

# **Assessment Evidence Guide**

## **For**

### **“Crushing Plant Technician/Supervisor”**

#### **Level 4**

**Perform Basic Machining Operations**  
(Formative Assessment)



**National Vocational & Technical  
Training Commission**

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level: 4</b>	<b>Version: 01</b>
<b>Competency Standard Title:</b> Perform Basic Machining Operations Establish and Maintain the Occupational Health and Safety System Perform Advance Communication	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b>		

Candidate Details	Name: .....  Registration/Roll Number: .....
Guidance for Candidate	<p><b>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration &amp; assessment):</b></p> <p><b>Assessment Task 1:</b> Candidate is required to perform single point Tool Grinding on Pedestal Grinder according to the cutting tool geometry assign by assessor.</p> <p><b>Assessment Task 2:</b> Candidate is required to perform Grinding on work piece according to the drawing assign by assessor.</p> <p><b>Assessment Task3:</b> Candidate is required to perform following Lathe Operations on work piece according to the drawing assign by assessor.</p> <ul style="list-style-type: none"> <li>○ Facing</li> <li>○ Turning (Straight and Taper)</li> </ul> <p><b>Assessment Task 4:</b> Candidate is required to perform Drilling/Boring On work piece according to the drawing assign by assessor.</p> <p><b>Assessment Task 5:</b> Candidate is required to perform Arc Welding on work piece according to the requirement given by assessor.</p> <p><b>And complete:</b></p> <ol style="list-style-type: none"> <li>1. Knowledge assessment test (Written or Oral)</li> <li>2. Portfolios at the time of assessment (if any)</li> </ol>
	<p><b>During a practical assessment, under observation by an assessor, you will complete:</b></p> <p><b>Assessment Task 1</b></p> <p><b>Performance Criteria 1:</b> Perform tool grinding operation by holding the tool firmly against the rotating wheel by placing it on the tool rest.</p> <p><b>Performance Criteria 2:</b> Adopt technique and methods as per requirements of tool geometry.</p> <p><b>Performance Criteria 3:</b> Check quality of the tool at suitable intervals.</p> <p><b>Performance Criteria 4:</b> Shut down the grinder after finishing the work.</p> <p><b>Performance Criteria 5:</b> Follow standard procedure to provide sufficient light at workplace</p>

	<p><b>Performance Criteria 6:</b> Identify task requirements.</p> <p><b>Assessment Task 2</b></p> <p><b>Performance Criteria 1:</b> Select clamping device according to the job requirement.</p> <p><b>Performance Criteria 2:</b> Manage the measuring instruments as per job requirement.</p> <p><b>Performance Criteria 3:</b> Switch ON the machine</p> <p><b>Performance Criteria 4:</b> Clamp the work piece as per standard procedure</p> <p><b>Performance Criteria 5:</b> Maintain safe distance between work piece &amp; grinding wheel</p> <p><b>Performance Criteria 6:</b> Apply coolant on grinding surface</p> <p><b>Performance Criteria 7:</b> Perform grinding as per standard procedure.</p> <p><b>Performance Criteria 8:</b> Clean &amp; de burr the work piece</p> <p><b>Performance Criteria 9:</b> Verify dimensional and geometrical accuracy at suitable intervals.</p> <p><b>Performance Criteria 10:</b> Shut down the machine in safe position after finishing the work</p> <p><b>Performance Criteria 11:</b> Take corrective/preventive action to mitigate the risk</p> <p><b>Performance Criteria 12:</b> Plan steps to complete tasks</p> <p><b>Assessment Task 3</b></p> <p><b>Performance Criteria 1:</b> Check oil levels</p> <p><b>Performance Criteria 2:</b> Switch On the machine</p> <p><b>Performance Criteria 3:</b> Run machine warm-up cycle</p> <p><b>Performance Criteria 4:</b> Select tool &amp; clamping device according to the job requirement.</p> <p><b>Performance Criteria 5:</b> Manage the measuring instruments as per job requirement.</p> <p><b>Performance Criteria 6:</b> Clamp and centre the work piece as per SOPs</p> <p><b>Performance Criteria 7:</b> Clamp the tool in tool post &amp; set in required angle</p> <p><b>Performance Criteria 8:</b> Set machine parameter as per job specifications</p> <p><b>Performance Criteria 9:</b> Perform facing operation by initial touching and adjust the depth of cut as per SOPs.</p> <p><b>Performance Criteria 10:</b> Check quality of the component at suitable intervals.</p> <p><b>Performance Criteria 11:</b> Shut down the machine at safe position after finishing the work.</p> <p><b>Performance Criteria 12:</b> Clamp and centre the work piece as per SOPs</p> <p><b>Performance Criteria 13:</b> Clamp the tool in tool post &amp; set in required angle</p> <p><b>Performance Criteria 14:</b> Set machine parameter as per job specifications</p> <p><b>Performance Criteria 15:</b> Perform turning operation by initial touching and adjust the depth of cut as per SOPs.</p> <p><b>Performance Criteria 16:</b> Check quality of the component at suitable intervals</p> <p><b>Performance Criteria 17:</b> Shut down the machine at safe position after finishing the work</p> <p><b>Performance Criteria 18:</b> Identify different types of waste material</p> <p><b>Performance Criteria 19:</b> Review planning and organizing process</p>
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	<p><b>Assessment Task 4</b></p> <p><b>Performance Criteria 1:</b> Clamp and centre work piece as per SOPs</p> <p><b>Performance Criteria 2:</b> Fit the drill bit in tail stock</p> <p><b>Performance Criteria 3:</b> Perform drilling to produce appropriate hole size for boring as per SOPs.</p> <p><b>Performance Criteria 4:</b> Clamp the boring tool in the tool post.</p> <p><b>Performance Criteria 5:</b> Carry out Boring operation as per standard procedure</p> <p><b>Performance Criteria 6:</b> Check quality of the job at suitable intervals.</p> <p><b>Performance Criteria 7:</b> Shut down the machine at safe position after finishing the work.</p> <p><b>Performance Criteria 8:</b> Identify potential hazards at workplace</p> <p><b>Performance Criteria 9:</b> Organize work as per task requirement</p>
	<p><b>Assessment Task 5</b></p> <p><b>Performance Criteria 1:</b> Adjust welding parameters (current, voltage etc.) of welding plant</p> <p><b>Performance Criteria 2:</b> Maintain gap between electrode and base metal as per standard practices</p> <p><b>Performance Criteria 3:</b> Deposit root pass as per welding procedure specifications/job requirements</p> <p><b>Performance Criteria 4:</b> Deposit filling passes as per welding procedure specifications/job requirements</p> <p><b>Performance Criteria 5:</b> Deposit capping pass as per welding procedure specifications/job requirements</p> <p><b>Performance Criteria 6:</b> Check root, filling and capping passes for any visual discontinuities as per acceptance standards</p> <p><b>Performance Criteria 7:</b> Clean work area in accordance with workplace safety practices</p> <p><b>Performance Criteria 8:</b> Follow standard working posture/position at workplace</p>

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**Assessors Judgment Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							
<b>Assessment Task 1</b>			<b>Description of Assessment Task 1</b> Perform single point Tool Grinding on Pedestal Grinder according to the cutting tool geometry assign by assessor.				
During the practical assessment, candidate demonstrated the following:					Yes	No	Remarks
1.	Perform tool grinding operation by holding the tool firmly against the rotating wheel by placing it on the tool rest.						
2.	Adopt technique and methods as per requirements of tool geometry.						
3.	Check quality of the tool at suitable intervals.						
4.	Shut down the grinder after finishing the work.						
5.	Follow standard procedure to provide sufficient light at workplace						
6.	Identify task requirements.						
Competent <input type="checkbox"/>				Not Yet Competent <input type="checkbox"/>			

Each Assessment Task (with performance criteria)				
<b>Assessment Task 2</b>		<b>Description of Assessment Task 2</b> Perform Grinding on work piece according to the drawing assign by assessor.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Select clamping device according to the job requirement.			
2.	Manage the measuring instruments as per job requirement.			
3.	Switch on the machine and check coolant levels			
4.	Clamp the work piece as per standard procedure			
5.	Maintain safe distance between work piece & grinding wheel			
6.	Apply coolant on grinding surface			
7.	Perform grinding as per standard procedure.			
8.	Clean & de burr the work piece			
9.	Verify dimensional and geometrical accuracy at suitable intervals.			
10.	Shut down the machine in safe position after finishing the work			
11.	Take corrective/preventive action to mitigate the risk			
12.	Plan steps to complete tasks			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

<b>Assessment Task 3</b>		<b>Description of Assessment Task 3</b> Perform following Lathe Operations on work piece according to the drawing assign by assessor. <ul style="list-style-type: none"> <li>○ Facing</li> <li>○ Turning (Straight and Taper)</li> </ul>		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Check oil levels			
2.	Check oil levels			
3.	Switch On the machine			
4.	Select tool & clamping device according to the job requirement.			
5.	Manage the measuring instruments as per job requirement.			
6.	Clamp and centre the work piece as per SOPs			
7.	Clamp the tool in tool post & set in required angle			
8.	Set machine parameter as per job specifications			
9.	Perform facing operation by initial touching and adjust the depth of cut as per SOPs.			
10.	Check quality of the component at suitable intervals.			
11.	Shut down the machine at safe position after finishing the work.			
12.	Clamp and centre the work piece as per SOPs			
13.	Clamp the tool in tool post & set in required angle			
14.	Set machine parameter as per job specifications			
15.	Perform turning operation by initial touching and adjust the depth of cut as per SOPs.			
16.	Check quality of the component at suitable intervals			
17.	Shut down the machine at safe position after finishing the work			
18.	Identify different types of waste material			
19.	Review planning and organizing process			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Each Assessment Task (with performance criteria)				
<b>Assessment Task 4</b>		<b>Description of Assessment Task 4</b> Perform Drilling/Boring on work piece according to the drawing assign by assessor.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Clamp and centre work piece as per SOPs			
2.	Fit the drill bit in tail stock			
3.	Perform drilling to produce appropriate hole size for boring as per SOPs.			
4.	Clamp the boring tool in the tool post			
5.	Carry out Boring operation as per standard procedure.			
6.	Check quality of the job at suitable intervals.			
7.	Shut down the machine at safe position after finishing the work.			
8.	Identify potential hazards at workplace			
9.	Organize work as per task requirement			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		



<b>Assessment Task 5</b>		<b>Description of Assessment Task 5</b> Perform Arc Welding on work piece according to the requirement given by assessor.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Adjust welding parameters (current, voltage etc.) of welding plant			
2.	Maintain gap between electrode and base metal as per standard practices			
3.	Deposit root pass as per welding procedure specifications/job requirements			
4.	Deposit filling passes as per welding procedure specifications/job requirements			
5.	Deposit capping pass as per welding procedure specifications/job requirements			
6.	Check root, filling and capping passes for any visual discontinuities as per acceptance standards			
7.	Clean work area in accordance with workplace safety practices			
8.	Follow standard working posture/position at workplace			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

**Written Assessment Guide**  
**For**  
**“Crushing Plant  
Technician/Supervisor”**  
**Level 4**

**Perform Basic Machining Operations**



**National Vocational & Technical  
Training Commission**

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/supervisor”	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Perform Basic Machining Operations Establish and Maintain the Occupational Health and Safety System Perform Advance Communication	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

Guidance for Candidate	<b>To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.</b>
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**Assessors Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Perform Basic Machining Operations Establish and Maintain the Occupational Health and Safety System Perform Advance Communication	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

### WRITTEN ASSESSMENT

Question	Candidate's answer
1. What is the process of Grinding?	
2. Enlist types of Grinding wheel according to bonding material	
3. Enlist types of Grinding wheel according to Grit size	
4. Enlist types of Grinding wheel according to Abrasive material	
5. Classify grinding wheels according to shape of wheel	
6. Enlist types of Grinding wheel Dressers	
7. State cutting fluids used in Grinding operation	
8. How a Grinding wheel is coded?	
9. Enlist the five major types of welding joints?	
10. Define Welding?	
11. State the functions of lathe machine?	
12. What is the function of coolant in lathe machine?	
13. Enlist any three parts of lathe machine.	
14. How size of lathe is determined?	
15. What is the purpose of knurling operation?	
16. Enlist any five different types of training methods.	
17. State four common types of emergencies.	

## **ANSWER KEY**

<b>Sr.</b>	<b>Answers</b>
<b>1.</b>	Grinding is machining process that used to rubbing material from a work piece via grinding wheel
<b>2.</b>	Vitrified, Silicate, Shellac, Resinoid, Rubber, Oxycloride Bond
<b>3.</b>	Coarse (10-24), Medium (30-60), Fine (80-180), Very fine (220-1000)
<b>4.</b>	Natural abrasive (Sand stone, Emery, Corundum, Diamond). Artificial Abrasive (Silicon carbide, Aluminum Oxide, Synthetic diamond)
<b>5.</b>	Straight, One/two side recessed, Taper faced, Cup shaped, Cylindrical shaped, Flaring cup, Saucer wheel, segmented wheel, dish wheel, etc.
<b>6.</b>	Washer/mechanical dresser and Diamond tipped wheel dresser
<b>7.</b>	Soluble Oil, Kerosene Oil, Truncated Oil, Pure water, etc.
<b>8.</b>	W- (Manufacturer's Abrasive Symbol) , A- (Abrasive type), 50 (Grain size), L- (Grade (Soft/medium/hard)), 5- (Structure type), R- (Bond type), 17- (Manufacturer's Symbol), etc.
<b>9.</b>	Butt Joint ,Tee Joint ,Lap Joint ,Corner Joint ,Edge Joint
<b>10.</b>	Welding is the process of permanently joining two similar or dissimilar metals by fusion and pressure with or without a filler metal.
<b>11.</b>	Coolant reducing and removing the heat build-up in the cutting zone and work piece. It provides lubrication to reduce friction between the tool and removal of the chips.
<b>12.</b>	A lathe tool post is a machine tool that spins a block of material when abrasive, cutting, or deformation tools are applied to the block
<b>13.</b>	Headstock ,Tailstock ,Bed ,Carriage ,Lead Screw ,Feed Rod ,Chip Pan ,Hand Wheel
<b>14.</b>	Knurling is used to make easy grip for a component.
<b>15.</b>	Lathe machine is used for the removal of material from revolving job with single point cutting tool as per required sizes and shapes.
<b>16.</b>	<ul style="list-style-type: none"> <li>• Technology-based learning.</li> <li>• Simulators.</li> <li>• On-the-job training.</li> <li>• Coaching/mentoring.</li> <li>• Instructor-led training.</li> <li>• Role playing.</li> <li>• Films and videos.</li> <li>• Case studies.</li> </ul>
<b>17.</b>	<ul style="list-style-type: none"> <li>• Fires or explosions.</li> <li>• Medical emergencies.</li> <li>• Severe weather.</li> <li>• Earthquakes.</li> <li>• Major power failures.</li> <li>• Hazardous material spills.</li> </ul>

# **Assessment Evidence Guide**

## **For**

### **“Crushing Plant Technician/Supervisor”**

**Level-4**

**Disassemble and Assemble Diesel Engine**  
(Formative Assessment)



**National Vocational & Technical  
Training Commission**

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level: 4</b>	<b>Version: 01</b>
<b>Competency Standard Title:</b> Disassemble and Assemble Diesel Engine Establish and Maintain the Occupational Health and Safety System Perform Advance Communication	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b>		

Candidate Details	Name: .....  Registration/Roll Number: .....
Guidance for Candidate	<p><b>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration &amp; assessment):</b></p> <p><b>Assessment Task 1:</b> Candidate is required to disassemble and assemble the diesel engine according to the instructions given by assessor.</p> <p><b>And complete:</b></p> <p><b>3. Knowledge assessment test (Written or Oral)</b></p> <p><b>4. Portfolios at the time of assessment (if any)</b></p>
Minimum Evidence Required	<p><b>During a practical assessment, under observation by an assessor, you will complete:</b></p> <p><b>Assessment Task 1</b></p> <p><b>Performance Criteria 1:</b> Select appropriate tools.</p> <p><b>Performance Criteria 2:</b> Perform disassemble the engine block according to engine manual.</p> <p><b>Performance Criteria 3:</b> Carry out disassembly of engine camshaft according to specified procedure</p> <p><b>Performance Criteria 4:</b> Carry out disassembly of engine head valve train according to specified procedure</p> <p><b>Performance Criteria 5:</b> Remove Head Gasket</p> <p><b>Performance Criteria 6:</b> Fill in the inspection check list</p> <p><b>Performance Criteria 7:</b> Perform crankshaft assembly in the engine block</p> <p><b>Performance Criteria 8:</b> Perform piston ring assembly in the block as per specified procedure.</p> <p><b>Performance Criteria 9:</b> Place the Head Gasket.</p> <p><b>Performance Criteria 10:</b> Assembly of engine head valve train according to specified procedure.</p> <p><b>Performance Criteria 11:</b> Assembly of engine camshaft according to specified procedure.</p> <p><b>Performance Criteria 12:</b> Identify potential hazards at workplace</p> <p><b>Performance Criteria 13:</b> Evaluate the risk</p> <p><b>Performance Criteria 14:</b> Take corrective/preventive action to mitigate the risk</p> <p><b>Performance Criteria 15:</b> Record your findings</p> <p><b>Performance Criteria 16:</b> Review the risk assessment</p> <p><b>Performance Criteria 17:</b> Plan steps to complete tasks</p> <p><b>Performance Criteria 18:</b> Organize work as per task requirement</p>

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**Assessors Judgment Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							
Each Assessment Task (with performance criteria)							



Assessment Task 1		Description of assessment task 1 Disassemble and assemble the diesel engine according to the instructions given by assessor.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Select appropriate tools.			
2.	Perform disassemble the engine block according to engine manual.			
3.	Carry out disassembly of engine camshaft according to specified procedure			
4.	Carry out disassembly of engine head valve train according to specified procedure			
5.	Remove Head Gasket			
6.	Fill in the inspection check list			
7.	Perform crankshaft assembly in the engine block			
8.	Perform piston ring assembly in the block as per specified procedure.			
9.	Place the Head Gasket.			
10	Assembly of engine head valve train according to specified procedure			
11	Assembly of engine camshaft according to specified procedure.			
12	Identify potential hazards at workplace			
13	Evaluate the risk			
14	Take corrective/preventive action to mitigate the risk			
15	Record your findings			
16	Review the risk assessment			
17	Plan steps to complete tasks			
18	Organize work as per task requirement			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

**Written Assessment Guide**  
**For**  
**“Crushing Plant  
Technician/Supervisor”**  
**Level 4**

**Disassemble & Assemble Engine**



**National Vocational & Technical  
Training Commission**

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Disassemble & Assemble Engine Establish and Maintain the Occupational Health and Safety System Perform Advance Communication	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

Guidance for Candidate	<b>To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.</b>
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**Assessors Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Disassemble & Assemble Engine Establish and Maintain the Occupational Health and Safety System Perform Advance Communication	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

### WRITTEN ASSESSMENT

Question	Candidate's answer
1. Define Engine?	
2. Describe types of internal combustion engine?	
3. Enlist main components of engine.	
4. Enlist major components of cylinder head.	
5. Enlist components of cylinder block.	
6. What is TDC and BDC stands for?	
7. Define TDC.	
8. Define BDC.	
9. Define Stroke.	
10. Define Bore.	
11. Define Compression Ratio.	
12. Define Clearance Volume.	
13. Define Swept Volume.	
14. Define Total Volume.	
15. Define Power Stroke.	
16. In which stroke ignition is take place.	
17. Enlist advanced language skills.	
18. What is hazard risk assessment?	

## ANSWER KEY

Sr.	Answers
1.	The device used to convert chemical energy into heat and then heat energy converted into mechanical energy.
2.	<ol style="list-style-type: none"> <li>1. Spark Ignition Engine ( Petrol Engine)</li> <li>2. Compression Ignition Engine (Diesel Engine).</li> </ol>
3.	<ol style="list-style-type: none"> <li>1. Cylinder Head</li> <li>2. Cylinder Block</li> <li>3. Oil Sump</li> </ol>
4.	<ol style="list-style-type: none"> <li>1. Cam Shaft</li> <li>2. Engine Valve</li> <li>3. Valve Train.</li> </ol>
5.	<ol style="list-style-type: none"> <li>1. Piston</li> <li>2. Connecting Rod</li> <li>3. Gudgeon Pin</li> <li>4. Crank Shaft</li> <li>5. PTO (Power Take Off) etc.</li> </ol>
6.	TDC ( Top Dead Center) BDC ( Bottom Dead Center)
7.	The extreme top position of piston inside cylinder bore.
8.	The extreme bottom position of piston inside cylinder bore.
9.	Distance between TDC and BDC.
10.	Inside dia-meter of Cylinder in which piston move.
11.	Ratio between total volumes to clearance volume.
12.	The volume of cylinder above piston when piston is at TDC.
13.	The volume of cylinder in which piston sweep.
14.	The volume of cylinder above piston when piston is at BDC.
15.	The stroke in which air fuel mixture is combust.
16.	Power Stroke
17.	Reading comprehension, advanced writing skills, translation techniques, and vocabulary
18.	A risk assessment is a process to identify potential hazards and analyze what could happen if a hazard occurs.

# **Assessment Evidence Guide**

## **For**

### **“Crushing Plant Technician/Supervisor”**

**Level-4**

**Perform Periodic Maintenance of Hauling  
Machines**  
(Formative Assessment)



**National Vocational & Technical  
Training Commission**

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level: 4</b>	<b>Version: 01</b>
<b>Competency Standard Title:</b> Perform Periodic Maintenance of Hauling Machines Establish and Maintain the Occupational Health and Safety System Perform Advance Communication	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b>		

Candidate Details	Name: .....  Registration/Roll Number: .....
Guidance for Candidate	<p><b>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration &amp; assessment):</b></p> <p><b>Assessment Task 1:</b> Candidate is required to service hydraulic and pneumatic (Air-filled) system of hauling machine according to the instructions given by assessor.</p> <p><b>Assessment Task 1:</b> Candidate is required to service suspension system, drive train, braking system and operator cab of hauling machine according to the instructions given by assessor.</p> <p><b>And complete:</b></p> <ol style="list-style-type: none"> <li>5. Knowledge assessment test (Written or Oral)</li> <li>6. Portfolios at the time of assessment (if any)</li> </ol>
Minimum Evidence Required	<p><b>During a practical assessment, under observation by an assessor, you will complete:</b></p> <p><b>Assessment Task 1</b></p> <p><b>Performance Criteria 1:</b>Identify leakages and noise of the hydraulic system</p> <p><b>Performance Criteria 2:</b>Check hydraulic oil levels</p> <p><b>Performance Criteria 3:</b>Replace hoses/pipes</p> <p><b>Performance Criteria 4:</b>Select tools</p> <p><b>Performance Criteria 5:</b>Perform basic maintenance of choked drain and valves</p> <p><b>Performance Criteria 6:</b>Check and replace damage seal, air lines and valves</p> <p><b>Performance Criteria 7:</b> Identify task requirements.</p> <p><b>Performance Criteria 8:</b>Take corrective/preventive action to mitigate the risk</p>
	<p><b>Assessment Task 2</b></p> <p><b>Performance Criteria 1:</b>Select tools</p> <p><b>Performance Criteria 2:</b>Check gashes or bulges and tires</p> <p><b>Performance Criteria 3:</b>Lubricant bearings, bush and pins</p> <p><b>Performance Criteria 4:</b>Change damaged grease fittings</p> <p><b>Performance Criteria 5:</b>Check wear, leaks and damage components</p>

	<p><b>Performance Criteria 6:</b>Identify defective undercarriage components</p> <p><b>Performance Criteria 7:</b>Repair / replace defective undercarriage components</p> <p><b>Performance Criteria 8:</b>Top-up brake fluid reservoir</p> <p><b>Performance Criteria 9:</b>Identify defective components of braking system</p> <p><b>Performance Criteria 10:</b>Repair /replace defective components of braking system</p> <p><b>Performance Criteria 11:</b>Identify missing or defective components or controls</p> <p><b>Performance Criteria 12:</b>Clean front/rear wind screen, windows and mirrors</p> <p><b>Performance Criteria 13:</b> Adjust mirrors</p> <p><b>Performance Criteria 14:</b>Replace broken mirror/frame</p> <p><b>Performance Criteria 15:</b>Adjust seat and seat belt</p> <p><b>Performance Criteria 16:</b>Check knobs of all lights and indicators</p> <p><b>Performance Criteria 17:</b>Plan steps to complete tasks</p> <p><b>Performance Criteria 18:</b>Organize work as per task requirement</p> <p><b>Performance Criteria 19:</b>Follow standard working posture/position at workplace</p>
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**Assessors Judgment Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Each Assessment Task (with performance criteria)			
<b>Assessment Task 1</b>	<b>Description of Assessment Task 1</b> Service hydraulic and pneumatic (Air-filled) system of hauling machine according to the instructions given by assessor.		

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Identify leakages and noise of the hydraulic system			
2.	Check hydraulic oil levels			
3.	Replace hoses/pipes			
4.	Select tools			
5.	Perform basic maintenance of choked drain and valves			
6.	Check and replace damage seal, air lines and valves			
7.	Identify task requirements.			
8.	Take corrective/preventive action to mitigate the risk			

Competent <input type="checkbox"/>	Not Yet Competent <input type="checkbox"/>
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Each Assessment Task (with performance criteria)				
Assessment Task 2		Description of Assessment Task 2		
		Service suspension system, drive train, braking systems and operator cab of hauling machines according to the instructions given by assessor.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Select tools			
2.	Check gashes or bulges and tires			
3.	Lubricant bearings, bush and pins			
4.	Change damaged grease fittings			
5.	Check wear, leaks and damage components			
6.	Identify defective undercarriage components			
7.	Repair / replace defective undercarriage components			
8.	Top-up brake fluid reservoir			
9.	Identify defective components of braking system			
10.	Repair /replace defective components of braking system			
11.	Identify missing or defective components or controls			
12.	Clean front/rear wind screen, windows and mirrors			
13.	Adjust mirrors			
14.	Replace broken mirror/frame			
15.	Adjust seat and seat belt			
16.	Check knobs of all lights and indicators			
17.	Plan steps to complete tasks			
18.	Organize work as per task requirement			
19.	Follow standard working posture/position at workplace			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

**Written Assessment Guide**

**For**

**“Crushing Plant  
Technician/Supervisor”**

**Level 4**

**Perform Periodic Maintenance of Hauling  
Machines**



**National Vocational & Technical  
Training Commission**

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology "Crushing Plant Technician/Supervisor"	<b>CS Code:</b> 4	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Perform Periodic Maintenance of Hauling Machines Establish and Maintain the Occupational Health and Safety System Perform Advance Communication	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

Guidance for Candidate	<b>To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.</b>
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**Assessors Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Perform Periodic Maintenance of Hauling Machines Establish and Maintain the Occupational Health and Safety System Perform Advance Communication	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

#### WRITTEN ASSESSMENT

Question	Candidate's answer
1. Define Hydraulic System.	
2. Define Suspension system.	
3. Define drive Line.	
4. Define brake system.	
5. Define pneumatic system.	
6. Define pump.	
7. Define undercarriage.	
8. Define dump truck.	
9. What is basic ergonomics?	
10. What is the indirect communication method?	

### **ANSWER KEY**

<b>Sr.</b>	<b>Answers</b>
<b>1.</b>	It is the combination of inter-related and inter-connected hydraulic components to transmit the hydraulic power from one component to another.
<b>2.</b>	A mechanical system of springs or shock absorbers connecting the wheels and axles to the chassis of a wheeled vehicle.
<b>3.</b>	The system involve to transmit the power of engine to tires or track chain for moving the vehicle from one place to another place by using different components is known as power line.
<b>4.</b>	It is used to reduce the speed of moving vehicle.
<b>5.</b>	The movement created by pressured air in the system.
<b>6.</b>	The device which is used to create flow in the fluid.
<b>7.</b>	It is the combination of different components combines to create track chain assembly.
<b>8.</b>	The machine used to carry the material from one place to another place
<b>9.</b>	Ergonomics is the branch of science that deals with the people and their working environment. Ergonomics is for worker safety and health and maintaining the healthy working environment.
<b>10.</b>	Indirect communication is acting out rather than directly saying what a person is thinking or feeling using facial expressions, tone of voice, and/or gestures

# **Assessment Evidence Guide**

## **For**

### **“Crushing Plant Technician/Supervisor”**

**Level-4**

**Troubleshooting of Crushing Plant**  
(Formative Assessment)



**National Vocational & Technical  
Training Commission**

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level: 4</b>	<b>Version: 01</b>
<b>Competency Standard Title:</b> Troubleshooting of Crushing Plant Perform Basic Green Skills for Crushing Plant	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b>		

Candidate Details	Name: .....  Registration/Roll Number: .....
Guidance for Candidate	<p><b>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration &amp; assessment):</b></p> <p><b>Assessment Task 1:</b> Candidate is required to service different systems of crushing plant assign by assessor, including:</p> <ul style="list-style-type: none"> <li>• Spring and cushions of screen</li> <li>• Plant Cabin</li> <li>• Conveyer</li> <li>• Hopper and Feeder</li> <li>• Crusher</li> </ul> <p><b>And complete:</b></p> <p><b>7. Knowledge assessment test (Written or Oral)</b></p> <p><b>8. Portfolios at the time of assessment (if any)</b></p>
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p><b>Assessment Task 1</b></p> <p><b>Performance Criteria 1:</b>Select tools</p> <p><b>Performance Criteria 2:</b>Check and lubricate , bearings, bush and pins</p> <p><b>Performance Criteria 3:</b> Check and replace greasing nipples</p> <p><b>Performance Criteria 4:</b>Check and replace spring and cushions</p> <p><b>Performance Criteria 5:</b>Check and replace the screen</p> <p><b>Performance Criteria 6:</b>Change damaged greasing nipples</p> <p><b>Performance Criteria 7:</b>Identify defective components / controls</p> <p><b>Performance Criteria 8:</b>Clean wind screen</p> <p><b>Performance Criteria 9:</b>Clean knobs of all lights and siren</p> <p><b>Performance Criteria 10:</b>Check and replace the damage switches of control panel</p> <p><b>Performance Criteria 11:</b> Check and lubricate bush and pins of rollers</p> <p><b>Performance Criteria 12:</b>Check and adjust the conveyer belt</p> <p><b>Performance Criteria 13:</b> Check and adjust the alignment of motors</p> <p><b>Performance Criteria 14:</b>Inspect the speed sensors with volt meter</p> <p><b>Performance Criteria 15:</b>Replace the damage sensors</p>



	<p><b>Performance Criteria 16:</b> Check and adjust the damage components of conveyor</p> <p><b>Performance Criteria 17:</b> Lubricate bush and pins of hopper and feeder</p> <p><b>Performance Criteria 18:</b> Weld the damage parts</p> <p><b>Performance Criteria 19:</b> Inspect the connecting rode and crushing jaws</p> <p><b>Performance Criteria 20:</b> Tight nuts and flange</p> <p><b>Performance Criteria 21:</b> Replace with new bearing</p> <p><b>Performance Criteria 22:</b> Replace with new shaft</p> <p><b>Performance Criteria 23:</b> Follow standard procedure to manage systems (waste, energy, water)</p>
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*Continued on following page*

**Assessors Judgment Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							
Each Assessment Task (with performance criteria)							

<b>Assessment Task 1</b>		<b>Description of Assessment Task 1</b> Service different systems of crushing plant assign by assessor, including: <ul style="list-style-type: none"> <li>• Spring and cushions of screen</li> <li>• Plant Cabin</li> <li>• Conveyer</li> <li>• Hopper and Feeder</li> <li>• Crusher</li> </ul>		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Select tools			
2.	Check and lubricate , bearings, bush and pins			
3.	Check and replace greasing nipples			
4.	Check and replace spring and cushions			
5.	Check and replace the screen			
6.	Change damaged greasing nipples			
7.	Identify defective components / controls			
8.	Clean wind screen			
9.	Clean knobs of all lights and siren			
10.	Check and replace the damage switches of control panel			
11.	Check and lubricate bush and pins of rollers			
12.	Check and adjust the conveyer belt			
13.	Check and adjust the alignment of motors			
14.	Inspect the speed sensors with volt meter			
15.	Replace the damage sensors			
16.	Check and adjust the damage components of conveyor			
17.	Lubricate bush and pins of hopper and feeder			
18.	Weld the damage parts			
19.	Inspect the connecting rode and crushing jaws			
20.	Tight nuts and flange			
21.	Replace with new bearing			
22.	Replace with new shaft			
23.	Follow standard procedure to manage systems (waste, energy, water)			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

# **Written Assessment Guide**

## **For**

### **“Crushing Plant Technician/Supervisor”**

#### **Level 4**

**Troubleshooting of Crushing Plant**



**National Vocational & Technical  
Training Commission**

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Troubleshooting of Crushing Plant Perform Basic Green Skills for Crushing Plant	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

Guidance for Candidate	<b>To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.</b>
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**Assessors Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Troubleshooting of Crushing Plant Perform Basic Green Skills for Crushing Plant	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

### WRITTEN ASSESSMENT

Question	Candidate's answer
1. Differentiate between inspection and servicing	
2. Define screen and screening.	
3. Define Hooper.	
4. Define conveyor belt.	
5. Enlist the types of conveyor belt.	
6. Define rollers in conveyor belt.	
7. Define motor and its uses?	
8. Describe 6 R approach?	

### **ANSWER KEY**

<b>Sr.</b>	<b>Answers</b>
<b>1.</b>	Service is defined as to repair, maintain or provide something to someone. An inspection is, most generally, an organized examination or formal evaluation exercise. In engineering activities inspection involves the measurements, tests, and gauges applied to certain characteristics in regard to an object or activity
<b>2.</b>	Screening is the process by which granulated ore material gets separated into different grades of particle size. On a <i>crushing and screening plant</i> , punch plates or perforated plates are mostly used on scalper vibrating <i>screens</i> , after raw products pass on grizzly bars.
<b>3.</b>	A hopper is a large, pyramidal or cone shaped container used in industrial processes to hold material of any sort, can dispense these from the bottom when needed.
<b>4.</b>	A conveyor belt is the carrying medium of a belt conveyor system (often shortened to belt conveyor). A belt conveyor system is one of many types of conveyor systems.
<b>5.</b>	Belts are generally made of rubber, PVC, Urethane, Neoprene, Nylon, Nitrile, Polyester, leather and others.
<b>6.</b>	Conveyor rollers are parts of a conveyor belt which is used to move products or loose bulk goods such as coal, sand or iron ore. The conveyor rollers are part of this installation and are essential to enable transport.
<b>7.</b>	An electric motor is a device used to convert electricity into mechanical energy.
<b>8.</b>	Rethink, Refuse, Reduce, Reuse, Recycle and Repair.

# **Assessment Evidence Guide**

## **For**

### **“Crushing Plant Technician/Supervisor”**

**Level-4**

**Perform Basic Electrical Installations**  
(Formative Assessment)



**National Vocational & Technical  
Training Commission**



<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level: 4</b>	<b>Version: 01</b>
<b>Competency Standard Title:</b> Perform Basic Electrical Installations Perform Basic Green Skills for Crushing Plant	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b>		

Candidate Details	Name: .....  Registration/Roll Number: .....
Guidance for Candidate	<p><b>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration &amp; assessment):</b></p> <p><b>Assessment Task 1:</b> Candidate is required to perform basic electric circuits and electrical measurement according to the circuit diagram given by assessor.</p> <p><b>Assessment Task 2:</b> Candidate is required to perform three phase power supply according to the circuit diagram given by assessor.</p> <p><b>And complete:</b></p> <p><b>9. Knowledge assessment test (Written or Oral)</b></p> <p><b>10. Portfolios at the time of assessment (if any)</b></p>
Minimum Evidence Required	<p><b>During a practical assessment, under observation by an assessor, you will complete:</b></p> <p><b>Assessment Task 1</b></p> <p><b>Performance Criteria 1:</b> Interpret layout of the job for installations</p> <p><b>Performance Criteria 2:</b> Interpret electrical drawing for electrical wirings</p> <p><b>Performance Criteria 3:</b> Connect components of equipment according to drawing</p> <p><b>Performance Criteria 4:</b> Prepare series circuit on work bench</p> <p><b>Performance Criteria 5:</b> Prepare parallel circuit on work bench tools.</p> <p><b>Performance Criteria 6:</b> Prepare Head and Tail Light Circuit on work bench</p> <p><b>Performance Criteria 7:</b> Prepare indicator circuit on work bench using appropriate tools.</p> <p><b>Performance Criteria 8:</b> Follow standard procedure to manage systems (waste, energy, water)</p> <p><b>Assessment Task 2</b></p> <p><b>Performance Criteria 1:</b> Select cable gauge</p> <p><b>Performance Criteria 2:</b> Select cables colors</p> <p><b>Performance Criteria 3:</b> Connect cables</p> <p><b>Performance Criteria 4:</b> Insulate Joints</p> <p><b>Performance Criteria 5:</b> Select electrical appliances</p> <p><b>Performance Criteria 6:</b> Connect cables with electrical appliances as per operation manual</p> <p><b>Performance Criteria 7:</b> Verify the connections according to color coding / tagging / numbering.</p>

*Continued on following page*

**Assessors Judgment Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Each Assessment Task (with performance criteria)

<b>Assessment Task 1</b>	<b>Description of Assessment Task 1</b> Perform basic electric circuits and electrical measurement according to the circuit diagram given by assessor.
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During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Interpret layout of the job for installations			
2.	Interpret electrical drawing for electrical wirings			
3.	Connect components of equipment according to drawing			
4.	Prepare series circuit on work bench			
5.	Prepare parallel circuit on work bench			
6.	Prepare Head and Tail Light Circuit on work bench			
7.	Prepare indicator circuit on work bench			
8.	Follow standard procedure to manage systems (waste, energy, water)			

Competent <input type="checkbox"/>	Not Yet Competent <input type="checkbox"/>
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<b>Assessment Task 2</b>		<b>Description of Assessment Task 2</b> Perform three phase power supply according to the circuit diagram given by assessor.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
	Select cable gauge			
1.	Select cables colors			
2.	Connect cables			
3.	Insulate Joints			
4.	Select electrical appliances			
5.	Connect cables with electrical appliances as per operation manual			
6.	Verify the connections according to color coding / tagging / numbering.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

**Written Assessment Guide**

**For**

**“Crushing Plant  
Technician/Supervisor”**

**Level 4**

**Perform Basic Electrical Installations**



**National Vocational & Technical  
Training Commission**

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology "Crushing Plant Technician/Supervisor"	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Perform Basic Electrical Installations Perform Basic Green Skills for Crushing Plant	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

Guidance for Candidate	<b>To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.</b>
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**Assessors Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/supervisor”	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Perform Basic Electrical Installations Perform Basic Green Skills for Crushing Plant	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

### WRITTEN ASSESSMENT

Question	Candidate's answer
1. Define Ohm's Law?	
2. Define Alternating Current?	
3. What does DMM stand for?	
4. Describe the working principle of earth tester.	
5. Enlist any two advantages of a three phase power.	
6. Where 3 phase power supplies used?	
7. Define L.C.R meter.	
8. Define environmental degradation.	

### **ANSWER KEY**

<b>Sr.</b>	<b>Answers</b>
1.	Ohm's law states that the current through a conductor between two points is directly proportional to the voltage across the two points.
2.	Alternating current describes the flow of charge that changes direction periodically. As a result, the voltage level also reverses along with the current.
3.	Digital Multi Meter.
4.	The earth ground tester works on the principle that in parallel/multi-grounded systems, the net resistance of all ground paths will be extremely low compared to any single path (the one under test)
5.	6. Run larger loads 7. Do not require any starters to three-phase motors used in big industries
6.	Three-phase power supplies power grids, data centers, aircraft, shipboard, and other electronic loads larger than 1,000 watts.
7.	Measure the inductance (L), capacitance (C), and resistance (R) of an electronic component.
8.	Environmental degradation is a process through which the natural environment is compromised in some way, reducing biological diversity and the general health of the environment

# **Assessment Evidence Guide**

## **For**

### **“Crushing Plant Technician/Supervisor”**

**Level-4**

**Maintain Power Generator**  
(Formative Assessment)



**National Vocational & Technical  
Training Commission**



<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level: 4</b>	<b>Version: 01</b>
<b>Competency Standard Title:</b> Maintain Power Generator Perform Basic Green Skills for Crushing Plant	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b>		

Candidate Details	Name: .....  Registration/Roll Number: .....
Guidance for Candidate	<p><b>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration &amp; assessment):</b></p> <p><b>Assessment Task 1:</b> Candidate is required to perform preventive maintenance of generator according to the instructions given by assessor.</p> <p><b>Assessment Task2:</b> Candidate is required to troubleshoot the generator according to the instructions given by assessor, including:</p> <ul style="list-style-type: none"> <li>• Main alternator</li> <li>• Control panel</li> </ul> <p><b>And complete:</b>  <b>11. Knowledge assessment test (Written or Oral)</b>  <b>12. Portfolios at the time of assessment (if any)</b></p>
Minimum Evidence Required	<p><b>During a practical assessment, under observation by an assessor, you will complete:</b></p> <p><b>Assessment Task 1</b></p> <p><b>Performance Criteria 1:</b> Perform daily maintenance of engine</p> <p><b>Performance Criteria 2:</b> Perform periodic maintenance of engine.</p> <p><b>Performance Criteria 3:</b> Perform alternator preventive maintenance</p> <p><b>Performance Criteria 4:</b> Identify various types of waste at site</p> <p><b>Performance Criteria 5:</b> Sort and categorize reusable waste</p> <hr/> <p><b>Assessment Task 2</b></p> <p><b>Performance Criteria 1:</b> Check stator, rotor, exciter, rectifiers</p> <p><b>Performance Criteria 2:</b> Replace rectifier and exciter</p> <p><b>Performance Criteria 3:</b> Check and replace the cooling fan</p> <p><b>Performance Criteria 4:</b> Check and replace starting solenoid valve</p> <p><b>Performance Criteria 5:</b> Replace AVR(automatic voltage regulator)</p> <p><b>Performance Criteria 6:</b> Check and replace switches</p> <p><b>Performance Criteria 7:</b> Check and replace wires</p> <p><b>Performance Criteria 8:</b> Check and replace fuses</p> <p><b>Performance Criteria 9:</b> Dispose unusable waste as per set standards</p> <p><b>Performance Criteria 10:</b> Place reusable material at designated storage area</p>

**Assessors Judgment Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor: .....

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Each Assessment Task (with performance criteria)			
<b>Assessment Task 1</b>		<b>Description of Assessment Task 1</b>	
		Perform preventive maintenance of generator according to the instructions given by assessor.	

During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Perform Daily maintenance of Engine			
2.	Perform periodic maintenance of engine			
3.	Perform Alternator preventive maintenance			
4.	Identify various types of waste at site			
5.	Sort and categorize reusable waste			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

<b>Assessment Task 2</b>		<b>Description of Assessment Task 2</b> Troubleshoot the generator according to the instructions given by assessor, including: <ul style="list-style-type: none"> <li>• Main alternator</li> <li>• Control panel</li> </ul>		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Check stator, rotor, exciter, rectifiers			
2.	Replace rectifier and exciter			
3.	Replace cooling fan			
4.	Check and replace starting solenoid valve			
5.	Replace AVR(automatic voltage regulator)			
6.	Check and replace switches			
7.	Check and replace wires			
8.	Check and replace fuses			
9.	Dispose unusable waste as per set standards			
10.	Place reusable material at designated storage area			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

**Written Assessment Guide**  
**For**  
**“Crushing Plant**  
**Technician/Supervisor”**  
**Level 4**

**Maintain Power Generator**



**National Vocational & Technical**  
**Training Commission**

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Maintain Power Generator Perform Basic Green Skills for Crushing Plant	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

Guidance for Candidate	<b>To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.</b>
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**Assessors Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Maintain Power Generator Perform Basic Green Skills for Crushing Plant	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

### WRITTEN ASSESSMENT

Question	Candidate's answer
1. Define Engine?	
2. Types of engine according to combustion?	
3. Types of internal combustion engine.	
4. Enlist main components of engine.	
5. Enlist major components of cylinder head.	
6. Enlist components of cylinder block.	
7. Enlist main parts of alternator.	
8. Define control panel.	
9. Define Routine Maintenance.	
10. Define solar energy.	

### **ANSWER KEY**

<b>Sr.</b>	<b>Answers</b>
<b>1.</b>	The device used to convert chemical energy into heat and then heat energy converted into mechanical energy..
<b>2.</b>	External combustion engine ,Internal combustion engine
<b>3.</b>	Spark Ignition Engine (Petrol Engine), Compression Ignition Engine (Diesel Engine).
<b>4.</b>	Cylinder Head ,Cylinder Block ,Oil Sump
<b>5.</b>	Cam Shaft, Engine Valve, Valve Train.
<b>6.</b>	Piston ,Connecting Rod ,Gudgeon Pin ,Crack Shaft ,PTO (Power Take Off) etc.
<b>7.</b>	The device used to convert mechanical energy into electrical energy.
<b>8.</b>	Rotor ,Stator ,Slip Ring ,Shaft ,Voltage Regulator ,Rectifier Bearing ,Housing
<b>9.</b>	The control panel will be a collection of components, together they should monitor the diesel engine and AC alternator as they run and ensure the readings stay within pre-set parameters.
<b>10.</b>	Routine maintenance is an activity such as regular inspection of machines. Routine maintenance is done on regular intervals whether that is daily, weekly, monthly, or yearly.
<b>11.</b>	Solar energy is the transformation of heat, the energy that comes from the sun

# **Assessment Evidence Guide**

## **For**

### **“Crushing Plant Technician/Supervisor”**

**Level-4**

**Maintain Hydraulic System**  
(Formative Assessment)



**National Vocational & Technical  
Training Commission**



<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level: 4</b>	<b>Version: 01</b>
<b>Competency Standard Title:</b> Maintain Hydraulic System Perform Basic Green Skills for Crushing Plant	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b>		

Candidate Details	Name: .....  Registration/Roll Number: .....
Guidance for Candidate	<p><b>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration &amp; assessment):</b></p> <p><b>Assessment Task 1:</b> Candidate is required to overhaul the hydraulic system of crushing plant according to the instructions given by assessor.</p> <p><b>And complete:</b></p> <p><b>13. Knowledge assessment test (Written or Oral)</b></p> <p><b>14. Portfolios at the time of assessment (if any)</b></p>
Minimum Evidence Required	<p><b>During a practical assessment, under observation by an assessor, you will complete:</b></p> <p><b>Assessment Task 1</b></p> <p><b>Performance Criteria 1:</b> Check the set-pressure and compare with standard value</p> <p><b>Performance Criteria 2:</b> Measure the flow rate and compare with standard value</p> <p><b>Performance Criteria 3:</b> Inspect and adjust proportional pressure control (PPC) valve as per requirement</p> <p><b>Performance Criteria 4:</b> Remove hydraulic pipes of pump and motor</p> <p><b>Performance Criteria 5:</b> Remove hydraulic pump and motor from hydraulic unit</p> <p><b>Performance Criteria 6:</b> Install hydraulic pump and motor to hydraulic unit</p> <p><b>Performance Criteria 7:</b> Install hydraulic pipes of pump and motor</p> <p><b>Performance Criteria 8:</b> Remove hydraulic pipes of control valve</p> <p><b>Performance Criteria 9:</b> Remove hydraulic control valve</p> <p><b>Performance Criteria 10:</b> Install hydraulic pipes of control valve</p> <p><b>Performance Criteria 11:</b> Install hydraulic valve on hydraulic unit</p> <p><b>Performance Criteria 12:</b> Disassemble the hydraulic cylinder</p> <p><b>Performance Criteria 13:</b> Replace dust seal</p> <p><b>Performance Criteria 14:</b> Replace U-packing</p> <p><b>Performance Criteria 15:</b> Replace V-packing</p> <p><b>Performance Criteria 16:</b> Replace piston "O" rings</p> <p><b>Performance Criteria 17:</b> Assembling of hydraulic cylinder.</p> <p><b>Performance Criteria 18:</b> Identify various types of waste at site</p> <p><b>Performance Criteria 19:</b> Sort and categorize reusable waste</p> <p><b>Performance Criteria 20:</b> Dispose unusable waste as per set standards</p> <p><b>Performance Criteria 21:</b> Place reusable material at designated storage area</p>

*Continued on following page*

**Assessors Judgment Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							
Each Assessment Task (with performance criteria)							

Assessment Task 1		Description of Assessment Task 1		
		Overhaul the hydraulic system of crushing plant according to the instructions given by assessor.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Check the set-pressure and compare with standard value			
2.	Measure the flow rate and compare with standard value			
3.	Inspect and adjust Proportional pressure control (PPC) valve as per requirement			
4.	Remove hydraulic pipes of pump and motor			
5.	Remove hydraulic pump and motor from hydraulic unit			
6.	Install hydraulic pump and motor to hydraulic unit			
7.	Install hydraulic pipes of pump and motor			
8.	Remove hydraulic pipes of control valve			
9.	Remove hydraulic control valve			
10.	Install hydraulic pipes of control valve			
11.	Install hydraulic valve on hydraulic unit			
12.	Disassemble the hydraulic cylinder			
13.	Replace dust seal			
14.	Replace U-packing			
15.	Replace V-packing			
16.	Replace piston "O" rings			
17.	Assembling of hydraulic cylinder.			
18.	Identify various types of waste at site			
19.	Sort and categorize reusable waste			
20.	Dispose unusable waste as per set standards			
21.	Place reusable material at designated storage area			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

**Written Assessment Guide**

**For**

**“Crushing Plant  
Technician/Supervisor”**

**Level 4**

**Maintain Hydraulic System**



**National Vocational & Technical  
Training Commission**

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology “Crushing Plant Technician/Supervisor”	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Maintain Hydraulic System Perform Basic Green Skills for Crushing Plant	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

Guidance for Candidate	<b>To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.</b>
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**Assessors Guide** (to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: ..... Registration/Roll Number: ..... Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: ..... Assessor's code: ..... Signature of the Assessor:.....

<b>Title of Qualification:</b> National Vocational Certificate Level 4 in Crush Plant Technology "Crushing Plant Technician/Supervisor"	<b>CS Code:</b>	<b>Level:</b> 4	<b>Version:</b> 01
<b>Competency Standard Title:</b> Maintain Hydraulic System Perform Basic Green Skills for Crushing Plant	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time:</b> 30 min		

### WRITTEN ASSESSMENT

Question	Candidate's answer
1. Define Hydraulic System.	
2. Enlist components of hydraulic system.	.
3. Define pump.	
4. Define hydraulic tank.	
5. Define control valve.	
6. Define pressure.	
7. Define flow rate.	
8. Define Pascal Law.	
9. Define set – pressure.	
10. Define cracking pressure.	
11. Define surge pressure.	
12. Define back pressure.	
13. Define Actuator.	
14. Enlist types of Actuator.	
15. Define hydraulic cylinder.	
16. Define hydraulic motor.	
17. Define dust seal.	
18. Define packing.	
19. Define Entrained Air.	

Question	Candidate's answer
<b>20.</b> Define Chattering Sound.	
<b>21.</b> Define recycling materials.	

### **ANSWER KEY**

<b>Sr.</b>	<b>Answers</b>
<b>1.</b>	It is the combination of inter-related and inter-connected hydraulic components to transmit the hydraulic power from one component to another.
<b>2.</b>	Hydraulic Tank Hydraulic Pump Control Valve Assembly Actuator Pipes and Housings
<b>3.</b>	The component which is used to create flow in the fluid.
<b>4.</b>	The component which is used to provide storage to the hydraulic oil.
<b>5.</b>	The component which is used to provide direction to pressurized oil.
<b>6.</b>	Pressure is force per unit area applied in a direction perpendicular to the surface of an object.
<b>7.</b>	It is defined as the volume of fluid which moves in unit time, and is expressed in liter/min.
<b>8.</b>	Pascal's law states that when there is an increase in pressure at any point in a confined fluid, there is an equal increase at every other point in the container.
<b>9.</b>	Rated pressure is the maximum pressure which can be applied continuously. It is also known as the base pressure.
<b>10.</b>	The pressure at which the oil starts being relieved from valve it will be lower than set - pressure. This pressure is referred to as cracking pressure.
<b>11.</b>	Surge pressure is defined as the maximum value of a momentary rise of pressure in a hydraulic system.
<b>12.</b>	The pressure which is created inside the system due to any external resistance.
<b>13.</b>	The component used to convert hydraulic energy into mechanical energy.
<b>14.</b>	Hydraulic Cylinder Hydraulic Motor
<b>15.</b>	The type of actuator which is used to convert hydraulic energy into mechanical energy in the form of linear motion.
<b>16.</b>	The type of actuator which is used to convert hydraulic energy into mechanical energy in the form of rotary motion.
<b>17.</b>	The seal which is used to resist the external dust or dirt particles inside actuator.
<b>18.</b>	The combination of different seal to resist the leakage from high pressure side to low pressure side.
<b>19.</b>	Entrained air is air which is mixed in a liquid (oil or water) in the form of fine bubbles. An example is air mixed with hydraulic oil, which is visible as a series of white bubbles. Such entrained air causes oil to lose its ability to resist compression.
<b>20.</b>	The sound created due to continuous opening and closing of main relief valve.
<b>21.</b>	Recycling is the process of collecting and processing materials that would otherwise be thrown away as trash and turning them into new products.