

## Instruction Sheet for the Candidate

<b>Qualification</b>	<b>National Vocational Certificate in Metal Forming &amp; Processing Level 4</b>
<b>Competency Standard</b>	<b>Perform Shielded Metal Arc Welding (SMAW)</b>
<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>• Prepare Welding Machine and Accessories for SMAW</li> <li>• Make Welds on Carbon Steel Plate Flat (1F) and Flat (1G)</li> <li>• Make Welds on Carbon Steel Plate Horizontal (2F) and Horizontal (2G)</li> <li>• Make Welds on Carbon Steel Plate Vertical (3F) and Vertical (3G)</li> <li>• Make Welds on Carbon Steel Plate Overhead (4F) and Overhead (4G)</li> <li>• Perform Post Welding 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>Prepare Welding Machine and Accessories for SMAW</b></p> <ul style="list-style-type: none"> <li>• Identify welding requirements of the job, Welding Procedure Specifications (WPS) and/or technical drawings</li> <li>• Carry out the pre-cleaning of base metal as per requirement.</li> <li>• Prepare SMAW welding machine in accordance with WPS/ manufacturer instructions</li> <li>• Set-up welding machine accessories and consumables as per job requirements, WPS and/or manufacturer's instructions</li> <li>• Connect welding machine to an independent power supply</li> <li>• Perform baking of electrode in an Oven as per standard.</li> <li>• Set polarity indicated in the WPS</li> </ul>

**Make Welds on Carbon Steel Plate  
Flat (1F) and Flat (1G)**

- Adjust welding parameters (current, voltage etc.) as per WPS/job requirements to produce acceptable weld by maintaining gap between electrode and base metal as per standard practices
- Carry out pre-heating of the given job, if needed.
- Carry out welding in Flat (1F) and Flat (1G) positions following standard procedures.
- Carry out the cleaning of root pass as per requirement
- Maintain distance between electrode and base metal as per standard practices.
- Deposit root pass as per WPS/job requirements
- Deposit filling passes as per WPS/job requirements
- Deposit capping pass as per WPS/job requirements
- Follow applicable manufacturing codes and standards for acceptance criteria of visual welding defects

**Make Welds on Carbon Steel Plate  
Horizontal (2F) and Horizontal (2G)**

- Adjust welding parameters (current, voltage etc.) as per welding procedure specifications/job requirements to produce acceptable weld.
- Carry out pre-heating of the given job, if needed.
- Maintain distance between electrode and base metal as per standard practices.
- Carry out welding in Horizontal (2F) and Horizontal (2G) positions following standard procedures
- Deposit root pass as per welding procedure specifications/job requirements
- Deposit filling passes as per welding procedure specifications/job requirements
- Deposit capping pass as per welding procedure specifications/job requirements
- Carry out the cleaning of passes as per requirement
- Check root, filling and capping passes for any visual discontinuities as per acceptance standards
- Follow applicable manufacturing codes and standards for acceptance criteria of visual welding defects

**Make Welds on Carbon Steel plate  
Vertical (3F) and Vertical (3G)**

- Adjust welding parameters (current, voltage etc.) as per welding procedure specifications/job requirement to produce acceptable weld
- Carry out pre-heating of the given job, if needed.
- Maintain distance between electrode and base metal as per standard practices
- Carry out welding in Vertical (3F) and Vertical (3G) positions

	<p>following standard procedures</p> <ul style="list-style-type: none"> <li>• Deposit root pass as per welding procedure specifications/job requirements</li> <li>• Deposit filling passes as per welding procedure specifications/job requirements</li> <li>• Deposit capping pass as per welding procedure specifications/job requirements</li> <li>• Carry out the cleaning of passes as per requirement</li> <li>• Check root, filling and capping passes for any visual discontinuities as per acceptance standards</li> <li>• Follow applicable manufacturing codes and standards for acceptance criteria of visual welding defects</li> </ul> <p><b>Make Welds on Carbon Steel plate Overhead (4F) and overhead (4G)</b></p> <ul style="list-style-type: none"> <li>• Adjust welding parameters (current, voltage etc.) as per WPS/job requirements to produce acceptable weld</li> <li>• Carry out pre-heating of the given job, if needed.</li> <li>• Maintain distance between electrode and base metal as per standard practices</li> <li>• Carry out welding in Overhead (4F) and Overhead (4G) positions following standard procedures</li> <li>• Deposit root pass as per WPS/job requirements</li> <li>• Deposit filling passes as per WPS/job requirements</li> <li>• Deposit capping pass as per WPS/job requirements</li> <li>• Carry out the cleaning of passes as per requirement</li> <li>• Check root, filling and capping passes for any visual discontinuities as per acceptance standards</li> <li>• Follow applicable manufacturing codes and standards for acceptance criteria of visual welding defects</li> </ul> <p><b>Perform post welding operations</b></p> <ul style="list-style-type: none"> <li>• Carry out finishing work of welds following standard procedures</li> <li>• Inspect weld visually and mark any defects, if any</li> <li>• Carry out repair work in accordance with approved procedures, if required</li> <li>• Perform post weld heat treatment operation as per requirement.</li> <li>• Clean work area in accordance with workplace safety practices</li> <li>• Maintain tools/equipment/consumable materials in accordance with organization guidelines</li> <li>• Store tools/equipment/consumable materials in accordance with organization guidelines</li> </ul>
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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 4</b>
<b>Competency Standard</b>	<b>Perform Shielded Metal Arc Welding (SMAW)</b>
<b>Purpose of Assessment</b>	<b>Formative Assessment</b>
<b>Assessment Task</b>	<ul style="list-style-type: none"> <li>• Prepare Welding Machine and Accessories for SMAW</li> <li>• Make Welds on Carbon Steel Plate Flat (1F) and Flat (1G)</li> <li>• Make Welds on Carbon Steel Plate Horizontal (2F) and Horizontal (2G)</li> <li>• Make Welds on Carbon Steel Plate Vertical (3F) and Vertical (3G)</li> <li>• Make Welds on Carbon Steel Plate Overhead (4F) and Overhead (4G)</li> <li>• Perform Post Welding Operations</li> </ul>

I can.....

<b>Performance Criteria</b>	<b>Yes</b>	<b>No</b>
1. Identify welding requirements of the job, Welding Procedure Specifications (WPS) and/or technical drawings	<input type="checkbox"/>	<input type="checkbox"/>
2. Carry out the pre-cleaning of base metal as per requirement.	<input type="checkbox"/>	<input type="checkbox"/>
3. Prepare SMAW welding machine in accordance with WPS/ manufacturer instructions	<input type="checkbox"/>	<input type="checkbox"/>
4. Set-up welding machine accessories and consumables as per job requirements, WPS and/or manufacturer's instructions	<input type="checkbox"/>	<input type="checkbox"/>
5. Connect welding machine to an independent power supply	<input type="checkbox"/>	<input type="checkbox"/>
6. Perform baking of electrode in an Oven as per standard.	<input type="checkbox"/>	<input type="checkbox"/>
7. Set polarity indicated in the WPS	<input type="checkbox"/>	<input type="checkbox"/>

8. Adjust welding parameters (current, voltage etc.) as per WPS/job requirements to produce acceptable weld by maintaining gap between electrode and base metal as per standard practices	<input type="checkbox"/>	<input type="checkbox"/>
9. Carry out pre-heating of the given job, if needed.	<input type="checkbox"/>	<input type="checkbox"/>
10. Carry out welding in Flat (1F) and Flat (1G) positions following standard procedures.	<input type="checkbox"/>	<input type="checkbox"/>
11. Carry out the cleaning of root pass as per requirement	<input type="checkbox"/>	<input type="checkbox"/>
12. Maintain distance between electrode and base metal as per standard practices.	<input type="checkbox"/>	<input type="checkbox"/>
13. Deposit root pass as per WPS/job requirements	<input type="checkbox"/>	<input type="checkbox"/>
14. Deposit filling passes as per WPS/job requirements	<input type="checkbox"/>	<input type="checkbox"/>
15. Deposit capping pass as per WPS/job requirements	<input type="checkbox"/>	<input type="checkbox"/>
16. Follow applicable manufacturing codes and standards for acceptance criteria of visual welding defects	<input type="checkbox"/>	<input type="checkbox"/>
17. Adjust welding parameters (current, voltage etc.) as per welding procedure specifications/job requirements to produce acceptable weld.	<input type="checkbox"/>	<input type="checkbox"/>
18. Carry out pre-heating of the given job, if needed.	<input type="checkbox"/>	<input type="checkbox"/>
19. Maintain distance between electrode and base metal as per standard practices.	<input type="checkbox"/>	<input type="checkbox"/>
20. Carry out welding in Horizontal (2F) and Horizontal (2G) positions following standard procedures	<input type="checkbox"/>	<input type="checkbox"/>
21. Deposit root pass as per welding procedure specifications/job requirements	<input type="checkbox"/>	<input type="checkbox"/>
22. Deposit filling passes as per welding procedure specifications/job requirements	<input type="checkbox"/>	<input type="checkbox"/>
23. Deposit capping pass as per welding procedure specifications/job requirements	<input type="checkbox"/>	<input type="checkbox"/>
24. Carry out the cleaning of passes as per requirement	<input type="checkbox"/>	<input type="checkbox"/>
25. Check root, filling and capping passes for any visual discontinuities as per acceptance standards	<input type="checkbox"/>	<input type="checkbox"/>
26. Follow applicable manufacturing codes and standards for acceptance criteria of visual welding defects	<input type="checkbox"/>	<input type="checkbox"/>
27. Adjust welding parameters (current, voltage etc.) as per welding procedure specifications/job requirement to produce acceptable weld	<input type="checkbox"/>	<input type="checkbox"/>
28. Carry out pre-heating of the given job, if needed.	<input type="checkbox"/>	<input type="checkbox"/>
29. Maintain distance between electrode and base metal as per standard practices	<input type="checkbox"/>	<input type="checkbox"/>
30. Carry out welding in Vertical (3F) and Vertical (3G) positions following standard procedures	<input type="checkbox"/>	<input type="checkbox"/>
31. Deposit root pass as per welding procedure specifications/job requirements	<input type="checkbox"/>	<input type="checkbox"/>
32. Deposit filling passes as per welding procedure specifications/job requirements	<input type="checkbox"/>	<input type="checkbox"/>

33. Deposit capping pass as per welding procedure specifications/job requirements	<input type="checkbox"/>	<input type="checkbox"/>
34. Carry out the cleaning of passes as per requirement	<input type="checkbox"/>	<input type="checkbox"/>
35. Check root, filling and capping passes for any visual discontinuities as per acceptance standards	<input type="checkbox"/>	<input type="checkbox"/>
36. Follow applicable manufacturing codes and standards for acceptance criteria of visual welding defects	<input type="checkbox"/>	<input type="checkbox"/>
37. Adjust welding parameters (current, voltage etc.) as per WPS/job requirements to produce acceptable weld	<input type="checkbox"/>	<input type="checkbox"/>
38. Carry out pre-heating of the given job, if needed.	<input type="checkbox"/>	<input type="checkbox"/>
39. Maintain distance between electrode and base metal as per standard practices	<input type="checkbox"/>	<input type="checkbox"/>
40. Carry out welding in Overhead (4F) and Overhead (4G) positions following standard procedures	<input type="checkbox"/>	<input type="checkbox"/>
41. Deposit root pass as per WPS/job requirements	<input type="checkbox"/>	<input type="checkbox"/>
42. Deposit filling passes as per WPS/job requirements	<input type="checkbox"/>	<input type="checkbox"/>
43. Deposit capping pass as per WPS/job requirements	<input type="checkbox"/>	<input type="checkbox"/>
44. Carry out the cleaning of passes as per requirement	<input type="checkbox"/>	<input type="checkbox"/>
45. Check root, filling and capping passes for any visual discontinuities as per acceptance standards	<input type="checkbox"/>	<input type="checkbox"/>
46. Follow applicable manufacturing codes and standards for acceptance criteria of visual welding defects	<input type="checkbox"/>	<input type="checkbox"/>
47. Carry out finishing work of welds following standard procedures	<input type="checkbox"/>	<input type="checkbox"/>
48. Inspect weld visually and mark any defects, if any	<input type="checkbox"/>	<input type="checkbox"/>
49. Carry out repair work in accordance with approved procedures, if required	<input type="checkbox"/>	<input type="checkbox"/>
50. Perform post weld heat treatment operation as per requirement.	<input type="checkbox"/>	<input type="checkbox"/>
51. Clean work area in accordance with workplace safety practices	<input type="checkbox"/>	<input type="checkbox"/>
52. Maintain tools/equipment/consumable materials in accordance with organization guidelines	<input type="checkbox"/>	<input type="checkbox"/>
53. Store tools/equipment/consumable materials in accordance with organization guidelines	<input type="checkbox"/>	<input type="checkbox"/>

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

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

## Assessors Judgment Guide

<b>Qualification</b>	<b>National Vocational Certificate in Metal Forming &amp; Processing Level 4</b>
<b>Competency Standard</b>	<b>Perform Shielded Metal Arc Welding (SMAW)</b>
<b>Purpose of Assessment</b>	<b>Formative Assessment</b>
<b>Candidate Details</b>	Name: _____ Registration/Roll Number: _____ Signature: _____
<b>Assessment Outcome</b>	<div style="display: flex; justify-content: space-between; align-items: center;"> <span><b>COMPETENT</b> <input type="checkbox"/></span> <span><b>NOT YET COMPETENT</b> <input type="checkbox"/></span> </div> 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>• Prepare Welding Machine and Accessories for SMAW</li><li>• Make Welds on Carbon Steel Plate Flat (1F) and Flat (1G)</li><li>• Make Welds on Carbon Steel Plate Horizontal (2F) and Horizontal (2G)</li><li>• Make Welds on Carbon Steel Plate Vertical (3F) and Vertical (3G)</li><li>• Make Welds on Carbon Steel Plate Overhead (4F) and Overhead (4G)</li><li>• Perform Post Welding Operations</li></ul>			
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Identify welding requirements of the job, Welding Procedure Specifications (WPS) and/or technical drawings			
2.	Carry out the pre-cleaning of base metal as per requirement.			
3.	Prepare SMAW welding machine in accordance with WPS/ manufacturer instructions			
4.	Set-up welding machine accessories and consumables as per job requirements, WPS and/or manufacturer's instructions			
5.	Connect welding machine to an independent power supply			
6.	Perform baking of electrode in an Oven as per standard.			
7.	Set polarity indicated in the WPS			
8.	Adjust welding parameters (current, voltage etc.) as per WPS/job requirements to produce acceptable weld by maintaining gap between electrode and base metal as per standard practices			
9.	Carry out pre-heating of the given job, if needed.			
10.	Carry out welding in Flat (1F) and Flat (1G) positions following standard procedures.			
11.	Carry out the cleaning of root pass as per requirement			
12.	Maintain distance between electrode and base metal as per standard practices.			



13.	Deposit root pass as per WPS/job requirements			
14.	Deposit filling passes as per WPS/job requirements			
15.	Deposit capping pass as per WPS/job requirements			
16.	Follow applicable manufacturing codes and standards for acceptance criteria of visual welding defects			
17.	Adjust welding parameters (current, voltage etc.) as per welding procedure specifications/job requirements to produce acceptable weld.			
18.	Carry out pre-heating of the given job, if needed.			
19.	Maintain distance between electrode and base metal as per standard practices.			
20.	Carry out welding in Horizontal (2F) and Horizontal (2G) positions following standard procedures			
21.	Deposit root pass as per welding procedure specifications/job requirements			
22.	Deposit filling passes as per welding procedure specifications/job requirements			
23.	Deposit capping pass as per welding procedure specifications/job requirements			
24.	Carry out the cleaning of passes as per requirement			
25.	Check root, filling and capping passes for any visual discontinuities as per acceptance standards			
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28.	Carry out pre-heating of the given job, if needed.			
29.	Maintain distance between electrode and base metal as per standard practices			
30.	Carry out welding in Vertical (3F) and Vertical (3G) positions following standard procedures			
31.	Deposit root pass as per welding procedure specifications/job requirements			

32.	Deposit filling passes as per welding procedure specifications/job requirements			
33.	Deposit capping pass as per welding procedure specifications/job requirements			
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47.	Carry out finishing work of welds following standard procedures			
48.	Inspect weld visually and mark any defects, if any			
49.	Carry out repair work in accordance with approved procedures, if required			
50.	Perform post weld heat treatment operation as per requirement.			
51.	Clean work area in accordance with workplace safety practices			

52.	Maintain tools/equipment/consumable materials in accordance with organization guidelines			
53.	Store tools/equipment/consumable materials in accordance with organization guidelines			
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 4</b>
<b>Competency Standard</b>	<b>Perform Shielded Metal Arc Welding (SMAW)</b>
<b>Purpose of Assessment</b>	<b>Formative Assessment</b>
<b>Candidate Details</b>	Name: _____ Registration/Roll Number: _____ Candidate Signature: _____
<b>Assessment Outcome</b>	<div style="display: flex; justify-content: space-around; align-items: center;"> <span><b>COMPETENT</b> <input type="checkbox"/></span> <span><b>NOT YET COMPETENT</b> <input type="checkbox"/></span> </div> 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.	What is shielded metal arc welding?		
2.	Describe different parameters of SMAW.		
3.	What are different applications of SMAW?		

4.	What are different advantages of SMAW?		
5.	What are different limitations of SMAW?		

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