

Assessment Evidence Guide

For

“Foreman in Metallurgy and Cast metal technology”

Level-4

Module name
(Summative Assessment)

8th -12th March 2021



**National Vocational & Technical
Training Commission**

Title of Qualification: Level 4 National Qualification Certificate, Foreman in Metallurgy and cast metal technology	CS Code:	Level: 4	Version: 01
Competency Standard Title: Perform Shell Mold Casting Perform austempering Perform Case Hardening process Perform Hardness Test Perform Impact Test Perform Mechanical Testing on Universal Testing Machine	Assessment Date (DD/MM/YY): Assessment Time: 5 hours		

Candidate Details	Name: Registration/Roll Number:.....
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to: Create shell mold for casting</p> <p>Assessment Task 2: Candidate is required to: Assemble mold for casting</p> <p>Assessment Task 3: Candidate is required to: Cast molten metal in mold</p> <p>Assessment Task 4: Candidate is required to: Remove casting from mold</p> <p>Assessment Task 5: Candidate is required to: Perform Austempering treatment on steel</p> <p>Assessment Task 6: Candidate is required to: Perform Flame hardening</p> <p>Assessment Task 7: Candidate is required to: Measure hardness of the specimen by using Rockwell Hardness Test</p> <p>Assessment Task 8: Candidate is required to: Measure toughness of the specimen by using Izod Impact Test</p> <p>Assessment Task 9: Candidate is required to: Measure tensile properties of the specimen</p>

	<p>And complete:</p> <ol style="list-style-type: none"> 1. Knowledge assessment test (Written or Oral) 2. Portfolios at the time of assessment (if any)
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Performance Criteria</p> <p>P1. Heat each pattern half to 175-370°C as per standard operating procedures</p> <p>P2. Coat pattern with a lubricant to facilitate removal process</p> <p>P3. Clamp the heated pattern to a dump box containing a mixture of sand and a resin binder</p> <p>P4. Invert the dump box allowing sand-resin mixture to coat the pattern</p> <p>P5. Create shell around the heated pattern while curing the mixture in an oven</p> <p>Eject the shell from the pattern</p> <p>P1. Insert cores in the mold as per requirement</p> <p>P2. Join the two shell halves together</p> <p>P3. Clamp the halves to form a complete shell mold</p> <p>Place the shell mold into a flask supported by a backing material</p> <p>P1. Pour molten metal from ladle into the gating system</p> <p>P2. Ensure the mold is securely clamped together while the molten metal is poured</p> <p>Fill the mold cavity completely with the melt</p> <p>Carry out solidification of melt into the shape of the final casting</p> <p>P1. Break the mold after the metal is cool down</p> <p>P2. Shake out any sand from the mold</p> <p>P3. Trim any excess metal from the feed system</p> <p>P4. Carry out visual inspection of casting</p> <p>Prepare observation data sheet(ODS) and report to concerned department</p> <p>Handle the job as per SOP</p> <p>P2. Place the workpiece in the furnace</p> <p>P3. Adjust the temperature in the austenitic range and soaking time of the</p>

	<p>furnace according to steel grade and size.</p> <p>P4. Turn of the furnace once the required temperature and soaking time is achieved.</p> <p>P5. Let the workpiece to quench in a salt bath maintained at a temperature above the martensitic start (MS) range.</p> <p>P6. Hold the workpiece in a salt bath till the complete transformation of bainite.</p> <p>P7. Remove the workpiece from the salt bath and cool in the air.</p> <p>P7. Clean the workpiece and referred it to the next section</p> <p>Place the workpiece in flame exposed area</p> <p>P2. Wear the safety gloves and goggles.</p> <p>P3. Adjust the oxyacetylene flame torch.</p> <p>P4. Heat the surface of workpiece as per standard time.</p> <p>P5. Quench the workpiece in quenching media as per job requirement</p> <p>P1. Perform tempering of job as per requirement</p> <p>P6. Clean the workpiece and prepare report of all findings</p> <p>P1. Prepare the surface of standard specimen as per requirement.</p> <p>P2. Inspect the working mode of the Rockwell Hardness Testing Machine.</p> <p>P3. Select the Scale of the machine (A, B or C) depending upon the material.</p> <p>P4. Place the specimen on anvil with safety precautions and apply minor load.</p> <p>P5. Apply major load on the specimen according to the scale of the machine.</p> <p>Note the Rockwell Hardness number from gauge.</p> <p>P1. Check the dimensions of Izod specimen with the help of measuring instrument as per ASTM standard.</p> <p>P2. Inspect the working mode of the izod impact testing machine.</p> <p>P3. Adjust the initial position of the hammer.</p> <p>P4. Calculate the initial potential energy of the hammer.</p> <p>P5. Clamp the standard specimen in the anvil by keeping standard length</p>
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	<p>out of the anvil.</p> <p>P6. Drop the hammer to strike it with standard specimen.</p> <p>P7. Calculate the final potential energy of the hammer.</p> <p>Calculate the toughness of the specimen material by calculating difference of initial and final energy of the hammer.</p> <p>P1. Inspect the dimensions of standard specimen with the help of measuring instruments.</p> <p>P2. Mark the gauge length points on the specimen.</p> <p>P3. Measure the initial cross sectional area of the specimen.</p> <p>P4. Select the gripping device as per standard specimen.</p> <p>P5. Inspect the functioning condition of the gripping device.</p> <p>P6. Grip the specimen in gripping device according to standard.</p> <p>P7. Attach the extensometer with the specimen if required.</p> <p>P8. Apply the load on the specimen up to fracture.</p> <p>P9. Note the values of applied load after specific intervals.</p> <p>P10. Note the extension produced against the noted applied load.</p> <p>P11. Calculate stress and strain from the values of load and extension.</p> <p>P12. Sketch stress strain curve.</p> <p>Calculate the required mechanical properties.</p>
	<p>Portfolios required at the time of assessment (if any) for</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		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
	P1. Label the identification number to recognize specimen identity.			
	P2. Perform proper documentation with date & time in log book.			
	P3. Record the initial conditions of Specimen.			
	P4. Use the measuring tool for marking.			
	P5. Mark the cutting area with permanent marker, to be sectioned or cut.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 2		Description of assessment task 2		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Title of Qualification:	CS Code:	Level:	Version: 01
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Competency Standard Title:	Assessment Date (DD/MM/YY): Assessment Time: 30 min
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Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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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:

Title of Qualification:	CS Code:	Level:	Version: 01
Competency Standard Title:	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

WRITTEN ASSESSMENT

Question	Candidate's answer
1. What is purpose of coating?	<ul style="list-style-type: none"> • To protect metal surface • Lifetime • Enhance materiel properties
2.	
3.	
4.	
5.	
6.	
7.	

Question	Candidate's answer
8.	
9.	