

Assessment Evidence Guide

For

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Level-2

Module name
(Formative Assessment)

8th -12th March 2021



**National Vocational & Technical
Training Commission**

Title of Qualification: Melter	CS Code:	Level: 2	Version: 01
Competency Standard Title: Melt Non-Ferrous Material in Pit Furnace	Assessment Date (DD/MM/YY): Assessment Time:		

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) as per the instructions given in Annexure A:</p> <p>Assessment Task 1: Candidate is required to: Identify job requirement.</p> <p>Assessment Task 2: Candidate is required to: Perform melting of metal.</p> <p>Assessment Task 3: Candidate is required to: Perform metal treatment process</p> <p>Assessment Task 4: Candidate is required to: Identify casting quality requirement</p> <p>Assessment Task 5: Candidate is required to: Identify defects caused by unsound melting</p> <p>Assessment Task 6: Candidate is required to: Recycle scraps / turnings.</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>Assessment Task 1</p> <ul style="list-style-type: none"> • Identify alloy melting requirements as per manufacturers/ suppliers instruction sheets. • Cross check required specifications with corresponding international specification • Determine casting method with available mold • Determine metal treatment based on available product bulletin. • Coat all tools which comes into contact with the melt to avoid melt contamination • Select appropriate melting furnace as per required metal treatment and type of crucible (stationary/dip-out or tilting).
	<p>Assessment Task 2</p> <ul style="list-style-type: none"> • Feed Metal charges as per standard operating procedures. • Perform fluxing technique based on composition of metal charges (virgin ingot and recycled scrap). • Start furnace as per standard operating procedures. • Weigh specified amounts of scrap metal • Charge metal into furnace by hand or by directing crane operator • Regulate the injection of fuel and air into furnace • Apply appropriate degassing technique as per standard operating procedures. • Add melt refining agent of the alloy as per standard operating procedures. • Observe melt temperature with the help of thermocouple • Take test sample of molten metal from crucible using hand ladle • Record data from each melt on form
	<p>Assessment Task 3</p> <ul style="list-style-type: none"> • Apply structured modification of the alloy as per standard operating procedures. • Monitor speed of melting to avoid oxidation. • Control pouring temperature corresponding to the alloy • Apply filtration method and location corresponding to the alloy • Tap metal from crucible with minimum turbulence to avoid oxide formations. • Accompany pouring in accordance with OH & S requirements
	<p>Assessment Task 4</p> <ul style="list-style-type: none"> • Identify content of contaminants, which will affect integrity of the casting in accordance with procedures. • Apply structural modification in accordance with procedures • Carry out chemical analysis results in process control • Follow written procedures during casting as per quality standards
	<p>Assessment Task 5</p> <ul style="list-style-type: none"> • Identify remedial actions in accordance with standard operating procedures. • Show up defective castings with the respective sections in accordance with company procedures • Re-orient the correct melting and treatment of given alloy.
	<p>Assessment Task 6</p> <ul style="list-style-type: none"> • Accomplish re-melting in accordance with company standard operating procedures • Remove dross completely from the melt before pouring into molds. • Ensure label ingot type as per standard operating procedures • Enter production reports in performa with recommendation for future production reference.

	Portfolios required at the time of assessment (if any) for
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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		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Identify alloy melting requirements as per manufacturers/ suppliers instruction sheets.			
2.	Cross check required specifications with corresponding international specification			
3.	Determine casting method with available mold			
4.	Determine metal treatment based on available product bulletin.			
5.	Coat all tools which comes into contact with the melt to avoid melt contamination			
6.	Select appropriate melting furnace as per required metal treatment and type of crucible (stationary/dip-out or tilting).			
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
1.	Feed Metal charges as per standard operating procedures.			
2.	Perform fluxing technique based on composition of metal charges (virgin ingot and recycled scrap).			
3.	Start furnace as per standard operating procedures.			
4.	Weigh specified amounts of scrap metal			
5.	Charge metal into furnace by hand or by directing crane operator			
6.	Regulate the injection of fuel and air into furnace			
7.	Apply appropriate degassing technique as per standard operating procedures.			
8.	Add melt refining agent of the alloy as per standard operating procedures.			
9.	Observe melt temperature with the help of thermocouple			
10.	Take test sample of molten metal from crucible using hand ladle			
11.	Record data from each melt on form			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 3		Description of assessment task 3		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Apply structured modification of the alloy as per standard operating procedures.			
2.	Monitor speed of melting to avoid oxidation.			
3.	Control pouring temperature corresponding to the alloy			
4.	Apply filtration method and location corresponding to the alloy			
5.	Tap metal from crucible with minimum turbulence to avoid oxide formations.			
6.	Accompany pouring in accordance with OH & S requirements			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 4		Description of assessment task 4		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Identify content of contaminants, which will affect integrity of the casting in accordance with procedures.			
2.	Apply structural modification in accordance with procedures			
3.	Carry out chemical analysis results in process control			
4.	Follow written procedures during casting as per quality standards			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 5		Description of assessment task 5		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Identify remedial actions in accordance with standard operating procedures.			
2.	Show up defective castings with the respective sections in accordance with company procedures			
3.	Re-orient the correct melting and treatment of given alloy.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 6		Description of assessment task 6		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Accomplish re-melting in accordance with company standard operating procedures			
2.	Remove dross completely from the melt before pouring into molds.			
3.	Ensure label ingot type as per standard operating procedures			
4.	Enter production reports in performa with recommendation for future production reference.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Title of Qualification: Melter	CS Code:	Level: 2	Version: 01
Competency Standard Title: Melt Non-Ferrous Material in Pit Furnace	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

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: Melter	CS Code:	Level:2	Version: 01
Competency Standard Title: Melt Non-Ferrous Material in Pit Furnace	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

WRITTEN ASSESSMENT

Question	Candidate's answer
1. What are examples of non-ferrous metals?	<ul style="list-style-type: none"> Nonferrous metals, including aluminum, nickel, lead, tin, brass, silver, and zinc, are known for their tensile strength
2. Mention the steps of perform melting of metal?	<ul style="list-style-type: none"> Feed metal charge Perform fluxing techniques Start furnace & charge scrap in it Apply degassing technique & add refining agent
3. How to perform metal treatment process?	<ul style="list-style-type: none"> Apply structured modification of the alloy Monitor speed of melting to avoid oxidation. Control pouring temperature corresponding to the alloy Apply filtration method Tap metal from crucible with minimum turbulence
4. Why we use pit furnace?	<ul style="list-style-type: none"> Pit furnaces have been used for tempering (250° F to 1,400° F) and aluminum heat treating (250° F to 1,100° F) Used to easy loading and unloading of parts, which is done by lifting the lid away and hooking the parts out of the furnace
5. How does a melting furnace work?	<ul style="list-style-type: none"> Melting furnaces are used to overheat solid materials until they liquefy. A melting furnace generates overhot temperatures that exceed the metal's melting point and cause decomposition of its physical structure which leads to liquefaction.
6. Name some casting defects?	<ul style="list-style-type: none"> Surface defect Laminations Gas porosity Blisters Shrink porosity Ejector pin defects Inclusions

Question	Candidate's answer
7. Define the construction of pit furnace?	<ul style="list-style-type: none"> It consists of a cylindrical steel shell ,closed at the bottom with a grate and covered with a removable lid The shell is lined with refractory bricks from inside Work pieces can be suspended from fixtures, held in baskets, or placed on bases in the furnace.
8. For which tasks Pit furnaces are suitable?	<ul style="list-style-type: none"> Pit furnaces are suited to heating long tubes, shafts, and rods by holding them in a vertical position. This manner of loading provides minimal distortion
9. How melting is done in Pit furnace?	<ul style="list-style-type: none"> To prepare the furnace for melting, a deep bed pf coke is kindled and allowed to burn until a state of good combustion is attained .Some of the coke is removed to make place for the crucible The crucible is then lowered into furnace .The coke is replaced and additional coke is put to surround the crucible on all sides. Metal is then charged in the crucible and the furnace lid is replaced to give natural draft
10. What is the maximum temperature of pit furnace?	<ul style="list-style-type: none"> 1000 C
11. What are types of pit furnace design and heating system?	<p>TYPES OF FURNACE DESIGN</p> <ul style="list-style-type: none"> Closed bottom Opened bottom & fixed hearth <p>BASED ON HEATING SYSTEM</p> <ul style="list-style-type: none"> Electrically heated Gas fired

Annexure A: