

Assessment Evidence Guide

For

“Dies and Mould Technology”

Level-4

Perform Heat Treatment
(Formative Assessment)

1st -5th March 2021



National Vocational & Technical
Training Commission

Title of Qualification: National Vocational Certificate Level 4, (Dies and Mould Technology) "CAD/CAM Supervisor"	CS Code:	Level: 4	Version: 01
Competency Standard Title: Perform Heat Treatment	Assessment Date (DD/MM/YY): Assessment Time: 3hrs		

Candidate Details	Name: Registration/Roll Number:.....
Guidance for Candidate	To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment): Assessment Task 1: Candidate is required to perform Annealing on workpiece according to the requirement Assessment Task 2: Candidate is required to perform Normalizing on workpiece according to the requirement Assessment Task 3: Candidate is required to perform Hardening on workpiece according to the requirement Assessment Task 4: Candidate is required to perform Induction hardening on workpiece according to the requirement Assessment Task 5: Candidate is required to perform Flame hardening on workpiece according to the requirement Assessment Task 6: Candidate is required to perform Tempering on workpiece according to the requirement Assessment Task 7: Candidate is required to perform Pack carburizing on workpiece according to the requirement And complete: Knowledge assessment test (Written or Oral) Portfolios at the time of assessment (if any)
Minimum Evidence Required	During a practical assessment, under observation by an assessor, you will complete: Assessment Task 1 Performance Criteria 1: Prepare provision for holding the workpiece in furnace. Performance Criteria 2: Check the hardness of the workpiece using appropriate hardness tester Performance Criteria 3: Set the workpiece according to the requirement. Performance Criteria 4: Set the temperature of furnace as per material specification Performance Criteria 5: Held the part in the furnace to reach the required soaking time

	Performance Criteria 6: Cool the workpiece inside the furnace.
	Assessment Task 2 Performance Criteria 1: Set the temperature of furnace as per material specification. Performance Criteria 2: Held the part in the furnace to reach the required soaking time. Performance Criteria 3: Cool the workpiece at room temperature.
	Assessment Task 3 Performance Criteria 1: Set the temperature of furnace as per material specification Performance Criteria 2: Held the part in the furnace to reach the required soaking time. Performance Criteria 3: Ensure that quenching media temperature is as per standard requirement of the material. Performance Criteria 4: Dip the part in specific quenching media (bath) to achieve required hardness Performance Criteria 5: Agitate quenching media as per requirement to absorb heat of a part. Performance Criteria 6: Verify the required hardness
	Assessment Task 4 Performance Criteria 1: Set on the induction heating apparatus. Performance Criteria 2: Place the workpiece in heat exposed area of induction heating apparatus. Performance Criteria 3: Control the heat-up times to within $\pm 0.1s$ and should be less than 20s to avoid penetration of heat deep from the surface of workpiece Performance Criteria 4: Quench the workpiece in quenching media Performance Criteria 5: Clean the workpiece Performance Criteria 6: Verify the required hardness
	Assessment Task 5 Performance Criteria 1: Place the workpiece in flame exposed area Performance Criteria 2: Adjust the oxyacetylene flame torch. Performance Criteria 3: Gently heat all the surface of workpiece for a prescribed time. Performance Criteria 4: Quench the workpiece in quenching media. Performance Criteria 5: Clean the workpiece. Performance Criteria 6: Verify the required hardness

	Assessment Task 6 Performance Criteria 1: Take hardened sample Performance Criteria 2: Place the sample in the furnace Performance Criteria 3: Adjust the tempering temperature of furnace and soaking time of the furnace according to requirement. Performance Criteria4: Cool the specimen at room temperature.
	Assessment Task 7 Performance Criteria 1: Handle the samples with appropriate care. Performance Criteria 2: Pack the samples in carbonaceous material in steel box and seal the boxes by suitable method. Performance Criteria 3:Place the boxes in the furnace Performance Criteria 4: Heat the samples for suitable time and temperature. Performance Criteria 5: Turn off the furnace and remove the steel boxes from furnace and recover the specimen. Performance Criteria 6: Clean the workpiece. Performance Criteria 7:Verify the required hardness

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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 ☐ NOT YET COMPETENT ☐ 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 Candidate is required to perform Annealing on workpiece according to the requirement		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Prepare provision for holding the workpiece in furnace.			
2.	Check the hardness of the workpiece using appropriate hardness tester			
3.	Set the workpiece according to the requirement.			
4.	Set the temperature of furnace as per material specification			
5.	Held the part in the furnace to reach the required soaking time			
6.	Cool the workpiece inside the furnace.			
Competent ☐		Not Yet Competent ☐		

Assessment Task 2		Description of assessment task 2 Candidate is required to perform Normalizing on workpiece according to the requirement		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Set the temperature of furnace as per material specification.			
2.	Held the part in the furnace to reach the required soaking time.			
3.	Cool the workpiece at room temperature.			
Competent ☐		Not Yet Competent ☐		

Assessment Task 3		Description of assessment task 3 Candidate is required to perform Hardening on workpiece according to the requirement		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Set the temperature of furnace as per material specification			
2.	Held the part in the furnace to reach the required soaking time.			
3.	Ensure that quenching media temperature is as per standard requirement of the material.			
4.	Dip the part in specific quenching media (bath) to achieve required hardness			
5.	Agitate quenching media as per requirement to absorb heat of a part.			
6.	Verify the required hardness			
Competent ☐		Not Yet Competent ☐		

Assessment Task 4		Description of assessment task 4 Candidate is required to perform Induction hardening on workpiece according to the requirement		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Set on the induction heating apparatus.			
2.	Place the workpiece in heat exposed area of induction heating apparatus.			
3.	Control the heat-up times to within $\pm 0.1s$ and should be less than 20s to avoid penetration of heat deep from the surface of workpiece			
4.	Quench the workpiece in quenching media			
5.	Clean the workpiece			
6.	Verify the required hardness			
Competent ☐		Not Yet Competent ☐		

Assessment Task 5		Description of assessment task 5 Candidate is required to perform Flame hardening on workpiece according to the requirement		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Place the workpiece in flame exposed area			
2.	Adjust the oxyacetylene flame torch.			
3.	Gently heat all the surface of workpiece for a prescribed time.			
4.	Quench the workpiece in quenching media.			
5.	Clean the workpiece.			
6.	Verify the required hardness			
Competent ☐		Not Yet Competent ☐		

Assessment Task 6		Description of assessment task 6 Candidate is required to perform Tempering on workpiece according to the requirement		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Take hardened sample			
2.	Place the sample in the furnace			
3.	Adjust the tempering temperature of furnace and soaking time of the furnace according to requirement.			
4.	Cool the specimen at room temperature.			
Competent ☐		Not Yet Competent ☐		

Assessment Task 7		Description of assessment task 7 Candidate is required to perform Pack carburizing on workpiece according to the requirement		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Handle the samples with appropriate care.			
2.	Pack the samples in carbonaceous material in steel box and seal the boxes by suitable method.			
3.	Place the boxes in the furnace			
4.	Heat the samples for suitable time and temperature.			
5.	Turn off the furnace and remove the steel boxes from furnace and recover the specimen.			
6.	Clean the workpiece.			
7.	Verify the required hardness			
Competent ☐		Not Yet Competent ☐		