the workplace.
- Create accurate and functional 3D drawings for mining and technical applications.
- Plan and design safe and efficient blasting operations using appropriate methods.
- Apply underground mining techniques with emphasis on safety and productivity.
- Execute surface mining operations using standard procedures and equipment.
- Install appropriate ground support systems to maintain underground stability.
- Maintain strict inventory control and documentation of explosives after issuance.
- Apply basic environmental (green) practices to reduce ecological impact at mining sites.

Date of Validation

The level 4 Mining Process Technology qualification has been validated on 04 Oct to 08 Oct, 2021 at PITAC, Lahore, by the qualification validation committee (QVC) members.

Date of Review

The level 4 Mining Process Technology qualification has been reviewed on **30 June to 03 July 2025** at NUTECH, Islamabad, by the qualification review committee (QRC) members.



National Competency Standards for “Senior Technician/Shot Firer in Mining Process Technology”



Codes of Qualification

Qualification Title	Code
National Vocational Certificate Level in Mining Process Technology “Senior Technician/Shot Firer”	724MP14

Members of Qualification Development Committee

The following members participated in the qualification development process at PITAC, Lahore. **Date:** 13 to 17 August 2021

S#	Name	Designation
1.	Dr. Shahid Tufail Sheikh	Member Science, Ex-Head of MPRC Lahore
2.	Dr. Farhat Yasmeen	Professor, UET Lahore
3.	Dr. Muhammad Naeem Khan	AP, Govt Science College Wahdat Road, Lahore
4.	Dr. Irfan Hafeez	Senior Scientific Officer, PCSIR Lahore
5.	Dr. Asma Sheikh	Scientific Officer, PCSIR Lahore
6.	Dr. Shafia Iftikhar	AP, University of Sahiwal
7.	Muhammad Irfan Zubair	Deputy Director GSP, Lahore
8.	Shahbaz Muhammad	Assistant geophysicist GSP, Lahore
9.	Hafiz Zeeshan Akram	Assistant Director GSP, Lahore
10.	Muhammad Shahzad	Director, NAVTTC, Islamabad
11.	Engr. Saba Sadiq	DACUM FACILITATOR, Islamabad



Members of Qualification Development Committee

The following members participated in the qualification development process at PITAC, Lahore. **Date: Oct 4th 2021 to oct 8th 2021**

S#	Name	Designation
1.	Aftab Hussain	DACUM Facilitator/ Principal P-TEVTA Rawalpindi
2.	Dr. Shahid Tufail Sheikh	Member Science, Ex-Head of MPRC Lahore
3.	Dr. Farhat Yasmeen	Professor, UET Lahore
4.	Dr. Muhammad Naeem Khan	AP, Govt Science College Wahdat Road, Lahore
5.	Dr. Irfan Hafeez	Senior Scientific Officer, PCSIR Lahore
6.	Engr. Shafaat Ali	Lecturer (Mining) GCT KharBajaur
7.	Engr. M. MuneeburRehman Khan	Measurement Engineer, ACC PVT Ltd
8.	ZeeshanMusadiq	Data Engineer/Mudlogger (Geologist) Petro Services
9.	Tariq Mehmoob	Incharge Operational Wing PBTE, Lahore
10.	Mr. Tahir Shah	Assistant Secretary TTB Peshawar
11.	Syed Mansoor Ahmed	Assistant Manager IT, NVQF Registry Incharge, SBTE Sindh



Members of Qualification Review Committee

The following members participated in the qualification review process at NUTECH, Islamabad. **Date:** 30 June to 03 July 2025

S#	Name	Designation
1.	Mr. Samad Khan Kakar	Director, DoE (NESPA)
2.	Mr. Hafeez Ullah	Deputy Director, DoE, (NESPA)
3.	Dr. Habib Ur Rehman Marwat	UET, Peshawar
4.	Mr. Mobin Ul Haq	Wah Nobel
5.	Col.® Sherazi	Director, OS Directorate, GHQ
6.	Col. Saad Tajwar	OS Directorate, GHQ
7.	Lt. Col. Fahad	MI Director, GHQ
8.	Maj. Tahir	CIEDO, HQ
9.	Engr. Hamza Khan	FCCL, Wah
10.	Engr. Muhammad Yousuf	Lecturer, NUTECH
11.	Engr. Yasir Ghazi	KP TEVTA
12.	Maj. Omar	OS Directorate
13.	Mr. Imtiaz Ahmed Sial	NAVTTTC Hq
14.	Engr. Muhammad Aleem	DD/DACUM, Facilitator

ENTRY REQUIREMENTS

For National Vocational Certificate Level-4 in Mining Process Technology “

Senior technician/ Shot firer”, the entry requirement is **Level-3** in Mining Process Technology “Technician” in formal institute.

Regulation of the Qualification and schedule of units

Not applicable



Summary of Competency Standards

Sr.#	Competency Standards	NVQF Level	Category	Estimated Contact Hr.			Credit Hr.
				Th.	Pr.	Total	
	Senior technician/ short firer in Mining Process Technology -LEVEL 4						
1.	Monitor Workplace Policy and Procedures	4	Generic	12	18	30	3
2.	Perform effective communication skills	4	Generic	20	30	50	5
3.	Maintain Occupational Health and Safety SoPs System	4	Generic	20	30	50	5
4.	Maintain Professionalism in Workplace	4	Generic	20	30	50	5
5.	Develop 3D Drawing	4	Technical	14	66	80	8
6.	Design Blasting Operations	4	Technical	31	99	130	13
7.	Perform Underground Mining Technique	4	Technical	26	114	140	14
8.	Perform Surface Mining Technique	4	Technical	26	114	140	14
9.	Install Ground Support	4	Technical	24	126	150	15
10.	Ensure Explosives Chain of custody & Inventory Control after issuance	4	Technical	29	171	200	20
11.	Perform Basic Green Skills at Mining Site	4	Technical	9	21	30	3
	Total			240	960	1200	120



Details of Competency Standards

041700841A-Competency Standard: Monitor Workplace Policy and Procedures

Overview: This unit describes the skills and knowledge required to implement a workplace policy & procedures and to modify the policy to suit changed circumstances. It applies to individuals with managerial responsibilities who undertake work developing approaches to create, monitor and improve strategies and policies within workplaces and engage with a range of relevant stakeholders and specialists.

Competency Unit	Performance Criteria
CU1. Plan and organize work	You must be able to: P1. Identify work objectives on given instructions P2. Select appropriate tools for the assigned job P3. Allocate resources according to work needs P4. Complete assigned tasks with in allocated time
CU2. Manage to convene meeting	You must be able to: P1. Develop agenda in line with meeting purpose P2. Select participants and notify them accordingly P3. Carryout meeting arrangements according to the time P4. Record the minutes of the meeting
CU3. Set and meet own work priorities at instant	You must be able to: P1. Identify urgent tasks based on immediate work requirements P2. Select tasks with the highest impact o outcomes P3. Use available resources effectively for immediate tasks P4. Maintain focus under time pressure P5. Complete top priority tasks within tight deadlines



CU4. Develop and maintain professional competence	You must be able to: P1. Identify personal skill gaps through self-assessment P2. Set development goals based on job role P3. Seek feedback from supervisors after key tasks P4. Maintain records of professional development activities P5. Review progress towards competence goals periodically
	develop and improve competence
CU5. Follow and implement work safety requirements	You must be able to: P1. Identify workplace hazards P2. Wear correct PPE P3. Follow safety signs P4. Report unsafe acts

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- Understand how to plan and organize work tasks.
- Know how to set priorities under pressure.
- Recognize the importance of continuous skill development.
- Understand workplace safety rules and procedures.
- Know how to act professionally in different work situations.
- Understand the value of time management.
- Learn how to respond quickly to changing work demands.
- Gain awareness of personal strengths and areas for improvement.
- Understand the role of feedback in professional growth.
- Know how to maintain a safe and productive work environment.



Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Work plan or schedule
- Task completion records
- Training attendance proof
- Safety compliance observation
- Supervisor feedback
- Hazard report samples
- Skills logbook
- Performance checklist
- Incident report form
- Assessor’s verification

Tool & Equipment

- Personal Protective Equipment (PPE)
- Task planner
- Safety signs and labels
- Training manuals or SOP booklets
- Fire extinguisher and first aid kit
- Hand tools (hammer, spanner, screwdriver, etc.)
- Communication tools (radio, mobile phone)
- Whiteboard or notice board for planning and task updates



724CO10B-Competency Standard: Perform Effective Communication Skills

Overview: This unit describes the performance outcomes, skills and knowledge required to develop communication skills used professionally. It covers plan and organise work and conduct trainings at workplace, along with demonstrating professional skills independently.

Competency Unit	Performance Criteria
CU1. Demonstrate basic communication skills	You must be able to: P1. Demonstrate different modes of communication: P2. Demonstrate presentation skills through multimedia etc P3. Develop interview skills according to job requirement P4. Respond politely to others
CU2. Conduct Professional Activities Ethically	You must be able to: P1. Identify the ethical problems P2. Respect confidentiality of information P3. Treat co-workers with fairness P4. Maintain transparency in work
CU3. Resolve conflicts and misunderstandings	You must be able to: P1. Identify the root cause of the conflict through active listening P2. Encourage respectful communication between parties P3. Facilitate a collaborative approach to find mutually acceptable solutions P4. Follow up to ensure resolution is sustained
CU4. Report Hazards and incidents Clearly	You must be able to: P1. Identify the nature of the hazard or incident P2. Notify the concerned authority or supervisor immediately P3. Record detailed information in the incident report form P4. Submit the report as per organizational procedures



Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency standard. This includes the knowledge of:

- Training skills
- Professional skills
- Advanced language skills
- Assessment and trainees’ feedback methods
- Direct and indirect communication methods
- The need of the training type at the work place
- Tool & Equipment
- Note book
- Pen
- Communication gadgets

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Develop CV
- Prepare report on plan and organize work



724CO10C-Competency Standard: Maintain Occupational Health and Safety SoPs System

Overview: This unit covers how to establish, maintain and evaluate an occupational health and safety system in the work environment.

Competency Unit	Performance Criteria
CU1. Implement Health and Safety policies and Procedures	You must be able to: P1: Communicate health/ safety policies P2: Provide appropriate training and resources to ensure safe work practices. P3: Monitor compliance through regular inspections and risk assessments.
CU2. Carryout Risk assessment at workplace	You must be able to: P1. Identify potential hazards at workplace P2. Evaluate the risk P3. Take corrective/preventive action to mitigate the risk P4. Record your findings P5. Review the risk assessment
CU3. Follow emergency response protocol/procedure	You must be able to: P1. Identify emergency exits at workplace P2. Identify assembly area at workplace P3. Follow the instructions to evacuate the building P4. Report immediately at designated assembly area in case of emergency



CU4. Perform safe storage and disposal of waste	You must be able to: P1. Identify different types of waste material P2. Identify types of containers to store the different types of waste material P3. Use required labels on storage containers P4. Store the waste materials according to standards P5. Dispose- off waste material according to the safety procedure
CU5. Maintain ergonomics condition at workplace	You must be able to: P1. Follow standard working posture/position at workplace P2. Follow standard procedure to provide sufficient light at workplace P3. Use ergonomic workstations to avoid muscle fatigue

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- Risk assessment at workplace
- Hazard identification
- Ergonomic working condition
- Types of emergencies at workplace
- Storage and disposal of hazardous material
- Emergency protocol/procedure for fire, hazardous chemical spills, major power failure and terrorism activity and nature disasters
- Current Safety principles and practices used at workplace

Critical Evidence(s) Required



The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Perform risk assessment and hazard identification at the workplace
- Demonstrate safe disposal regarding given hazardous material

Tool & Equipment

- PPEs
- Note book
- Pen
- Safety sign board
- Different Barricades



724MP14D-Maintain Professionalism at Workplace

Overview: This unit describes the skills and knowledge required to Professionalism at Workplace.

Competency Unit	Performance Criteria
CU.1 Respect Work Timeframes	You must be able to: P1. Start task on scheduled time P2. Meet daily work target. P3. Submit reports within deadline P4. Complete tasks without overtime
CU.2 Maintain Personal Appearance and Hygiene	You must be able to: P1. Clean hair, body and nails regularly. Wear suitable cloths for the workplace P3. Meet specific company dress code requirements Keep positive body language during working hours
CU.3 Work in an Ethical Manner	You must be able to: P1. Follow company values/ethics codes of ethics P2. Use company resources in accordance with company ethical standards. P3. Undertake work practices in compliance with company ethical standards P4. Share Company values/practices with co-workers using appropriate behaviour P6. Report works incidents/situations in accordance with company protocol/guidelines.
CU.4 Support Continuous professional development	You must be able to: Identify skills gaps regularly P1. Set learning goals clearly P2. Join professional workshops P3. Review personal growth



Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes:

- Application of good manners and right conduct
- Basic practices for oral and personal hygiene
- Common products used for oral and personal hygiene
- Outline the company code of conduct/values
- Outline the Company regulations, performance and ethical standards
- Work responsibilities/job functions
- Communication skills
- Workplace hygiene standards

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Prepare a report about professionalism in workplace

Tool & Equipment

- Training manuals
- Learning management system (LMS)
- Computer or tablet
- Internet access
- Notebooks or journals
- Audio-visual aids
- Presentation slides
- Feedback forms
- Record-keeping templates
- Professional development logbook



724MP13E-Competency Standard: Develop 3D Drawing

Overview: This competency standard covers the skills and knowledge required to develop 3D objects, manipulate and Edit 3D objects and render 3D objects. The underpinning knowledge regarding 3D drawings will be sufficient to provide the basis for trainee’s work.

Competency Units	Performance Criteria
C1. Develop 3D Objects	<i>You must be able to:</i> P1. Select correct 3D modelling tool P2. Create basic geometric shapes P3. Apply dimensions to objects P4. Modify shapes using design tools P5. Save model in required format
C2. Manipulate 3D objects using 3D Editing Tools	<i>You must be able to:</i> P1. Modify 3D objects in line with the requirements. P2. Make customized 3D models according to the requirement of given job. P3. Convert 3D Face objects into a single mesh object.
C3. Render 3D Model	<i>You must be able to:</i> P1. Apply material to required 3D Model as per given specification P2. Apply lights to get the requisite scene of required 3D model P3. Assign cameras to execute different views of required 3D Model. P4. Render and print the 3D model according to required size & orientation. P5. Apply texture to 3D model as per given specification.



Knowledge & Understanding

The trainee must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency standard. This includes the knowledge of:

- 3D modelling in AutoCAD
- Differentiate between Surface Modelling and Solid Modelling.
- 3D face and Edges
- Boolean operation concepts
- 3D Navigate control
- Functions of different camera settings
- Importance of scene creation
- Material and light control
- Planner mapping
- Texture map
- Opacity control
- Render context
- Render sampling

Critical Evidence(s) Required

The candidate needs to produce following Critical Evidence(s) in order to be competent in this competency standard:

- Develop 3D Model
- Render 3D Model with cameras, lights and different materials

Tool and Equipment

- Computer with all accessories
- Printer



724MP14F -Competency Standard: Design Blasting Operations

Overview: This competency standard covers the skills and knowledge required to design blasting operations effectively.

Competency Units	Performance Criteria
CU1. Plan Blasting Operations	You must be able to: P1. Conduct site assessment and risk analysis P2. Develop a detailed blasting plan including timing and sequence P3. Ensure compliance with legal and safety regulations P4. Communicate the plan clearly to all personnel involve
CU2. Identify explosive materials for blasting	You must be able to: P1. Determine the type of rock and blasting requirements P2. Select suitable explosive materials based on site conditions P3. Verify the compatibility of explosives with initiating systems P4. Ensure materials meet regulatory and safety standard
CU3. Identify initiation systems	You must be able to: P1. Identify electric/non-electric initiation systems P2. Select initiation systems based on blast design and timing P3. Check system compatibility with selected explosives P4. Ensure compliance with safety and regulatory requirement
CU4. Comprehend Blasting Operation	You must be able to: P1. Understand the blasting objectives/desired outcomes P2. Understand blast sequence steps P3. Interpret blast design layout P3. Recognize types of explosives used P4. Follow safety protocols
CU5. Perform post blasting inspection	You must be able to: P1. Check blast area for misfires P2. Inspect site for structure stability, cracks or shifts P3. Verify fragmentation quality



	P4. Record blast results clearly P5. Clear the area for safe access P6. Report findings to supervisor
CU6. Secure the blast site before and after detonation	You must be able to: P1. Set warning signs around the site P2. Clear all personnel from blast area P3. Block access routes with barriers P4. Monitor site until detonation ends P5. Confirm site safety until post-blast inspection is complete

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes:

- Understand safety protocols before detonation
- Know procedures to restrict site access
- Identify proper warning and signage methods
- Understand blast monitoring techniques
- Know post-blast site clearance steps
- Recognize hazards during and after blasting
- Understand roles and responsibilities in blast security
- Learn compliance requirements for site safety
- Know communication procedures before detonation
- Understand risk control methods for blast zones

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Completed pre-blast safety checklist
- Photos or videos of secured site



- Record of warning signs placement
- Log of site clearance before detonation
- Incident-free blast report
- Supervisor’s verification of site security
- Post-blast inspection report
- Emergency readiness confirmation

Tool & Equipment

- Warning signs (e.g., "Blasting Area", "No Entry")
- Safety cones and barricade tape
- Radios or communication devices
- Blast sirens or horns
- Personal Protective Equipment (PPE)
- Access control barriers or gates
- Blast area monitoring tools (e.g., binoculars, cameras)
- Flashlights or headlamps for low visibility
- Site maps or blast layout plans
- First aid kit and emergency response gear



724MP14G -Competency Standard: Perform Underground Mining Technique

Overview: This competency standard covers the skills and knowledge required to perform Room and pillar, long wall method for underground mining.

Competency Units	Performance Criteria
CU.1 Perform Room and Pillar Method	<i>You must be able to:</i> P1. Mark layout for rooms and pillars P2. Operate equipment for material cutting P3. Maintain required pillar dimensions P4. Control roof conditions during excavation P5. Inspect stability of mined sections
CU.2 Perform Long Wall Method	<i>You must be able to:</i> P1. Set up long wall equipment correctly P2. Align supports with cutting face P3. Operate shearer across panel P4. Monitor roof support performance P5. Check ventilation in work area
CU3. Perform Stope and Pillar method	<i>You must be able to:</i> P1. Mark stope boundaries accurately P2. Drill blast holes in stope area P3. Maintain proper pillar spacing P4. Remove broken ore safely P5. Inspect roof and wall conditions P6. Ensure safety protocols are followed throughout the operation

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes knowledge of :



- Understand the layout of stope and pillar mining
- Know drilling and blasting techniques for stopes
- Learn how to maintain pillar stability
- Understand safe ore extraction practices
- Identify hazards in stope environments
- Recognize roof and wall control measures
- Understand equipment used in stope mining
- Know procedures for ventilation in stopes
- Learn sequencing of mining operations
- Understand safety compliance during extraction

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Perform different underground mining techniques
- Room and pillar method
- Long wall method

Tool & Equipment

- Drill
- Explosive material
- Long wall shearer
- Conveyor belt
- Continuous miner
- Hydraulic supports



724MP14H -Competency Standard: Perform Surface Mining Technique

Overview: This competency standard covers the skills and knowledge required to perform surface mining techniques

Competency Units	Performance Criteria
CU1. Perform Open Pit Mining	You must be able to: P1. Mark boundaries of pit area P2. Conduct rock face preparation for open pit mining P2. Carry out drill holes for core sampling of ore P3. Generate the Isopach map of ore body P4. Excavate overburden using machines P5. Carry out drilling for extraction of ore P6. Transport the required material
CU2. Perform Strip Mining	You must be able to: P1. Clear surface vegetation from site P2. Remove topsoil using suitable equipment P3. Excavate mineral layers in strips P4. Load extracted material for transport P5. Backfill mined strips after removal
CU3. Perform Placer Mining	You must be able to: P1. Identify location of placer deposits P2. Set up sluice or dredging equipment P3. Extract mineral-rich sediments P4. Separate minerals using gravity methods P5. Dispose of tailings properly



CU4. Perform Quarry Mining	You must be able to: P1. Mark quarry boundaries clearly P2. Drill holes for blasting P3. Break rock using controlled blasts P4. Load broken material into transport units P5. Inspect quarry faces for stability
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Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes knowledge of:

- Understand the basic layout of a quarry site
- Know drilling and blasting procedures for rock extraction
- Learn safe handling and loading of quarried material
- Understand equipment used in quarry operations
- Recognize hazards and stability issues in quarry walls
- Know environmental and safety regulations for quarrying
- Understand material flow from extraction to transport
- Learn inspection procedures for quarry face safety
- Know how to manage dust and noise during operations
- Understand operational planning in quarry mining

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Perform different surface mining techniques
- Open pit mining
- Strip mining
- Placer mining

Tool & Equipment

- Drilling machine



National Competency Standards for “Senior Technician/Shot Firer in Mining Process Technology”



- Explosive material
- Excavator
- Dozer
- Dumpers
- Jackhammer
- Pan
- Rocker box
- Sluice box
- Trommel (Optional)



724MP14I -Competency Standard: Install Ground Support

Overview: This competency standard covers the skills and knowledge required to install ground support for mining excavation and transportation.

Competency Units	Performance Criteria
CU1. Prepare for Installation	<i>You must be able to:</i> P1. Review installation plan carefully P2. Select ground support equipment P3. Remove all surface soils and vegetation P4. Scale down loose material P5. Position drill holes according to ground support plan
CU2. Assemble Ground Support	<i>You must be able to:</i> P1. Identify type of support required P2. Select tools and materials correctly P3. Position support elements accurately P4. Install components using safe methods P5. Check alignment of installed supports
CU3. Install Ground Support	<i>You must be able to:</i> P1. Position/place support materials at target area P2. Drill holes to required depth P3. Insert bolts or anchors securely P4. Tighten support elements firmly P5. Inspect installed supports for stability

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes knowledge of :

- Understand the purpose of ground support in mining



- Know different types of support systems (e.g., bolts, mesh, anchors)
- Learn proper installation techniques for ground support
- Understand equipment and tools used for installation
- Recognize site conditions that require support
- Know safety procedures during installation
- Identify signs of ground movement or instability
- Understand load-bearing principles in underground environments
- Learn inspection and maintenance practices for support systems
- Know relevant safety and regulatory standards

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Perform assembling and installation of ground support

Tool & Equipment

- Rock drills or jackleg drills
- Drill bits and extensions
- Roof bolts or rock bolts
- Resin cartridges or grout
- Bolt tensioners or torque wrenches
- Mesh panels or wire mesh
- Split sets or friction stabilizers
- Scaling bars
- Personal Protective Equipment (PPE)
- Support installation manuals or blueprints



724MP14J-Competency Standard: Ensure Explosives Chain of custody & Inventory Control after issuance

Overview: This competency standard covers the skills and knowledge required to Ensure Explosives Chain of custody & Inventory Control after issuance.

Competency Units	Performance Criteria
CU1. Maintain explosive inventory logbook	You must be able to: P1. Record explosive types received P2. Log quantities issued per shift P3. Note storage location for each item P4. Update entries after each transaction P5. Verify logbook with physical stock
CU2. Ensure custody at blasting site	You must be able to: P1. Receive explosives with proper documentation P2. Transport explosives securely to blast site P3. Assign custody to authorized personnel P4. Monitor explosives until detonation P5. Record handover details in custody log
CU3. Generate post blast consumption report	You must be able to: P1. Collect data on used explosives P2. Record quantities by type and batch P3. Note location and time of blast P4. Compare usage with issued inventory P5. Submit signed report to supervisor



CU4. Ensure return of unused explosive (if any)	You must be able to: P1. Identify unused explosives after blast P2. Check condition of returned items P3. Record quantities in return log P4. Transport materials to storage safely P5. Confirm return with authorized personnel
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Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes knowledge of:

- Understand procedures for handling unused explosives
- Know legal and safety requirements for explosive returns
- Learn documentation methods for returned materials
- Recognize conditions that make explosives safe to return
- Understand roles and responsibilities in explosive custody
- Know proper transport methods for unused explosives
- Learn how to maintain accurate return logs
- Understand risks related to mishandling returned explosives
- Recognize storage protocols for re-entered materials
- Know how to communicate with authorized personnel during return

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Explosive chain of custody and inventory control



724MP14K-Competency Standard: Perform Basic Green Skills at Mining Site

Overview: This unit describes the performance outcomes, skills and knowledge required to perform basic green skills for mining. It will also allow you to manage sustainability of materials used at mining and waste at site. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Manage sustainability of materials used at crush plant	You must be able to: P1. Select sustainable raw materials as per requirement P2. Follow standard procedure to manage systems (waste, energy, water) P3. Perform impact quantification of used material at crush plant
CU2. Manage crush plant waste	You must be able to: P1. Identify various types of waste at site P2. Categorize reusable waste P3. Dispose unusable waste as per set standards P4. Place reusable material at designated storage area P5. Transport waste material to designated place
CU3. Follow Environment-Friendly Blasting Practices	You must be able to: P1. Select low-impact explosive materials P2. Use controlled blasting techniques P3. Minimize fly rock during detonation P4. Reduce vibration through proper timing P5. Dispose of residues in approved areas

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes knowledge of:



- Environmental degradation
- Types of raw materials at crush plant
- Types of waste
- Waste reduction techniques
- Concept of 6 R approach (Reduce, Reuse, Recycle, Repair, Renew, and Rethink)
- Reusable materials
- Recyclable materials
- Methods for disposal of unusable materials
- Just-in-time (JIT) approach Basic knowledge

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Fill checklist of incorporating waste/reusable materials, wastage controls, and resources management as per instructions.
- Prepare impact assessment report of material used at site



COMPLETE LIST OF TOOLS AND EQUIPMENT

Sr. #	Description
1.	Computer system
2.	White board
3.	Printer
4.	Multimedia
5.	Safety Helmets
6.	Blankets
7.	Board of Safety instructions.
8.	Ear Plug
9.	Face mask
10.	Fire Buckets.
11.	Fire Extinguishers
12.	First aid Kit
13.	Hand gloves
14.	Hooks / Anchors
15.	Manufacturers Operation and Maintenance Manual & Video;
16.	Measuring Tape
17.	Multimeter



National Competency Standards for “Senior Technician/Shot Firer in Mining Process Technology”



18.	Safety Apron
19.	Safety Belts
20.	Safety goggles

21.	Safety harness
22.	Safety net
23.	Safety Shoes
24.	Long wall shearer
25.	Explosive material
26.	Slings
27.	Spatula
28.	Scraper
29.	Stretcher
30.	Various hand / power tools
31.	Scanner
32.	Dozer
33.	Dumpers
34.	Dump truck
35.	Excavator
36.	Drill rigs
37.	Drill



National Competency Standards for “Senior Technician/Shot Firer in Mining Process Technology”



38.	Cameras
39.	Tool kit
40.	Conveyors
41.	Dredging machine and equipment
42.	Steel Rules

43.	Tri Square
44.	Vernier Caliper
45.	Underground loader
46.	Crane Lift
47.	Shotcrete machine
48.	Mining drill
49.	Snap Gauge set
50.	Lifting and handling equipment (winch, crane, block and tackles)
51.	Set of Adjustable Wrench
52.	Set of Spanners (Open end, Ring)
53.	Pipe wrench
54.	L-key sets
55.	Nose pliers
56.	Grip pliers
57.	Cutting implement



National Competency Standards for “Senior Technician/Shot Firer in Mining Process Technology”



58.	Ball peen Hammer
59.	Claw Hammer
60.	Ancillary equipment (generators, pumps, lights, compressors, cleaning equipment, power tools, hand tools)
61.	Water suppressing device
62.	Continuous miner
63.	Drilling machine
64.	Hydraulic supports
65.	Jackhammer
66.	Pan
67.	Rocker box
68.	Sluice box
69.	Trommel (Optional)