



Model Curriculum

**QP Name: Sheet Metal Worker - Hand Tools and Manually Operated Machines
(Optional: Grinder - Hand and Hand Held Power Tools)**

QP Code: CSC/Q0301

QP Version: 3.0

NSQF Level: 2

Model Curriculum Version: 3.0

Capital Goods Skill Council || 1st Floor, L-29, Outer Circle, Connaught Place New Delhi – 110001 ||
[Email: coo@cgsc.in](mailto:coo@cgsc.in)

Table of Contents

Training Parameters.....	3
Program Overview	4
Training Outcomes.....	4
Compulsory Modules.....	4
Module 1: Introduction to the role of a Sheet Metal Worker - Hand Tools and Manually Operated Machines.....	6
Module 2: Health and safety Practices	7
Module 3: Process of coordinating with co-workers to achieve work efficiency.....	10
Module 4: Perform sheet metal cutting, forming and assembly operations	12
Module 5: Introduction to Employability Skills.....	14
Module 6: Constitutional values - Citizenship	15
Module 7: Becoming a Professional in the 21st Century.....	16
Module 8: Basic English Skills.....	17
Module 9: Communication Skills.....	18
Module 10: Diversity & Inclusion.....	19
Module 11: Financial and Legal Literacy.....	20
Module 12: Essential Digital Skills.....	21
Module 13: Entrepreneurship.....	22
Module 14: Customer Service.....	23
Module 15: Getting ready for apprenticeship & Jobs.....	24
Module 16: Perform grinding operations	25
On the Job Training.....	27
Annexure.....	28
Trainer Requirements	28
Assessor Requirements.....	29
Assessment Strategy	30
References	31
Glossary.....	31
Acronyms and Abbreviations.....	32

Training Parameters

Sector	Capital Goods
Sub-Sector	<ol style="list-style-type: none"> 1. Machine Tools 2. Dies, Moulds and Press Tools 3. Plastics Manufacturing Machinery 4. Textile Manufacturing Machinery 5. Process Plant Machinery 6. Electrical and Power Machinery 7. Light Engineering Goods
Occupation	Fitting and Assembly
Country	India
NSQF Level	2
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7213.0101
Minimum Educational Qualification and Experience	Ability to read and write
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	31/03/2022
Next Review Date	31/03/2025
NSQC Approval Date	31/03/2022
QP Version	3.0
Model Curriculum Creation Date	31/03/2022
Model Curriculum Valid Up to Date	31/03/2025
Model Curriculum Version	3.0
Minimum Duration of the Course	210 Hours 00 Minutes
Maximum Duration of the Course	270 Hours 00 Minutes

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Perform preparatory activities such as identification of raw material, tools and equipment, lifting of workpiece, inspection of tools and equipment etc.
- Perform sheet metal cutting, forming and assembling operations by following organisational procedure.
- Work effectively and efficiently as per schedules and timelines.
- Implement safety practices.
- Optimize the use of resources to ensure less wastage and maximum conservation.

Option 1: Grinder - Hand and Hand Held Power Tools

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Perform preparatory activities such as identification of raw material, tools and equipment, lifting of workpiece, inspection of tools and equipment etc.
- Perform grinding operations by following organisational procedure.
- Perform post-welding operations such as inspection, quality check, cleaning etc.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
CSC/N1335 – Follow the health and safety practices at work NSQF Level- 3	25:00	35:00	0:00	00:00	60:00
Module 1: Introduction to the role of a Sheet Metal Worker - Hand Tools and Manually Operated Machines	05:00	0:00	0:00	00:00	05:00
Module 2: Health and safety practices	20:00	35:00	0:00	00:00	55:00
CSC/N1336 – Coordinate with co-workers to achieve work efficiency NSQF Level- 3	10:00	20:00	0:00	00:00	30:00
Module 3: Process of coordinating with co-workers to achieve work efficiency	10:00	20:00	0:00	00:00	30:00
CSC/N0301 – Perform basic sheet metal cutting, forming and assembly operations NSQF Level – 2	30:00	30:00	0:00	00:00	60:00

Module 4: Perform sheet metal cutting, forming and assembly operations	30:00	30:00	0:00	00:00	60:00
DGT/VSQ/N0101 - Employability Skills (30 hours) NSQF Level – 2	12:00	18:00	0:00	00:00	30:00
Module 5: Introduction to Employability Skills	0.5:00	0.5:00	0:00	00:00	1:00
Module 6: Constitutional values - Citizenship	0.5:00	0.5:00	0:00	00:00	1:00
Module 7: Becoming a Professional in the 21st Century	0.5:00	0.5:00	0:00	00:00	1:00
Module 8: Basic English Skills	1:00	1:00	0:00	00:00	2:00
Module 9: Communication Skills	1.5:00	2.5:00	0:00	00:00	4:00
Module 10: Diversity & Inclusion	0.5:00	0.5:00	0:00	00:00	1:00
Module 11: Financial and Legal Literacy	1.5:00	2.5:00	0:00	00:00	4:00
Module 12: Essential Digital Skills	1:00	2:00	0:00	00:00	3:00
Module 13: Entrepreneurship	2.5:00	4.5:00	0:00	00:00	7:00
Module 14: Customer Service	1.5:00	2.5:00	0:00	00:00	4:00
Module 15: Getting ready for apprenticeship & Jobs	1:00	1:00	0:00	00:00	2:00
Total Duration	77:00	103:00	30:00	00:00	210:00

Optional Modules

The table lists the modules and their duration corresponding to the Optional NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
CSC/N0302 – Grind surface using hand and hand-held power tools NSQF Level – 2	25:00	35:00	0:00	00:00	60:00
Module 16: Perform grinding operations	25:00	35:00	0:00	00:00	60:00
Total Duration	25:00	35:00	0:00	00:00	60:00

Module Details

Module 1: Introduction to the role of a Sheet Metal Worker - Hand Tools and Manually Operated Machines

Mapped to CSC/N1335 v2.0

Terminal Outcomes:

- Discuss the role and responsibilities of a Sheet Metal Worker - Hand Tools and Manually Operated Machines.

Duration: 05:00	Duration: 00:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the role and responsibilities of a Sheet Metal Worker - Hand Tools and Manually Operated Machines. • Discuss the job opportunities of a Sheet Metal Worker - Hand Tools and Manually Operated Machines. • Describe the size and scope of the capital good industry and its sub-sectors. • Explain about Indian capital goods manufacturing market. • Discuss the standards and procedures involved in the different operations of fitting and assembly work. 	
Classroom Aids:	
Whiteboard, marker pen, projector, standard checklists and schedules	
Tools, Equipment and Other Requirements	

Module 2: Health and safety Practices

Mapped to CSC/N1335 v2.0

Terminal Outcomes:

- Demonstrate ways to maintain personal health and safety.
- Describe the process of assisting in hazard management.
- Explain how to check the first aid box, firefighting and safety equipment.
- Describe the process of assisting in waste management.
- Explain the importance of following the fire safety guidelines.
- Explain the importance of following the emergency and first-aid procedures.
- Demonstrate the process of carrying out relevant documentation and review.

Duration: 20:00	Duration: 35:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the recommended practices to be followed to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask. • Explain the importance and process of checking the work conditions, assessing the potential health and safety risks, and take appropriate measures to mitigate them. • Explain the importance and process of selecting and using the appropriate PPE relevant to the task and work conditions. • Explain the recommended techniques to be followed while lifting and moving heavy objects to avoid injury. • Explain the importance of following the manufacturer’s instructions and workplace safety guidelines while working on heavy machinery, tools and equipment. • Explain the importance and process of identifying existing and potential hazards at work. • Describe the process of assessing the potential risks and injuries associated with the various hazards. • Explain how to prevent or minimise different types of hazards. • Explain how to handle and store hazardous materials safely. • Explain the importance of ensuring the first aid box is updated with the relevant first aid supplies. • Describe the process of checking and testing the firefighting and various safety equipment to ensure they are in a usable 	<ul style="list-style-type: none"> • Demonstrate the use of appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions. • Demonstrate how to handle hazardous materials safely. • Demonstrate the process of testing the firefighting and various safety equipment to ensure they are in usable condition. • Demonstrate the process of recycling and disposing different types of waste appropriately. • Demonstrate how to use the appropriate type of fire extinguisher to extinguish different types of fires safely. • Demonstrate how to administer appropriate first aid to the injured personnel. • Demonstrate the process of performing Cardiopulmonary Resuscitation (CPR) on a potential victim of cardiac arrest. • Demonstrate the process of carrying out appropriate documentation following a health and safety incident at work, including all the required information.

condition.

- Explain the criteria for segregating waste into appropriate categories.
- Describe the appropriate methods for recycling recyclable waste.
- Describe the process of disposing of the non-recyclable waste safely and the applicable regulations.
- Explain the use of different types of fire extinguishers to extinguish different types of fires.
- State the recommended practices to be followed for a safe rescue during a fire emergency.
- Explain how to request assistance from the fire department to extinguish a serious fire.
- Explain the appropriate practices to be followed during workplace emergencies to ensure safety and minimise loss to organisational property.
- State the common health and safety hazards present in a work environment, associated risks, and how to mitigate them.
- State the safe working practices to be followed while working at various hazardous sites and using electrical equipment.
- Explain the importance of ensuring easy access to firefighting and safety equipment.
- Explain the appropriate preventative and remedial actions to be taken in the case of exposure to toxic materials, such as poisonous chemicals and gases.
- Explain various causes of fire in different work environments and the recommended precautions to be taken to prevent fire accidents.
- Describe different methods of extinguishing fire.
- List different materials used for extinguishing fire.
- Explain the applicable rescue techniques to be followed during a fire emergency.
- Explain the importance of placing safety signs and instructions at strategic locations in a workplace and following them.
- Explain different types of first aid treatment to be provided for different

<p>types of injuries.</p> <ul style="list-style-type: none"> • State the potential injuries associated with incorrect manual handling. • Explain how to move an injured person safely. • State various hazards associated with the use of various machinery, tools, implements, equipment and materials. • Explain the importance of ensuring no obstruction and free access to fire exits. • Explain how to free a person from electrocution safely. • Explain how to administer appropriate first aid to an injured person. • Explain how to perform Cardiopulmonary Resuscitation (CPR). • Explain the importance of coordinating with the emergency services to request urgent medical assistance for persons requiring professional medical attention or hospitalisation. • State the appropriate documentation to be carried out following a health and safety incident at work, and the relevant information to be included. • Explain the importance and process of reviewing the health and safety conditions at work regularly or following an incident. • Explain the importance and process of implementing appropriate changes to improve the health and safety conditions at work. 	
<p>Classroom Aids</p>	
<p>Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator’s Guide, Participant’s Handbook.</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>Personal Protective Equipment, Cleaning Equipment and Materials, Sanitizer, Soap, Mask</p>	

Module 3: Process of coordinating with co-workers to achieve work efficiency

Mapped to CSC/N1336 v2.0

Terminal Outcomes:

- Demonstrate ways to work and communicate effectively with co-workers.
- Discuss ways to promote diversity and inclusion at the workplace.

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the importance and process of effective communication in the workplace. • Explain the barriers to effective communication and how to overcome them. • Explain the importance of teamwork in an organisation's and individual's success. • Explain the importance of active listening in the work environment. • State the appropriate techniques to be followed for active listening. • Explain the importance of tone and pitch ineffective communication. • Explain the importance of avoiding casual expletives and unpleasant terms while communicating professional circles. • Explain the importance of maintaining discipline and ethical behaviour at work. • State the common reasons for interpersonal conflict and how to resolve them. • Explain the importance of developing effective working relationships for professional success. • Describe the process of expressing and addressing grievances appropriately and effectively. • Explain the importance and process of planning daily tasks to ensure their timely completion and efficient use of time. • Explain the importance of adhering to the limits of authority at work. • Explain the importance of following the applicable quality standards and timescales at work. • Explain the importance of coordinating with co-workers to achieve the work objectives efficiently. • Explain the relevant documentation requirements. 	<ul style="list-style-type: none"> • Demonstrate the process of preparing the relevant documents and reports as per the supervisor's instructions, providing appropriate information clearly and systematically. • Demonstrate how to mentor and assist subordinates in the execution of their work responsibilities. • Demonstrate the process of using various resources efficiently to ensure maximum utilisation and minimum wastage. • Demonstrate how to communicate clearly and politely to ensure effective communication with co-workers. • Demonstrate appropriate verbal and non-verbal communication that is respectful of genders and disability.

- Explain the importance of providing appropriate information clearly and systematically in work documents.
- State the escalation matrix to be followed to deal with out of authority tasks and concerns.
- Explain the importance and process of mentoring and assisting subordinates in the execution of their work responsibilities.
- Explain how to identify possible disruptions to work prevent them.
- Explain how to use various resources efficiently to ensure maximum utilisation and minimum wastage.
- Explain the recommended practices to be followed at work to avoid and resolve conflicts at work.
- Explain the importance and process of efficient and timely dissemination of information to the authorised personnel.
- Explain the procedure to report inappropriate behaviour e.g., harassment.

Classroom Aids:

Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop

Tools, Equipment and Other Requirements

NA

Module 4: Perform sheet metal cutting, forming and assembly operations

Mapped to CSC/N0301, v2.0

Terminal Outcomes:

- Identify tools and equipment required for sheet metal cutting, forming and assembly operations work.
- Perform various sheet metal cutting, forming and assembly operations to produce the machine components.

Duration: 30:00	Duration: 30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss organisational standards and procedures (including reporting and documentation) to be followed for carrying out sheet metal forming work. • List the information to be obtained from interpreting instructions received from supervisor. • List the tools, equipment, measuring instruments and material required during sheet metal cutting, forming and assembly operations. • Describe the precautions to be taken and safe practices to be followed while performing various sheet metal cutting, forming and assembly. • Describe marking out process and various marking out methods. • Describe various sheet metal cutting, forming and assembly operations. • Elucidate the factors for selecting the method of sheet metal cutting, forming and assembly as per the work requirements. • List the commonly occurring problems and their remedies in the fabricated components. • List the types of information to be recorded while performing components with various features as per standards applicable to the process operations. • State the importance of disposing the waste, scrap etc. after task completion. 	<ul style="list-style-type: none"> • Show how to arrange tools, equipment, measuring instruments and material used in the work process. • Apply appropriate industrial practices measures to check the tools, equipment, measuring instruments and material for desired functioning and calibration before use. • Show how to prepare the sheet metal for marking out. • Show how to mark the dimensions, range of features and templates on the sheet metal. • Demonstrate organisational procedure of obtaining approval from supervisor on marked out features and correcting errors as per feedback received • Demonstrate the procedure to carry out sheet metal cutting, forming and assembly operations on the metal sheet. • Employ appropriate ways to cut and shape the sheet metal materials to the required specification. • Demonstrate use of cutting hand and manually operated machine tools to cut the metal sheet. • Demonstrate the procedure of various forming operations to produce sheet metal components of required shapes. • Employ appropriate ways of measuring and comparing cut piece dimensions with the specified dimensions in the job orders. • Employ appropriate assembly and joining method for assembling and securing the components. • Show how to produce products with various features, having secure and firm joints. • Apply appropriate ways to monitor the

	<p>sheet metal cutting, forming and assembly operation and identify any problems that occur.</p> <ul style="list-style-type: none"> • Perform steps to report to the supervisor about any problems faced or anticipated during the complete process. • Employ appropriate practices to clean and store the tools, equipment and process auxiliaries safely. • Prepare sample records consisting of information such as the type of tasks performed. • Demonstrate the procedure of disposing the waste generated and unwanted materials safely.
<p>Classroom Aids:</p>	
<p>Whiteboard, marker pen, projector</p>	
<p>Tools, Equipment and Other Requirements</p>	
<ul style="list-style-type: none"> • Basic tool box, Work bench with vice • Tin snip, hacksaw, trepanning, bench shears, files, pneumatic tools, guillotine, pillar drill, cropping machine, Nibbling machine, mechanical saw, rotary shears Hammers, mallets, stakes, formers, wooden blocks, external micrometer, vernier calliper, Surface finish equipment, rules, squares, callipers, protractors, depth micrometer, depth vernier, feeler gauge, bore/hole gauge, slip gauge, radius/profile gauge, thread gauge, height gauge, Soldering equipment, brazing, equipment, mechanical fasteners • Hand book, job orders, work order, completion material requests, and Technical Reference Books. • Safety materials: Fire extinguisher, welding helmet, Leather sleeves, leather safety gloves, leather aprons, safety glasses with side shields, ear plug, safety shoes and first-aid kit • Cleaning material: Tip cleaner, wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel 	

Module 5: Introduction to Employability Skills

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Discuss about Employability Skills in meeting the job requirements

Duration: <0.5:00>	Duration: <0.5:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the importance of Employability Skills in meeting the job requirements 	<ul style="list-style-type: none"> • Demonstrate Employability Skills
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 6: Constitutional values - Citizenship

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Discuss about constitutional values to be followed to become a responsible citizen

Duration: <0.5:00>	Duration: <0.5:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen. 	<ul style="list-style-type: none"> • Show how to practice different environmentally sustainable practices
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 7: Becoming a Professional in the 21st Century

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Demonstrate professional skills required in 21st century

Duration: <0.5:00>	Duration: <0.5:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss 21st century skills. 	<ul style="list-style-type: none"> • Display positive attitude, self -motivation, problem solving, time management skills and continuous learning mindset in different situations.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 8: Basic English Skills

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Practice basic English speaking.

Duration: <1:00>	Duration: <1:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss need of basic English skills. 	<ul style="list-style-type: none"> • Use appropriate basic English sentences/phrases while speaking
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 9: Communication Skills

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Practice basic communication skills.

Duration: <1.5:00>	Duration: <2.5:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss need of communication skills • Describe importance of team work 	<ul style="list-style-type: none"> • Demonstrate how to communicate in a well -mannered way with others. • Demonstrate working with others in a team
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 10: Diversity & Inclusion

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Describe PwD and gender sensitisation.

Duration: <0.5:00>	Duration: <0.5:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Discuss the significance of reporting sexual harassment issues in time 	<ul style="list-style-type: none"> Show how to conduct oneself appropriately with all genders and PwD
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 11: Financial and Legal Literacy

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Describe ways of managing expenses, income, and savings.

Duration: <1.5:00>	Duration: <2.5:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Discuss the significance of using financial products and services safely and securely. Explain the importance of managing expenses, income, and savings. Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws 	<ul style="list-style-type: none"> Demonstrate ways of managing expenses, income, and savings.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 12: Essential Digital Skills

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Demonstrate procedure of operating digital devices and associated applications safely.

Duration: <1:00>	Duration: <2:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the significance of using internet for browsing, accessing social media platforms, safely and securely 	<ul style="list-style-type: none"> • Show how to operate digital devices and use the associated applications and features, safely and securely
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 13: Entrepreneurship

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Describe opportunities as an entrepreneur.

Duration: <2.5:00>	Duration: <4.5:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Discuss the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges 	<ul style="list-style-type: none"> Demonstrate ways for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 14: Customer Service

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Describe ways of maintaining customer.

Duration: <1.5:00>	Duration: <2.5:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Differentiate between types of customers. Explain the significance of identifying customer needs and addressing them. Discuss the significance of maintaining hygiene and dressing appropriately. 	<ul style="list-style-type: none"> Show how to maintain hygiene and dressing appropriately.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 15: Getting ready for apprenticeship & Jobs

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Describe ways of preparing for apprenticeship & Jobs appropriately.

Duration: <1:00>	Duration: <1:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Discuss the significance of dressing up neatly and maintaining hygiene for an interview Discuss how to search and register for apprenticeship opportunities 	<ul style="list-style-type: none"> Create a biodata Use various sources to search and apply for jobs
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 16: Perform grinding operations

Mapped to CSC/N0302, v2.0

Terminal Outcomes:

- Identify tools and equipment required for grinding work.
- Perform various grinding operations to produce the finished components.

Duration: 25:00	Duration: 35:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss organisational standards and procedures (including reporting and documentation) to be followed for carrying out sheet metal forming work. • List the information to be obtained from interpreting job specification document and instructions received from supervisor. • List the tools, equipment, measuring instruments and material required during grinding operations. • Describe selection criteria of stones, wheels, files or other abrasives for grinding work. • Describe the precautions to be taken and safe practices to be followed while performing various grinding. • Describe process of trimming and scraping the work pieces. • Discuss the process of lifting and placing the workpieces on the designated place. • List the steps to be performed for grinding process by using appropriate hand and/or hand-held power grinding tools • List the commonly occurring problems and their remedies in the grinded workpieces. • List the commonly occurring defects and their remedies in the grinded workpieces. • List the types of information to be recorded while performing components with various features as per standards applicable to the process operations. • State the importance of disposing the waste, scrap etc. after task completion. 	<ul style="list-style-type: none"> • Show how to report and rectify incorrect and inconsistent information in job specification documents to concerned person. • Show how to select grinding method/technique as per work requirement. • Show how to arrange tools, equipment, measuring instruments and material used in the work process. • Apply appropriate industrial practices measures to check the tools, equipment, measuring instruments and material for desired functioning and calibration before use. • Demonstrate use of diamond cutter for the dressing of grinding wheel. • Apply appropriate ways to measure and mark the specifications on the workpiece. • Demonstrate use of appropriate hand or power tools for trimming and scraping the work piece. • Perform the steps of placing workpiece on the designated place by using lifting tools. • Demonstrate the procedure to carry out grinding process by using appropriate hand and/or hand-held power grinding tools. • Apply appropriate ways to monitor the grinding operations and do the correction as per requirement. • Perform steps to report to the supervisor about any problems faced or anticipated during the complete process. • Show how to produce products with various features, having secure and firm joints. • Demonstrate appropriate inspection method to check the surface finish of the grinded workpiece. • Apply appropriate ways to identify

	<p>common surface imperfections on the workpiece and correct them by following work instructions and SOP.</p> <ul style="list-style-type: none"> • Prepare sample records consisting of information such as the type of tasks performed. • Employ appropriate practices to clean and store the tools, equipment and process auxiliaries safely. • Demonstrate the procedure of disposing the waste generated and unwanted materials safely. • Demonstrate organisational procedure of performing routine maintenance of grinding tools and equipment.
<p>Classroom Aids:</p>	
<p>Whiteboard, marker pen, projector</p>	
<p>Tools, Equipment and Other Requirements</p>	
<ul style="list-style-type: none"> • Basic tool box, Work bench with vice • Grinders, Power tools, Cutting tools measuring tools, Hand Tools, Marking tools, repairing tools stones, wheels, files or other abrasives chisels, scrapers grinding discs, wire brush wheels, grinding stones, dressing tools • Hand book, job orders, work order, completion material requests, and Technical Reference Books. • Safety materials: Fire extinguisher, welding helmet, Leather sleeves, leather safety gloves, leather aprons, safety glasses with side shields, ear plug, safety shoes and first-aid kit • Cleaning material: Tip cleaner, wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel 	

On-the-Job Training

Mapped to Sheet Metal Worker - Hand Tools and Manually Operated Machines

Mandatory Duration: 30:00

Recommended Duration: 00:00

Location: On Site

Terminal Outcomes

- Read the drawings and job order to identify work requirements
- Identify the requirements of sheet metal working process
- Select and arrange required tools and equipment
- Perform sheet metal cutting and shaping to obtain required shape and size of workpiece
- Check the quality of workpiece after cutting and shaping process
- Segregate the defective and correct pieces as per the standards
- Interact and coordinate with supervisor and colleagues
- Work as per the given timeline and quality standards
- Maintain a safe, healthy and secure work environment

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma	Mechanical/Fitter	2	Fitting/Assembly	1	Fitting/Assembly	NA
B.E/B.Tech	Mechanical	1	Fitting/Assembly	1	Fitting/Assembly	NA
CITS Certificate	Sheet Metal Worker	0	Fitting/Assembly	0	Fitting/Assembly	NA

Trainer Certification	
Domain Certification	Platform Certification
“Sheet Metal Worker - Hand Tools and Manually Operated Machines, CSC/Q0301, version 3.0”. Minimum accepted score is 80%.	“Trainer, MEP/Q2601 v1.0” Minimum accepted score is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma	Mechanical/Fitter	2	Fitting/Assembly	1	Fitting/Assembly	NA
B.E./B.Tech	Mechanical	1	Fitting/Assembly	1	Fitting/Assembly	NA

Assessor Certification	
Domain Certification	Platform Certification
“Sheet Metal Worker - Hand Tools and Manually Operated Machines, CSC/Q0301, version 3.0”. Minimum accepted score is 80%.	Certified for the Job Role: “Assessor” (VET and skills, mapped to the Qualification Pack: “MEP/Q2701, v2.0”, with a minimum score of 80%.

Assessment Strategy

1. Assessment System Overview:
 - Batches assigned to the assessment agencies for conducting the assessment on SDMS/SIP or email
 - Assessment agencies send the assessment confirmation to VTP/TC looping SSC
 - Assessment agency deploys the ToA certified Assessor for executing the assessment
 - SSC monitors the assessment process & records
2. Testing Environment:
 - Confirm that the centre is available at the same address as mentioned on SDMS or SIP
 - Check the duration of the training.
 - Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
 - If the batch size is more than 30, then there should be 2 Assessors.
 - Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
 - Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
 - Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
 - Check the availability of the Lab Equipment for the particular Job Role.
3. Assessment Quality Assurance levels / Framework:
 - Question papers created by the Subject Matter Experts (SME)
 - Question papers created by the SME verified by the other subject Matter Experts
 - Questions are mapped with NOS and PC
 - Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
 - Assessor must be ToA certified & trainer must be ToT Certified
 - Assessment agency must follow the assessment guidelines to conduct the assessment
4. Types of evidence or evidence-gathering protocol:
 - Time-stamped & geotagged reporting of the assessor from assessment location
 - Centre photographs with signboards and scheme specific branding
 - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
 - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos
5. Method of verification or validation:
 - Surprise visit to the assessment location
 - Random audit of the batch
 - Random audit of any candidate
6. Method for assessment documentation, archiving, and access
 - Hard copies of the documents are stored
 - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
 - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
SOP	Standard Operating Procedure
WI	Work Instructions
PPE	Personal Protective equipment