

## Instruction Sheet for the Candidate

<b>Qualification</b>	<b>National Vocational Certificate in Metal Forming &amp; Processing Level 3</b>
<b>Competency Standard</b>	Perform CO2 Sand Mold Casting
<b>Purpose of Assessment</b>	<b>Formative Assessment</b>
<b>Candidate Details</b>	Name_____ Registration/Roll Number_____
<b>Guidance for Candidate</b>	<p><b>To meet this standard, you are required to complete the following within 04 Hrs. time frame (for practical demonstration &amp; assessment):</b></p> <ul style="list-style-type: none"> <li>• CU1. Prepare CO2 sand Mold for Casting</li> <li>• CU2. Perform pre-casting operations</li> <li>• CU3. Perform CO2 sand mold casting process</li> <li>• CU4. Perform post casting operations</li> </ul>
<b>Time: 04 Hrs.</b>	During a practical assessment, under observation by an assessor, you are required to
<b>Minimum Evidence Required</b>	<p><b>CU1. Prepare CO2 sand Mold for Casting</b></p> <p><b>P1.</b> Carry out mixing of silica sand (clean, dry and free from clay) by weight of sodium silicate</p> <p><b>P2.</b> Perform mixing of mixture with liquid base binder in the muller</p> <p><b>P3.</b> Put mixture into the core-boxes by conventional methods</p> <p><b>P4.</b> Perform Ramming of the mould</p> <p><b>P5.</b> Carry out hardening of mold with CO2</p> <p><b>P6.</b> Perform assembling of mold</p> <p><b>P7.</b> Force CO<sub>2</sub> into the mold at required pressure</p> <p><b>CU2. Perform pre-casting operations</b></p> <p><b>P1.</b> Arrange CO2 sand molds as per requirement</p> <p><b>P2.</b> Arrange raw material for melting operations</p> <p><b>P3.</b> Set casting parameters as per SOPs</p> <p><b>P4.</b> Check the melting equipment availability as per requirement</p> <p><b>P5.</b> Check the tilting operation of casting ladles</p> <p><b>CU3. Perform CO2 sand mold casting process</b></p> <p><b>P1.</b> Carryout pouring with the defined work standards and specifications</p> <p><b>P2.</b> Regulate the speed of the molten metal into CO2 sand molds</p>

	<p>as per SOPs</p> <p><b>P3.</b> Prevent metal spillage in the work area</p> <p><b>P4.</b> Take preventive actions to avoid parting leak, gas evolution and interrupted pouring</p> <p><b>P5.</b> Maintain maximum limit of melt in down sprue during pouring as per the process mentioned in the work instructions/ SOPs</p> <p><b>P6.</b> Remove the CO2 sand molds with metal cast at a designated place to discard used sand</p> <p><b>CU4.      Perform post casting operations</b></p> <p><b>P1.</b> Analyze any irregularity in the casting process to take preventive steps in next casting</p> <p><b>P2.</b> Check the in-line composition/ soundness of the casting</p> <p><b>P3.</b> Inspect the conformance of final metal casting as per specification given in work order</p> <p><b>P4.</b> Send the casting for further processing in terms of chipping, fettling, wedge cutting etc.</p>
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## Self-Assessment Checklist

<b>Candidate Name</b>	
<b>Registration No.</b>	
<b>Qualification</b>	<b>National Vocational Certificate in Metal Forming &amp; Processing Level 3</b>
<b>Competency Standard</b>	Perform CO2 Sand Mold Casting
<b>Purpose of Assessment</b>	<b>Formative Assessment</b>
<b>Assessment Task</b>	<ul style="list-style-type: none"> <li>• CU1. Prepare CO2 sand Mold for Casting</li> <li>• CU2. Perform pre-casting operations</li> <li>• CU3. Perform CO2 sand mold casting process</li> <li>• CU4. Perform post casting operations</li> </ul>

I can.....

<b>Performance Criteria</b>	<b>Yes</b>	<b>No</b>
<b>P1.</b> Carry out mixing of silica sand (clean, dry and free from clay) by weight of sodium silicate	<input type="checkbox"/>	<input type="checkbox"/>
<b>P2.</b> Perform mixing of mixture with liquid base binder in the muller	<input type="checkbox"/>	<input type="checkbox"/>
<b>P3.</b> Put mixture into the core-boxes by conventional methods	<input type="checkbox"/>	<input type="checkbox"/>
<b>P4.</b> Perform Ramming of the mould	<input type="checkbox"/>	<input type="checkbox"/>
<b>P5.</b> Carry out hardening of mold with CO2	<input type="checkbox"/>	<input type="checkbox"/>
<b>P6.</b> Perform assembling of mold	<input type="checkbox"/>	<input type="checkbox"/>
<b>P7.</b> Force CO <sub>2</sub> into the mold at required pressure	<input type="checkbox"/>	<input type="checkbox"/>
<b>P8.</b> Arrange CO2 sand molds as per requirement	<input type="checkbox"/>	<input type="checkbox"/>
<b>P9.</b> Arrange raw material for melting operations	<input type="checkbox"/>	<input type="checkbox"/>
<b>P10.</b> Set casting parameters as per SOPs	<input type="checkbox"/>	<input type="checkbox"/>
<b>P11.</b> Check the melting equipment availability as per requirement	<input type="checkbox"/>	<input type="checkbox"/>
<b>P12.</b> Check the tilting operation of casting ladles	<input type="checkbox"/>	<input type="checkbox"/>
<b>P13.</b> Carryout pouring with the defined work standards and specifications	<input type="checkbox"/>	<input type="checkbox"/>
<b>P14.</b> Regulate the speed of the molten metal into CO2 sand molds as per SOPs	<input type="checkbox"/>	<input type="checkbox"/>
<b>P15.</b> Prevent metal spillage in the work area	<input type="checkbox"/>	<input type="checkbox"/>
<b>P16.</b> Take preventive actions to avoid parting leak, gas evolution and interrupted pouring	<input type="checkbox"/>	<input type="checkbox"/>
<b>P17.</b> Maintain maximum limit of melt in down sprue	<input type="checkbox"/>	<input type="checkbox"/>

	during pouring as per the process mentioned in the work instructions/ SOPs		
<b>P18.</b>	Remove the CO2 sand molds with metal cast at a designated place to discard used sand	<input type="text"/>	<input type="text"/>
<b>P19.</b>	Analyze any irregularity in the casting process to take preventive steps in next casting	<input type="text"/>	<input type="text"/>
<b>P20.</b>	Check the in-line composition/ soundness of the casting	<input type="text"/>	<input type="text"/>
<b>P21.</b>	Inspect the conformance of final metal casting as per specification given in work order	<input type="text"/>	<input type="text"/>
<b>P22.</b>	Send the casting for further processing in terms of chipping, fettling, wedge cutting etc.	<input type="text"/>	<input type="text"/>

Candidate's Signature \_\_\_\_\_ Assessor's Signature \_\_\_\_\_

Date: \_\_\_\_\_

## Assessors Judgment Guide

<b>Qualification</b>	<b>National Vocational Certificate in Metal Forming &amp; Processing Level 3</b>
<b>Competency Standard</b>	Perform CO2 Sand Mold Casting
<b>Purpose of Assessment</b>	<b>Formative Assessment</b>
<b>Candidate Details</b>	Name: _____ Registration/Roll Number: _____ Signature: _____
<b>Assessment Outcome</b>	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor _____ Assessor's code: _____ Signature: _____

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							

## Observation Checklist

Assessment Task		<ul style="list-style-type: none"> <li>• CU1. Prepare CO<sub>2</sub> sand Mold for Casting</li> <li>• CU2. Perform pre-casting operations</li> <li>• CU3. Perform CO<sub>2</sub> sand mold casting process</li> <li>• CU4. Perform post casting operations</li> </ul>		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Carry out mixing of silica sand (clean, dry and free from clay) by weight of sodium silicate			
2.	Perform mixing of mixture with liquid base binder in the muller			
3.	Put mixture into the core-boxes by conventional methods			
4.	Perform Ramming of the mould			
5.	Carry out hardening of mold with CO <sub>2</sub>			
6.	Perform assembling of mold			
7.	Force CO <sub>2</sub> into the mold at required pressure			
8.	Arrange CO <sub>2</sub> sand molds as per requirement			
9.	Arrange raw material for melting operations			
10.	Set casting parameters as per SOPs			
11.	Check the melting equipment availability as per requirement			
12.	Check the tilting operation of casting ladles			
13.	Carryout pouring with the defined work standards and specifications			
14.	Regulate the speed of the molten metal into CO <sub>2</sub> sand molds as per SOPs			
15.	Prevent metal spillage in the work area			
16.	Take preventive actions to avoid parting leak, gas evolution and interrupted pouring			
17.	Maintain maximum limit of melt in down sprue during pouring as per the process mentioned in the work instructions/ SOPs			
18.	Remove the CO <sub>2</sub> sand molds with metal cast at a designated place to discard			

	used sand			
19.	Analyze any irregularity in the casting process to take preventive steps in next casting			
20.	Check the in-line composition/ soundness of the casting			
21.	Inspect the conformance of final metal casting as per specification given in work order			
22.	Send the casting for further processing in terms of chipping, fettling, wedge cutting etc.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

## Knowledge Assessment

<b>Qualification</b>	<b>National Vocational Certificate in Metal Forming &amp; Processing Level 3</b>
<b>Competency Standard</b>	Perform CO2 Sand Mold Casting
<b>Purpose of Assessment</b>	<b>Formative Assessment</b>
<b>Candidate Details</b>	Name: _____ Registration/Roll Number: _____ Candidate Signature: _____
<b>Assessment Outcome</b>	<b>COMPETENT</b> <input type="checkbox"/> <span style="margin-left: 100px;"><b>NOT YET COMPETENT</b> <input type="checkbox"/></span> Name of the Assessor: _____ Assessor's code: _____ Signature of the Assessor: _____

Candidate's response is not required to be identical, but similar concepts and/or keywords must be used. Oral questioning may be used to clarify candidate understanding of topic and its application.

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)		Satisfactory	Not Satisfactory
1.	Define CO2 casting process.		
2.	Enlist the types of sand molds.		



3.	What is gating system?		
4.	Define types of equipments used for casting process.		

Feedback to the Candidate	
Candidate's Signature_____	Assessor's Signature _____