



*National Competency Standards*  
*“Metal Forming & Processing Assistant/Helper” Level 02*



# **National Competency Standards for “Metal Forming & Processing Assistant/Helper” Level 02**



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



**National Competency Standards**  
**“Metal Forming & Processing Assistant/Helper” Level 02**



## **ACKNOWLEDGEMENTS**

National Vocational and Technical Training Commission (NAVTTTC) extends its gratitude and appreciation to representatives of business, industry, academia, government agencies, provincial TEVTAs, sector skill councils and trade associations who spared time and extended their expertise for the development of National Vocational Qualification for the trade of **Metal Forming & Processing Level 02 - 05**. This work would not have been possible without the technical support of all the stakeholders.

NAVTTTC initiated development of CBT&A based qualifications for 200 traditional / hi-tech trades under the **Prime Minister’s Hunarmand 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 that highly facilitated the 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 on-going process and already 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 Baloch**  
**Executive Director (NAVTTTC)**



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## 1. Introduction

The Metal Forming & Processing industries are an essential part of our society that processes metals in order to manufacture machine components, machinery, instruments and tools needed by industries as well as by other sectors of the economy.

The products and components created by the different metal shaping techniques are used in creating everything from scaffolding and heavy machinery, to designing and creating microprocessors and artificial intelligence.

When it comes to metal forming, there are several processes to choose from, with each offering its own list of benefits and detriments, each suited to certain applications and for different types of metals.

That includes:

- Knowing the principles of common forming processes and their typical applications
- Identifying the key factors in the product to be made which will guide the forming process selection
- Applying basic metallurgy to the situation so as to make an appropriate recommendation.

Keeping in view of the above, the competency based national vocational qualifications have been developed by NAVTTC to train the unskilled human resource on the technical and entrepreneurial skills.

Being conscious of the emerging trends in the market, National Vocational & Technical Training Commission (NAVTTC) has developed competency standards in consultation with the stakeholders including academia, researchers, industry, chambers and TEVTAs for **Metal Forming & Processing Level 02 - 05** under National Vocational Qualifications Framework (NVQF). The competency standards document has been designed in such a way that helps trainees develop professional skills and facilitates them in targeting job market on national and international level especially middle east.

The National Competency Standards could be used as a referral document for the development of curriculum to be used by training institutions.



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## 2. Purpose of the Qualification

The purpose of this qualification is to set the highly professional standards for **Metal Forming & Processing Level 02 - 05** in order to compete local and international job market requirements. The specific objectives of developing these qualifications are as under:

- Empower the youth with locally and globally required employable skills
- Produce competitive **Metal Forming & Processing Skilled Personnel**
- Improve the quality and effectiveness of the training and assessment for **Metal Forming & Processing Industry**

## 3. Date of Validation

The National Competency Standards **Metal Forming & Processing Level 02 - 05** has been validated by the Qualifications Validation Committee (QVC) members on **01 - 05 November 2021 (5 days)** and will remain valid for **ten years**.

## 4. Date of Review

The National Competency Standards for **Metal Forming & Processing Level 02 - 05** has been reviewed by the Qualifications Validation Committee (QVC) members on **01 - 05 November 2021 (5 days)** and will remain valid for **ten years**.

## 5. 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	
Code	Description
0715-MF&P-1	2 <sup>nd</sup> Level National Certificate of level-5, in <b>Metal Forming &amp; Processing Assistant/Helper</b>
0715-MF&P-2	3 <sup>rd</sup> Level National Certificate of level-5, in <b>Metal Forming &amp; Processing Technician</b>
0715-MF&P-3	4 <sup>th</sup> Level National Certificate of level-5, in



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	<b>Metal Forming &amp; Processing Senior Technician</b>
<b>0715-MF&amp;P-4</b>	5 <sup>th</sup> Level National Certificate of level-5, in <b>Metal Forming &amp; Processing Supervisor</b>

## 6. Members of Qualification Development Committee

The following members participated in the qualification development process of the **Metal Forming & Processing Level 02 - 05** at PITAC, Lahore.

**Date: 9<sup>th</sup> - 13<sup>th</sup> August 2021**

S#	Name	Designation	Organization
1.	Engr. Salman Khalid Chaudhary	Assistant Director (Technical) Metallurgy	PITAC, Lahore
2.	Engr. Sohail Naseer	Assistant Professor	GSPCT, Gujrat
3.	Engr. Jamal Akbar	Associate Professor	GCT, Peshawar
4.	Engr. Bismillah Kakar	Deputy Director (Technical)	PITAC, Lahore
5.	Muhammad Ismail	Assistant Foreman	PITAC, Lahore
6.	Engr. Amina Irfan	Lecturer	UOL, Lahore
7.	Engr. Ahsan Shahbaz	Manager	PSS, Lahore
8.	Engr. Rashid Bashir	Senior Instructor	Pak Swiss Training Center, Lahore
9.	Dr. Gull Hamid Awan	Chairman Department of Metallurgy	UET, Lahore
10.	Mr. Javed Afzal	Assistant Manager	SMEDA, Lahore
11.	Engr. Tashiq Semab Amin	Deputy Manager	HIT, Taxila
12.	Engr. Muhammad Umar	Project Engineer	PNAC, Islamabad
13.	Engr. Farooq Iftikhar	Senior Engineer	PCSIR, Lahore



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14.	Engr. Fahad Qaiser	Assistant Director (Technical) Mechanical	PITAC, Lahore
15.	Engr. Muhammad Hafeez	Principal (R)	P-TEVTA, Lahore
16.	Engr. Amir Amin	DACUM Facilitator	Malaysian Institute, Lahore
17.	Engr. Muhammad Yasir	Deputy Director, NAVTTC Coordinator	NAVTTC HQ, Islamabad

## 7. Qualification Validation Committee

The following members participated in the qualification validation process of **Metal Forming & Processing Level 02 - 05** at PITAC, Lahore.

**Date: 01<sup>st</sup> – 05<sup>th</sup> November, 2021**

S#	Name	Status in Committee	Organization
1.	Engr. Salman Khalid Chaudhary	Assistant Director (Technical) Metallurgy	PITAC, Lahore
2.	Engr. Farooq Iftikhar	Senior Engineer	PCSIR, Lahore
3.	Engr. Umer Farooq	Instructor Mechanical	GSPCT, Gujrat
4.	Engr. Saif Ullah Khan	Assistant Director (Technical) Mechanical	PITAC, Lahore
5.	Engr. Rashid Bashir	Senior Instructor	Pak Swiss Training Center, Lahore
6.	Engr. Tehrim Ijaz	Teaching Assistant	Punjab University, Lahore
7.	Mr. Mushtaq Ahmad	Director M&E Representative of P-TEVTA	P-TEVTA
8.	Engr. Jamal Akbar	Associate Professor Representative of KPK-TEVTA	GCT, Peshawar
9.	Engr. Liaqat Jamro	Director Academics, Representative of S- TEVTA	S-TEVTA



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10.	Ms. Syeda Fatima Iqbal	System Analyst Representative of PBTE	PBTE Lahore
11.	Engr. Muhammad Umar	Project Engineer	PNAC, Islamabad
12.	Mr. Shoaib Anwar Sherazi	Principal Representative of B-TEVTA	TTC Quetta
13.	Engr. Abdul Maqsood	DACUM Facilitator	GPI, Mardan
14.	Engr. Muhammad Yasir	Deputy Director, NAVTTC Coordinator	NAVTTC HQ, Islamabad

### 8. Entry Qualification

The entry for National Competency Standards for **Metal Forming & Processing Level 02 - 05** would be Middle Certificate (8th Class).

### 9. Regulation of the qualification and schedule of units

Not Applicable

### 10. Summary of Competencies

Sr No	Occupation	Competency Standards	NVQF Level	Category	Contact Hours			Cr. Hrs.
					Th	Pr	T	
1.	Health and Safety Officer	CS 01 Observe Basic Occupational Safety & Health Practices	2	Generic	9	36	45	4.5
		CS 02 Maintain Occupational Safety & Health at Site	2	Generic	9	36	45	4.5
2.	Drawing Assistant	CS 03 Draw the Lettering and Geometrical shapes	2	Technical	6	21	27	2.7
		CS 04 Construct different Engineering Curves	2	Technical	9	36	45	4.5
		CS 05. Construct multi-view drawings	2	Technical	15	60	75	7.5
3.	Machining Assistant	CS 06 Perform Bench Works	2	Technical	12	48	60	6



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		CS 07 Perform cutting on Power Hack Saw	2	Technical	6	24	30	3
4.	Welding Assistant	CS 08 Interpret Welding/Fabrication Requirements	2	Technical	6	24	30	3
		CS 09 Perform Pre-welding operations	2	Technical	12	48	60	6
5.	Metal forming Assistant	CS 10 Identify Metal forming operations	2	Technical	12	48	60	6
		CS 11 Perform Preparation for Metal Processing	2	Technical	9	36	45	4.5
6.	Maintenance Assistant	CS 12 Carryout Housekeeping Jobs	2	Technical	6	24	30	3
		CS 13 Perform General Maintenance	2	Technical	12	48	60	6
	Total				123	489	612	61.2

## 11. Occupations of Qualification

Level 02	Level 03	Level 04	Level 05
<ul style="list-style-type: none"> <li>• Health and Safety Officer</li> <li>• Drawing Assistant</li> <li>• Machining Assistant</li> <li>• Welding Assistant</li> <li>• Metal forming Assistant</li> <li>• Maintenance Assistant</li> </ul>	<ul style="list-style-type: none"> <li>• Computer Operator</li> <li>• Draughtsman</li> <li>• Machining Technician</li> <li>• Welding Technician</li> <li>• Metal Casting Technician</li> <li>• Metal Forming Technician</li> </ul>	<ul style="list-style-type: none"> <li>• Soft Skills</li> <li>• Machining Sr. Technician</li> <li>• Welding Sr. Technician</li> <li>• Metal Casting Sr. Technician</li> <li>• Metal Forming Sr. Technician</li> <li>• Heat Treatment Technician</li> <li>• Destructive Testing Technician</li> </ul>	<ul style="list-style-type: none"> <li>• Machining Supervisor</li> <li>• Welding Supervisor</li> <li>• Metal Processing Supervisor</li> <li>• Metal Forming Supervisor</li> <li>• Quality Testing Inspector</li> <li>• Coating Supervisor</li> <li>• Entrepreneurial skills</li> </ul>



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Sr. No	Occupation	Duties/CS
<b>Level-2</b> <b>Metal Forming &amp; Processing Assistant/Helper</b>		
1.	Health and Safety Officer	CS 01 Observe Basic Occupational Safety & Health Practices
		CS 02 Maintain Occupational Safety & Health at Site
2.	Drawing Assistant	CS 03 Draw the lettering and Geometrical Shapes
		CS 04 Construct different Engineering Curves
		CS 05. Construct multi-view drawings
3.	Machining Assistant	CS 06 Perform Bench Works
		CS 07 Perform cutting on Power Hack Saw
4.	Welding Assistant	CS 08 Interpret Welding/Fabrication Requirements
		CS 09 Perform Pre-welding operations
5.	Metal forming Assistant	CS 10 Identify Metal forming operations
		CS 11 Perform Preparation for Metal Processing
6.	Maintenance Assistant	CS 12 Carryout Housekeeping Jobs
		CS 13 Perform General Maintenance

## 12. Levelling and Packaging of Qualification

### OCCUPATIONS AND LEVELS DESCRIPTOR

Level 2

Level 3

Level 4

Level 5



Sr. #	Occupations	No of Modules/CS	Level	Occupation Credit Hours	Training Duration
1.	Metal Forming and Processing Assistant/Helper	13	02	612	6 Months
2.	Metal Forming and Processing	18	03	600	6 Months



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	Technician				
3.	Metal Forming and Processing Senior Technician	24	04	1200	12 Months
4.	Metal Forming and Processing Supervisor	18	05	1206	12 Months

### 13. Generic Modules with respective levels

- Health and Safety

LEVEL 2

- Digital Skills

LEVEL 3

- Soft Skills

LEVEL 4

- Entrepreneurial Skills

LEVEL 5



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**14. Level 02 - Metal Forming & Processing Assistant/Helper**

**1. Health and Safety and Officer**

**0715-MF&P 01. Observe Basic Occupational Safety & Health Practices**

**Overview:** This competency standard covers the skills and knowledge required to Use PPEs, Clean the workplace, Adhere to emergency procedures, Perform risk assessment at Workplace, Follow machine's operating guidelines

Competency Units	Performance Criteria
<b>CU1.</b> Use PPEs	<b>P1.</b> Arrange PPEs as per job requirement <b>P2.</b> Check PPEs for smooth function. <b>P3.</b> Wear PPE as per nature of job <b>P4.</b> Inspect personal protective equipment to maintain in a good order for reuse. <b>P5.</b> Store PPE at designated place after use
<b>CU2.</b> Clean the workplace	<b>P1.</b> Inspect the workplace for friendly working condition. <b>P2.</b> Remove any unwanted material from workplace <b>P3.</b> Clean tools on a regular basis before stacking <b>P4.</b> Store tools and equipment at designated place <b>P5.</b> Perform housekeeping duties according to standard operating procedure.
<b>CU3.</b> Adhere to emergency procedures	<b>P1.</b> Follow OSH Rules/Regulations as per company policy <b>P2.</b> Use emergency equipment (like First aid box, Fire Alarm, Fire Extinguisher etc) available in accordance with workplace policies and procedures. <b>P3.</b> Response to emergency as per SOPs
<b>CU4.</b> Identify hazards and risk at Workplace	<b>P1.</b> Identify hazards to maintain a healthy and safe working environment. <b>P2.</b> Enlist the possible hazards at workplace. <b>P3.</b> Enlist the possible risk at workplace. <b>P4.</b> Follow workplace procedures and work instructions to control risks at workplace.



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<b>CU5.</b> Follow machine's operating guidelines	<b>P1.</b> Follow machine's operating procedure <b>P2.</b> Practice regulations & guidelines specific to Machine operations <b>P3.</b> Practice common safety procedures while using machines
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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.** Procedures relevant to raising OH&S issues
- K2.** Designated personnel responsible for OH&S
- K3.** Personal Protective Equipment (PPEs)
- K4.** Safety signs, symbols and labels
- K5.** Procedures for inspection of tools, equipment and PPEs servicing
- K6.** Risk Assessment procedures
- K7.** Workplace procedures for working in hazardous areas
- K8.** emergency response plan
- K9.** maintaining a clean and safe working environment
- K10.** Machine operating procedures and safety guidelines
- K11.** safe manual handling procedures of machines
- K12.** Designated location of emergency equipment including first aid facilities

### **Critical Evidence(s) Required**

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

- Perform material inspection
- Perform cleaning of the workplace
- Develop risk assessment matrix for the given workplace
- Use PPEs required for given task

### **Tools and Equipment**

- Steel-toed footwear
- Hard hat
- Safety gloves



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- Appropriate safety glasses
- Site emergency response plan
- Fire extinguishers



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**0715- MF&P 02. Maintain Occupational Safety & Health at Site**

**Overview:** This competency standard covers the skills and knowledge required to maintain safe work condition at site, emergency response activity at crushing plant site. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
<b>CU1.</b> Maintain safe work condition at site	<p><b>P1.</b> Recognize the safety signs and symbols</p> <p><b>P2.</b> Identify Potential hazards at work site</p> <p><b>P3.</b> Erect barricades hoardings, signage's in the hazardous areas</p> <p><b>P4.</b> Identify the risk of slip, trip and fall at work place</p> <p><b>P5.</b> Perform fall protection measures as per job requirements</p> <p><b>P6.</b> Maintain housekeeping at the workplace</p> <p><b>P7.</b> Label and store chemicals as per Material Safety Data Sheet (MSDS)`</p>
<b>CU2.</b> Perform fire fighting	<p><b>P1.</b> Identify source of fire.</p> <p><b>P2.</b> Identify classes of fire.</p> <p><b>P3.</b> Raise fire alarms</p> <p><b>P4.</b> Select suitable fire extinguishers</p> <p><b>P5.</b> Check expiry of fire extinguisher</p> <p><b>P6.</b> Check wind direction</p> <p><b>P7.</b> Locate emergency exits</p> <p><b>P8.</b> Perform PASS (Pull, aim, squeeze and sweep) on fire Extinguisher</p>
<b>CU3.</b> Carry out first aid treatment	<p><b>P1.</b> Follow COVID-19 SOP's</p> <p><b>P2.</b> Identify basic elements for first aid kit</p> <p><b>P3.</b> Maintain a fully stacked first aid kit</p> <p><b>P4.</b> Check expiry date of medicines</p> <p><b>P5.</b> Perform mock first aid treatment for minor injuries</p>



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<b>CU4.</b> Perform electrical work safely at workplace	<b>P1.</b> Check the connectivity of earthing with power equipment <b>P2.</b> Check leads and cable for any visual damage before use. <b>P3.</b> Tag damaged lead, cable and connection points and report to the supervisor.
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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:

- Unsafe act and unsafe conditions
- Electrical safety
- First Aid treatment
- Source of fire
- Firefighting techniques
- Housekeeping at workplace
- Emergency exits at workplace
- Types of fire extinguisher
- Classes of fire
- Types of hazardous materials and relevant safety procedures
- Use of Appropriate required PPE's for different situations
- Safety relevant to tools, tackles, & components of scaffolding as per job

### Critical Evidence(s) Required

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

- Perform first aid treatment for minor cut
- Perform mock firefighting on a source of fire

### Tools and Equipment

- Fall protection and other applicable PPEs
- Site emergency response plan
- Fire extinguishers



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- Fire blankets
- Respirators
- Masks
- Fire hoses
- First aid kit, Stretchers



## 2. **Drawing Assistant**

### 0715-MF&P 03. Draw the Lettering and Geometrical Shapes

**Overview:** This competency standard covers the skills and knowledge required to Draw horizontal, vertical and inclined lines, Draw Upper case and Lower-Case lettering, Draw Different type of technical drawing Lines, Draw circles, half circles, radius with compass, Construct different geometrical shapes

Competency Units	Performance Criteria
<b>CU1.</b> Draw horizontal, vertical and inclined lines.	<b>P1.</b> Prepare Drawing sheet. <b>P2.</b> Select the tools. <b>P3.</b> Draw Boundaries lines as per standards. <b>P4.</b> Make title bar <b>P5.</b> Divide the sheets in different equal parts. <b>P6.</b> Draw lines at 30, 45, 60,90and 120 angles. <b>P7.</b> Draw parallel-lines <b>P8.</b> Draw perpendicular & bisects line <b>P9.</b> Draw equal division of lines
<b>CU2.</b> Draw Upper case and Lower-Case lettering	<b>P1.</b> Prepare drawing sheet as per requirement. <b>P2.</b> Select the required drawing tools. <b>P3.</b> Select proper pencil for lettering with holding techniques. <b>P4.</b> Make title block <b>P5.</b> Draw upper and lower lines for lettering according to standards. <b>P6.</b> Draw lettering with different styles like vertical, gothic, single stroke, double stroke italic.
<b>CU3.</b> Draw Different type of technical drawing Lines	<b>P1.</b> Prepare Drawing sheet. <b>P2.</b> Select the Drawing tools as per job requirement. <b>P3.</b> Make title bar <b>P4.</b> Divide the sheets in different equal parts.



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	<p><b>P5.</b> Draw Center lines,</p> <p><b>P6.</b> Draw Object, border line.</p> <p><b>P7.</b> Draw Hidden line.</p> <p><b>P8.</b> Draw Section line.</p> <p><b>P9.</b> Draw Leader line.</p> <p><b>P10.</b> Draw Dimension line.</p> <p><b>P11.</b> Draw Extension line.</p> <p><b>P12.</b> Draw phantom line.</p> <p><b>P13.</b> Draw cutting plane line.</p>
<p><b>CU4.</b> Draw circles, half circles, radius with compass</p>	<p><b>P1.</b> Prepare Drawing sheet.</p> <p><b>P2.</b> Select the Drawing tools as per job requirement.</p> <p><b>P3.</b> Make title bar</p> <p><b>P4.</b> Divide the sheets in different equal parts.</p> <p><b>P5.</b> Make different diameters circles and half circles.</p>
<p><b>CU5.</b> Construct different geometrical shapes</p>	<p><b>P1.</b> Prepare Drawing sheet.</p> <p><b>P2.</b> Select the tools.</p> <p><b>P3.</b> Make title block</p> <p><b>P4.</b> Divide the sheets in different equal parts.</p> <p><b>P5.</b> Draw square and rectangle shape as per given dimension</p> <p><b>P6.</b> Draw Equilateral Triangle, Isosceles triangle, Scalene Triangle, Right Triangle, Obtuse Triangle, Acute Triangle.</p>

### Knowledge & Understanding

- K1.** Importance of Technical Drawing.
- K2.** Symbols of engineering terminology.
- K3.** Uses of technical Drawing tools
- K4.** Type of Drawing
- K5.** Application of Technical drawing
- K6.** Drawing Pencil, their grading, sharpening and using techniques.
- K7.** Style of letters.
- K8.** General rules for lettering



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- K9.** Basic lines
- K10.** Importance of lines
- K11.** Common Types of lines and correct line weightage.
- K12.** Introduction to geometry
- K13.** Introduction to sketching techniques.
- K14.** Techniques of sketching straight lines in different directions.

**Tools & Equipments**

- Graph and drawing sheet.
- Drawing board/table.
- T-Square
- Set Square.
- Templates.
- Compass.



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**0715- MF&P 04. Construct different Engineering Curves**

**Overview:** This competency standard covers the skills and knowledge required to Construct inscribe and circumscribe figures, Construct Tangents of circles (Inside & Outside), Construct Ellipse, Construct a parabola curve, Construct a hyperbola curve, Construct a Archimedean Spiral curve.

Competency Units	Performance Criteria
<b>CU1</b> Construct inscribe and circumscribe figures.	<b>P1.</b> Prepare drawing sheet. <b>P2.</b> Select the tools. <b>P3.</b> Make title block <b>P4.</b> Divide the sheets in different equal parts. <b>P5.</b> Draw triangle, square, pentagon, hexagon and octagon according to dimension.
<b>CU2</b> Construct Tangents of circles (Inside & Outside)	<b>P1.</b> Prepare Drawing sheet. <b>P2.</b> Select the tools. <b>P3.</b> Make title bar <b>P4.</b> Divide the sheets in different equal parts. <b>P5.</b> Draw Tangents Inside of a circle When the centre of the circle is known. <b>P6.</b> Draw Tangents Inside of a circle When the centre of the circle is unknown <b>P7.</b> Draw Tangents outside of a circle When the centre of the circle is known <b>P8.</b> Draw Tangents outside of a circle When the centre of the circle is unknown
<b>CU3</b> Construct Ellipse	<b>P1.</b> Prepare Drawing sheet. <b>P2.</b> Select the tools. <b>P3.</b> Make title bar <b>P4.</b> Divide the sheets in different equal parts.



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	<p><b>P5.</b> Draw an Ellipse by Concentric Circle.</p> <p><b>P6.</b> Draw an Ellipse by Rectangle Method</p> <p><b>P7.</b> Draw an Ellipse by Oblong Method</p> <p><b>P8.</b> Draw an Ellipse by Arcs of Circle Method</p> <p><b>P9.</b> Draw an Ellipse by Rhombus Method.</p> <p><b>P10.</b> Draw an Ellipse by Basic Locus Method</p>
<b>CU4</b> Construct a parabola curve	<p><b>P1.</b> Prepare Drawing sheet.</p> <p><b>P2.</b> Select the tools.</p> <p><b>P3.</b> Draw Boundaries lines as per standards.</p> <p><b>P4.</b> Make title bar</p> <p><b>P5.</b> Divide the sheets in different equal parts.</p> <p><b>P6.</b> Draw a parabola curve by Rectangle</p> <p><b>P7.</b> Draw a parabola curve by Method of Tangents( Triangle Method)</p> <p><b>P8.</b> Draw a parabola curve by Basic Locus Method</p>
<b>CU5</b> Construct a hyperbola curve	<p><b>P1.</b> Prepare Drawing sheet.</p> <p><b>P2.</b> Select the tools.</p> <p><b>P3.</b> Draw Boundaries lines as per standards.</p> <p><b>P4.</b> Make title bar</p> <p><b>P5.</b> Divide the sheets in different equal parts.</p> <p><b>P6.</b> Draw a hyperbola curve.</p>
<b>CU6</b> Construct a Archimedean Spiral curve	<p><b>P1.</b> Prepare Drawing sheet.</p> <p><b>P2.</b> Select the tools.</p> <p><b>P3.</b> Draw Boundaries lines as per standards.</p> <p><b>P4.</b> Make title bar</p> <p><b>P5.</b> Divide the sheets in different equal parts.</p> <p><b>P6.</b> Draw spiral curve.</p>

**Knowledge & Understanding**



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- K1.** Techniques of sketching straight lines in different directions
- K2.** Define Triangles, Quadrilateral and Polygons
- K3.** Describe circular arc using different line method
- K4.** Describe circular arc
- K5.** Types of Geometric Shape
- K6.** Two-dimensional shapes
- K7.** Three-dimensional shapes
- K8.** Types of Geometric Shape
- K9.** Regular Polyhedrons
- K10.** Methods of drawing Tangents & Normal
- K11.** Describe ellipse
- K12.** Describe different methods of sketching ellipse
- K13.** Describe parabola
- K14.** Describe different methods of parabola
- K15.** Describe hyperbola curve
- K16.** Describe different methods of hyperbola curve.
- K17.** Describe spiral curve

**Tools and Equipments**

- Graph and drawing sheet
- Drawing Board/Table
- Tee-Square
- Set Square
- Templates
- Compass



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**0715-MF&P 05. Construct multi-view drawings**

**Overview:** This competency standard covers the skills and knowledge required to Sketch Orthographic projection 1<sup>st</sup> angle, Sketch Orthographic projection 3<sup>rd</sup> angle, Sketch Isometric Drawing, Construct multi view drawing of General Bearing, Construct Development drawing

Competency Units	Performance Criteria
<b>CU1</b> Sketch Orthographic projection in 1 <sup>st</sup> angle of Projection	<b>P1.</b> Prepare Drawing sheet. <b>P2.</b> Select the tools. <b>P3.</b> Make title bar <b>P4.</b> Divide the sheets in equal parts. <b>P5.</b> Draw front view, Side View and top View 1 <sup>st</sup> angle projection
<b>CU2</b> Sketch Orthographic projection 3 <sup>rd</sup> angle of Projection	<b>P1.</b> Prepare Drawing sheet. <b>P2.</b> Select the tools. <b>P3.</b> Make title bar <b>P4.</b> Divide the sheets in equal parts. <b>P5.</b> Draw front view, Side View and top View 3 <sup>rd</sup> angle projection
<b>CU3</b> Sketch Isometric Drawing	<b>P1.</b> Prepare Drawing sheet. <b>P2.</b> Select the tools. <b>P3.</b> Make title bar <b>P4.</b> Divide the sheets in equal parts <b>P5.</b> Draw the isometric drawing from orthographic view of a part
<b>CU4</b> Construct multi view drawing of General Bearing.	<b>P1.</b> Prepare Drawing sheet. <b>P2.</b> Select the tools. <b>P3.</b> Draw Boundaries lines as per standards. <b>P4.</b> Make title bar <b>P5.</b> Divide the sheets in equal parts. <b>P6.</b> Draw Multiview drawing of general bearing



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<b>CU5.</b> Construct development drawing	<b>P1.</b> Interpret development drawing <b>P2.</b> Draw Development drawing of right cone section <b>P3.</b> Draw development drawing of truncated cylinder
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### **Knowledge & Understanding**

- K1.** Explain Orthographic projection 1st angle.
- K2.** Explain Orthographic projection 3rd angle.
- K3.** Explain Oblique Drawing.
- K4.** Explain Multi view drawing of bearing.

### **Tools and Equipments**

- Graph and drawing sheet.
- Drawing Board/Table.
- Tee-Square
- Set Square.
- Templates.
- Geometry Box



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### 3. **Machining Assistant**

#### **0715-MF&P 06. Perform Bench Works**

**Overview:** This competency standard covers the skills and knowledge required to Carry out Sawing, Filing, drilling, reaming, tapping and counter sinking and counter boring according to instructions.

Competency Units	Performance Criteria
<b>CU1. Carry out Sawing</b>	<p><b>P1.</b> Identify the required tools and equipment as per job requirement</p> <p><b>P2.</b> Interpret the given drawing</p> <p><b>P3.</b> Mark layout of job as per drawing using required marking tool</p> <p><b>P4.</b> Perform clamping of the work piece according to the instructions</p> <p><b>P5.</b> Select type/size of the blade according to the material and fix in hacksaw frame</p> <p><b>P6.</b> Perform sawing according to the instructions</p> <p><b>P7.</b> Check quality of the component at suitable intervals</p> <p><b>P8.</b> Verify the final job with the given drawing</p>
<b>CU2. Carry out Filing</b>	<p><b>P1.</b> Identify the required tools and equipment as per job requirement</p> <p><b>P2.</b> Interpret the given drawing</p> <p><b>P3.</b> Select marking tool and mark layout of job as per drawing</p> <p><b>P4.</b> Select clamping device and clamp the work piece as per standard</p> <p><b>P5.</b> Select the type of file according to the material &amp; profile</p> <p><b>P6.</b> Perform filing as per standard procedures</p> <p><b>P7.</b> Check quality of the component at suitable intervals.</p> <p><b>P8.</b> Verify the final job with the given drawing</p>
<b>CU3. Carry out Chipping</b>	<p><b>P1.</b> Identify the required tools and equipment as per job requirement</p>



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	<p><b>P2.</b> Interpret the given drawing</p> <p><b>P3.</b> Select tool &amp; clamping device according to the job requirement.</p> <p><b>P4.</b> Use the marking tool and measuring instruments as per job requirement.</p> <p><b>P5.</b> Clamp the work piece as per job requirement.</p> <p><b>P6.</b> Perform chipping as per standard procedures</p> <p><b>P7.</b> Check quality of the component at suitable intervals.</p> <p><b>P8.</b> Verify the final job with the given drawing</p>
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### **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.** Basic engineering drawings
- K2.** Types & application of clamping devices
- K3.** Types and use of basic measuring instruments required during different operations
- K4.** Types and use of layout tools
- K5.** Different types of hacksaw blades and its use
- K6.** File types and their use
- K7.** Types & properties of material
- K8.** Types of chipping tools

### **Critical Evidence(s) Required**

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

- Develop Name Plate manually
- Cut Threads on Work Piece with tap and die
- Cut Pipe Threads
- Prepare Funnel

### **Tools and Equipments**

- Workbench



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- Bench vice
- Tri-square
- Hand hacksaw with blade
- Scriber
- Flat File
- Vernier caliper
- Punching tools
- Chipping tools
- Files
- Measuring instruments

**0715-MF&P 07. Perform cutting on Power Hack Saw**

**Overview:** This competency standard covers the skills and knowledge required to Cut material by using power hacksaw, Carry out Sawing at different angles with disc cutter

Competency Units	Performance Criteria
<b>CU1.</b> Cut material by using power	<b>P1.</b> Mark the job according to given drawing <b>P2.</b> Select appropriate blade according to job requirement



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hacksaw	<p><b>P3.</b> Set blade in frame of hacksaw as per procedure</p> <p><b>P4.</b> Ensure the work piece is clamped firmly and properly</p> <p><b>P5.</b> Adopt methods and techniques for sawing that is appropriate to job requirement</p> <p><b>P6.</b> Follow marked line during sawing to ensure accuracy.</p>
<b>CU2.</b> Carry out Sawing at different angles with disc cutter	<p><b>P1.</b> Mark the job according to given drawing</p> <p><b>P2.</b> Select appropriate disc according to job requirement</p> <p><b>P3.</b> Set Disc in metal disc cutter as per procedure.</p> <p><b>P4.</b> Ensure the disc tightness</p> <p><b>P5.</b> Ensure the work piece is clamped firmly and properly</p> <p><b>P6.</b> Adopt methods and techniques for disc cutting that is appropriate to job requirement</p> <p><b>P7.</b> Follow marked line during sawing to ensure accuracy.</p>

### Knowledge & Understanding

- K1. Describe basic measurement
- K2. Describe types of hacksaw frames
- K3. Describe basic measuring /Marking /cutting tools
- K4. Describe clamping/holding methods
- K5. Define methods and techniques of sawing.

### Tools and Equipments

- Workbench
- Bench vice
- Tri-square
- Scriber
- Flat File
- Vernier caliper
- Punching tools
- Power hacksaw with blades
- Measuring Tools



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#### 4. **Welding Assistant**

##### **0715-MF&P 08. Interpret Welding/Fabrication Requirements**

**Overview:** This competency standard covers the skills and knowledge required to Read and Understand Interpret Fabrication Drawings, Interpret Welding Symbols, Recognize Material Specifications

Competency Units	Performance Criteria
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<b>CU1.</b> Interpret Fabrication Drawings	<b>P1.</b> Identify welding symbols used in engineering drawings. <b>P2.</b> Identify different types of welding joints. <b>P3.</b> Interpret welding requirements according to welding symbols given in the engineering drawings
<b>CU2.</b> Interpret Welding Symbols	<b>P1.</b> Understand basic and supplementary welding symbols used in fabrication drawings <b>P2.</b> Understand and differentiate between types of welds and joints <b>P3.</b> Identify welding requirements according to welding symbols given in the fabrication drawings
<b>CU3.</b> Recognize Material Specifications	<b>P1.</b> Identify material specifications according to fabrication drawing <b>P2.</b> Identify bill of material (BOM) according to fabrication drawing

### **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.** Describe Basic elements of engineering drawing
- K2.** Describe Drawing symbols
- K3.** Explain Dimensioning techniques
- K4.** Define General tolerance
- K5.** Define Angular tolerance
- K6.** Define Geometric tolerance
- K7.** Explain Perspective
- K8.** Explain Exploded view
- K9.** Explain Hidden view technique
- K10.** Explain First angle projections



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**K11.** Explain Third angle projections

**Critical Evidence(s) Required**

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

- Identify welding requirements according to welding symbols given in the manufacturing drawings
- Identify material specifications according to manufacturing drawing
- Identify bill of material (BOM) according to manufacturing drawing
- Interpret dimensional tolerances according to manufacturing drawing
- Assemble and tack weld parts according to manufacturing drawing

**Tools and Equipment**

- Layout tools
- Measuring devices
- Hand held calculator
- Fabrication drawings
- Fabrication and welding equipment

**0715-MF&P 09. Perform Pre-welding operations**

**Overview:** This competency standard covers the skills and knowledge required to Prepare work pieces to be welded, Prepare welding machines and torches, Perform Tacking

**Competency Units**

**Performance Criteria**



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<b>CU1.</b> Prepare work pieces to be welded	<b>P1.</b> Select Work piece as per drawing <b>P2.</b> Mark layout of job as per drawing <b>P3.</b> Perform pre-cleaning of the work piece <b>P4.</b> Carryout the Straightening of given job as per requirement. <b>P5.</b> Carry out the beveling of given job as per requirement
<b>CU2.</b> Prepare welding machines and torches	<b>P1.</b> Interpret welding / engineering drawings <b>P2.</b> Select the welding machine as per job specification <b>P3.</b> Select the welding torch as per job specification <b>P4.</b> Setup the machine for welding as per job requirement <b>P5.</b> Make essential connections for specific welding procedures being undertaken <b>P6.</b> Identify welding consumables as per job requirement <b>P7.</b> Arrange the work piece as per required welding position. <b>P8.</b> Use safety equipment related to specific tasks
<b>CU4.</b> Perform Tacking	<b>P1.</b> Interpret dimensional tolerances according to fabrication drawing <b>P2.</b> Assemble and tack weld parts according to fabrication drawing

### Knowledge & Understanding

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

- K1.** Define welding
- K2.** Types of welding
- K3.** Welding consumables
- K4.** Welding parameters
- K5.** Welding joints
- K6.** Welding positions (pipes and plates)
- K7.** Enlist types of hazards involved during welding process
- K8.** Explain Emergency safety control measures and actions to be taken under emergency situation



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- K9.** Types of welding machine (AC transformers, DC Generators, Rectifiers)
- K10.** Describe types of welding torch
- K11.** Identify high-low gas pressure regulators

### **Critical Evidence(s) Required**

The candidate must present evidence of practical observations showing their ability to maintain safety at site. The observation measures include:

- Select PPEs as per requirement
- Prepare work pieces to be welded
- Set parameters of welding machine as per the requirement
- Select welding consumables as per requirement

### **Tools & Equipments**

- Welding plant and accessories
- Welding consumables
- Welding torch
- Steel wire brush
- Work bench
- Bench vice
- Hammer
- Tri-square
- Hand hacksaw
- Scriber
- Vernier caliper
- Flat File
- Disk grinder
- Pin grinder
- Flat file

## **5. Metal Forming Assistant**

### **0715-MF&P 10. Identify Metal forming operations**

**Overview:** This competency standard covers the skills and knowledge required to Identify Injection and Extrusion process, Explore Rolling Operation, Explore Wire Drawing Operation, Explore Deep Drawing Operation, Explore Forging operations, Explore Casting operation, Explore sheet metal operations



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Competency Units	Performance Criteria
<b>CU1.</b> Identify Injection and Extrusion process	<b>P1.</b> Interpret drawings as per requirement <b>P2.</b> Identify the required tools used in the given process <b>P3.</b> Arrange types of dies as per requirement <b>P4.</b> Identify required material for given process <b>P5.</b> Arrange the required material as per given job <b>P6.</b> Identify inspection techniques for given process
<b>CU2.</b> Explore Rolling Operation	<b>P1.</b> Interpret drawings as per requirement <b>P2.</b> Identify the required tools used in the rolling process <b>P3.</b> Identify the engineering materials for rolling operation <b>P4.</b> Select the required rolling mill as per job requirement <b>P5.</b> Identify the operational parameters of rolling process <b>P6.</b> Identify inspection tools for rolling operation <b>P7.</b> Identify inspection techniques for rolling process
<b>CU3.</b> Explore Wire Drawing Operation	<b>P1.</b> Interpret drawings as per requirement <b>P2.</b> Identify the required tools used in the drawing process <b>P3.</b> Arrange raw material as per job requirement <b>P4.</b> Identify operational parameters (pre-heat treatment, draw force etc.) for drawing operation. <b>P5.</b> Arrange required die for drawing operation. <b>P6.</b> Identify inspection techniques for drawing process
<b>CU4.</b> Explore Deep Drawing Operation	<b>P1.</b> Interpret drawings as per requirement <b>P2.</b> Identify the required tools used in the deep drawing process <b>P3.</b> Arrange raw material as per job requirement <b>P4.</b> Identify operational parameters (pre-heat treatment, draw force etc.) for deep drawing operation. <b>P5.</b> Select the type of die for deep drawing operation <b>P6.</b> Identify inspection techniques for deep drawing



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	process
<b>CU5. Explore Forging operations</b>	<b>P1.</b> Interpret drawings as per requirement <b>P2.</b> Identify the required tools used in the forging process <b>P3.</b> Arrange engineering raw material for forging operation <b>P4.</b> Identify operational parameters for forging operation. <b>P5.</b> Identify the handling of tools for forging process <b>P6.</b> Identify post-heat treatment techniques.
<b>CU6. Explore Casting operation</b>	<b>P1.</b> Maintain safe work environment with molten metals handling <b>P2.</b> Interpret engineering drawings as per requirement <b>P3.</b> Identify the required tools used in the casting process <b>P4.</b> Identify desired melting furnace as per casting material <b>P5.</b> Arrange raw material for sampling <b>P6.</b> Arrange molds as per job requirement <b>P7.</b> Identify inspection techniques for casting process
<b>CU7. Explore sheet metal operations</b>	<b>P1.</b> Interpret engineering drawings as per requirement <b>P2.</b> Identify the required tools used in the given process <b>P3.</b> Arrange tools and equipment used in given operations. <b>P4.</b> Arrange raw materials for given operation <b>P5.</b> Identify inspection techniques for given process

### **Knowledge & Understanding**

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

- K1.** Tools and equipment required for forming operations



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- K2.** Material required for the process
- K3.** Describe material behavior in metal forming processes
- K4.** Explain temperature in metal forming
- K5.** Explain strain rate sensitivity
- K6.** Explain friction and lubrication in metal forming
- K7.** Injection and extrusion process and its types
- K8.** Understand drawing operation according to Job.
- K9.** Explain types of rolling process
- K10.** Describe Basic safety practices regarding rolling process
- K11.** Identify types of dies and die materials according to standard requirements
- K12.** Identify different Rolling defect according to standard
- K13.** Describe Annealing.
- K14.** Describe Normalizing.
- K15.** State heating equipment and applications
- K16.** Explain safety Practices and PPE used in Forging.
- K17.** Describe Cold forging
- K18.** State Warm forging.
- K19.** State hot forging.
- K20.** types of alloy additions and their effects on casting behavior and finished product
- K21.** induction furnace melting and refractories suitable for steelmaking
- K22.** Influence of carbon and silicon contents
- K23.** the grades of steel and their applications including carbon steel and alloy steels
- K24.** methods of controlling physical properties
- K25.** advantages/disadvantages of density of each type of ferrous metal
- K26.** Describe punching, shearing and bending operations
- K27.** Types of metal bending
- K28.** Types of shearing
- K29.** Difference between shearing and cutting
- K30.** Difference between blanking and punching
- K31.** Describe Channel Bending, Offset Bending, Edge Bending, U-Bending, V-Bending
- K32.** Inspection types

**Critical Evidence(s) Required**



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The candidate must present evidence of practical observations showing their ability to understand forming operations. The observation measures include.

- Select tools/materials required for the given forming operations
- Select tools/material required for the given injection/extrusion process
- Arrange tools/material required for the given rolling process
- Select tools/material required for the given forging process
- Select tools/material required for the given drawing/deep drawing process
- Arrange tools/material required for the given casting process
- Select material inspection technique

### **Tools & Equipments**

- Hammer
- Press
- Die
- Clamping device
- Punch
- Chisel
- Anvil
- PPE's
- Inspection tools
- Puncher
- Shearing device
- Press tools
- Two-High Rolling Mills
- Three-High Rolling Mills
- Four high rolling mills
- Tandem rolling mills
- Cluster rolling mills
- Deep drawing Machine
- Induction melting Furnace
- Immersion type Thermo-couple
- Transfer ladle
- Weighing scale (10, 50, 100, 500, 1000 Kgs capacity)
- Charging hoist (1 ton capacity)
- Charging box (200Kgs capacity)



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- Optical Pyro-meter (for ferrous metals)
- Shearing device
- Measuring devices

**0715-MF&P 11. Perform Preparation for Metal Processing**

**Overview:** This competency standard covers the skills and knowledge required to arrange raw materials for metal processing, prepare tools and equipment for metal



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processing, prepare the machine for metal processing and maintain coordination with other departments.

Competency Units	Performance Criteria
<b>CU1.</b> Arrange raw materials for metal processing	<p><b>P1.</b> Interpret the drawings as per specific metal processing requirement</p> <p><b>P2.</b> Identify material specifications according to metal processing drawing</p> <p><b>P3.</b> Arrange the grains and powder required for injection molding and extrusion process as per the given specification.</p> <p><b>P4.</b> Arrange the sheet required for sheet metal working operations</p> <p><b>P5.</b> Arrange the sheet required for rolling operations</p> <p><b>P6.</b> Prepare the work piece required for machining operations</p> <p><b>P7.</b> Arrange the flux material required for given welding operations</p>
<b>CU2.</b> Prepare tools and equipment for metal processing	<p><b>P1.</b> Identify the Hand tools, Power Tools, Cutting Tools, Marking and Measuring Tools required for each forming operations</p> <p><b>P2.</b> Arrange the required tools for forming operation as per job requirement</p> <p><b>P3.</b> Clean tools and equipment after use</p> <p><b>P4.</b> Store the tools and equipment at the designated place.</p>
<b>CU3.</b> Prepare the machine for metal processing	<p><b>P1.</b> Check the machine for proper working condition</p> <p><b>P2.</b> Fix the work piece on machine as per job requirement</p> <p><b>P3.</b> Set the cutting tool on machine as per job requirement</p> <p><b>P4.</b> Adjust cutting condition of machine as per job need</p> <p><b>P5.</b> Adjust the feed and speed required for the given job</p>
<b>CU4.</b> Maintain coordination with relevant departments	<p><b>P1.</b> Collaborate with relevant departments before the job execution</p> <p><b>P2.</b> Remove hurdles for inter-departmental collaboration in case of continuous production</p> <p><b>P3.</b> Maintain collaborative culture at workplace</p>



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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:

- Types of raw materials required for forming processes.
- Types of Hand tools, Power Tools, Cutting Tools, Marking and Measuring Tools.
- Use of Hand tools, Power Tools, Cutting Tools, Marking and Measuring Tools
- Feed and speed of cutting machine.
- Adjustment techniques of Machine Parameters
- Work holding devices required for forming operations.
- Inter-departmental collaboration

### **Critical Evidence(s) Required**

The candidate must present evidence of practical observations showing their ability to Perform preparation for metal processing. The observation measures include.

- Identify raw material specifications for metal processing
- Identify tools and equipment required for forming operation
- Prepare tools and equipment for forming operation
- Use of tools and equipment required for forming operation
- Prepare machine for forming operation
- Adjustment techniques of machine for forming operation
- Set parameter of machining for the given machining operations

### **Tools & Equipments**

- Measuring, marking and cutting tools
- Hand tools
- Power tools
- Drawing sheet
- Hammer
- Press
- Die



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- Flatter
- Swage
- Clamping device
- Punch
- Chisel
- Anvil
- Spatula
- Inspection tools
- Puncher
- Shearing device
- Press tools
- Two-High Rolling Mills
- Three-High Rolling Mills
- Four high rolling mills
- Tandem rolling mills
- Cluster rolling mills
- Deep drawing Machine
- Induction melting Furnace
- Immersion type Thermo-couple (1300 C° min.)
- Transfer ladle
- Raw materials (as per job requirement)
- Weighing scale (10, 50, 100, 500, 1000 Kgs capacity)
- Charging hoist (as per job requirement )
- Charging box (as per job requirement )
- Optical Pyrometer (for ferrous metals)
- Shearing device

**6. Maintenance Assistant**

**0715-MF&P 12. Carryout Housekeeping Jobs**



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**Overview:** This competency standard covers the skills and knowledge required to Perform cleaning of workstation, Perform Cleaning of Equipments

Competency Units	Performance Criteria
<b>CU1.</b> Perform cleaning of workstation	<b>P1.</b> Prepare checklist for routine cleanliness of the workstation <b>P2.</b> Follow specific guidelines and checklists to conduct housekeeping of workstation <b>P3.</b> Clean the work area under process and create safe working environment
<b>CU2.</b> Perform Cleaning of Equipments	<b>P1.</b> Prepare list of the tools/equipment/consumables (lubricants etc.) and machinery used in the shop <b>P2.</b> Apply the methods and techniques for cleanliness and maintenance of machines & tools as per checklist <b>P3.</b> Perform greasing of all moving parts as per checklist <b>P4.</b> Store the tools & material in designated place

### Knowledge & Understanding

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

- K1.** Guidelines and checklists to conduct maintenance and housekeeping of machines & tools
- K2.** Importance of routine cleaning of workplace and lubrication of the machine as per given checklist of oiling
- K3.** Machine SOPs
- K4.** Importance of storing tools in specific place, oiling, greasing of machine



**National Competency Standards**  
**“Metal Forming & Processing Assistant/Helper” Level 02**



**Critical Evidence:**

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

- Clean and maintain all bench-work tools and machines as per housekeeping checklists or instructions given

### Tools & Equipments

- Checklists
- Machine SOPs
- Cleaning Equipment
- Lubrications



**National Competency Standards**  
**“Metal Forming & Processing Assistant/Helper” Level 02**



**0715-MF&P 13. Perform General Maintenance**

**Overview:** This competency standard covers the skills and knowledge required to Perform Preventive Maintenance of tools and equipment, Perform Corrective Maintenance of tools and equipment

Competency Units	Performance Criteria
<b>CU1.</b> Perform Preventive Maintenance of tools and equipment	<b>P1.</b> Interpret routine maintenance schedule <b>P2.</b> Prepare oiling and greasing schedule chart (daily/weekly as per machine requirement) <b>P3.</b> Maintain machine history record - date of installation, condition, oiling and maintenance <b>P4.</b> Inspect and assess the general condition of an assigned machine on regular basis <b>P5.</b> Observe expected problems and carry out routine maintenance as per given instructions and schedules
<b>CU2.</b> Perform Corrective Maintenance of tools and equipment	<b>P1.</b> Check functions or working of tools / equipment <b>P2.</b> Identify faulty/damaged/ worn out parts. <b>P3.</b> Repair/replace the faulty/damage parts <b>P4.</b> Rectify safety hazards on all bench-work tools & machines <b>P5.</b> Report faults and problems of the machines, if not controllable, to the person concerned <b>P6.</b> Verify smooth functioning of tool/ equipment through dry run.

**Knowledge & Understanding**

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

- Types of maintenance (preventive, periodic, corrective)
- Importance of storing tools and material in specific place, oiling, greasing of machine
- Identification of faulty/damaged/ worn out parts



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- Replacement techniques of Faulty/damaged/ worn out parts
- Importance of Record keeping
- Routine maintenance problems and their solution
- Report writing
- Management system standards

**Critical Evidence:**

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

- Perform Preventive & Corrective Maintenance of equipments

### **Tools & Equipment**

- Machine SOPs
- Inspection tools
- Machine shutdown Schedules and Checklists