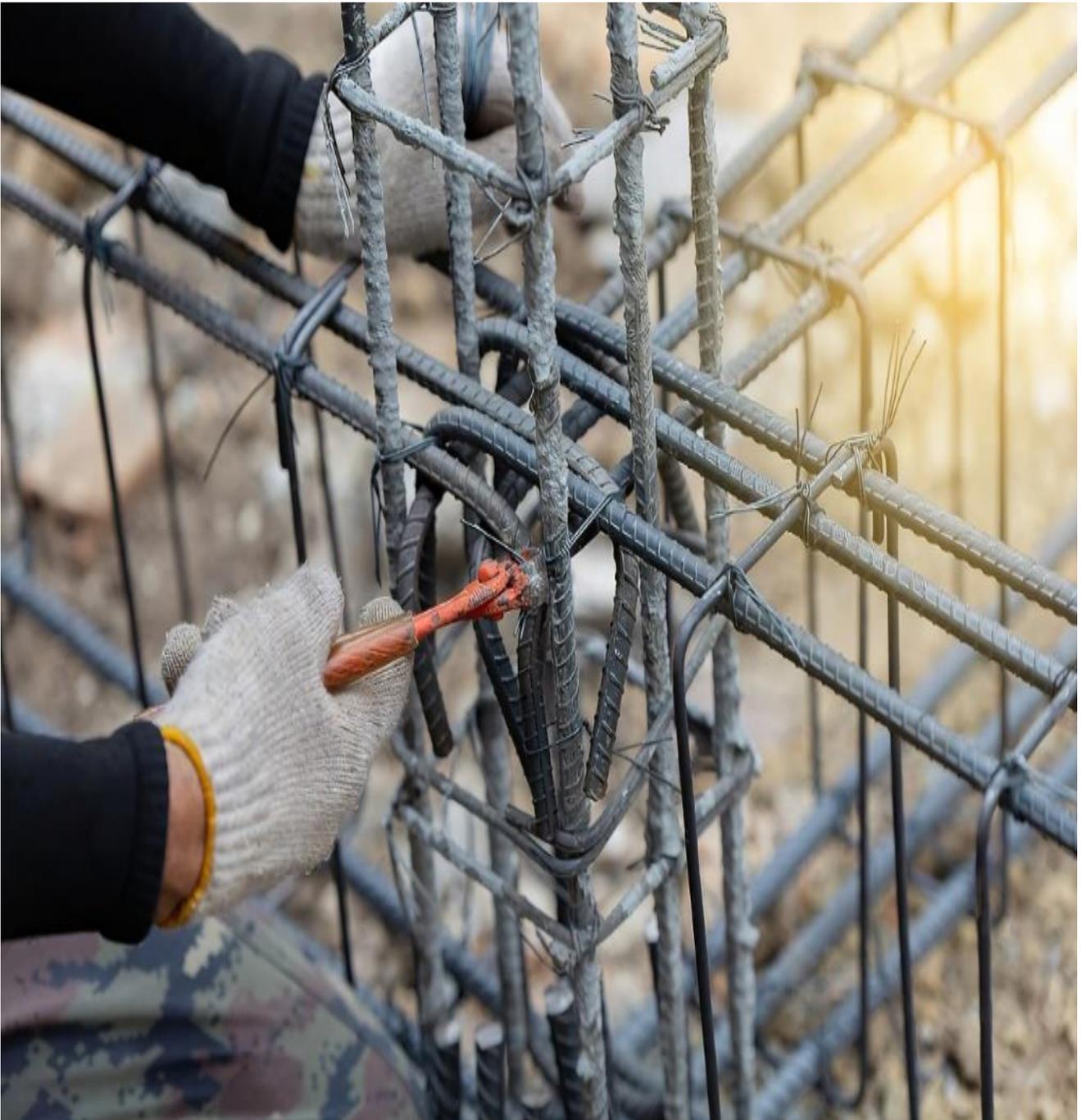




National Competency Standards for “Assistant Steel Fixer”



National Competency Standards Level-2 For “Assistant Steel Fixer”



**National Vocational and Technical Training Commission (NAVTTTC),
Government of Pakistan**



National Competency Standards for "Assistant Steel Fixer"



ACKNOWLEDGEMENT

National Vocational and Technical Training Commission (NAVTTTC) extends its gratitude and appreciation to many representatives of business, industry, academia, government agencies, Provincial TEVTAs, Sector Skill Councils and trade associations who spared their time and expertise to the development and validation of National Vocational Qualifications (Competency Standards, Assessments Packs and related material) for the trade of Steel Fixer & Erector. This work would not have been possible without the technical support of the personnel of the above said organizations. The core team for Qualification Developments Skill Standard is Wing of NAVTTTC.

NAVTTTC initiated development of CBT&A based qualifications for 200 traditional / hi-tech trades under the **Prime Minister's Hunermand Pakistan Program**, focusing on Development & Standardization of 200 Technical & Vocational Education & Training (TVET) Qualifications. NAVTTTC efforts have received full support from the Ministry of Federal Education and Professional Training which highly facilitated progress under this initiative.

It may not be out of place to mention here that all the experts of Industry, Academia and TVET experts of TEVTAs, BTEs and PVTC work diligently for making this qualification worthy and error free for which all credit goes to them. However, NAVTTTC accepts the responsibility of all the errors and omissions still prevailing in the Qualification document.

It is also noteworthy that development of Skill Standards is a dynamic and ongoing process, and the developed skill standards needs periodic review and updating owing to the constant technological advancements, development in scientific knowledge, and growing experience of implementation at the grass root level as well as the demand of industry. NAVTTTC will ensure to keep the qualifications abreast with the changing demands of both national and international job markets.

**Engr. Sajid Balouch
Executive Director,
NAVTTTC**



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1. Introduction

The Construction Industry is the 2nd largest industry of the country after agriculture. The manpower of this industry produces a lot of foreign exchange to share the economy of the country. However, contrary to its share in local economic market, the development in this sector is not at par with market demand through the use of various new technologies. Though the use of various new technologies and deployment of project management, strategies has made it possible to undertake projects of mega skill. Yet direly needs a development strategy that could maintain its competitiveness in local as well as global scenario.

The role of concrete work in construction technology is above board. The most of the concrete work is complement to steel fabrication. The importance of fabrication can never be denied for mega projects at local and international level.

The objective of this course is to impart theoretical and practical knowledge about steel fixing so that the trainees may be able to work and do job of steel fixing for civil work and earn their livelihood by offering their skill. The mission of NAVTTC and TEVTA is to train and transform young men and women into responsible thinking technologist to motivate them to attain professional excellence and to inspire them to proactively engage themselves for the betterment of the society at country level as well as at global level.

Therefore, the importance of knowledge related to Steel fixer/Erector through the latest techniques makes this qualification more valuable. Market demands for qualified workers are therefore a need of time and can only be addressed by developing specific skills standards in partnership with all stakeholders and industry experts. Recognizing this fact, the National Vocational and Technical Training Commission (NAVTTC) has developed the National Vocational Qualifications Framework (NVQF) for Steel Fixer/Erector. These competency standards have been developed by the Qualification Development Committee (QDC) and validated by the Qualification Validation Committee (QVC) with representation from the country's leading departments, NPSL, PU Lahore, PCSIR, TEVTA, NESPAK and C&W.



2. Purpose of the Qualification

The aim of this qualification is to set high and applicable professional standards for all stake holders in construction sector. The basic goals of establishing these credentials are as follows:

1. Equip with the latest techniques used by steel erector/fixers
2. Improve trainees' professional competency in construction industry.
3. Provide opportunities for recognition of non-formal or informal skills
4. Raise standard and efficacy of scientific training and assessment
5. Improve the method and techniques in the realm of steel structure and fabrication.
6. Enable the existing workforce to learn new technologies and methods in field of construction.

3. Leveling and packaging of Core Competencies of the Qualification							
Code	Competency Standard	Level	TH	PR	TL	Credits	Category
CS 2.1	Follow Safety Rules at Site	2	5	15	20	2	Generic
CS 2.2	Perform Basic Communication Skills	2	12	18	30	3	Generic
0732CM01	Draw Basic Technical Drawings	2	11	39	50	5	Functional
0732CM02	Demonstrate Basic Numeracy Skills	2	11	39	50	5	Functional
0732CM03	Maintain Steel Fixing & Erecting Tools, Equipment and Materials	2	9	21	30	3	Technical
0732CM04	Perform Cutting and Bending Rebar for Simple Shapes	2	17	63	80	8	Technical
0732CM05	Execute the Steel Work of Foundations	2	10	60	70	7	Technical
0732CM06	Execute steel work in Column for domestic building	2	12	48	60	6	Technical
0732CM07	Execute steel work in Beams for domestic building	2	10	60	70	7	Technical
0732CM08	Execute steel work in Roof slabs for domestic building	2	7	33	40	4	Technical
0732CM09	Execute steel work in Stairs for domestic building	2	8	42	50	5	Technical
0732CM10	Execute steel work in Arches	2	8	42	50	5	Technical
Total		2	120	480	600	60	



4. Date of Validation

The level 2 of National qualification on Assistant Steel Fixer & Erector has been validated by the Qualifications Validation Committee (QVC) members on Nov 01, 2021 to Nov 05, 2021 at PITAC, Lahore and will remain valid for ten years i.e. Nov 05, **2031**

5. Date of Review

The level 2 of National qualification on Assistant Steel Fixer & Erector has been validated by the Qualifications Validation Committee (QVC) members on Nov 01, 2021 to Nov 05, 2021 at PITAC, Lahore and shall be reviewed after three years i.e. 05 Nov, 2024.

6. Codes of Qualifications

The International Standard Classification of Education (ISCED) is a framework for assembling, compiling and analyzing cross-nationally comparable statistics on education and training. ISCED codes for these qualifications are assigned as follows:

ISCED Classification for Steel Fixer & Erector Level 2	
ISCED Code	Description
Assistant Steel Fixer (Level 2)	
CS 2.1	Follow Safety Rules at Site
CS 2.2	Perform Basic Communication Skills
0732CM01	Draw Basic Technical Drawings
0732CM02	Demonstrate Basic Numeracy Skills
0732CM03	Maintain Steel Fixing & Erecting Tools, Equipment and Materials
0732CM04	Perform Cutting and Bending Rebar for Simple Shapes
0732CM05	Execute the Steel Work of Foundations
0732CM06	Execute steel work in column for domestic building
0732CM07	Execute steel work in beams for domestic building
0732CM08	Execute steel work in roof slabs for domestic building
0732CM09	Execute steel work in stairs for domestic building
0732CM10	Execute steel work in arches



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7. Members of Qualification Development Committee

The following members participated in the qualification development process on 9th to 13th August 2021 at PITAC, Lahore.

S#	Name	Designation
1.	Mr. Azhar Iqbal Shad	Ex. Principal, GCT Raiwind Road Lahore
2.	Mr. Nadeem Zaigham	Sr. Instructor, GCT Raiwind Road Lahore
3.	Mr. Muhammad Shafiq	Sr. Instructor, GSTC Mughalpura Lahore
4.	Mr. Sikandar Hayat	Instructor, GCT Raiwind Road Lahore
5.	Mr. Riaz Ahmed	Instructor, GCT Multan, P-TEVTA
6.	Mr. Muhammad Abid	Sr. Instructor, GCT Railway Road Lahore
7.	Mr. Tahir Mehmood	Sr. Instructor, GTTI Mughalpura Lahore
8.	Engr. Danish Khan	DACUM Facilitator
9.	Mr. Muhammad Yasir	Deputy Director/ Coordinator –(Skills Standards and Curricula) NAVTTTC HQ



8. Members of Qualification Validation Committee

The following members participated in the qualification validation process on 01-11-2021 to 05-11-2021 at PITAC, Lahore.

S#	Name	Designation
1.	Mr. Tariq Saeed	Sr. Instructor, GTTI Mughalpura Lahore
2.	Mr. Azhar Iqbal Shad	Principal, GCT Raiwind Road Lahore
3.	Mr. Shoaib Anwar Sherazi	Principal TTC Quetta, Representative of B-TEVTA
4.	Engr. Habiba Mohsin	Lecturer UOL, Lahore
5.	Ms. Noorheen Amina	Design Engineer, Allied Engineering & Consultants Lahore
6.	Mr. Muhammad Asim	Lab Technologist UOL, Lahore
7.	Mr. Muhammad Shafiq	Sr. Instructor, GSTC Mughalpura Lahore
8.	Ms. Hira Ishtiaq	Lecturer, UOL, Lahore
9.	Ms. Fatima	System Analyst, PBTE Lahore, Representative of PBTE
10.	Engr. Liaqat Jamro	Director Academics, Representative of S-TEVTA
11.	Muhammad Qasim	Sr. Instructor, GCT Multan, Representative of P-TEVTA
12.	Engr. Mahmood Ullah	Principal GPI Peshawar, Representative of KP-TEVTA
13.	Ms. Saima Asghar	CBT Expert & Certified Assessor, Lahore
14.	Engr. Danish Khan	DACUM Facilitator
15.	Mr. Muhammad Yasir	Deputy Director/ Coordinator –(Skills Standards and Curricula) NAVTTC HQ

9. Entry Requirements

The entry requirement for this qualification would be Middle or equivalent.

10. Regulation of the qualification and schedule of units

Not Applicable



11. Qualification Leveling and Packaging

OCCUPATIONS AND LEVELS DESCRIPTOR



S #	Occupations	No of CS	Level	Occupation Credit Hours	Training duration
1.	Assistant Steel Fixer & Erector	12	2	600	6 Months
2.	Steel Fixer & Erector	11	3	600	6 Months
3.	Steel Fixer & Erector Supervisor	11	4	1200	12 Months

11.1 Generic Modules with respective levels

- Health and Safety

LEVEL 2 & 3

- Digital Skills

LEVEL 3 & 4

- Entrepreneurial Skills & Green Skills

LEVEL 4



12. Detail of Competency Standards

CS 2.1 Follow Safety Rules at Site

Overview: This competency standard covers the skills and knowledge required to work according to personal health and safety protocol at crushing plant site. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Maintain occupational safety and health at workplace	You must be able to: P1. Identify basic safety signs and symbols P2. Erect barricades, hoardings, signage in the hazardous areas P3. Maintain Housekeeping P4. Report unsafe condition to immediate supervisor (shift position)
CU2. Use Personal Protective and Safety Equipment (PPE)	You must be able to: P1. Identify risk associated with job to be done P2. Select PPE according to job P3. Wear PPE according to job P4. Store PPE at Designated place after use
CU3. Perform Communication Signals	You must be able to: P1. Identify different types of communication hand signals. P2. Use appropriate hand signals as per situation.
CU4. Perform Manual Handling of Loads	You must be able to: P1. Check the load's weight to be handled P2. Check the availability of broad stable base P3. Lift and place the load with proper posture P4. Lift the load as per given standards
CU5. Carry out Basic first aid treatment	You must be able to: P1. Follow COVID-19 SOP's P2. Identify basic elements for first aid kit P3. Maintain a fully stocked first aid kit P4. Check expiry date of medicines P5. Perform mock first aid treatment for minor injuries

Knowledge & Understanding

The student must be able to demonstrate knowledge and understanding required to carry out tasks covered in this competency standards. This includes the knowledge of:

- K1. Types of hazards involved in site



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- K2. Verbal and nonverbal (Hand Signals) communication
- K3. Basic first aid treatment
- K4. Safety signs and symbols
- K5. Manual handling of loads
- K6. Standard procedure of handling, storing and stacking material.
- K7. Usage of Appropriate PPE for different situations

Critical Evidence(s) Required

The candidate needs to produce following critical evidence (s) to be competent in this competency standard:

- Use of PPEs according to hazard/job
- Keep the workplace clean and tidy
- Balance the load while handling manually
- Use of first aid kit

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	PPEs
2.	First Aid Kit
3.	Different types of waste bins
4.	Different types of barrication
5.	Safety sign boards



CS 2.2 Perform Basic Communication Skills

Overview: This competency standard covers the skills and knowledge required to assist in the development of communication competence by providing information regarding different forms of communication and their appropriate use. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Communicate in a team	You must be able to: P1. Treat team members with respect P2. Maintain positive relationships to achieve common organizational goals P3. Get work related information from team P4. Identify interrelated work activities to avoid confusion P5. Adopt communication skills, which are designed in a team. P6. Identify problems in communication with a team P7. Resolve Communication barrier through discussion and mutual agreement
CU2. Follow Supervisor's instructions as per organizational SOPs	You must be able to: P1. Receive the instructions from Supervisor P2. Carry out the instructions of the supervisor P3. Report to the supervisor as per organizational SOPs
CU3. Develop Generic communication skills at workplace	You must be able to: P1. Develop basic reading skills P2. Develop Basic writing Skills P3. Develop basic listening skills

Knowledge & Understanding

The student must be able to demonstrate knowledge and understanding required to carry out tasks covered in this competency standards. This includes the knowledge of:

- K1. Reporting techniques
- K2. Application of Work ethics
- K3. Good communication skills (7Cs of effective communication)
- K4. Workplace dress code
- K5. The role of team members and functionality of the teams
- K6. Team dynamics
- K7. Basic Reading Skills
- K8. Basic Writing skills
- K9. Basic Verbal communication skills



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- K10. Basic Problem solving skills
- K11. Basic Self-Management Skills
- K12. Basic Technology Skills
- K13. Basic Interview Skills

Critical Evidence(s) Required

The candidate needs to produce following critical evidence (s) to be competent in this competency standard:

- Maintain effective communication with colleagues and supervisors
- Prepare different office reports

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Note book
2.	Pen
3.	Computer
4.	Multimedia

0732CM01 Draw Basic Technical Drawings

Overview: This competency standard covers the skills and knowledge required to perform basic technical drawing. That includes lettering/lines, different geometrical shapes. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Explore Lettering, Lines and symbols	You must be able to: P1. Draw different types of lettering P2. Draw different types of lines P3. Draw different drawing symbols
CU2. Draw Different Geometrical Shapes	You must be able to: P1. Draw different geometrical figures P2. Draw simple curve P3. Create a pattern with simple shapes
CU3. Explore Orthographic projections of simple pictorial views	You must be able to: P1. Draw first angle projection P2. Draw third angle projection P3. Draw missing views P4. Draw different section views



CU4. Dimension the drawing	You must be able to: P1. Draw different types of dimensions. P2. Draw geometrical tolerance
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Knowledge & Understanding

The student must be able to demonstrate knowledge and understanding required to carry out tasks covered in this competency standards. This includes the knowledge of:

- K1. Types of orthographic views
- K2. Types of pictorial drawings
- K3. Types of sectional views
- K4. Types of lines
- K5. Types of scales
- K6. Types of dimensioning and drawing symbols
- K7. Types of development drawings
- K8. Types of geometrical solids and geometrical figures
- K9. Different types of drawing pencils (Clutch pencil Mechanical pencils, etc.)
- K10. Different types of technical pens
- K11. Different types of ruler
- K12. Different drawing sheets (scholar sheet, chart paper, Canson Sheet, etc.)

Critical Evidence(s) Required

The candidate needs to produce following critical evidence (s) to be competent in this competency standard:

- Portfolio
- Draw different geometrical shapes
- Draw first and third angle projection with symbols
- Identify different installation and assembly plans and sections

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Pencil
2.	Eraser
3.	Sharpner
4.	Tee
5.	Set Square
6.	Clip Board
7.	Drawing Sheet
8.	Scotch Tape
9.	Structural drawing (Sample)



10. Scale cards

0732CM02 Demonstrate Basic Numeracy Skills

Overview: This competency standard covers the skills and knowledge required to apply basic Numeracy skills, Perform Measurement, Perform basic mathematical calculations and Calculate Area and Volume of aggregate

Competency Units	Performance Criteria
CU1. Apply Basic Numeracy Skills	You must be able to: P1. Perform addition P2. Perform subtraction P3. Perform multiplication P4. Perform division P5. Calculate percentage
CU2. Perform Measurement	You must be able to: P1. Select measuring tools as per requirement P2. Identify imperial and metric system P3. Perform inter conversion of Measuring units
CU3. Calculate Area and Volume of Aggregate	You must be able to: P1. Calculate area of geometrical figures P2. Calculate volume of solid figures P3. Calculate quantities of materials in the stack/pile of stone aggregate by incorporating time saving practices

Knowledge & Understanding

The student must be able to demonstrate knowledge and understanding required to carry out tasks covered in this competency standards. This includes the knowledge of:

- K1. basic principles of addition, subtraction, multiplication and division
- K2. measuring tools
- K3. Imperial and metric system
- K4. Basic measuring units and its inter conversion.
- K5. Area and Volume of solid figures
- K6. Time saving practices

Critical Evidence(s) Required

The candidate needs to produce following critical evidence (s) to be competent in this competency standard:

- Perform addition
- Perform subtraction
- Perform multiplication
- Calculate percentage
- Perform division



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- Inter convert measuring units.
- Calculate Area and Volume of geometrical figures
- Calculate volume of material stack

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Pencil
2.	Eraser
3.	Sharpner
4.	Calulator
5.	Note book

0732CM03 Maintain Steel Fixing & Erecting Tools, Equipment and Materials

Overview: This competency standard covers the skills and knowledge required to use steel fixing tools, accessories and equipment. It includes identification, selection and safe use of commonly used steel fixing tools, accessories and equipment. Candidate will be able to use the Steel fixing and erecting tools at different conditions and also able to maintain the inventory record of Steel Fixing Tools and equipment and accessories.

Competency Units	Performance Criteria
CU1. Arrange tools, equipment and accessories.	You must be able to: P1. Identify hand tools P2. Select the tools as per job requirement.
CU2. Perform routine maintenance of components	You must be able to: P1. Clean and check the working condition of Tools components and accessories. P2. Tag the faulty/damaged/ worn out tools components and accessories. P3. Report faults /damages components. P4. Lubricate tools and accessories as per checklists. P5. Stack all the components & material in proper place to ensure safe work.
CU3. Maintain inventory of stores	You must be able to: P1. Arrange the Steel fixing & erecting tools, components and accessories at appropriate positions in store P2. Identify and label/tag the damaged and out of order tools and accessories. P3. Protect the Steel fixing & erecting fitting, component and tools from dust & moisture to avoid corrosion.



Knowledge & Understanding.

The student must be able to demonstrate knowledge and understanding required to carry out tasks covered in this competency standards. This includes the knowledge of:

- K1. Types and uses accessories.
- K2. Uses of different working tools.
- K3. Basic techniques for using and handling measuring, cutting and layout tools.
- K4. Basic measuring units and its interred conversion.
- K5. Guidelines and checklists to conduct maintenance and good housekeeping of fittings & tools.
- K6. Importance of daily cleanliness of workplace and lubrication of the tools.
- K7. Importance of storing tools and material in specific place.
- K8. Identify Faulty/damaged/ worn out parts.
- K9. Preventive and corrective measures for tools and accessories
- K10. Basic Steel Erector components and their standard size
- K11. Methods of stacking of various components & fitting as per standards procedure.
- K12. Inventory Management.

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Prepare list of the required tools use for Steel fixing & erecting
- Check Physical Condition of Tools & Equipment before use.
- Perform routine maintenance of components and accessories as per standards.

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Cold Chisels (for cutting steel)
2.	Differnt types of hammer(sledge hammer,light hammer etc.)
3.	Cutting bar
4.	Clippers
5.	Measuring Tapes
6.	Pliers
7.	Tongs
8.	Pliers
9.	Bending Rods
10.	Cutting Machine with cutters
11.	Bench vice
12.	Gloves



13.	Anvil
14.	Straighting Base
15.	Manual Cutting Base
16.	Pincers
17.	Wire Twisting Tool
18.	Empty tool box

0732CM04 Perform Cutting and Bending Rebar for Simple Shapes

Overview: This competency standard covers the skills and knowledge required to perform preparatory activities like Cutting, Bending and shaping of rebar are required to gather and convey information in response to perform basic Steel Erector setup. Candidate will be able to maintain basic Steel fixer & erector setup.

Competency Units	Performance Criteria
CU1. Perform straightening of rebars	<p>You must be able to:</p> <p>P1. Select the tools as per job requirement. P2. Place the steel base on firm and level surface. P3. Perform straightening of rebar using hammer and bending lever. P4. Select and wear the PPEs relevant to Job.</p>
CU2. Perform Measuring	<p>You must be able to:</p> <p>P1. Select the tools as per job requirement. P2. Interpret the hand sketch of bend up rebars, stirrups & chair rebars etc. P3. Select the types of rebar as per job P4. Mark the cutting length of stirrups & ties bar on rebars P5. Mark the cutting length of chair bar on rebars P6. Check the dia of rebars P7. Check the gauge of binding wire P8. Mark the spacing of rebars with chalk on plate - form as per sketch</p>
CU3. Perform Cutting of Rebars	<p>You must be able to:</p> <p>P1. Select the tools as per job requirement. P2. Place the cutting base with chool/wedge on firm and level surface. P3. Cut the binding wire using chisel & hammer P4. Cut the rebar using power cutting tools.</p>
CU4. Perform bending of Rebars at different Angles	<p>You must be able to:</p> <p>P1. Select the tools as per job requirement. P2. Place the bending table on firm & level ground. P3. Mark on rebar as per sketch. P4. Select appropriate lever according to dia of rebar.</p>



	<p>P5. Bend the rebar according to required angle</p> <p>P6. Check the bent rebar for its shape, angle & length</p>
<p>CU5. Make Stirrups and Ties of different sizes and shapes</p>	<p>You must be able to:</p> <p>P1. Collect and check the bending tools & accessories required for bending of stirrups, ties, rings and chairs</p> <p>P2. Mark and pin on bending bench for making of stirrups, ties, rings and chairs.</p> <p>P3. Place rebar between the pins and bend at required angle.</p> <p>P4. Check the bent rebar for its shape, angle & length.</p> <p>P5. Check and clean all tools & accessories for any discrepancy, tag and report.</p> <p>P6. Clear work area and dispose off rebar wastage as per standards.</p>

Knowledge & Understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- K1) Importance of basic Steel erecting setup
- K2) Different types of Cutting Tools
- K3) Use of bending rebars
- K4) The erection process
- K5) Types of power tools, accessories for cutting, bending of reinforcement.
- K6) Fixing and cutting blade and other accessories in cutting and bending machine
- K7) Capacity and required details of cutting machines, bending machine.
- K8) Methods of protecting steel from rusting
- K9) Tolerance limits for bending and cutting of rebars
- K10) Types of hand tool available for cutting and bending
- K11) Use of measurement and marking tools
- K12) Simple arithmetic calculation
- K13) Simple measurements using metric and imperial systems
- K14) BBS in order to carry out cutting and bending of reinforcement.
- K15) Conversion of linear unit for measurement unit weight of steel
- K16) Storing of cut rebars and scrap material

Critical Evidence(s) Required

The candidate must present evidence of practical observations showing their ability to bend, cut and shaping of rebars. They must know:

- Cutting of rebars
- Bending of rebars.
- Shaping of rebars.



TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1	Cold Chisels (for cutting steel)
2	Different types of hammer(sledge hammer, light hammer etc.)
3	Hammers (light weight)
4	Cutting bar
5	Clippers
6	Measuring Tapes
7	Pincers
8	Tongs
9	Pliers
10	Binding wires
11	Rebars (Different Diameters)
12	Cutting Machine with cutters
13	Bench vice
14	PPEs
15	Anvil
16	Straightening Base
17	Manual Cutting Base
18	Rebar bender

0732CM05 Execute the Steel Work of Foundations

Overview: This competency standard covers the skills and knowledge required to execute fabrication of steel work of the foundation.

Competency Units	Performance Criteria
CU1. Perform preparatory work	You must be able to: P1. Interpret the drawing. P2. Select the tools as per job requirement. P3. Place the steel base on firm and level surface. P4. Categorize the types of rebars according to bar bending schedule P5. Select and wear the PPEs relevant to Job.
CU2. Perform cutting of main rebars	You must be able to: P1. Straighten up the rebars P2. Measure and mark the required cut length on rebars P3. Cut the rebars with relevant cutting tool



	P4. Make the bundle of cutting rebars and mark the bar code using tag for foundation.
CU3. Perform Erection of steel frame	You must be able to: P1. Place rebars as per drawing P2. Place dowel rebars for neck column P3. Bind rebars with binding wire according to the drawing P4. Provide steel chairs and spacers for the erected frame work of steel

Knowledge & Understanding.

The student must be able to demonstrate knowledge and understanding required to carry out tasks covered in this competency standards. This includes the knowledge of:

- K1.** Different rebars of steel of various diameters.
- K2.** Different grade of steel.
- K3.** Describe the use of steel chairs and spacers.
- K4.** Types of Foundations
- K5.** Types of Foundation reinforcement
- K6.** Interpretation of technical drawings
- K7.** Interpretation of bar bending schedule
- K8.** Safe handling of material
- K9.** Use of PPEs

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Preparation of steel stirrups in exact dimension
- Erect a foundation reinforcement

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1	Measuring tape (1m to 30 m)
2	White chalk rebars



3	Sledgehammer
4	Straightening base
5	Cold chisel
6	Round tong
7	Claw Lever (Bari)
8	Cutting base
9	Pencil/ Ballpen and Writing Pad
10	Eraser
11	PPEs
12	Rebars
13	Binding wires

0732CM06Execute Steel Work In Column For Domestic Building

Overview: This competency standard covers the skills and knowledge required to execute steel work in column for domestic building

Competency Units	Performance Criteria
CU1. Perform preparatory work	<p>You must be able to:</p> <ul style="list-style-type: none"> P1. Interpret reinforcement drawing P2. Interpret bar bending schedule P3. Select the tools as per job requirement. P4. Select and wear the PPEs relevant to Job.
CU2. Perform Cutting of vertical rebars and lateral ties	<p>You must be able to:</p> <ul style="list-style-type: none"> P1. Measure and mark the required cut length on rebars as per bar bending schedule P2. Cut the rebars with relevant cutting tool P3. Make the bundle of cutting rebars and mark the bar code using tag.
CU3. Perform bending to make lateral ties	<p>You must be able to:</p> <ul style="list-style-type: none"> P1. Bend the bar to make the lateral ties, as per bar bending schedule. P2. Make the bundle of ties and attach the bar code tag for reference.
CU4. Bind the vertical rebars	<p>You must be able to:</p> <ul style="list-style-type: none"> P1. Place the lateral ties P2. Erect the main vertical rebars one by one with dowel bar of column within the lateral ties. P3. Bind the main vertical rebars with ties with the help of binding wire according to drawing/bar bending schedule. P4. Fix spacer around the column as per drawing



Knowledge & Understanding.

The student must be able to demonstrate steel fixing in column, knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of

- K1.** Interpretation of Structural drawings.
- K2.** Interpretation and use of bar bending schedule.
- K3.** Cutting, bending and binding of rebars.
- K4.** Marking of codes and numbers to the rebars, using tags for reference.
- K5.** Operating procedure of various bar cutting tools.
- K6.** Types of columns
- K7.** Types of column reinforcement

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Perform measurement and mark the cut length on rebars.
- Perform bending procedure to prepare lateral ties for column.
- Perform binding of main vertical rebars to the ties.

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1	Chisels(for cutting rebars)
2	Differnt types of hammer(sledge hammer,light hammer etc.)
3	Hammer (light)
4	Cutting base
5	calipers
6	Measuring tape(100')
7	Measuring tape 18'
8	pliers
9	knipex
10	Bending bar
11	Bar bending table



12	Disc cutter
13	PPEs
14	Rebars
15	Binding wires
16	First aid box

0732CM07Execute Steel Work in Beams For Domestic Building

Overview: This competency standard covers the skills and knowledge required to execute steel work in beams for domestic building

Competency Units	Performance Criteria
CU1. Perform preparatory work	You must be able to: P1. Interpret bar bending schedule P2. Interpret structural drawing P3. Select the tools as per job requirement. P4. Select and wear the PPEs relevant to Job.
CU2. Perform cutting of rebars	You must be able to: P1. Straighten up the rebars P2. Measure and mark the required cut length on rebars P3. Cut the rebars with relevant cutting tool P4. Make the bundle of cutting rebars and mark the bar code using tag for beam.
CU3. Perform bending for stirrups and hooks	You must be able to: P1. Bend the rebars to make the stirrups using bar bending schedule P2. Bend the end hooks for main, and bent up rebars as per bar bending schedule. P3. Make the bundle of stirrups and bent up rebars, attach the bar code tag for reference.
CU4. Bind the stirrups with main rebars	You must be able to: P1. Place main rebars as per drawing P2. Fix the strip along with the main rebars as per drawing P3. Bind the main rebars with stirrups by binding wire P4. Fix spacer around the beam as per drawing P5. Fix spacer bars between rows of main rebars

Knowledge & Understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency standard. This includes the knowledge of:

- K1.** Main rebars, holding rebars, curtail rebars, in the beam.
- K2.** General sequence of binding steps involved in beam formation.
- K3.** Methods for cutting, bending and fixing of rebars in beams.
- K4.** Operating procedure for required tools
- K5.** Types of beam



Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Perform cutting of rebars to make the stirrups, and different rebars for beam, with cutting tools.
- Perform bending of rebars to make the stirrups and hooks and bend rebars for beam.

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1.	Chisels (for cutting rebars)
2.	Differnt types of hammer(sledge hammer,light hammer etc.)
3.	Hammer (light)
4.	Cutting base
5.	calipers
6.	Measuring tape(100')
7.	Measuring tape 18'
8.	pliers
9.	knipex
10.	Bending bar
11.	Bar bending table
12.	Disc cutter
13.	PPEs
14.	Rebars
15.	Binding wires
16.	First aidKit

0732CM08 Execute Steel Work In Roof Slabs For Domestic Building

Overview: This competency standard covers the skills and knowledge required to carry out initial preparatory activities, study the measurements and diameter of the rebars, cut the rebars and prepares stirrups for beams and roof slab, place and bind the rebars in prepared form work of roof and use of spacer in roof slab.

Competency Units	Performance Criteria
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CU1. Perform preparatory work	You must be able to: P1. Interpret bar bending schedule P2. Interpret structural drawing P3. Select the tools as per job requirement. P4. Select and wear the PPEs relevant to Job.
CU2. Perform cutting of main rebars	You must be able to: P1. Straighten the rebars P2. Separate the rebars as per bar bending schedule of roof P3. Measure and mark the rebars as per requirements P4. Cut the rebars as per measurements of roof slab
CU3. Perform placing and binding the rebars	You must be able to: P1. Place the main rebars as per drawing P2. Place distribution steel as per drawing P3. Place extra rebars as per drawing P4. Bind the rebars by binding wire.
CU4. Perform placing of spacer	You must be able to: P1. Select the spacer P2. Place spacer as per design

Knowledge & Understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of

- K1.** Personal protective equipment (PPE)
- K2.** Bar bending schedule
- K3.** Different Measurement systems
- K4.** Operating procedure for required tools
- K5.** Technical drawings
- K6.** Types of roof slabs
- K7.** Types of slab reinforcement

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Cut steel in proper dimensions
- Prepare rings/stirrups for beam
- Place the rebars at proper place and exact c/c distance
- Perform binding of rebars
- Perform placing of spacer



TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1	Differnt types of hammer(sledge hammer,light hammer etc.)
2	Chiesel
3	Spanner
4	Steel Cutting machine
5	Pencil / ballpoint
6	Paper sheet
7	Measuring tape
8	Marking chalk
9	PPEs
10	First aid kits
11	Bending tools
12	Rebars
13	Binding wires

0732CM09Execute Steel Work In Stairs For Domestic Building

Overview: This competency standard covers the skills and knowledge related to the information to carry out initial preparatory activities and drawing study, determine the measurements and diameter of the rebars of stair, cut the rebars and prepare stirrups as per design and bend the required rebars for beams and stairs slab, place and bind the rebars in prepared form work for execution of the stair and use of spacer in stair slab.

Competency Units	Performance Criteria
CU1. Perform preparatory work	You must be able to: P1. Interpret bar bending schedule P2. Interpret structural drawing P3. Select the tools as per job requirement. P4. Select and wear the PPEs relevant to Job.
CU2. Perform cutting of rebars	You must be able to: P1. Straighten the rebars P2. Mark the points for cutting the rebars as per measurements. P3. Prepare required rings for beam by cutting and bending of rebars P4. Cut and bend the rebars as per stair shape P5. Make the bundles of rebars and tag according to the length and diameters



CU3. Perform placing and binding rebars	You must be able to: P1. Place the rebars in waist slab of stairs as per drawing P2. Bind the rebars P3. Place spacer as per requirement
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Knowledge & Understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of

- K1.** Bar Bending Schedule
- K2.** Different Measurement systems
- K3.** Health and safety rules
- K4.** Operating procedure for required tools
- K5.** Different angles measurement procedures
- K6.** Types of staircase
- K7.** Technical terms of staircase
- K8.** Reinforcement details of staircase

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Perform Cutting of rebars
- Bending the rebars
- Perform placing and binding of the rebars

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1	Differnt types of hammer(sledge hammer,light hammer etc.)
2	Chiesel
3	Spanner
4	Steel Cutting machine
5	Pencil / ballpoint
6	Paper sheet
7	Measuring tape
8	Marking chalk



9	PPEs
10	First aid kits
11	Rebars
12	Binding wires
13	Rebar bending tools and machine

0732CM10 Execute Steel Work in Arches

Overview: This competency standard covers the skills and knowledge of measuring, cutting and fixing of the rebars in form work of any arch as per design by the structural engineer.

Competency Units	Performance Criteria
CU1. Perform preparatory work	You must be able to: P1. Interpret bar bending schedule P2. Interpret structural drawing P3. Select the tools as per job requirement. P4. Select and wear the PPEs relevant to Job.
CU2. Perform cutting of rebars	You must be able to: P1. Straighten the rebars P2. Separate the rebars according to their diameters P3. Measure the rebars as per bar bending schedule P4. Mark the rebars P5. Cut main and tie rebars P6. Bend the main rebars as per bar bending schedule P7. Make the bundles of rebars and tag them
CU3. Perform placing and binding of rebars	You must be able to: P1. Transport the bundle of rebars to site P2. Place the rebars according to the drawing P3. Bind the rebars P4. Place spacers as per requirement

Knowledge & Understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of

- K1. bar bending schedule
- K2. different measurement systems
- K3. different diameter of rebars
- K4. Types of Arches
- K5. Technical terms of arches
- K6. Reinforcement details of arches

Critical Evidence(s) Required



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The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Measure and cut rebars in exact dimensions
- Bend the rebars
- Make stirrups
- Placing rebars in order and appropriate spaces

TOOLS AND EQUIPMENT

The tools and equipment required for this competency standard are given below:

S. No.	Items
1	Measuring Tape
2	Marking Chalks/Marker etc.
3	Spanner
4	Chisel
5	Paper Sheet
6	Pencil/Ballpoint
7	Different types of hammer (sledge hammer, light hammer etc.)
8	Sand paper for removing corrosion
9	First aid kits
10	PPEs
11	Rebars
12	Binding wires
13	Rebar bending tools and machine