

# **National Vocational Certificate Level 3 in Crush Plant Technology**

## **(Crush Plant Operator)**



### **Competency Standards**

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

**National Competency Standards**  
**For**  
**National Vocational Certificate Level 3 in Crush**  
**Plant Technology “Crush Plant Operator”**  
  
**NVQF Level 3**

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## TABLE OF CONTENTS

| <b>S. No.</b> | <b>CONTENTS</b>  | <b>Pages</b> |
|---------------|--|--------------|
| <b>1.</b>     | Title of Qualifications  | 1            |
| <b>2.</b>     | Introduction   | 4            |
| <b>3.</b>     | Purpose of the Qualification   | 4            |
| <b>4.</b>     | Date of Validation   | 5            |
| <b>5.</b>     | Code of qualifications   | 5            |
| <b>6.</b>     | Entry Requirements   | 5            |
| <b>7.</b>     | Qualifications development committee                                     | 6            |
| <b>8.</b>     | Validation committee   | 7            |
| <b>9.</b>     | Summary of Competency Standards  | 8            |
| <b>CS1</b>    | <b>724CO09-A-Maintain Safety at Crushing Plant Site</b>                  | 9            |
| <b>CS2</b>    | <b>724CO09-B-Work in a Team Environment</b>                              | 11           |
| <b>CS3</b>    | <b>724CO09-C-Perform Computer Applications</b>                           | 13           |
| <b>CS4</b>    | <b>724CO09-D-Manage Inventory of Raw Material for Production Process</b> | 15           |
| <b>CS5</b>    | <b>724CO09-E-Operate Crushing Plant Software</b>                         | 17           |
| <b>CS6</b>    | <b>724CO09-F-Prepare Crushing Plant for Production</b>                   | 19           |
| <b>CS7</b>    | <b>724CO09-G-Perform Production on Plant</b>                             | 22           |
|               | <b>List of Tools and Equipment</b>                                       | 25           |

## INTRODUCTION

Mining and construction Industries are the booming industries of Pakistan and Middle East. There is an increasing demand of the jobs related to Crushing Plant. Therefore, the skills are required to be inducted in the future generation. If an individual is planning to pursue a career in crushing plant, this program will be helpful in targeting various projects in Pakistan and other countries etc.

Keeping in view of the above the competency based national vocational qualifications have been developed by NAVTTC to train the unskilled human resource on the technical and entrepreneurial skills to be employed / self-employed and inevitably set sustainable impact on their lives by increase in their livelihood income.

Training Course is based on competency standards which are defined by the industry and the traditional role of a trainer changes and shifts towards the facilitation of training. A trainer encourages and assists trainees to learn for themselves. Trainees are likely to work in groups (pairs) and all doing something different. Some are doing practical tasks in the workshop, some writing, some not even in the classroom or workshop but in another part of the building using specialist equipment, working on computers doing research on the Internet or the library. As trainees learn at different pace they might well be at different stages in their learning, thus learning must be tailored to suit individual needs. The following facilitation methods (teaching strategies) are generally employed

## PURPOSE OF THE QUALIFICATION

The purpose of the training is to provide skilled manpower to improve the existing mining industry. This will improve the quality in mining sector and the availability of skilled professionals will bring socio-economic benefits to all stakeholders. The specific objectives of developing these qualifications are as under:

- Improve the professional competence of crushing
- Capacitate the local community and trainers in modern CBT training, methodologies and processes as envisaged under NVQF
- Provide flexible pathways and progressions in the mining sector
- Enable the trainees to perform their duties in efficient manner
- Establish a standardized and sustainable system of training for crushing plant technology in Pakistan

## DATE OF VALIDATION

This national vocational qualification (NVQ) has been validated by the Qualifications Development Committee (QDC) in 4<sup>th</sup> Oct to 8th Oct 2021 and will remain in currency until 10<sup>th</sup> October 2031.

\*Shall be reviewed after 3 years

## CODE OF QUALIFICATION

| Qualification Title  | Code    |
|--|---------|
| National Vocational Certificate Level 3 in Crush Plant Technology “Crush Plant Operator” | 724CO09 |

## ENTRY REQUIREMENTS

- For National Vocational Certificate Level-3 in “Crush Plant Operator”, the entry requirement is award of National Vocational Certificate Level-2 in “Crush Plant Assistant”. The entry in informal sector is not prescribed.

## QUALIFICATIONS DEVELOPMENT COMMITTEE

The following members participated in the qualification development of these qualifications:

| Sr. No. | Name                      | Designation             | Organization                                      |
|---------|---------------------------|-------------------------|---|
| 1.      | Saima Asghar              | DACUM Facilitator       | CBT Expert/Certified Assessor                     |
| 2.      | Mohammad Ishaq            | Coordinator             | Deputy Director<br>NAVTTTC, Islamabad             |
| 3.      | Engr.Azhar Iqbal Shad     | Principal               | GCT , Raiwand road Lahore                         |
| 4.      | Engr.Nadeem Zaghim        | Senior Instructor Civil | GCT ,Raiwand road Lahore                          |
| 5.      | Mr.Sikandar Hayat         | Instructor              | GCT ,Raiwand road Lahore                          |
| 6.      | Engr.Imran Murtaza        | Lab Engineer Civil      | University of South Asia,<br>Lahore               |
| 7.      | Engr.Hassan Ali           | Site Engineer(Civil)    | Punjab Engineering<br>Construction Service Lahore |
| 8.      | Mr. Atif Waheed           | Instructor              | CMT,NLC Dina                                      |
| 9.      | Engr.Muhammad Asad Saleem | Project Engineer        | Habib Construction Services,<br>Lahore            |
| 10.     | Engr.Amina Irfan          | Lecturer                | The University of Lahore                          |
| 11.     | Engr.Umer Farooq          | Instructor              | GSPCT Gujrat                                      |
| 12.     | Engr.Haroon Ejaz          | Site Engineer           | DHA Multan  |
| 13.     | Mr.Hassan Raza            | Instructor              | CTTI Islambad                                     |
| 14.     | Engr.Mehr Ali Qurashi     | Senior Service Manager  | Jaffar Brother Islambad                           |
| 15.     | Engr.Taimoor Iftikhar     | Site Supervisor         | Hadi Construction KPK                             |

## VALIDATION COMMITTEE

The following members participated in the qualification development of these qualifications:

| Sr. No. | Name                    | Designation                                     | Organization                                   |
|---------|-------------------------|---|--|
| 1.      | Saima Asghar            | DACUM Facilitator                               | CBT Expert/Certified Assessor                  |
| 2.      | Mohammad Ishaq          | Coordinator                                     | Deputy Director<br>NAVTTTC, Islamabad          |
| 3.      | Engr.Azhar Iqbal Shad   | Principal                                       | GCT , Raiwand road Lahore                      |
| 4.      | Muhammad Abdul Moeez    | Structural Engineer                             | Rizwan Mirza Consulting<br>Engineering, Lahore |
| 5.      | Mr. Atif Waheed         | Instructor                                      | CMT,NLC Dina                                   |
| 6.      | Mr. Sikandar Hayat      | Instructor                                      | GCT ,Raiwand road Lahore                       |
| 7.      | Mr. Ahsan Shahbaz       | Manager HSE                                     | Pak Safety Solution, Lahore                    |
| 8.      | Mr. Abdul Samad         | Construction Contractor<br>(CBT Assessor)       | Faisalabad                                     |
| 9.      | Engr.Haroon Ejaz        | Site Engineer                                   | DHA Multan                                     |
| 10.     | Mr. Munawar Husain      | Secretary                                       | PBT Lahore                                     |
| 11.     | Mr. Khalid Mahmood      | Ex-Principal                                    | GATC Sialkot, Mechanical<br>Power Lahore       |
| 12.     | Syed Mansoor Ahmed      | Assistant IT Manager,<br>NVQF Registry Incharge | SBTE Sindh                                     |
| 13.     | Mr. Israr Ahmad         | Secretary ,BTE                                  | KPK  |
| 14.     | Engr.Liaqat Ali Jamhroo | Director, Academics                             | STEVTA   |
| 15.     | MS. Sumbal Ayaz         | Curriculum Expert                               | British Council Lahore                         |

## SUMMARY OF COMPETENCY STANDARDS

| Code         | Competency Standards                                    | Level | Theory |     | Practical |     | Total |     |
|--------------|---|-------|--------|-----|-----------|-----|-------|-----|
|              |   |       | C      | Hr. | C         | Hr. | C     | Hr. |
| 1.           | Maintain Safety at Crushing Plant Site                  | 3     | 1.7    | 17  | 6.3       | 63  | 8     | 80  |
| 2.           | Work in a Team Environment                              | 3     | 1.2    | 12  | 1.8       | 18  | 3     | 30  |
| 3.           | Perform Computer Applications                           | 3     | 1.1    | 11  | 3.9       | 39  | 5     | 50  |
| 4.           | Manage Inventory of Raw Material for Production Process | 3     | 1.9    | 19  | 8.1       | 81  | 10    | 100 |
| 5.           | Operate Crushing Plant Software                         | 3     | 1.2    | 12  | 4.8       | 48  | 6     | 60  |
| 6.           | Prepare Crushing Plant for Production                   | 3     | 2.7    | 27  | 12.3      | 123 | 15    | 150 |
| 7.           | Perform Production on Plant                             | 3     | 2.2    | 22  | 10.8      | 108 | 13    | 130 |
| <b>Total</b> |   |       | 12     | 120 | 48        | 480 | 60    | 600 |



## 724CO09A-Competency Standard: Maintain Safety at Crushing Plant Site

**Overview:** This competency standard covers the skills and knowledge required to maintain safe work condition at site, emergency response activity at crushing plant site. Your underpinning knowledge will be sufficient to provide you the basis for your work.

| Competency Units                                 | Performance Criteria  |
|--|---|
| <b>CU1.</b> Maintain safe work condition at site | <p><b><i>You must be able to:</i></b></p> <p><b>P1.</b> Recognize the safety signs and symbols</p> <p><b>P2.</b> Identify potential hazards at work site</p> <p><b>P3.</b> Identify the risk of slip, trip and fall at work place</p> <p><b>P4.</b> Perform fall protection measures as per job requirements</p> <p><b>P5.</b> Label and store chemicals as per Material Safety Data Sheet (MSDS)</p>   |
| <b>CU2.</b> Perform fire fighting                | <p><b><i>You must be able to:</i></b></p> <p><b>P1.</b> Identify source of fire.</p> <p><b>P2.</b> Identify classes of fire</p> <p><b>P3.</b> Raise fire alarms</p> <p><b>P4.</b> Select suitable fire extinguishers</p> <p><b>P5.</b> Check expiry of fire extinguisher</p> <p><b>P6.</b> Check wind direction</p> <p><b>P7.</b> Locate emergency exits</p> <p><b>P8.</b> Perform PASS (Pull, aim, squeeze and sweep) on fire extinguisher</p> |
| <b>CU3.</b> Carry out first aid treatment        | <p><b><i>You must be able to:</i></b></p> <p><b>P1.</b> Follow COVID-19 SOP's</p> <p><b>P2.</b> Identify basic elements for first aid kit</p> <p><b>P3.</b> Maintain a fully stocked first aid kit</p> <p><b>P4.</b> Check expiry date of medicines</p> <p><b>P5.</b> Perform mock first aid treatment for minor injuries</p>   |

|   |   |
|---|---|
| <b>CU4.</b> Perform Basic electrical work safely at workplace | <p><b><i>You must be able to:</i></b></p> <p><b>P1.</b> Check the connectivity of earthing with power equipment</p> <p><b>P2.</b> Check leads and cable for any visual damage before use</p> <p><b>P3.</b> Tag damaged lead, cable and connection points and report to the supervisor</p> |
|---|---|

## 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:

- Unsafe act and unsafe conditions
- Electrical safety
- First Aid treatment
- Source of fire
- Firefighting techniques
- Housekeeping at workplace
- Emergency exits at workplace
- Types of fire extinguisher
- Classes of fire
- Types of hazardous materials and relevant safety procedures
- Use of required PPE for different situations

## Critical Evidence(s) Required

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

- ✓ Perform first aid treatment for minor cut
- ✓ Perform mock firefighting on a source of fire

## 724CO09B Competency Standard: Work in a Team Environment

**Overview:** This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements. It also identifies role and responsibility as a member of a team. Your underpinning knowledge will be sufficient to provide you the basis for your work.

| Competency Units  | Performance Criteria  |
|---|---|
| <b>CU1.</b> Obtain and convey Workplace information           | <p><b><i>You must be able to:</i></b></p> <p><b>P1.</b> Assess the specific and relevant information from the appropriate sources</p> <p><b>P2.</b> Convey the information using the appropriate medium and ideas</p> <p><b>P3.</b> Use appropriate non- verbal communication</p> <p><b>P4.</b> Identify appropriate lines of communication with supervisors and colleagues</p> <p><b>P5.</b> Use the defined workplace procedures for storage of information</p> <p><b>P6.</b> Inform co-workers and superiors about any deviation</p> |
| <b>CU2.</b> Participate in workplace meetings and discussions | <p><b><i>You must be able to:</i></b></p> <p><b>P1.</b> Express your own opinions</p> <p><b>P2.</b> Listen other's point of view without interruption</p> <p><b>P3.</b> Prepare simple questions about workplace procedures</p>   |
| <b>CU3.</b> Identify own role and responsibility within team  | <p><b><i>You must be able to:</i></b></p> <p><b>P1.</b> Identify the individual role and responsibilities within the team environment.</p> <p><b>P2.</b> Recognize the roles and responsibility of other team members.</p> <p><b>P3.</b> Report relationships within team and external to team</p> <p><b>P4.</b> Share report with co-workers.</p>  |

|                                    |   |
|------------------------------------|---|
| <b>CU4.</b> Support the co-workers | <p><b><i>You must be able to:</i></b></p> <p><b>P1.</b>Hand over the required materials and tools timely to interfacing team</p> <p><b>P2.</b>Work together with co-workers in an effective manner</p> <p><b>P3.</b>Address the problems of co-worker effectively</p> <p><b>P4.</b>Report to immediate boss</p> |
|------------------------------------|---|

### **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:

- Importance of effective communication
- Different mode of communication
- Types of non-verbal communication
- Mode of communication while operating machines
- Importance of creating cooperative work environment
- Role and objective of team.
- Different Sources of information
- Risk of failure in team work on the project.
- Importance of resolving the co-worker's problems
- Plan work and organize required resources in coordination with team
- 7Cs of communications

### **Critical Evidence(s) Required**

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

- Prepare minutes of meeting
- Prepare questions for meeting
- Prepare a report about daily workplace tasks

## 724CO09C Competency Standard: Perform Computer Applications

**Overview:** This Competency Standard identifies the competencies required to perform computer applications and troubleshooting. Trainee will be able to acquired skills in operating MS PowerPoint, and MS Excel. The underpinning knowledge regarding computer applications will be sufficient to provide the basis for trainee's work.

| Competency Units  | Performance Criteria  |
|---|---|
| <b>CU1.</b> Prepare Spreadsheet using MS Excel          | <b><i>You must be able to:</i></b><br><b>P1.</b> Create worksheet as per given data<br><b>P2.</b> Format the worksheet according to given criteria<br><b>P3.</b> Apply formulas according to the requirement<br><b>P4.</b> Generate Charts/Graphs according to the given data<br><b>P5.</b> Print Worksheet according to requirements   |
| <b>CU2.</b> Prepare a presentation using MS Power Point | <b><i>You must be able to:</i></b><br><b>P1.</b> Insert slides with different layouts according to requirements of presentation.<br><b>P2.</b> Insert text, tables, images, etc. according to the requirement.<br><b>P3.</b> Apply a set of effects to animate the slide according to requirement.<br><b>P4.</b> Apply slide transitions on slides according to requirement.<br><b>P5.</b> Apply sound effects on objects/text/images according to requirement. |

### 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:

- Different types of formulas in MS Excel
- Short Keys MS Excel and Power Point
- Types of presentation format

### Critical Evidence(s) Required

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

- Prepare graph by entering data and applying formula into the respective columns and rows as per given instructions
- Prepare and present a presentation in Power Point according to 7Cs of communication.



## 724CO09D Competency Standard: Manage Inventory of Materials for Production Process

**Overview:** This competency standard identifies competencies required to manage inventory of material for production process, material and quality requirements. You will be able to maintain log register, measure the materials available in dump yard, perform safe storage of materials, and inspect materials. Your underpinning knowledge will be sufficient to provide you the basis for your work.

| Competency Units  | Performance Criteria   |
|---|--|
| <b>CU1.</b> Measure Raw material available in dump yard | <b><i>You must be able to:</i></b><br><b>P1.</b> Calculate amount of materials available on site<br><b>P2.</b> Cross check with the log register<br><b>P3.</b> Adjust demands in accordance with the available raw materials<br><b>P4.</b> Manage production plan accordingly  |
| <b>CU2.</b> Perform the storage of finished materials   | <b><i>You must be able to:</i></b><br><b>P1.</b> Dump materials as per graded sizes<br><b>P2.</b> Check materials quality & quantity visually as per standard procedures<br><b>P3.</b> Maintain log book of materials In/Out   |
| <b>CU3.</b> Maintain the Log Register                   | <b><i>You must be able to:</i></b><br><b>P1.</b> Manage Log Register on daily basis<br><b>P2.</b> Enter data corresponding to every type of raw material<br><b>P3.</b> Audit Log register with available materials at site<br><b>P4.</b> Report to incharge in case of any issues<br><b>P5.</b> Prepare production / dispatch record sheet |

### 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:

- Types of Aggregates



- Classification of aggregates according to nature of size and shape
- Characteristics of good fine and coarse aggregates
- Moisture on the aggregates
- Safety of aggregates against the weather and dust
- Importance of gradation of aggregates
- The flaky and elongated aggregates
- Principles of safe and efficient storage
- Material characteristics

### **Critical Evidence(s) Required**

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

- Maintain Log book including quantity ,quality ,types of stored raw material and quantity of finished aggregate





## 724CO09E Competency Standard: Operate Crushing Plant Software

**Overview:** This competency standard deal with learning the competencies needed to operate crushing plant software. That includes operate plant through software and PLC for production. Your underpinning knowledge will be sufficient to provide you the basis for your work.

| Competency Units   | Performance Criteria   |
|--|--|
| <b>CU1.</b> Operate plant through software                         | <b><i>You must be able to:</i></b><br><b>P1.</b> Turn the ignition switch<br><b>P2.</b> Check and adjust the rpm of engine<br><b>P3.</b> Adjust the position of conveyer belts<br><b>P4.</b> Check hydraulic temperature<br><b>P5.</b> Start product conveyors<br><b>P6.</b> Start crusher<br><b>P7.</b> Start dirt conveyors<br><b>P8.</b> Adjust speed of feeder<br><b>P9.</b> Trial and error with rotor speed and apron setting until get the product as per work order, and Start Production<br><b>P10.</b> Finish Production<br><b>P11.</b> Empty the feeder and dirt conveyors<br><b>P12.</b> Stop crusher ,product conveyors and engine respectively |
| <b>CU2.</b> Operate PLC (crushing plant controller) for production | <b><i>You must be able to:</i></b><br><b>P1.</b> Set programme value for different crushing and quantity in PLC<br><b>P2.</b> Set system parameters to control equipment<br><b>P3.</b> Control auto and manual operation of plant through PLC<br><b>P4.</b> Identify error and reset the display for safe operations   |



|  |   |
|--|---|
|  | <b>P5.</b> Calibrate and parameterisation error |
|--|---|

### 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:

- Importance of software usage for plant operations
- Procedures of input data (recipe/job order, vehicle etc.) in software
- Data management process and its importance
- Importance of keeping production data record
- Types of PLC
- Usage of different types of PLC for production process
- Error codes of PLC and their meanings
- Techniques of handling PLC

### Critical Evidence(s) Required

The candidate needs to produce any or all of the following documents/evidences:

- Procedures of input data (recipe/job order, vehicle etc.) in software
- Techniques of handling PLC



## 724CO09F Competency Standard: Prepare Crushing Plant for Production

**Overview:** This competency standard deal with learning the competencies needed to prepare crushing plant for production. That includes prepare production plan, perform pre-operative checks and routine calibration. Your underpinning knowledge will be sufficient to provide you the basis for your work.

| Competency Units                                     | Performance Criteria  |
|--|---|
| <b>CU1.</b> Prepare production plan as per job order | <b>You must be able to:</b><br><br><b>P1.</b> Interpret production plan given by plant in-charge<br><b>P2.</b> Identify the type of product required, time to run and raw/reclaim materials required<br><b>P3.</b> Check availability of raw material as per production plan<br><b>P4.</b> Check availability of transportation machinery (Dumper & loader, etc.)<br><b>P5.</b> Generate demand for material and machinery  |
| <b>CU2.</b> Perform pre-operative checks             | <b>You must be able to:</b><br><br><b>P1.</b> Inspect oil, water and filter of compressor and generator<br><b>P2.</b> Maintain the oil level in all gear boxes, hydraulic unit as per the procedures set by the manufacturer<br><b>P3.</b> Inspect tension on all v-drive belts<br><b>P4.</b> Inspect conveyor belt for alignment and excessive wear<br><b>P5.</b> Grease, lubricate and tighten bearings and gate pivot points<br><b>P6.</b> Check emptiness of crush plant<br><b>P7.</b> Inspect adequacy of voltage/frequency (for single and three phase) supply PLC according to machinery requirement<br><b>P8.</b> Check damaged wiring, loose electrical fitting ,sensor and switches |



|   |  |
|---|--|
|   | <p><b>P9.</b> Check tightness of all hydraulic and pneumatic connections and the condition of flexible tubes and rubber seals</p> <p><b>P10.</b> Operate manually valves and gates of plant</p> <p><b>P11.</b> Inspect that all equipment is set and adjusted according to production schedule as required</p> <p><b>P12.</b> Report maintenance requirements</p> <p><b>P13.</b> Test run of crush plant</p> |
| <b>CU3.</b> Perform routine calibration | <p><b>You must be able to:</b></p> <p><b>P1.</b> Check RPM sensor of conveyor belt for accurate values</p> <p><b>P2.</b> Perform trial loading for calibration</p>   |

### 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:

- Plant layout drawings and its interpretation
- Production process and requirements
- Importance of plant design in production process
- Principles of operation of the equipment to be maintained
- Function and troubleshooting of major internal components and their problems
- Appropriate testing procedures and use of equipment for a range of faults
- Urgency and timeliness factors in maintenance
- Maintenance planning/scheduling/records systems
- Identification of tools, materials and spare parts
- Basic techniques for using and handling tools
- Physical measurement, alignment and clearance principles.
- Testing procedures
- Importance of production schedules and its designing



- Maintenance of machinery / plant
- Calibration techniques
- Underlying causes of faults such as precipitated by:
  - Product loading and unloading
  - Materials
  - Equipment
  - Functions of Mechanical Systems of crushing plant
  - Inspection & Maintenance of crushing plant, and its associated Attachments.
  - Inspection & Maintenance procedure of Mechanical Systems in crushing plant
  - Types of crush plant
  - Types of crushers
  - Components of crushers
  - Components of conveyor belt
  - Types of screen
  - Types of Hopper
  - Components of control panel
  - Components of feeder
  - Components Electrical system
  - Types of feeders
  - Components of hydraulic system and pneumatic system

### **Critical Evidence(s) Required**

The candidate needs to produce any or all of the following documents/evidences:

- Interpret the Installation layout drawing / manual of the Plant
- Prepare production plan as per job order
- Perform pre-operative checks
- Perform routine calibration



## 724CO09G Competency Standard: Perform Production on Plant

**Overview:** This competency standard deal with learning the competencies needed to perform production on plant. That includes preliminary operations, production, rectify malfunctioning, cleaning the plant after production and shutdown. Your underpinning knowledge will be sufficient to provide you the basis for your work.

| Competency Units                              | Performance Criteria   |
|---|--|
| <b>CU1.</b> Perform preliminary operations    | <b>You must be able to:</b><br><b>P1.</b> ON the ignition switch<br><b>P2.</b> Enter and adjust Input data as per work order<br><b>P3.</b> Set parameter of plant operations   |
| <b>CU2.</b> Start Production                  | <b>You must be able to:</b><br><b>P1.</b> Select quantity in cubic meter for Aggregates<br><b>P2.</b> Select screens<br><b>P3.</b> Run 1 <sup>st</sup> trial of aggregate<br><b>P4.</b> Conduct the sieve test<br><b>P5.</b> Make adjustments as per work order specifications of aggregates<br><b>P6.</b> Modify the recipe as per work order given by supervisor<br><b>P7.</b> Prepare sample at site as per standard procedures and sampling rules. |
| <b>CU3.</b> Rectify malfunctioning during run | <b>You must be able to:</b><br><b>P1.</b> Diagnose the software indicated fault<br><b>P2.</b> Switch plant from automatic to manual operations<br><b>P3.</b> Discharge the in-process load before rectification of fault<br><b>P4.</b> Rectify fault before next operation in accordance with procedures   |



|  |   |
|--|---|
| <b>CU4.</b> Maintain the crushing record | <b>You must be able to:</b><br><b>P1.</b> Prepare the Raw Materials Consumption summary sheet<br><b>P2.</b> Prepare crush plant production summary sheet.<br><b>P3.</b> Keep crushing record (input and output flow) on plant log book.   |
| <b>CU5.</b> Perform shutdown activities  | <b>You must be able to:</b><br><b>P1.</b> Empty the feeder, conveyors and crusher<br><b>P2.</b> Clean the conveyor that discharges the aggregates into the storage area<br><b>P3.</b> Run the empty crusher for 5-10 minutes.<br><b>P4.</b> Stop the feeder, dirt conveyor belt, crusher and product conveyor respectively and then shutdown the system.<br><b>P5.</b> Inspect for damages/ leaks etc. and report / take appropriate action<br><b>P6.</b> Greasing all required parts manually. |

## Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to;

- Working principle of crushing Plant (Automatic and Manual) type
- Features, performance and output of the crushing plant.
- Type and grade of aggregates.
- Starting procedure, basic operations and monitoring systems.
- Stopping procedure including emergency stop button.
- Post operation procedure for crushing plant
- Identification and correct usage of basic communication hand signals, safety & emergency signs at project site.
- Use the techniques of operational slow-downs and take timely remedial actions



- Typical causes of equipment failures and the service conditions which may increase maintenance
- Types and nature of maintenance (preventative, periodic , corrective) uses, benefits and limitations
- Factors that may affect product quality or production output and appropriate remedies.

### **Critical Evidence(s) Required**

The candidate needs to produce any or all of the following documents/evidences:

- Perform primarily operations and production
- Perform Rectification of malfunctioning during test run
- Production summary sheet
- Log book with crushing record
- Perform cleaning the plant after production & shut down





## COMPLETE LIST OF TOOLS AND EQUIPMENT

| Sr. # | Description  |
|-------|--|
| 1.    | Safety Helmets   |
| 2.    | Safety Blankets  |
| 3.    | Board of Safety instructions.                          |
| 4.    | Chain Hoist  |
| 5.    | Circuit Diagrams for Plants                            |
| 6.    | Sieve set  |
| 7.    | Digital Balance  |
| 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   |



| Sr. # | Description   |
|-------|---|
| 18.   | Safety Apron  |
| 19.   | Safety Belts  |
| 20.   | Safety goggles  |
| 21.   | Safety harness  |
| 22.   | Safety net  |
| 23.   | Safety Shoes  |
| 24.   | Shovels with handle                                       |
| 25.   | Simulated version of crushing plant operational software. |
| 26.   | Slings  |
| 27.   | Spatula   |
| 28.   | Spirit Level  |
| 29.   | Stretcher   |
| 30.   | Various hand / power tools                                |
| 31.   | Computers   |
| 32.   | Printer   |
| 33.   | Scanner   |
| 34.   | Internet router   |
| 35.   | Application Software                                      |
| 36.   | Log Books   |



| Sr. # | Description                      |
|-------|----------------------------------|
| 37.   | Stationary Items                 |
| 38.   | Plant software                   |
| 39.   | Cameras                          |
| 40.   | Jackhammer                       |
| 41.   | Conveyors                        |
| 42.   | Hoppers                          |
| 43.   | Steel Rules                      |
| 44.   | Tri Square                       |
| 45.   | Vernier Caliper                  |
| 46.   | Thread gauges                    |
| 47.   | Screw pitch gauges               |
| 48.   | Feeler gauges                    |
| 49.   | Micrometer                       |
| 50.   | Snap Gauge set                   |
| 51.   | Dial Bore Gauge                  |
| 52.   | Set of Adjustable Wrench         |
| 53.   | Set of Spanners (Open end, Ring) |
| 54.   | Pipe wrench                      |
| 55.   | L-key sets                       |



| Sr. # | Description          |
|-------|----------------------|
| 56.   | Nose pliers          |
| 57.   | Grip pliers          |
| 58.   | Straight peen Hammer |
| 59.   | Ball peen Hammer     |
| 60.   | Claw Hammer          |
| 61.   | Tong                 |
| 62.   | Chisel               |
| 63.   | Hand hacksaw         |
| 64.   | Socket set           |
| 65.   | Slip joint plier     |
| 66.   | Plier                |
| 67.   | Screw driver set     |