

# **Assessment Evidence Guide**

**For**

**“Steel Fixer/ Erector”**

**Level-3**

**(Summative Assessment)**



**National Vocational & Technical  
Training Commission**

## Instruction Sheet for the Candidate

<b>Title of Qualification:</b> National Vocational Certificate Level 3 in Steel Fixer& Erector	<b>CS Code:</b>	<b>Level:03</b>	<b>Version:01</b>
<b>Competency Standard Title:</b> Perform Basic Computer Operations Plan and Organize Work Maintain Safety at Site Interpret Bar Bending Schedule Execute the Steelwork for the Foundations and the Necks Execute the Steel work for the Grade Beams Erect rebars for Columns Execute the Steel work for the Stairs Execute the Steel work for the Shell and Dome Execute steel work for the Tank / Basement Perform Welding	<b>Assessment Date (DD/MM/YY):</b>  <b>Assessment Time: 05hrs.</b>		

Candidate Details	Name: .....  Registration/Roll Number: .....
Guidance for Candidate	<p><b>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration &amp; assessment):</b></p> <p style="text-align: center;"><b>Assessment Task 1:</b>Candidate is required to perform steelwork for prototype small size dome as per drawing given by assessor</p> <p style="text-align: center;"><b>Assessment Task 2:</b>Candidate is required to perform steelwork for prototype small underground water tank as per drawing given by assessor</p> <p><b>And complete:</b></p> <ol style="list-style-type: none"> <li>2. Knowledge assessment test (Written or Oral)</li> <li>3. Portfolios at the time of assessment (if any)</li> </ol>

<p>Minimum Evidence Required</p>	<p><b>During a practical assessment, under observation by an assessor, you will complete:</b></p> <p><b>Assessment Task 1</b></p> <p><b>Performance Criteria 1:</b> Interpret bar bending schedule</p> <p><b>Performance Criteria 2:</b> Interpret structural drawing</p> <p><b>Performance Criteria 3:</b> Select the material as per job requirement.</p> <p><b>Performance Criteria 4:</b> Select the tools as per job requirement.</p> <p><b>Performance Criteria 5:</b> Select and wear the PPEs relevant to Job.</p> <p><b>Performance Criteria 6:</b> Identify physical hazards (risk of slip, trip and fall etc.) at work site.</p> <p><b>Performance Criteria 7:</b> Identify risk associated with job to be done.</p> <p><b>Performance Criteria 8:</b> Report unsafe condition to immediate supervisor</p> <p><b>Performance Criteria 9:</b> Use hand signal while lifting and placing load</p> <p><b>Performance Criteria 10:</b> Check load balance.</p> <p><b>Performance Criteria 11:</b> Select lifting equipment accordingly</p> <p><b>Performance Criteria 12:</b> Assemble the lifting equipment</p> <p><b>Performance Criteria 13:</b> Abstract cut length and number of different types of rebars</p> <p><b>Performance Criteria 14:</b> Bind the stirrups with bottom and top rebars on marked points</p> <p><b>Performance Criteria 15:</b> Bind curtailed/tension rebars with stirrups</p> <p><b>Performance Criteria 16:</b> Spread the main rebars and distribution rebars for dome</p> <p><b>Performance Criteria 17:</b> Bind rebars with one another with binding wire</p> <p><b>Performance Criteria 18:</b> Fix the additional tension rebars with rebars</p> <p><b>Performance Criteria 19:</b> Fix the concrete spacers in dome and ring beam</p> <p><b>Performance Criteria 20:</b> Remove obstacles from work area.</p>
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	<p><b>Assessment Task 2</b></p> <p><b>Performance Criteria 1:</b> Select the tools as per job requirement</p> <p><b>Performance Criteria 2:</b> Select and wear the PPEs relevant to Job.</p> <p><b>Performance Criteria 3:</b> Interpret bar bending schedule</p> <p><b>Performance Criteria 4:</b> Interpret structural drawing</p> <p><b>Performance Criteria 5:</b> Plan task sequence</p> <p><b>Performance Criteria 6:</b> Abstract cut length and number of different types of rebars for footing, column, and base slab and shear wall.</p> <p><b>Performance Criteria 7:</b> Straighten the rebars</p> <p><b>Performance Criteria 8:</b> Measure and mark the length of rebars according to bar bending schedule</p> <p><b>Performance Criteria 9:</b> Cut rebars as per bar bending schedule</p> <p><b>Performance Criteria 10:</b> Bend the rebars, stirrups, ties and chairs at the required angle as per drawing</p> <p><b>Performance Criteria 11:</b> Make bundles of cut bars and tag them</p> <p><b>Performance Criteria 12:</b> Mark the position of rebars on finish surface of base</p> <p><b>Performance Criteria 13:</b> Place and bind rebars for footing and columns as per bar bending schedule</p> <p><b>Performance Criteria 14:</b> Place and bind rebars for base slab and shear wall as per bar bending schedule</p> <p><b>Performance Criteria 15:</b> Check overlap/splices of rebars.</p> <p><b>Performance Criteria 16:</b> Place the spacer as per requirement</p> <p><b>Performance Criteria 17:</b> Verify the reinforcement detail in Overhead Tank according to the drawing</p> <p><b>Performance Criteria 18:</b> Gather tools, equipment and waste material</p> <p><b>Performance Criteria 19:</b> Remove, clean and store barriers and signs</p> <p><b>Performance Criteria 20:</b> Identify physical hazards (risk of slip, trip and fall etc.) at work site.</p> <p><b>Performance Criteria 21:</b> Erect barricades, hoardings, signage in the hazardous areas.</p> <p><b>Performance Criteria 22:</b> Remove obstacles from work area.</p> <p><b>Performance Criteria 23:</b> Report unsafe condition to immediate supervisor</p>
	<p><b>Portfolios required at the time of assessment (if any) for</b></p>

- Folder/file includes evidence of steelwork for the foundations and the necks
- Folder/file includes evidence of steelwork for the grade beams
- Folder/file includes evidence of erection of rebars for columns
- Folder/file includes evidence of door step
- Folder/file includes evidence of different types of stairs and RCC ramp
- Folder/file includes evidence of shell roof and sloping roof
- Folder/file includes evidence of Arc welding and oxy-fuel welding
- Report written in MS word about Planning and Organizing Work
- Folder/file includes evidence of 2D Drawings with given project specification and measurements

**Performance Criteria 1:** Mark the neck columns in foundation

**Performance Criteria 2:** Measure the rebars of neck column as per drawing

**Performance Criteria 3:** Mark the location of grade beams as per structure drawing

**Performance Criteria 4:** Straighten up the rebars

**Performance Criteria 5:** Measure and mark the required cut length on rebars as per cut length mentioned in bar bending schedule

**Performance Criteria 6:** Cut the rebars

**Performance Criteria 7:** Bend the rebars to make the stirrups, as per bar bending schedule

**Performance Criteria 8:** Bend the end hooks for main and bent up rebars as per shape dimension

**Performance Criteria 9:** Make the bundle of prepared rebars and mark the bar code using tag for grade beam for reference.

**Performance Criteria 10:** Mark and pin on bending bench for making of ties, and rings.

**Performance Criteria 11:** Place and fix dowel bars rebars as per requirement

**Performance Criteria 12:** Bind rebars as per drawing

**Performance Criteria 13:** Place spacer as per requirement

**Performance Criteria 14:** Abstract cut length and number of different types of rebars

**Performance Criteria 15:** Place the rebars to required location

**Performance Criteria 16:** Bind curtailed/tension rebars with stirrups.

**Performance Criteria 17:** Spread the main rebars and distribution rebars for slab in two direction

**Performance Criteria 18:** Bind rebars with one another with binding wire

**Performance Criteria 19:** Prepare base / parent metal for welding following standard procedures.

**Performance Criteria 20:** Cut the rebars by Oxy-Fuel Equipment

**Performance Criteria 21:** Print Word Documents according to requirements

**Performance Criteria 22:** Develop 2D Drawing with given project specification and measurements.

**Performance Criteria 23:** Plot drawing on scale according to required size & orientation.



## Observation Checklist

<b>Assessment Task 1</b>	<b>Description of Assessment Task 1</b> Candidate is required to perform steelwork for prototype small size dome as per drawing given by assessor			
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Interpret bar bending schedule			
2.	Interpret structural drawing			
3.	Select the material as per job requirement.			
4.	Select the tools as per job requirement.			
5.	Select and wear the PPEs relevant to Job.			
6.	Identify physical hazards (risk of slip, trip and fall etc.) at work site.			
7.	Identify risk associated with job to be done.			
8.	Report unsafe condition to immediate supervisor			
9.	Use hand signal while lifting and placing load			
10.	Check load balance.			
11.	Select lifting equipment accordingly			
12.	Assemble the lifting equipment			
13.	Abstract cut length and number of different types of rebars			
14.	Bind the stirrups with bottom and top rebars on marked points			
15.	Bind curtailed/tension rebars with stirrups			
16.	Spread the main rebars and distribution rebars for dome			
17.	Bind rebars with one another with binding wire			
18.	Fix the additional tension rebars with rebars			
19.	Fix the concrete spacers in dome and ring beam			
20.	Remove obstacles from work area.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

<b>Assessment Task 2</b>		<b>Description of Assessment Task 2</b> Perform steelwork for prototype small underground water tank as per drawing given by assessor		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Select the tools as per job requirement			
2.	Select and wear the PPEs relevant to Job.			
3.	Interpret bar bending schedule			
4.	Interpret structural drawing			
5.	Plan task sequence			
6.	Abstract cut length and number of different types of rebars for footing, column, and base slab and shear wall.			
7.	Straighten the rebars			
8.	Measure and mark the length of rebars according to bar bending schedule			
9.	Cut rebars as per bar bending schedule			
10.	Bend the rebars, stirrups, ties and chairs at the required angle as per drawing			
11.	Make bundles of cut bars and tag them			
12.	Mark the position of rebars on finish surface of base			
13.	Place and bind rebars for footing and columns as per bar bending schedule			
14.	Check overlap/splices of rebars.			
15.	Place the spacer as per requirement			
16.	Verify the reinforcement detail in Overhead Tank according to the drawing			
17.	Gather tools, equipment and waste material			
18.	Remove, clean and store barriers and signs			
19.	Identify physical hazards (risk of slip, trip and fall etc.) at work site.			
20.	Erect barricades, hoardings, signage in the hazardous areas.			
21.	Remove obstacles from work area.			
22.	Report unsafe condition to immediate supervisor			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

<b>Portfolio</b>	<b>Description of Portfolio</b> <ul style="list-style-type: none"> <li>▪ Folder/file includes evidence of steelwork for the foundations and the necks</li> <li>▪ Folder/file includes evidence of steelwork for the grade beams</li> <li>▪ Folder/file includes evidence of erection of rebars for columns</li> <li>▪ Folder/file includes evidence of door step</li> <li>▪ Folder/file includes evidence of different types of stairs and RCC ramp</li> <li>▪ Folder/file includes evidence of shell roof and sloping roof</li> <li>▪ Folder/file includes evidence of Arc welding and oxy-fuel welding</li> <li>▪ Report written in MS word about Planning and Organizing Work</li> <li>▪ Folder/file includes evidence of 2D Drawings with given project specification and measurements</li> </ul>
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During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Mark the neck columns in foundation			
2.	Measure the rebars of neck column as per drawing			
3.	Mark the location of grade beams as per structure drawing			
4.	Straighten up the rebars			
5.	Measure and mark the required cut length on rebars as per cut length mentioned in bar bending schedule			
6.	Cut the rebars			
7.	Bend the rebars to make the stirrups, as per bar bending schedule			
8.	Bend the end hooks for main and bent up rebars as per shape dimension			
9.	Make the bundle of prepared rebars and mark the bar code using tag for grade beam for reference.			
10.	Mark and pin on bending bench for making of ties, and rings.			
11.	Place and fix dowel bars rebars as per requirement			
12.	Bind rebars as per drawing			
13.	Place spacer as per requirement			
14.	Abstract cut length and number of different types of rebars			
15.	Place the rebars to required location			
16.	Bind curtailed/tension rebars with stirrups.			
17.	Spread the main rebars and distribution rebars for slab in two direction			
18.	Bind rebars with one another with binding wire			
19.	Prepare base / parent metal for welding following standard procedures.			

<b>20.</b>	Cut the rebars by Oxy-Fuel Equipment			
<b>21.</b>	Print Word Documents according to requirements			
<b>22.</b>	Develop 2D Drawing with given project specification and measurements.			
<b>23.</b>	Plot drawing on scale according to required size & orientation.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		



Question	Candidate's answer
4. Define scaffolding?	
5. How to set scale on auto cad?	
6. What is the purpose of o snap?	
7. Enlist the name any five steel symbols used in drawing?	
8. How to calculate man hours?	
9. Define stirrups?	
10. BOQ stands for?	
11. Define Layout?	
12. Define bar bending schedule?	
13. Define the procedure to store the material?	
14. Enlist the types cutting tools?	
15. What is first aid process?	
16. What is the importance of planning?	
17. Define ties?	
18. Which is use of stirrups?	
19. Define eccentricity?	
20. What are the components of door?	
21. Define tread?	

<b>Question</b>	<b>Candidate's answer</b>
<b>22.</b> Define Ramp?	
<b>23.</b> What are the components of stair?	
<b>24.</b> Define winder?	
<b>25.</b> Enlist PPE's for eye protection?	
<b>26.</b> Define landing?	
<b>27.</b> Define Dome?	
<b>28.</b> Enlist the different types of roof?	
<b>29.</b> What are the components of fall arrest system?	
<b>30.</b> What is the purpose of reinforcement?	
<b>31.</b> Define RCC water tank?	
<b>32.</b> Define retaining wall?	
<b>33.</b> What are the OSHA requirements for working in trenches?	
<b>34.</b> Explain the role of spacer in steel work?	
<b>35.</b> Enlist the types of welding tools	
<b>36.</b> Define arcing?	

## ANSWER KEY

Sr.	Answers								
1.	Opens Windows Task Manager.								
2.	Select whole document								
3.	<table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: left; width: 50%;"><b>Unsafe acts</b></th> <th style="text-align: left; width: 50%;"><b>Unsafe conditions</b></th> </tr> </thead> <tbody> <tr> <td>Operating without clearance or warning</td> <td>Inadequately guarded</td> </tr> <tr> <td>Operating or working at unsafe speed</td> <td>Unguarded, absence of required guards</td> </tr> <tr> <td>Making safety devices inoperative</td> <td>Defective, sharp, slippery, cracked, etc</td> </tr> </tbody> </table>	<b>Unsafe acts</b>	<b>Unsafe conditions</b>	Operating without clearance or warning	Inadequately guarded	Operating or working at unsafe speed	Unguarded, absence of required guards	Making safety devices inoperative	Defective, sharp, slippery, cracked, etc
<b>Unsafe acts</b>	<b>Unsafe conditions</b>								
Operating without clearance or warning	Inadequately guarded								
Operating or working at unsafe speed	Unguarded, absence of required guards								
Making safety devices inoperative	Defective, sharp, slippery, cracked, etc								
4.	A scaffold is any temporary, elevated work platform and its supporting structure used for holding people, materials								
5.	Select the object(s), type SCALE, and then specify a number larger than 1. Hit Enter. The size of the object(s) will SCALE UP by that scale factor.								
6.	On-snap is used when two objects appear to intersect on the screen, but do not truly intersect. It also works when any two objects do not intersect, but you need to find the point where they would.								
7.	Flush, weld all around, fillet, Concave, Convex.								
8.	Total hours work a day x Total number of workers x Total numbers of days worked over the specific period of time.								
9.	A <i>stirrup</i> is a light frame or ring that holds the foot of a rider, attached to the saddle by a strap, often called a <i>stirrup</i>								
10.	Bill of Quantities.								
11.	The plan or design or arrangement of something laid out.								
12.	Bar bending schedule generally describes the particulars of bars, shape of bending with sketches and total length and weight of the bars along with their number								
13.	<ul style="list-style-type: none"> <li>• Inspect regularly.</li> <li>• Carry with care. ...</li> <li>• Don't pocket sharp objects. ...</li> <li>• Be aware of your surroundings. ...</li> <li>• Use the right tools. ...</li> <li>• Follow instructions. ...</li> <li>• Clean and return</li> </ul>								
14.	<ul style="list-style-type: none"> <li>• Cutting tools.</li> <li>• Reamer.</li> <li>• Drill.</li> <li>• Milling tools.</li> <li>• End mill</li> <li>• Broach.</li> <li>• Tap/thread cutting die</li> </ul>								
15.	ABC in first aid traditionally stands for airway, breathing, and circulation.								
16.	Planning is essential both personally and professionally. It helps us achieve our goals, and allows for more efficient use of time and other resources								
17.	Stirrups assist in holding the reinforcement bars in place.								

18.	Tie bars are deformed, epoxy coated steel bars, typically placed mid-depth across longitudinal joints or between an edge joint and a curb or shoulder.
19.	$e$ = eccentricity, the distance from the center of gravity of the column section to the center of gravity of the applied load
20.	<ul style="list-style-type: none"> <li>• Door Frame.</li> <li>• Head jamb.</li> <li>• Side jamb</li> <li>• Mullion (mull)</li> </ul>
21.	Stair tread is the horizontal portion of a set of stairs on which a person walks.
22.	The entrance to make it easier access
23.	There are Stringers, Treads, Risers, Newels, Winders and Landings, Handrail's and Balusters. Stringer.
24.	Winders are steps that are narrower on one side than the other. They are used to change the direction of the stairs without landings.
25.	general safety glasses, laser safety glasses, chemical splash goggles and impact goggles
26.	A level platform, typically used when a stair makes a turn. Typically found on a "Landing" stair. Built from framing material.
27.	A large rounded roof or ceiling that is shaped like half of a ball
28.	<ul style="list-style-type: none"> <li>• Gable roof.</li> <li>• Dutch.</li> <li>• Mansard roof.</li> <li>• Flat roof.</li> <li>• Shed roof.</li> <li>• Butterfly roof</li> <li>• Gambrel roof.</li> </ul>
29.	It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.
30.	The purpose of reinforcement is to provide additional strength for concrete where it is needed.
31.	Reinforced concrete water tanks are constructed for storing water. The tanks can be made in different shapes usually circular and rectangular shapes are mostly used
32.	Retaining wall is a structure that retain (holds back) any material (usually earth) and prevents it from sliding or eroding away
33.	OSHA requires employers to provide ladders, steps, ramps, or other safe means of egress for workers working in trench excavations 4 feet (1.22 meters) or deeper
34.	A rebar spacer is a device that secures the reinforcing steel or "rebar" in reinforced concrete structures as the rebar is assembled in place prior to the final concrete pour.
35.	<ul style="list-style-type: none"> <li>• Auto-Darkening Welding Helmet.</li> <li>• Welding Gloves.</li> <li>• MIG Welding Pliers</li> <li>• Welding Magnets.</li> <li>• Chipping Hammer.</li> <li>• Welding Framing Jig</li> <li>• Speed Square.</li> <li>• Metal Brush.</li> </ul>
36.	Arcing is occurring on electric transformer if the fuse link blow on any phase.