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DIES AND MOULDS MAKER



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COMPETENCY STANDARDS

National Vocational Certificate Level 2-4

Version 1 - August, 2019



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1. Introduction

Dies and Mold Maker are a class of machinists in the manufacturing industry, who will make dies, molds, machine tools and cutting tools used in manufacturing processes. Depending on which area of concentration a particular person works in, he or she may be called by variations on the name, including tool-maker, die maker, mold-maker, die-fitter, or mold fitter etc.

They produce tooling used to manufacture and stamp out parts and they supply tooling and dies for all manufacturing sectors such as domestic consumer goods, transportation industry, medical, electronics, automotive and aerospace. They lay out, set up, machine, fit and finish metal & plastic components. They make items to meet given standards.

Dies & mold makers use machining tools such as lathes, mills, saws, grinders, drills, computer numerical control (CNC) machines and Electrical Discharge Machines (EDM). They also use hand tools and measuring equipment to ensure accuracy and close tolerances. They work from sketches, drawings, computer-aided designs (CAD), specifications and their own concepts to calculate dimensions, tolerances and types of fit. They must be knowledgeable about the properties of metal and non-metallic materials such as plastic, rubber and composite materials

Safety is important at all times. There are risks of injury working with moving machine parts, flying chips, sharp edges and extreme heat from heated materials. Tool and die makers may also be lifting and moving heavy components. Precautions are required while working with manufacturing chemicals, airborne irritants, toxic lubricants and cleaners.

Some attributes for people entering this trade are: communication skills, mechanical aptitude, attention to details, hand-eye coordination, manual dexterity, ability to work independently and in teams, logical reasoning ability, advanced knowledge of applied science, creativity, resourcefulness, above average spatial ability and ability to plan and think sequentially. The work often requires considerable physical activity, stamina and mental ability & toughness, as tool and die makers spend long periods of time on their feet. Dies & mold makers may work with other professionals such as machinists, industrial mechanics (millwrights), designers, programmers and engineers.



Experienced dies & mold makers may become entrepreneur , managers, supervisors or instructors. With additional training, they may transfer their skills to design and engineering responsibilities. Their skills are also transferable to related occupations such as machinist, mold maker, pattern maker, industrial mechanic (millwright) and CNC programmer.

2. Detail of National Vocational Certificate Levels

The detail of the competency standards included in this qualifications are given below:

- National Vocational Certificate level 2, in “Dies & Mold Maker”

Comply personal health & safety guidelines

Perform Bench Works

Perform Lathe Operations

Perform Milling operations

Perform Grinding Operations

Communicate the work policy & procedure

Perform basic communication

Perform basic computer application

- National Vocational Certificate level 3, in “Dies & Mold Maker”

Apply work health & safety practices

Identify & implement workplace policy & procedures

Perform EDM Operations

Perform Wire cut Operations

Perform CNC Lathe Operations

Perform CNC Milling Operations

Perform Heat Treatment

Communicate at workplace

Perform computer application skills

Manage personal finances



- National Vocational Certificate level 4, in “Dies & Mold Maker”

Contribute to Work Related Health and Safety (WHS) Initiatives

Comply with workplace Policy and Procedures

Finalize Dies & Molds

Fabricate a Die

Fabricate a Mold

Carry Out Maintenance of Dies & Molds

Perform Advanced Communication

Develop Advance Computer Application Skills

Manage Human Resource Services

Develop Entrepreneurial Skills

3. Purpose of the Qualification

The purpose of the Dies and Mold Maker course is to engage young people with a programme of development that will provide them with the knowledge, skills and understanding to start this career in Pakistan. Upon completion of the Dies and Mold Mechanic qualification, students will be ready to join the workforce with a healthy number of options in the production, manufacturing and light engineering sector.

The core purpose of this qualification is to produce employable Dies & Mold Maker who could perform relevant operations according to national and international standards. In addition, this qualification will prepare unemployable youth to be employed in the light engineering and manufacturing sector.

4. Main Objectives of the Qualification

The Dies & Mold Maker qualifications level 2- 4 consists of theoretical and practical details required to operate conventional & special purpose machines to develop dies & molds for plastic & sheet metal parts The main objectives of the qualification are as follows:

1. Comply Personal Health and Safety Guidelines
2. Perform bench works
3. Perform lathe operations
4. Perform milling operations
5. Perform grinding operations



6. Communicate the Workplace Policy and Procedure
7. Perform Basic Communication
8. Perform Basic Computer Application
9. Apply Work Health and Safety Practices (WHS)
10. Identify and Implement Workplace Policy and Procedures
11. Perform EDM operations
12. Perform wire cut operations
13. Perform CNC lathe operations
14. Perform CNC Milling operations
15. Perform heat treatment
16. Communicate at Workplace
17. Perform Computer Application Skills
18. Manage Personal Finances
19. Contribute to Work Related Health and Safety (WHS) Initiatives
20. Comply with Workplace Policy and Procedures
21. Finalize dies & molds
22. Fabricate a die
23. Fabricate a mold
24. Carry out maintenance of dies & molds
25. Perform advance communication
26. Develop Advance Computer Application Skills
27. Manage Human Resource Services
28. Develop Entrepreneurial Skills

5. Date of Validation

The level 2-4 of National vocational qualification on Dies & Mold Maker has been validated by the Qualifications Development Committee (QDC) members on May 25 - 26, 2019 and will remain in force until December 2021.

6. Codes of Qualifications

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



ISCED Classification for Dies & Mold Maker level 2-4

Code	Description
0715MMT28	National Vocational Certificate level 2, in Dies & Mold Maker
0715MMT29	National Vocational Certificate level 3, in Dies & Mold Maker
0715MMT30	National Vocational Certificate level 4, in Dies & Mold Maker



7. Members of Qualification Development Committee

The following members participated in the qualification development and validation process.

S#	Name	Designation	Organization	Role in QDC
1	Mr. S.M. Noman	CEO, Chairman QDC	Al Huda Plastics	QDC+OP+CS+Validation
2	Mr. Syed Nadeem Gohar	Director	PSTC	QDC+OP+CS+Validation
3	Mr. Mohammad Akmal	Vice Principal	PSTC	QDC+OP+CS+Validation
4	Mr. Leslie D Souza	Principal Instructor (Rtd)	PSTC	QDC+OP+CS
5	Mr. Nasir Ali	Mold Maker	Alson Auto parts	QDC+OP+CS+Validation
6	Mr. Akhter Ali Ujan	Die Fitter	Alson Auto parts	QDC+OP+CS
7	Mr. Adnan Zafar	Dy. Manager PD	Procon Engineering	QDC+OP+CS+Validation
8	Mr. Adeel Ahmed	Designer, Die Maker	Noor Engineering	QDC+OP+CS+Validation
9	Mr. Irfan	Designer, Mold Maker	Noor Engineering	QDC+OP+CS+Validation
10	Mr. Arslan Baig	Team Leader	Dollar Industries Pvt Ltd	QDC+OP+CS+Validation
11	Mr. Furqan Ahmed	EDM Operator	Dollar Industries Pvt Ltd	QDC+OP+CS+Validation
12	Mr. Saqib	Mold Maker	Euro Golf Industries	QDC+OP
13	Mr. Mujahid Ali Mian	Sr. Instructor	AMANTECH , Karachi	QDC+OP+CS+Validation
14	Mr. M. Ramzan	Sr. Instructor	AMANTECH, Karachi	QDC+OP+CS+Validation
15	Mr. Ali	Mold Designer	KTDMC	QDC+OP+CS
16	Mr. Talha Mushtaq	Development Executive	Loads Limited	QDC+OP
17	Mr. Masood Raza	Principal	STEVTA	QDC+OP+Validation
18	Mr. Salman Shah	DD Curriculum	PTEVTA	QDC+OP
19	Ahsan Riaz	Manager-Dies & Molds	Alsons Auto Parts	CS Validation
20	Mr. Liaqat Ali Jamro	Director	STEVTA	QDC+OP+CS+Validation
21	Nawal Kishore	Co Facilitator	STEVTA	QDC+OP+CS+Validation
22	Syed Fawwad Ashraf	Head of Academics	AMANTECH	OP+CS Facilitator
23	Shaikh Asim Qamar	Co Facilitator	Consultant	QDC+OP+CS+Validation



8. Entry Requirements

The entry for National Vocational Certificate level 2-4, in “Dies & Mold Maker” are given below:

Title	Entry Requirements
National Vocational Certificate level 2, in “Dies & Mold Maker”	Entry for assessment for this qualification is open. However, entry into formal training institutes, based on this qualification may require skills and knowledge equivalent to Middle.
National Vocational Certificate level 3, in “Dies & Mold Maker”	Entry for assessment for this qualification is open. However, entry into formal training institute for this qualification is person having National Vocational Certificate level 2, in “Dies & Mold Maker” Or National Vocational Certificate level 2, in Machinist or Middle with hands on experience.
National Vocational Certificate level 4, in “Dies & Mold Maker”	Entry for assessment for this qualification is open. However, entry into formal training institute for this qualification is person having National Vocational Certificate level 3, in “Dies & Mold Maker” or National Vocational Certification level 3, in Machinist or GIII or Middle with one year work experience.



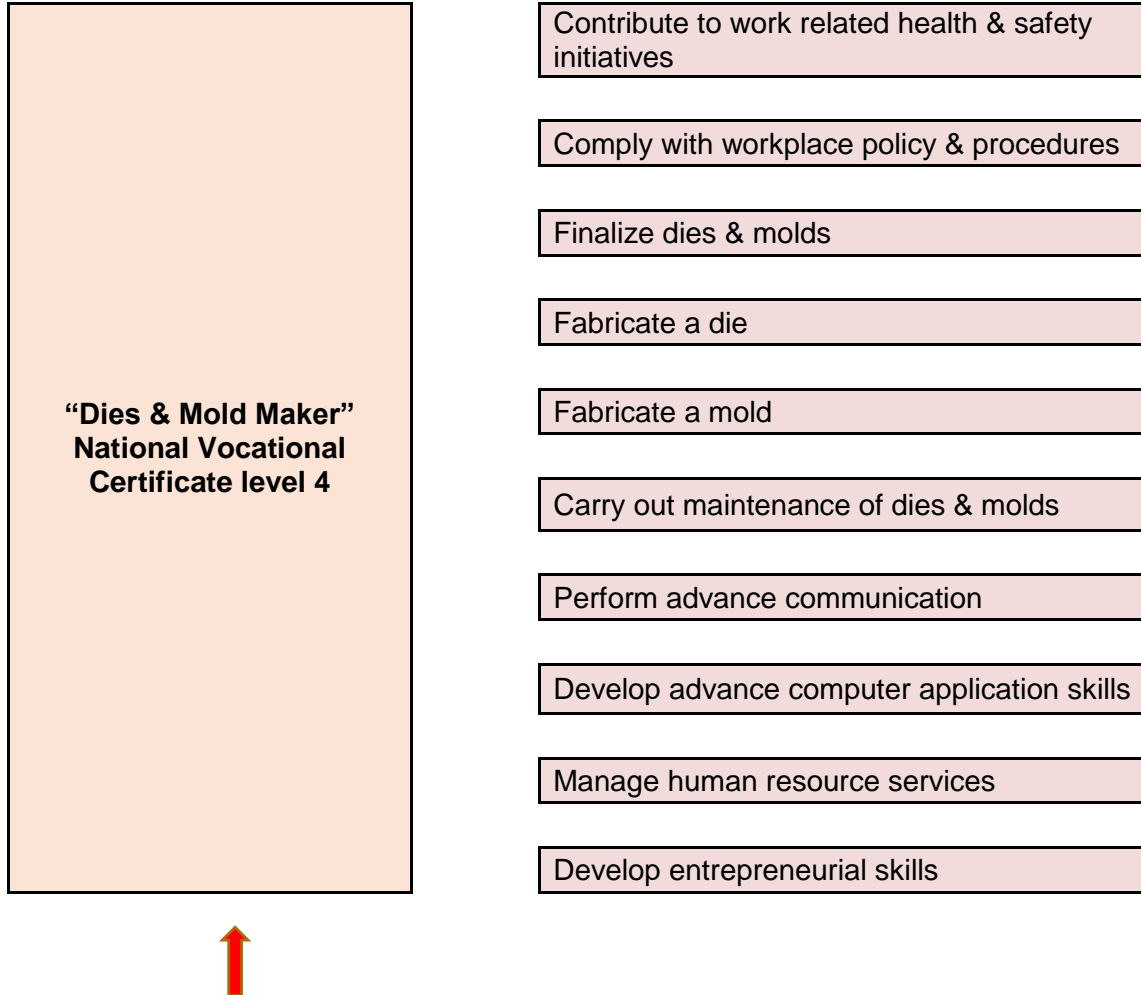
9. Categorization and Levelling of the Competency Standards

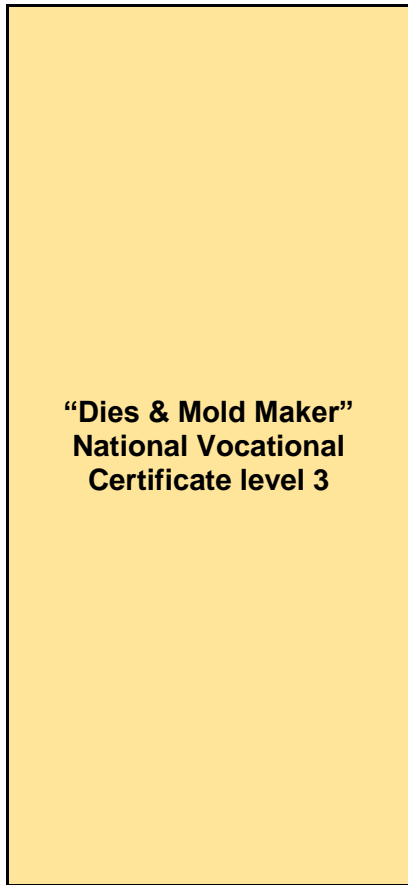
Code	Name of Duty or (Module)	Level	Credit	Category
102200844	Comply personal health and safety guidelines	2	3	Generic
071500966	Perform bench works	2	18	Technical
071500967	Perform lathe operations	2	20	Technical
071500968	Perform milling operations	2	19	Technical
071500969	Perfrom grinding operations	2	11	Technical
041700839	Communicate the workplace policy and procedure	2	2	Generic
001100851	Perform basic communication	2	3	Generic
061100856	Perform basic computer application	2	4	Generic
102200846	Apply work health & safety practices	3	3	Generic
041700840	Identify & implemet workplace policies & proceudres	3	2	Generic
071500970	Perform EDM operations	3	9	Technical
071500971	Perform wire cut operations	3	12	Technical
071500972	Perform CNC lathe operations	3	18	Technical
071500973	Perform CNC Milling operations	3	18	Technical
071500974	Perfrom heat treatment	3	8	Technical
001100852	Communicate at workplace	3	3	Generic
061100858	Perform computer application skills	3	4	Generic
041300867	Manage perosnal finances	3	3	Generic
102200848	Contribute to work related health & safety initiaves	4	3	Generic
041700841	Comply with workplace policy and procedures	4	3	Generic
071500975	Finalize dies & molds	4	12	Technical
071500976	Fabricate a die	4	20	Technical
071500977	Fabricate a mould	4	20	Technical
071500978	Carry out maintenance of dies & moulds	4	10	Technical
001100853	Perform advance communication	4	3	Generic
061100858	Develop advance computer application skills	4	4	Generic
041300869	Manage human resource services	4	2	Generic
041300860	Develop entprenurial skills	4	3	Generic



1. Packaging of Qualifications

The National Vocational Qualifications have been packaged as detailed below:





**“Dies & Mold Maker”
National Vocational
Certificate level 3**

Apply work health & safety practices

Identify & implement workplace policies & procedures

Perform EDM operations

Perform wirecut operations

Perform CNC lathe operations

Perform CNC milling operations

Perform heat treatment

Communicate at workplace

Perform computer application skills

Manage personal finances





**“Dies & Mold Maker”
National Vocational
Certificate level 2**

Comply personal health & safety guidelines

Perform bench works

Perform lathe operations

Perform milling operations

Perform grinding operations

Communicate the workplace policy & procedures

Perform basic communication

Perform basic computer application



2. Detail of Competency Standards

102200844 Comply with Perform Personal Health and Safety Guidelines

Overview: This Competency Standard identifies the competencies required to protect/apply occupational Safety, health and Environment at workplace according to the industry's approved guidelines, procedures and interpret environmental rules/regulations. Trainee will be expected to identify and use Personal Protective Equipment (PPE) according to the work place requirements. The underpinning knowledge regarding Observe Occupational Safety and Health (OSH) will be sufficient to provide the basis for the job at workplace.

Competency Units	Performance Criteria
CU1. Identify Personal Hazards at Workplace	P1: Identify risk to personal health P2: Identify hygiene and safety at work place P3: Identify processes P4: Identify tools, equipment and consumable materials that have the potential to cause harm P5: Report, identified risk to Health, hygiene and safety to concerned
CU2. Apply Personal Protective Safety Equipment (PPE) and Equipment	P1: List the Personal Protective equipment P2: Select personal protective equipment in terms of type and quantity according to work orders. P3: Wear personal protective equipment according to job requirements. P4: Clean personal protective equipment P5: Stored Personal Protective equipments in proper place after use.
CU3. Comply Occupational Safety and Health (OSH)	P1: Maintain cleanliness and hygiene as per organizational policy P2: Comply with Health, hygiene and safety precautions before starting work P3: Comply organizational Health, hygiene and safety guidelines during work P4: Deal with resolvable problems according to prescribed procedures P5: Report un resolvable problems to concerned P6: Place the tools equipment etc at their prescribed place after



	completion of work
CU4. Dispose of hazardous Waste/materials from the designated area.	P1: Identify hazardous waste materials which needs to be disposed off P2: Segregate hazardous or non-hazardous waste carefully from the designated area as per approved procedure P3: Use proper disposal hazardous containers for dispose-off hazardous waste as per procedure P4: Take necessary precautions like putting masks and gloves while disposing hazardous waste/ materials as per standard operating procedure

Knowledge and 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:** Explain safety rules and regulations of organization
- K2:** List Personal protection and safety Equipment
- K3:** Describe meaning of Safety signs and symbols
- K4:** Demonstrate understanding of safety related Standard Operating Procedure/guidelines
- K5:** Describe waste disposal SOPs
- K6:** Explain best practices relating to clean and safe work environment

Critical Evidence(s) Required

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

A person who demonstrates competency in this unit must be able to provide evidence of maintaining personal health and hygiene practices. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments.



071500966 Perform Bench Work

Overview: This competency standard covers the skills and knowledge required to perform bench work operations including sawing, filing, drilling, tapping, reaming, countersinking, counter boring, polishing & grinding.

Competency Unit	Performance Criteria
CU1. Perform sawing	<p>P1. Select appropriate blade according to the material and set in hacksaw frame</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Perform sawing as per standard procedures</p> <p>P5. Verify the final job with the given drawing</p>
CU2. Perform filing	<p>P1. Select appropriate file type according to the material & profile</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Perform filing as per standard procedures</p> <p>P5. Verify the final job with the given drawing</p>
CU3. Perform Drilling	<p>P1. Select appropriate drilling bit according to the material</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Set the machine RPM according to the drill size and work piece material</p> <p>P5. Perform drilling as per standard procedures</p> <p>P6. Perform post drilling operations</p> <p>P7. Verify the final job with the given drawing</p>
CU4. Perform hand tapping	<p>P1. Select appropriate tap according to the job specification</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Perform drilling to produce hole according to tap size</p> <p>P5. Perform tapping as per job specification</p> <p>P6. Verify the final job with given drawing</p>



CU5. Perform hand reaming	<p>P1. Select appropriate reamer according to the job specification</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Perform drilling to produce hole according to the size of reamer</p> <p>P5. Perform reaming as per job specification</p> <p>P6. Verify the final job with given drawing</p>
CU6. Perform counter boring	<p>P1. Select appropriate counter boring tool according to the drawing</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Perform drilling operation as per drawing</p> <p>P5. Set the machine RPM according to the bore size and work piece material</p> <p>P6. Perform counter boring as per standard procedures</p> <p>P7. Perform post drilling operations</p> <p>P8. Verify the final job with the given drawing</p>
CU7. Perform counter sinking	<p>P1. Select appropriate counter sinking tool according to the drawing</p> <p>P2. Select appropriate marking tool and mark the job as per drawing</p> <p>P3. Select appropriate clamping device and clamp the work piece</p> <p>P4. Perform drilling operation as per drawing</p> <p>P5. Set the machine RPM according to the counter sink size and work piece material</p> <p>P6. Perform counter sinking as per standard procedures</p> <p>P7. Verify the final job with the given drawing</p>
CU8. Perform polishing	<p>P1. Select appropriate polishing aid as per specification</p> <p>P2. Prepare the surface for polishing</p> <p>P3. Perform polishing as per required standards</p> <p>P4. Perform post polishing operations</p> <p>P5. Verify the final job with the given drawing</p>
CU9. Perform hand grinding	<p>P1. Select appropriate hand grinder & grinding wheel / disk as per job specifications</p> <p>P2. Mount the grinding wheel / disk as per standard procedure</p> <p>P3. Perform grinding as per standard procedures</p>



CU10. Demonstrate safe working conditions & housekeeping	P1. Select & use appropriate PPEs P2. Maintain cleanliness at workplace P3. Practice safe storage of tools & equipment P4. Prepare checklist of daily housekeeping activities

Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Define different types of blades and its use
- Define file types and their uses
- Define the types of drill bits
- Describe the methods to calculate & set RPM of machine
- Describe types and application of reamers
- Define the types of counter boring & counter sinking tools
- Define the types of polishing aid
- Describe the types of hand grinding machine & grinding wheels
- Describe the methods of tapping
- Interpret basic engineering drawings
- Describe the types & application of clamping devices
- Describe types & properties of material

Critical Evidence(s) Required

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

Prepare a work piece demonstrating the following competencies with following safety procedures.

- Sawing
- Filing
- Drilling
- Taping
- Counter boring & countersinking



Tools and Equipment

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

S. No.	Items
1.	Vernier Caliper (0-150mm)
2.	Micrometer (0-25mm)
3.	Steel Rule (0-300mm)
4.	Tri Square (0-100mm)
5.	Centre & Dot Punch
6.	Scriber
7.	Hammer (Ball Peen 250gm)
8.	Power disc cutter (14inch)
9.	Hacksaw blades (18-24 TPI)
10.	Second cut files 8-12in (Flat , Round, Triangle, Square)
11.	Drill bits of different sizes (4-20mm)
12.	Bench vices 4 inches
13.	Bench type drill machine
14.	Drill chuck
15.	Countersinking & counter boring tools (10-20mm)
16.	Hand grinder (4inch & 7inch)
17.	Pin grinder (3mm)
18.	Grinding disks & Cutting disks (4 in & 7 in)
19.	Grinding wheel for pin grinder (miscellaneous)
20.	Hand reamers with handle (8-16mm)
21.	Tap set with handle (M3-M12)
22.	Polishing abrasives / paste with different grits (miscellaneous)
23.	Polishing sticks (miscellaneous)
24.	Emery paper (200-400)



071500967 Perform Lathe Operations

Overview: This competency standard covers the skills and knowledge required to perform different processes on lathe machines including facing, turning, parting, threading, knurling, and drilling.

Competency Unit	Performance Criteria
CU1. Set tool & lathe machine	<p>P1. Identify & select machine.</p> <p>P2. Manage the required measuring equipment's</p> <p>P3. Set machine & other attachments if required</p> <p>P4. Select proper tool according to job specifications</p> <p>P5. Clamp the tool as per standard procedures</p> <p>P6. Set machine parameters</p>
CU2. Perform work piece setting	<p>P1. Prepare work piece for machining operations</p> <p>P2. Clamp the work pieces as per standard procedures</p> <p>P3. Dial the work piece & ensure final clamping</p>
CU3. Perform facing	<p>P1. Select appropriate tool for facing</p> <p>P2. Clamp the tool in tool post & set in required angle</p> <p>P3. Set machine parameter as per job specifications</p> <p>P4. Dial the work piece & ensure final clamping</p> <p>P5. Carry out machining operation for facing as per standard procedure</p>
CU4. Perform turning	<p>P1. Select appropriate tool for turning</p> <p>P2. Clamp the tool in tool post & set in required angle</p> <p>P3. Set machine parameter as per job specifications</p> <p>P4. Dial the work piece & ensure final clamping</p> <p>P5. Carry out machining operation for turning as per standard procedure</p>
CU5. Perform thread cutting	<p>P1. Select & prepare appropriate tool for thread cutting</p> <p>P2. Clamp & set the tool in tool post</p> <p>P3. Set machine parameters as per job specifications</p> <p>P4. Dial the work piece & ensure final clamping</p> <p>P5. Carry out machining operation for thread cutting as per standard procedure</p>
CU6. Perform Parting	<p>P1. Select appropriate tool for parting</p> <p>P2. Clamp & set the tool in tool post.</p> <p>P3. Set machine parameter as per job specifications</p>



	<p>P4. Dial the work piece & ensure final clamping</p> <p>P5. Carry out machining operation for parting as per standard procedure</p>
CU7. Perform drilling / boring	<p>P1. Select appropriate tool for drilling / boring as per drawing</p> <p>P2. Set machine parameter as per job specifications</p> <p>P3. Clamp drill bit in drill chuck</p> <p>P4. Perform drilling to produce appropriate hole size for boring</p> <p>P5. Clamp the boring tool in the tool post.</p> <p>P6. Carry out machining operation for Boring as per standard procedure</p>
CU8. Perform knurling	<p>P1. Select appropriate tool for knurling</p> <p>P2. Clamp the tool in tool post.</p> <p>P3. Set machine parameter as per job specifications</p> <p>P4. Dial the work piece & ensure final clamping</p> <p>P5. Carry out machining operation for Knurling as per standard procedure</p>
CU9. Perform final inspection	<p>P1. Prepare the work piece for inspection</p> <p>P2. Visually Inspect the work piece</p> <p>P3. Manage the required measuring tools</p> <p>P4. Perform the required inspection as per drawing</p>
CU10. Demonstrate safe working practice & housekeeping	<p>P1. Select & use appropriate PPEs.</p> <p>P2. Maintain cleanliness at the workplace</p> <p>P3. Ensure relevant safety procedure for lathe operations</p>



Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Describe types of lathe machines & their applications
- Identify the parts of lathe machine.
- Identify different types of attachment used in lathe machines
- Describe the clamping devices & procedures
- Describe how to set machine parameters
- Interpret basic engineering drawings.
- Define types of knurling & knurling tools
- Identify types of threads, relevant tools & its nomenclature
- Define inspection tools & techniques
- Define the types of work piece material & cutting tool
- Describe how to grind cutting tools
- Describe safety hazards associated with lathe operations.
- Describe sequence of operations to achieve the job requirements
- Identify tool types and tooling geometry
- Describe types of PPEs & their application

Critical Evidence(s) Required

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

- Perform Facing, Turning, Thread cutting & boring in a metal workpiece according to given drawing

Tools and Equipment

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

S. No.	Items
1.	Lathe machines with all standard accessories (Tool room)
2.	HSS tools (12mm x 12mm x 150mm) , T-max holders with carbide bits
3.	Centre Drills (12mm) & HSS drill bits (Standard set, step set)
4.	Knurling tools (straight & diamond)
5.	Thread pitch gauges (up to 2 mm)
6.	Thread ring gauge (M8-M16)
7.	Vernier Calipers (0-150mm)
8.	Dial indicator with magnetic stand (0.01mm)
9.	Micrometer (0-25mm, 25-50mm , 50-75mm)
10.	Radius Gauge (R2 – R15)
11.	Plug Gauges (Dia 8 to 20mm)
12.	Ring Gauges (Dia 8 to 20mm)



07150968 Perform Milling Operations

Overview: This competency standard covers the skills and knowledge required to perform different processes on milling machines including pocketing, contouring, reaming, indexing, and drilling/boring.

Competency Unit	Performance Criteria
CU1. Set tool and Milling Machine	<p>P1. Identify & select milling machine according to the job specifications</p> <p>P2. Select appropriate tool & clamping device according to the job Specifications</p> <p>P3. Mount the tool as per standard procedure</p> <p>P4. Set machine parameters according to the job specifications</p> <p>P5. Select & set cutting fluid as per job specifications</p>
CU2. Perform workpiece setting	<p>P1. Interpret drawing and arrange the material for milling operation according to the job requirement</p> <p>P2. Prepare work piece for machining operations</p> <p>P3. Check and verify the dimension of raw material according as per drawing.</p> <p>P4. Identify & select appropriate clamping device</p> <p>P5. Clamp the workpiece as per standard procedure</p>
CU3. Perform pocketing	<p>P1. Select appropriate tool & clamping device as per job specifications</p> <p>P2. Mount the tool as per standard procedures</p> <p>P3. Set machine parameters as per job specifications</p> <p>P4. Select appropriate clamping device/method for work piece.</p> <p>P5. Dial the work piece & ensure final clamping</p> <p>P6. Carry out machining operation for pocketing as per standard procedure</p>
CU4. Perform contouring	<p>P1. Select appropriate tool & clamping device as per job specifications</p> <p>P2. Mount the tool as per standard procedures</p> <p>P3. Set machine parameters as per job specifications</p> <p>P4. Select appropriate clamping device/method for work piece.</p> <p>P5. Dial the work piece & ensure final clamping</p> <p>P6. Carry out machining operation for contouring as per standard procedure</p>
CU5. Perform Drilling / Boring	<p>P1. Select appropriate tool & clamping device as per job specifications</p> <p>P2. Mount the tool as per standard procedures</p> <p>P3. Set machine parameters as per job specifications</p>



	<p>P4. Select appropriate clamping device/method for work piece.</p> <p>P5. Dial the work piece & ensure final clamping</p> <p>P6. Carry out machining operation for drilling/boring as per standard procedure</p>
CU6. Perform reaming	<p>P1. Select appropriate tool & clamping device as per job specifications</p> <p>P2. Mount the tool as per standard procedures</p> <p>P3. Set machine parameter as per job specifications</p> <p>P4. Select appropriate clamping device/method for work piece.</p> <p>P5. Dial the work piece & ensure final clamping</p> <p>P6. Carry out machining operation for reaming as per standard procedure</p>
CU7. Perform Indexing	<p>P1. Select appropriate tool & clamping device as per job specifications</p> <p>P2. Mount the tool as per standard procedures</p> <p>P3. Set machine parameters as per job specifications</p> <p>P4. Select and mount appropriate indexing head on machine table</p> <p>P5. Select appropriate clamping device/method for work piece.</p> <p>P6. Dial the work piece & ensure final clamping</p> <p>P7. Perform calculations & select appropriate disc for indexing</p> <p>P8. Carry out indexing as per standard procedure</p>
CU8. Perform Final Inspection	<p>P1. Prepare the work piece for inspection</p> <p>P2. Visually Inspect the work piece</p> <p>P3. Manage the required measuring tools</p> <p>P4. Perform the required inspection as per drawing</p>
CU9. Demonstrate safe working Practice & housekeeping	<p>P1. Select & use appropriate PPEs.</p> <p>P2. Maintain cleanliness at the workplace</p> <p>P3. Ensure relevant safety procedure for milling operations</p>

Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Define the types of milling machines & their applications
- Identify the parts of milling machine.
- Identify the different types of attachment used in milling machines
- Describe the clamping devices & procedures
- Describe how to set machine parameters
- Interpret basic engineering drawings.
- Describe inspection tools & techniques



- Define the types of work piece material & cutting tool
- Describe safety hazards associated with milling operations.
- Describe the sequence of operations to achieve the job requirements
- Identify the tool types & tool geometry
- Describe the types of PPEs & their application
- Describe the conventional and climb milling techniques and their applications
- Describe the applications of dividing heads and rotary tables
- Define the types of worm wheel
- Describe the procedures of indexing calculations

Critical Evidence(s) Required

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

1. Perform climb & conventional milling operations
2. Perform pocketing
3. Produce a rectangular work piece with parallelism & tolerance

Tools and Equipment

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

S. No.	Items
1.	Universal Milling Machine (400 x 200 bed size) with all standard accessories
2.	Dial indicators (0-10mm)
3.	Lever gauge (0-3mm)
4.	Vernier Calipers (0-150mm)
5.	Micrometer (0-25mm, 25-50mm , 50-75mm)
6.	Parallel blocks
7.	Step clamps standard set
8.	Machine vice standard size
9.	Indexing head (worm wheel dia 40 & 60)
10.	Rotary table 150 mm
11.	Shell end mill cutter (dia 60 – 100 mm)
12.	End mill cutter (dia 10- 30 mm)
13.	Face mill cutter (dia 40-100 mm)



071500969 Perform Grinding Operation

Overview: This competency standard covers the skills and knowledge required to perform different grinding processes including surface grinding & cylindrical grinding

Competency Unit	Performance Criteria
CU1. Set grinding machine	<p>P1. Identify & select grinding machine according to the job specifications</p> <p>P2. Select appropriate grinding wheel according to the work piece material</p> <p>P3. Mount the grinding wheel as per standard procedure</p> <p>P4. Dress the grinding wheel as per standard procedure</p> <p>P5. Select & set coolant as per job specifications</p>
CU2. Perform workpiece setting	<p>P1. Select and use appropriate clamping device</p> <p>P2. Prepare workpiece for clamping</p> <p>P3. Clamp the work piece as per standard procedure</p> <p>P4. Set travel length of machine bed as per workpiece</p>
CU3. Perform surface grinding	<p>P1. Select appropriate grinding wheel according to the work piece material</p> <p>P2. Set the table travel according to the work piece.</p> <p>P3. Maintain safe distance between work piece & grinding wheel</p> <p>P4. Apply coolant on surface grinding process</p> <p>P5. Perform grinding as per standard procedure.</p> <p>P6. Lubricate & debur the workpiece</p> <p>P7. Verify parallelism</p>
CU4. Perform cylindrical Grinding	<p>P1. Select appropriate grinding wheel according to the work piece material</p> <p>P2. Mount the work piece in chuck or collet between centres as per Requirement.</p> <p>P3. Set the appropriate RPM of work piece</p> <p>P4. Set the table travel according to the work piece</p> <p>P5. Apply coolant on cylindrical grinding process</p> <p>P6. Perform grinding as per standard procedure</p> <p>P7. Lubricate & debur the work piece.</p> <p>P8. Verify parallelism</p>
CU5. Perform final inspection	<p>P1. Prepare the work piece for inspection</p> <p>P2. Visually Inspect the work piece</p> <p>P3. Manage the required measuring tools</p>



	P4. Perform the required inspection as per drawing
CU6. Demonstrate safe working practice & housekeeping	P1. Select & use appropriate PPEs. P2. Maintain cleanliness at the workplace P3. Ensure relevant safety procedure for grinding operations

Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Define the machine operations
- Describe the method of work piece clamping
- Describe specification of grinding wheels & their application
- Define coolant & procedure of application
- Identify the hazards relevant to grinding operation
- Describe the standard procedures of grinding
- Calculate the of RPM of work piece & grinding wheel according to the job specification

Critical Evidence(s) Required

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

- Perform surface grinding
- Perform cylindrical grinding
- Must be able to maintain parallelism & concentricity (if applicable)

Tools and Equipment

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

S. No.	Items
1.	Surface grinding machine (400-500mm magnetic bed length)
2.	Cylindrical grinding machine (150mm center height)
3.	Grinding wheel (Aluminum oxide & silicon carbide)
4.	Diamond wheel dresser with stand
5.	Wheel balancing device
6.	Supporting block
7.	Grinding vice universal type
8.	Sine bar device
9.	Dial indicator (0.01mm)



041700839 Communicate the Workplace Policy and Procedure

Overview: This unit describes the performance outcomes, skills and knowledge required to develop communication skills in the workplace. It covers gathering, conveying and receiving information, along with completing assigned written information under direct supervision.

Competency Units	Performance Criteria
CU1. Identify workplace communication procedures	<p>P1. Identify organizational communication requirements and workplace procedures with assistance from relevant authority</p> <p>P2. Identify appropriate lines of communication with supervisors and colleagues.</p> <p>P3. Seek advice on the communication method/equipment most appropriate for the task</p>
CU2. Communicate at workplace	<p>P1. Use effective questioning, and active listening and speaking skills to gather and convey information</p> <p>P2. Use appropriate non-verbal behavior at all times</p> <p>P3. Encourage, acknowledge and act upon constructive feedback</p>
CU3. Draft Written Information	<p>P1. Identify and comply with required range of written materials in accordance with organizational policy and procedures</p> <p>P2. Draft and present assigned written information for approval, ensuring it is written clearly, concisely and within designated timeframes.</p> <p>P3. Ensure written information meets required standards of style, format and detail.</p> <p>P4. Seek assistance and/or feedback to aid communication skills development</p>
CU4. Review Documents	<p>P1. Check draft for suitability of tone for audience, purpose, format and communication style</p> <p>P2. Check draft for readability, grammar, spelling, sentence and paragraph construction and correct any inaccuracies or gaps in content.</p> <p>P3. Check draft for sequencing and structure</p> <p>P4. Check draft to ensure it meets organizational requirements</p>



	P5. Ensure draft is proofread, where appropriate, by supervisor or colleague
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Knowledge and Understanding

- K1:** Key provisions of relevant regulations that may affect aspects of business operations, such as privacy laws
- K2:** Organizational policies, plans and procedures.
- K3:** Barriers to communication
- K4:** Communication model
- K5:** Verbal and written communication techniques

Critical Evidence(s) Required

A person who demonstrates competency in this unit must be able to provide evidence of the ability to develop communication skills in the workplace. It covers gathering, conveying and receiving information, along with completing assigned written information under direct supervision. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments.



001100851 Perform Basic Communication (Specific)

Overview: This unit describes the skills and knowledge required to assist in the development of communication competence by providing information regarding different forms of communication and their appropriate use.

By the end of this program, learners will be able, to communicate more effectively and efficiently by: working in a team, follow supervisor’s instructions and develop generic communication work skills at workplace

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

Knowledge and 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 Learn and understand Types of communication
- K2:** Basic Reading Skills
- K3:** Basic Writing skills



- K4:** Basic Verbal communication skills
- K5:** Basic Problem solving skills
- K6:** Basic Self-Management Skills
- K7:** Basic Technology Skills
- K8:** Basic Interview Skills
- K9:** Basic Workplace dress code
- K10:** Basic The role of team members and functionality of the teams

Critical Evidence(s) Required

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

- Make a list of appropriate communication skills with colleagues and supervisors



061100856 Perform Basic Computer Application (Specific)

Overview: This unit describes the skills and knowledge required to use spreadsheet to prepare a page of document, develops familiarity with Word, Excel, Access, PowerPoint, email, and computer graphics basics.

It applies to individuals who perform a range of routine tasks in the workplace using a fundamental knowledge of spreadsheets, Microsoft office and computer graphics in under direct supervision or with limited responsibility.

Competency Units	Performance Criteria
CU1. Create Word Documents	<p>P1. Open word processing application</p> <p>P2. Create a word document</p> <p>P3. Customize page layout with relevant name setting</p> <p>P4. Set up page in a word document</p> <p>P5. Edit word document as required</p> <p>P6. Use simple formatting tools when creating the document</p> <p>P7. Save word document to directory</p> <p>P8. Insert table in a word document</p> <p>P9. Insert appropriate images into document as necessary</p> <p>P10. Insert header/footer in a word document</p> <p>P11. Insert section break in a word document</p> <p>P12. Set style in word document</p> <p>P13. Select basic Print settings</p> <p>P14. Print the document</p>
CU2. Use internet for Browsing	<p>P1. Use search engines to open website</p> <p>P2. Search data on different topics</p> <p>P3. Refine search to increase relevance of information or content</p> <p>P4. Navigate a website to access the information or content required</p>



Knowledge and 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:** Describing formatting styles and their effect on formatting, readability and appearance of documents
- K2:** Outline purpose, use and function of word-processing software.
- K3:** Editing in MS Word
- K4:** Formatting in MS word
- K5:** Use of different search engines
- K6:** Use of different web pages

Critical Evidence(s) Required

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

- Identify the components of computer
- Follow organizational ergonomic work health and safety (WHS) requirements and practices
- Create, open and retrieve documents using customized basic settings
- Format documents by creating tables and adding text, objects and images
- Save and prints documents.
- Download data through web browser



102200846 Apply Work Health and Safety Practices (WHS)

Overview: This unit describes the skills to work with safety and participate in hazard assessment activities, follow emergency procedures and participate OHS practices in process.

Competency Units	Performance Criteria
CU1. Implement safe work practices at work place	P1. Implement relevant rules and procedures of WHS at work place. P2. Comply with duty of care requirements P3. Use personal protective equipment according to safe work practices P4. Contribute to WHS consultative activities P5. Raise WHS issues with relevant personnel
CU2. Participate in hazard assessment activities a work place	P1. Identify hazards or WHS issues in the workplace to relevant personnel P2. Assess and control risks according to own level of responsibility, in line with workplace procedures P3. Report hazards or WHS issues in the workplace to relevant personnel P4. Document risk control actions as required
CU3. Follow emergency procedures at workplace	P1. Report emergencies or incidents promptly to relevant personnel P2. Deal with emergencies in line with own level of responsibility P3. Implement evacuation procedures as required
CU4. Participate in OHS consultative processes	P1. Contribute to workplace meetings, inspections or other consultative activities P2. Raise OHS (Occupational Health and Safety) issues with designated persons in accordance with organizational procedures P3. Take actions to eliminate workplace hazards or to reduce risks



Knowledge and 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:** Outline the WHS rights and responsibilities that apply to own role
- K2:** Explain the term duty of care
- K3:** Describe typical health and safety roles in the workplace
- K4:** List and describe common safety signs and symbols
- K5:** Explain procedures for reporting hazards, risks, incidents and accidents
- K6:** Identify and describe common hazards and major causes of accidents relevant to the workplace
- K7:** Explain what the term risk control means
- K8:** List and describe potential emergency situations and how to respond to them

Critical Evidence(s) Required

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

Demonstrate evidences of the Health and safety Processes to avoid any incident.



041700840 Identify and Implement Workplace Policy and Procedures

Overview: This unit describes the skills and knowledge required to develop and implement a workplace policy & procedures and to modify the policy to suit changed circumstances. It applies to individuals with managerial responsibilities who undertake work developing approaches to create, monitor and improve strategies and policies within workplaces and engage with a range of relevant stakeholders and specialists.

Competency Units	Performance Criteria
CU1. Identify workplace policy & procedures	P1. Identify the workplace policy & procedures P2. Apply appropriate strategies that can be used to measure whether your workplace health and safety obligations are being met. P3. Assure the policies are realistic, resources and personnel to implement P4. Implement the policy & procedures that reflects the organizations commitments P5. Ensure the appropriate methods of implementation, outcomes and performance indicators
CU2. Implement workplace policy & procedures	P1. Apply and assign responsibility for recording systems to track continuous improvements in policy & procedures P2. Implement strategies for continuous improvement in effective and efficient information
CU3. Communicate workplace policy & procedures	P1. Communicate procedures to help implement workplace policy P2. Inform those involved in implementing the policy about expected outcomes, activities to be undertaken and assigned responsibilities
CU4. Review the implementation of workplace policy & procedures	P1. Identify the trends that may require remedial actions P2. Record the trends that may require remedial actions. P3. Ensure policy and procedures as required are made for continuous improvement of performance



Knowledge and 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:** Legislation, regulations and codes of practice applicable to the organization
- K2:** internal and external sources of information and organizational policy & procedures
- K3:** Typical barriers to implementing policies and procedures in an organization.

Critical Evidence(s) Required

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

Identify evidences of the ability to implement work place policy and procedures. briefly identify work place procedures to avoid incident.



071500970 Perform EDM operations

Overview: This competency standard covers the skills and knowledge required to perform EDM operations including setup of machine & electrode and produce cavities by EDM operation.

Competency Unit	Performance Criteria
CU1. Setup electrode	P1. Perform inspection of electrode before mounting P2. Mount electrode on spindle according to standard procedure P3. Dial electrodes as per standard procedure
CU2. Setup workpiece	P1. Clamp the work piece according to job specification P2. Dial the work piece as per standard procedure P3. Align the electrode according to workpiece as per drawing.
CU3. Setup machine parameters	P1. Set electrode height & depth reference to workpiece P2. Set on time & off time / parameter selection P3. Set machine ampere according to required surface finish
CU4. Setup flushing	P1. Check & maintain di-electric fluid level in the storage tank P2. Set the nozzles as per job specifications P3. Set the control of dielectric flow P4. Set the nozzles P5. Set external / internal flushing method as per specification / job requirement
CU5. Carryout machining process	P1. Set machine parameters according to the required surface finish P2. Set the pulsation time according to the flushing P3. Carry out machining process as per standard procedure P4. Ensure proper monitoring of the process
CU6. Perform final inspection	P1. Prepare the work piece for inspection P2. Visually Inspect the work piece P3. Manage the required measuring tools & instruments P4. Perform the required inspection as per drawing
CU7. Demonstrate safe working practice & housekeeping	P1. Select & use appropriate PPEs. P2. Maintain cleanliness at the workplace P3. Ensure relevant safety procedure for EDM operation P4. Ensure fire safety is available around the workplace P5. Ensure proper ventilation at the workplace



Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Define operating principle of EDM
- Identify the hazards associated to EDM operations and preventions
- Identify main parts of EDM
- Define the reasons of dielectric used in EDM
- Describe the flushing system, flushing procedure & its types
- Describe the use of measuring instruments
- Describe how to set the machine parameters
- Identify the material of electrode
- Describe fire hazards and its prevention
- Describe different faults & their remedies relevant to EDM

Critical Evidence(s)

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

- Produce a cavity as per given specification / drawing

Tools and Equipment required

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

S. No.	Items
1.	EDM (Electrode discharge machine) (min 50 ampere)
2.	Measuring instruments / dialing equipment
3.	Clamping device
4.	Magnetic table
5.	Exhaust system
6.	Environment control system (Air conditioner)
7.	Tools cabinet
8.	Die-electric fluid
9.	Spanner set
10.	Allen key set
11.	Screw driver set
12.	Lever gauge (0.01)



071500971 Perform Wire cut operations

Overview: This Competency Standard identifies the competencies you need to be competent in CNC wire cut operation in accordance with approval procedure.

Competency Unit	Performance Criteria
CU1. Set machine Programing	P1. Generate a CAD drawing as per job specification P2. Export the drawing in machining format P3. Import the file into machine panel P4. Set the machine parameters as per job specifications
CU2. Setup wire	P1. Select appropriate wire as per job & machine specification P2. Mount the wire as per standard procedure P3. Set the wire tension as per standard procedure P4. Align the wire with reference to the axis.
CU3. Setup di-electric attachments	P1. Select appropriate work holding devices to clamp work piece P2. Mount the work piece as per standard procedure P3. Identify and locate di-electric nozzle if required
CU4. Setup machine parameters according to the job	P1. Set wire speed according to the surface finish & workpiece thickness P2. Set current according to the surface finish & workpiece thickness P3. Set on and off time according to the surface finish & workpiece thickness.
CU5. Carryout machining process	P1. Set the wire at start point P2. Turn On dielectric fluid P3. Put the protective guards on machine table P4. Start the machine P5. Follow relevant health & safety procedures
CU6. Perform final inspection	P1. Prepare the work piece for inspection P2. Visually Inspect the work piece P3. Manage the required measuring tools P4. Perform the required inspection as per drawing
CU7. Demonstrate safe working practice and house keeping	P1. Select & use appropriate PPEs. P2. Maintain cleanliness at the workplace P3. Ensure relevant safety procedure for Wire cut operations



Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Generate basic drawing through 2D CAD software
- Describe program troubleshooting techniques
- Define clamping devices used on wire cut
- Describe portable devices used with wire cut
- Describe & calculate feed and speed according to the job and material specification
- Interpret basic engineering drawing
- Understand inspection of job
- Know how to use measuring instrument
- Describe surface finish grades

Critical Evidence(s)

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

- Cut a given profile through wire cut machine

Tools and Equipment

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

S. No.	Items
1.	Wire cut machine (4inch work height)
2.	Wire spool (0.18 – 0.2mm)
3.	Auto CAD software
4.	USB for program transfer
5.	Measuring instruments
6.	Complete set of computer system with printer
7.	V block and precise grinded spacer
8.	Wire tension pulley for wire alignment
9.	Clamping set
10.	PPEs.
11.	Magnetic blocks (20-40 dia)



071500972 Perform CNC lathe Operations

Overview: This competency standard covers the skills and knowledge required to operate CNC lathe machine safely

Competency Unit	Performance Criteria
CU1. Set machine programming	<p>P1. Select appropriate programming software</p> <p>P2. Set machine parameters as per job specifications</p> <p>P3. Generate program as per given specification</p> <p>P4. Test run the program on any simulation software</p> <p>P5. Make necessary correction if required</p> <p>P6. Save the program</p>
CU2. Set tools	<p>P1. Check and verify the pneumatic pressure & coolant</p> <p>P2. Select appropriate tools</p> <p>P3. Set the tools into the turret as per standard procedure</p>
CU3. Set workpiece	<p>P1. Select the appropriate clamping device (chuck ,collet) according to the workpiece</p> <p>P2. Perform dialing of workpiece according to the standard procedure</p> <p>P3. Set workpiece zero reference.</p>
CU4. Carryout machining Process	<p>P1. Ensure proper synchronization between machine control unit and part program file as per standard procedure</p> <p>P2. Set the feed rate, cutting speed and override of machine before operating according to the prescribed procedure.</p> <p>P3. Switch machine to execution mode (single block or Auto) as per prescribed method and start machining</p> <p>P4. Compare the block wise movements of machine sequence thoroughly during operation of machine according to the part program.</p>
CU5. Perform final Inspection	<p>P1. Prepare the work piece for inspection</p> <p>P2. Visually Inspect the work piece</p> <p>P3. Manage the required measuring tools</p> <p>P4. Perform the required inspection as per drawing</p>
CU6. Demonstrate safe working practice & housekeeping	<p>P1. Select & use appropriate PPEs.</p> <p>P2. Maintain cleanliness at the workplace</p> <p>P3. Ensure relevant safety procedure for CNC Lathe operations</p>



Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Know the safety procedure for CNC lathe machine
- Interpret basic engineering drawing
- Understand how to operate control panel
- Define hazards associated with CNC machine and its prevention
- Describe basic troubleshooting
- Describe the coordinate system
- Define the G&M codes
- Describe feed rate and cutting speed concepts in CNC lathe machine
- Define the use of cutting tools.
- Understand how to use the use of turret
- Understand NC program editing techniques.
- Describe the method of inspection
- Know about the CAD/CAM software

Critical Evidence(s)

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

- Make a simple G&M code / CAD/CAM program and execute through CNC Lathe machine

Tools and Equipment required

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

S. No.	Items
1.	CNC Lathe machine / turning center (6ft) along with standard accessories
2.	Lathe tooling (assorted range)
3.	CNC programming manual (hard & soft copy)
4.	CAM software with simulation module.
5.	Measuring instruments (Vernier, inside/outside micrometer, steel rule, Try square, bevel protector, bore gauge etc.
6.	Work holding devices
7.	Measuring gauges
8.	Tooling catalogs
9.	CNC manual (hard & soft copy)
10.	Complete set of computer system
11.	PPEs
12.	Tool cabinet standard
13.	Soft jaws



071500973 Perform CNC Milling Operations

Overview: This competency standard covers the skills and knowledge required to operate CNC milling machine safely.

Competency Unit	Performance Criteria
CU1. Set machine programming	<p>P1. Select appropriate programming software</p> <p>P2. Set basic parameters as per specifications</p> <p>P3. Generate program as per given specification</p> <p>P4. Perform post processing of program</p> <p>P5. Select tool size and set offset value as per specification</p> <p>P6. Test run the program</p> <p>P7. Make necessary correction</p> <p>P8. Save the program</p>
CU2. Set tools	<p>P1. Check and verify the pneumatic pressure & coolant</p> <p>P2. Select appropriate tool and clamping device</p> <p>P3. Clamp the tool into tool holder on machine spindle.</p>
CU3. Set workpiece	<p>P1. Select the appropriate clamping devices according to the job</p> <p>P2. Remove the sharp edges from work piece</p> <p>P3. Perform dialing of workpiece</p> <p>P4. Calculate the offset value of axis</p> <p>P5. Add the offset values in machine parameters (tool height & diameter)</p> <p>P6. Set workpiece zero reference</p>
CU4. Carryout machining process	<p>P1. Set machine reference point (home position)</p> <p>P2. Ensure proper synchronization between machine control unit and part program file as per standard procedure</p> <p>P3. Control the feed rate, cutting speed and override of machine before operating according to the prescribe procedure</p> <p>P4. Switch machine to execution mode (single block or Auto) as per prescribed method and start machining</p> <p>P5. Compare the block wise movements of machine sequence thoroughly during operation of machine according to the part program.</p>
CU5. Perform final inspection	<p>P1. Prepare the work piece for inspection</p> <p>P2. Visually Inspect the work piece</p> <p>P3. Manage the required measuring tools</p> <p>P4. Perform the required inspection as per drawing</p>



CU6. Demonstrate safe working practice & housekeeping	P1. Select & use appropriate PPEs. P2. Maintain cleanliness at the workplace P3. Ensure relevant safety procedure for CNC Lathe operations
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Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Understand the safety procedure for CNC milling machine
- Interpret basic engineering drawing
- Understand how to operate control panel
- Define the hazards associated with CNC machine and its prevention
- Describe the basic troubleshooting techniques
- Define the coordinate system
- Define the G&M codes
- Describe feed rate and cutting speed concepts in milling machine
- Understand the use of milling tools and their types with respect to operation and materials
- Define the use of cutting tools
- Describe the use of ATC (automatic tool changer)
- Understand NC program editing techniques
- Understand the method of inspection
- Define the CAD/CAM software
- Understand the use of measuring tools

Critical Evidence(s)

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

- Make a simple G&M code / CAD/CAM program and execute through CNC milling machine by following complete step including tools & workpiece setting



Tools and Equipment required

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

Sr. No	Items
1.	3 axis CNC milling/machining center (500*400*350) along with standard accessories
2.	Milling tooling (assorted range)
3.	CNC programming manual
4.	CAD/CAM software
5.	Measuring instruments (Vernier, inside/outside micrometer, steel rule, Try square, bevel protector, bore gauge etc.)
6.	Work holding devices
7.	Measuring gauges
8.	Tooling catalogs
9.	CNC manual
10.	Complete set of computer system
11.	PPEs
12.	Tool cabinet standard
13.	Z setter
14.	Clamping kit



071500974 Perform Heat Treatment

Overview:

This competency standard covers the skills and knowledge required to perform heat treatment through standard procedures

Competency Unit	Performance Criteria
CU1. Prepare material for heat treatment	<p>P1. Debur the work piece before heat treatment.</p> <p>P2. Prepare provision of holding the work piece before putting in furnace.</p> <p>P3. Set the wok piece according to the furnace/ torch available</p>
CU2. Perform stress relieving	<p>P1. Set the temperature of furnace as per material requirement.</p> <p>P2. Place the work piece in furnace.</p> <p>P3. Set furnace off time according to the stress relieving requirement</p> <p>P4. Take out the workpiece from the furnace after giving required soaking time</p>
CU3. Perform hardening	<p>P1. Set the temperature of furnace as per material specification</p> <p>P2. Ensure part is well prepared and cleaned</p> <p>P3. Ensure that quenching media temperature is as per standard requirement of the material.</p> <p>P4. Move quenching media to proximity of furnace. (If required to reduce heat loss of a part.)</p> <p>P5. Ensure the part is heated to the specified temperature and held in the furnace to reach the soaking time</p> <p>P6. Submerge the part in specific quenching media (bath) to achieve required hardness</p> <p>P7. Verify that the required hardness is achieved</p>
CU4. Perform tempering	<p>P1. Set the temperature of furnace as per required hardness</p> <p>P2. Ensure part is heated to a set temperature according to tempering specification to reach specified condition</p> <p>P3. Repeat the procedure for second & third time where required</p> <p>P4. Allow the workpiece to cool at room temperature</p> <p>P5. Verify that the required hardness is achieved</p>
CU5. Perform annealing	<p>P1. Set the temperature of furnace as per material specification</p> <p>P2. Ensure part is well prepared and cleaned from oil prior heating</p> <p>P3. Ensure part is heated to a set temperature according to annealing</p>



	<p>specification to reach specified condition</p> <p>P4. Control cool down rate according to material specification following the annealing procedure</p> <p>P5. Verify that the required hardness is achieved</p>
<p>CU6. Perform final inspection</p>	<p>P1. Prepare workpiece for inspection</p> <p>P2. Perform visual inspection for scratches, cracks, craters, geometric deformation & distortion</p> <p>P3. Select & use the tools and equipment such as hardness tester, chart, indenter and V-block</p> <p>P4. Verify hardness tester is functioning properly by using standard calibration samples</p> <p>P5. Set up work piece on hardness tester by aligning with indenter activate mechanism to initiate hardness test</p> <p>P6. Compare test value against standard specification</p> <p>P7. Record the value for quality assurance</p>
<p>CU7. Demonstrate safe working Practice & housekeeping</p>	<p>P1. Select & use appropriate PPEs.</p> <p>P2. Maintain cleanliness at the workplace</p> <p>P3. Ensure relevant safety procedure for Heat treatment operations</p>



Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Know the heat treatment process
- Understand the time, temperature & transformation diagram
- Understand the quenching procedure
- Understand how to select quenching media as per material requirements.(Oil, Water & Air)
- Define heat treatment temperature according to the material
- Describe hardness testing procedure
- Define the different types of furnace
- Define safety hazards associated with heat treatment processes
- Understand workpiece setting before hardening



Critical Evidence(s) Required

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

- Perform hardening (complete procedure) of given material and verify the hardness

Tools and Equipment required

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

Sr. No	Items
1.	Heat treatment furnaces (Gas, Electric or Vacuum Furnaces also Gas Torch) (1 cubic feet)
2.	Quenching drum
3.	Tempering furnace or bath
4.	Holding devices (such as tongs, hooks)
5.	Hand tool of wiring of work piece (pliers, wire cutter & file etc.)
6.	Trolley for quenching drum
7.	Face shield
8.	Boxes for work piece (different sizes as per requirement)
9.	Rockwell hardness tester or tools
10.	Visual testing material such as dye penetrant & magnifiers.
11.	Hardness scale (table)
12.	Hardness standard gauges



001100852 Communicate at Workplace

Overview: This unit describes the performance outcomes, skills and knowledge required to develop communication skills in the workplace. It covers gathering, conveying and receiving information, along with completing assigned written information under direct supervision.

Competency Units	Performance Criteria
CU1. Communicate within the organization	P1. Communicate within a department P2. Communicate with other departments. P3. Use various media to communicate effectively P4. Communicate orally and written
CU2. Communicate outside the organization	P1. Deal with vendors P2. Deal with clients/customers P3. Interact with other organisations P4. Use various media to communicate effectively P5. Work with people of different cultures / backgrounds
CU3. Communicate effectively in workgroup	P1. Assess the issues to provide relevant suggestion to group members P2. Resolve the issues/ problems /conflicts within the group P3. Arrange group working sessions to increase the level of participation in the group processes P4. Communicate messages to group members clearly to ensure interpretation is valid P5. Communicate style /manner to reflect professional standards/ awareness of appropriate cultural practices P6. Act upon constructive feedback
CU4. Communicate in writing	P1. Identify relevant procedures for written information P2. Use strategies to ensure correct communication in writing .i.e. <ul style="list-style-type: none">• correct composition• clarity• comprehensiveness• accuracy• appropriateness



	<p>P3. Draft assigned written information for approval, ensuring it is written within designated timeframes</p> <p>P4. Ensure written information meets required standards of style, format and detail</p> <p>P5. Seek assistance / feedback to aid communication skills development</p>
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Knowledge and 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:** Importance of intra and inter organizational communication
- K2:** Basics of business communication
- K3:** Defining Modes of communication
- K4:** Effective communication in workgroup
- K5:** Communicating through writing
- K6:** The importance of teamwork

Critical Evidence(s) Required

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

In your current position, what types of written communication do you use most often? (List them all).



061100858 Perform Computer Application Skills

Overview: This unit describes the skills and knowledge required to use spreadsheet applications, prepare in page documents, develops familiarity with Word, Excel, Access, PowerPoint, email, and computer graphics basics.

It applies to individuals who perform a range of routine tasks in the workplace using a fundamental knowledge of spreadsheets, Microsoft office and computer graphics in under direct supervision or with limited responsibility.

Competency Units	Performance Criteria
CU1. Prepare In-page documents as per required information	P1. Set keyboard preferences according to information requirements P2. Layout Page according to information requirements P3. Toggle between Languages P4. Identify the usage of tool bar P5. Insert Columns as per requirement P6. Print the document
CU2. Prepare Spreadsheets as per required information	P1. Create workbook according to information requirements P2. Insert sheet according to information requirements P3. Enter basic formulae / functions using cell referencing when required P4. Correct formulas when error messages occur P5. Use a range of common tools during spreadsheet development P6. Edit columns and rows within the spreadsheet Filter data P7. Save the spreadsheet to a folder on a storage device P8. Format spreadsheet using formatting features as required P9. Incorporate object and chart in spreadsheet P10. Print spreadsheet
CU3. Use MS Office as per required information	P1. Use Microsoft Word for documentation P2. Use Microsoft Excel for documentation P3. Use Microsoft PowerPoint for presentation P4. Perform OneNote P5. Perform Outlook for emails



	P6. Perform Publisher applications
CU4. Perform computer graphics in basic applications	P1. Perform graphic fundamentals in basic applications P2. Draw Points and lines to make images P3. Draw Dots in space to make images P4. Draw lightening blot Shapes to make images P5. Enlarge circles and rectangles to block in forms
CU5. Create Email account for communications	P1. Make email account for communications P2. . Compose text of an email message according to organizational guidelines as required P3. Create an automatic signature for the user P4. Attach files to email message where required P5. Send email message P6. Reply to / forward a received message using available features P7. Save an attachment to the relevant folder P8. Save email message using available settings P9. Adjust email accounts to restrict and quarantine possible email security problems <ul style="list-style-type: none">• Print email message as per requirements

Knowledge and 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:** List basic technical terminology related to reading help files and prompts
- K2:** Explain the effect of formatting and appearance on the readability and usability of spreadsheets
- K3:** Outline log-in procedures relating to accessing a personal computer (PC)
- K4:** Describe the purpose, use and function of spreadsheet applications.



K5: Understand **MS Word** to create documents, flyers, publications

K6: Understand **MS PowerPoint** to create presentations

K7: Understand **MS Excel** to store, organize, and manipulate data

K8: Understand **OneNote** to organize data you collect including handwritten notes, drawings, screen captures, audio clips, and more

K9: Understand of **Publisher** to create extensive publications, posters, flyers, menus

K10: Understand **Outlook** to manage email and calendars, to do lists, and contacts

Critical Evidence(s) Required

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

- Create spreadsheets
- Customize basic settings
- Format spreadsheets
- Apply basic formulas
- Insert objects and charts in spreadsheets
- Save and print spreadsheets.



041300867 Manage Personal Finances

Overview: This unit of competency describes the outcomes required to manage develop, implement and monitor a personal budget in order to plan regular savings and manage debt effectively.

Competency Units	Performance Criteria
CU1. Develop a personal budget	<p>P1. Calculate current living expenses using available information to prepare a personal budget.</p> <p>P2. Keep a record of all income and expenses for a short period of time to help estimate ongoing expenses.</p> <p>P3. Subtract total expenses from total income to determine a surplus or deficit budget for the specified period.</p> <p>P4. Find reasons for a deficit budget and ways to reduce expenditure identified.</p> <p>P5. Identify ways to increase income</p>
CU2. Develop long term personal budget	<p>P1. Analyze income and expenditure and set long term personal financial goals.</p> <p>P2. Develop a long-term budget based on the outcomes of short-term budgeting.</p> <p>P3. Identify obstacles that might affect the business</p> <p>P4. Formulate a regular savings plan based on budget</p>
CU3. Identify ways to maximize future finances	<p>P1. Determine sources to maximize personal income,</p> <p>P2. Get further education or training to maintain or improve future income.</p> <p>P3. Identify the need for debt to finance living and other expenses,</p> <p>P4. Determine the appropriate levels of debt and repayment.</p> <p>P5. Consolidate existing debt, where possible, to minimize interest costs and fees.</p> <p>P6. Seek professional money management services.</p>



Knowledge and 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:** Explain the abilities to plan and organize to keep records and monitor a personal budget
- K2:** Describe abilities to set and review goals
- K3:** Explain basic financial management and record keeping to enable development and management of a personal budget
- K4:** Describe benefits of financial goal setting and personal budgeting to enable effective management of personal finances
- K5:** Outline numeracy skills to compare income and expenditure

Critical Evidence(s) Required

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

Demonstrates competency to provide evidence of the ability to manage personal finances. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments.



102200848 Contribute to Work Related Health and Safety (WHS) Initiatives

Overview: This unit describes the skills and knowledge required to manage the identification, review, development, implementation and evaluation of effective participation and consultation processes as an integral part of managing work health and safety (WHS).

Competency Units	Performance Criteria
<p>CU1. Contribute to initiate work-related health and safety measures</p>	<p>P1. compile database on work-related health and safety</p> <p>P2. Identify measures that address legal obligations.</p> <p>P3. Consult with individuals/ parties to formulate measures and initiatives</p> <p>P4. Consult with individuals/parties to identify factors impacting on work-related health and safety</p> <p>P5. Participate in consultative meetings.</p>
<p>CU2. Contribute to establish work-related health and safety measures</p>	<p>P1. Assist in planning of work-related health and safety measures</p> <p>P2. Contribute to the development of work-related health and safety measures</p> <p>P3. Identify to implement work-related health and safety measures i.e.</p> <ul style="list-style-type: none"> • resourcing requirements, • timelines • responsibilities <p>P4. Assist to implement work-related health and safety measures and initiatives i.e.</p> <ul style="list-style-type: none"> • scheduling • liaison • administering resources • communication
<p>CU3. Contribute to ensure legal requirements of WHS measures</p>	<p>P1. Identify WHS legal requirements</p> <p>P2. Apply knowledge of all aspects of WHS measures to</p> <ul style="list-style-type: none"> • Consultation • workplace policies • participation processes <p>P3. Ensure, WHS measures are in accordance with legal requirements</p>



CU4. Contribute to review WHS measures	P1. Develop effective practices to review work-related health and safety measures P2. Assist individuals and parties related to WHS measures in following activities <ul style="list-style-type: none">• preparing reports• communicating review• evaluating outcomes
CU5. Evaluate the organization's WHS system	P1. Assess ongoing compliance with OHS (Occupational Health and safety) P2. Take feedback from concerned persons regarding WHS measures. P3. Assess the overall effectiveness of WHS management practices P4. Assist the development process of WHS measures in following ways <ul style="list-style-type: none">• Suggest amendments• Document amendments• Implement amendments P5. Take feedback from concerned persons regarding WHS measures. P6. Communicate improvements in WHS Measures

Knowledge and 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:** Explain the application of relevant mandatory health monitoring, including biological monitoring, to help secure work health and safety
- K2:** Explain the difference between work-related health and safety measures and initiatives designed to meet specific legislative requirements and obligations, and those designed to support non-statutory health promotion programs, and give examples of each



- K3:** List factors that impact on work-related health and safety and their potential effects
- K4:** Identify internal and external sources of WHS information and data, and how to access them
- K5:** Outline organizational WHS and other relevant policies, procedures, processes and systems, including human resources
- K6:** Summarize relevant WHS legislation, other legislation (such as privacy and workers compensation) and common law rights and duties specific to work-related health and safety measures and initiatives
- K7:** Describe work-related health and safety measures and initiatives that either address specific legislative requirements and obligations, or support non-statutory health prevention programs, including:
 - The factors impacting on worker health and safety that they address
 - Effectiveness
 - Costs and benefits
 - Criteria for decisions regarding their implementation in a specific workplace
 - How they should be implemented.

Critical Evidence(s) Required

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

A person who demonstrates competency in this unit must be able to provide evidence of the ability to contribute work-related health and safety measures and initiatives. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments.



041700841 Comply with Workplace Policy and Procedures

Overview: This unit describes the skills and knowledge required to implement a workplace policy & procedures and to modify the policy to suit changed circumstances. It applies to individuals with managerial responsibilities who undertake work developing approaches to create, monitor and improve strategies and policies within workplaces and engage with a range of relevant stakeholders and specialists.

Competency Units	Performance Criteria
CU1. Manage work timeframes	P1. Complete work tasks within deadlines in according to order of priority P2. Supervisors are informed of any delays in work times or projects
CU2. Manage to convene meeting	P1. Develop agenda in line with meeting purpose P2. Select participants and notify them accordingly P3. Carryout meeting arrangements according to the time P4. Record the minutes of the meeting
CU3. Decision making at workplace	P1. Identify the problem, challenge or opportunity P2. Generate an array of possible solutions or responses P3. Evaluate the costs and benefits associated with each option P4. Assess the impact of the decision and modify the course of action as needed
CU4. Set and meet own work priorities at instent	P1. Take initiative to prioritize and facilitate competing demands to achieve organizational goals and objectives P2. Use technology efficiently and effectively to manage work priorities and commitments P3. Maintain appropriate work-life balance
CU5. Develop and maintain professional competence	P1. Assess personal knowledge and skills against competency P2. Participate in networks to enhance personal knowledge, skills and work relationships P3. Seek feedback from employees, clients and colleagues to develop and improve competence



CU6. Follow and implement work safety requirements	P1. Identify and report emergency incidents P2. Practice organizational policy and procedures for responding to emergency incidents P3. Identify and implement workplace procedures and work instructions for controlling risks
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Knowledge and 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:** Healthy work life balance
- K2:** Meeting terminologies, structures and arrangements
- K3:** Relevant organizational procedures and policies regarding meetings, chairing and minutes.
- K4:** Barriers to implement policies and procedures in an organization and possible strategies to address them.

Critical Evidence(s) Required

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

A person who demonstrates competency in this unit must be able to provide evidence of the ability to understand workplace policy and procedures. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments



071500975 Finalize Dies and Mold

Overview: This standard defines the advanced knowledge, skills and understanding needed to finalize dies & molds and inspect dies & molds as per standard procedure

Competency Unit	Performance Criteria
CU1. Interpret drawing and sketches	<p>P1. Interpret assembly drawing</p> <p>P2. Check & verify the detailed drawing with assembly drawing</p> <p>P3. Arrange the drawings of dies & moulds for assembly process</p> <p>P4. Identify the Individual's role and responsibilities within the team</p>
CU2. Carry out final assembly according to the sequence	<p>P1. Perform fitting of guiding system</p> <p>P2. Perform fitting of punch & die in the respective plates as per drawing</p> <p>P3. Perform fitting of punch & die back plates as per drawing</p> <p>P4. Perform fitting of ejection system as per drawing</p> <p>P5. Perform fitting of stripper / blank holder in the die</p> <p>P6. Perform fitting of feeding system</p> <p>P7. Perform fitting of heating/cooling system</p> <p>P8. Ensure punch & die are hardened & ground</p> <p>P9. Ensure proper fitting of inserts</p> <p>P10. Ensure tagging (identification marking) of all components</p>
CU3. Perform Die spotting	<p>P1. Check & verify tool assy. (mold & die) according to the tool drawing</p> <p>P2. Load & clamp the die/mold on die spotting press</p> <p>P3. Check, verify all bearing faces & cutting edges by applying touching paste.</p> <p>P4. Match all bearing/ matching faces of tool</p> <p>P5. Verify ejection system</p> <p>P6. Finalize the die spotting</p>
CU4. Perform polishing	<p>P1. Select the required polishing materials and aids according to the required surface finish.</p> <p>P2. Select and protect all edges & surfaces need to be protected before start procedure.</p> <p>P3. Perform final polishing according to the required surface finish</p> <p>P4. Verify surface finish according to the required specification</p>
CU5. Verify all functions of dies & molds	<p>P1. Verify all the aligned & matching parts of the tool</p> <p>P2. Verify function of all cooling channels</p> <p>P3. Verify the feeding system according to function</p>



	<p>P4. Verify hydraulic core (if required)</p> <p>P5. Verify spring/cushion functions for dies</p>
<p>CU6. Perform tool trial</p>	<p>P1. Select appropriate machine for trial</p> <p>P2. Select & use appropriate material handling devices</p> <p>P3. Load the tool on the machine as per standard procedure</p> <p>P4. Arrange & connect all relevant attachment as per requirement</p> <p>P5. Select specified material for the trial purpose</p> <p>P6. Carry out trial of the tool as per trial procedure</p> <p>P7. Verify the dimension of the sample & make necessary changes for next trial (where required)</p> <p>P8. Follow relevant health & safety procedures</p>
<p>CU7. Inspect dies & molds before delivery</p>	<p>P1. Ensure mounting holes are according to the specified press</p> <p>P2. Ensure safety/holding strips on dies & molds</p> <p>P3. Ensure provision of lifting is available</p> <p>P4. Ensure locating ring/ shank size according to the machine</p> <p>P5. Ensure holes for ejector rod is according to the machine specification</p> <p>P6. Verify final check list / packing list.</p>
<p>CU8. Demonstrate safe working practice & housekeeping</p>	<p>P1. Select & use appropriate PPEs.</p> <p>P2. Maintain cleanliness at the workplace</p> <p>P3. Follow & apply standard lifting procedure</p>

Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Interpret engineering drawing
- Interpret of die & mold design
- Describe polishing aids
- Define dies & molds making hints
- Describe assembly sequence of dies & mold system
- Define different material handling devices
- Describe machine elements



Critical Evidence(s) Required

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

- Assemble a sample die/mold according to the drawing
- Perform polishing of a block surface according to the standard
- Perform inspection
- Perform die spotting

Tools and Equipment required

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

Sr. No	Items
1.	Injection molding machine (50-100ton)
2.	Mechanical press (50ton)
3.	Hydraulic press (100-200 ton)
4.	Etching machine (for manual marking)
5.	Die spotting press(100ton)
6.	Number/Alphabet punch
7.	Hammer (250-500g)
8.	Allen key set
9.	Spanner set
10.	Hand grinder (4in)
11.	Pin grinder (3mm to 6mm)
12.	Hoist (5 ton)
13.	Shackles (different sizes)
14.	Eye bolts (different sizes)
15.	Tool trolley
16.	Stalker (1-3 ton)
17.	Screw driver set
18.	Polishing aids
19.	Copper mallet (500 gm)
20.	Tool maker bench (with pressure motor and all arrangement)



071500976 Fabricate a Die

Overview: This standard defines the advanced knowledge, skills and understanding needed to fabricate die components and perform final assembly

Competency Unit	Performance Criteria
CU1. Interpret drawing	<p>P1. Make list of material required.(BoM)</p> <p>P2. Identify machining process required</p> <p>P3. Identify material heat treatment process</p> <p>P4. Identify surface finish required for different components</p> <p>P5. Identify standard fasteners required</p> <p>P6. Identify limits, fits and tolerances for different parts</p>
CU2. Carry out machining process of die components	<p>P1. Check available raw material with measuring tools</p> <p>P2. Plan machining operations as required</p> <p>P3. Perform required machining operations</p> <p>P4. Perform heat treatment of required components</p> <p>P5. Perform finishing operation according to the drawings</p> <p>P6. Perform final inspection as per drawing</p>
CU3. Carryout assembly of die	<p>P1. Collect all manufactured parts at assigned area</p> <p>P2. Assemble die side according to the standard procedure</p> <p>P3. Assemble punch side according to the standard procedure</p> <p>P4. Assemble both halves (punch & die side)</p>
CU4. Perform inspection	<p>P1. Mount die on die spotting press.</p> <p>P2. Check clearance between punch & die (for cutting dies)</p> <p>P3. Check die spotting in case of forming die</p> <p>P4. Check over all assembly</p>



Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Interpret die design/drawing
- Describe the use of measuring & inspection instruments
- Describe the usage of all type of relevant machines
- Define the heat treatment processes
- Describe the process of polishing
- Describe assembly sequence
- Define die making hints
- Describe die spotting process

Critical Evidence(s) Required

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

- Fabricate a die as per given drawing/design.

Tools and Equipment required

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

Sr. No	Items
1.	All type of relevant Machine (Conventional & SPM).
2.	Heat treatment furnaces & tools.
3.	Polishing aids
4.	Measuring & marking tools
5.	Inspection tools.
6.	Lifting equipment



071500977 Fabricate a Mold

Overview: This standard defines the advanced knowledge, skills and understanding needed to fabricate components of a mold and perform final assembly

Competency Unit	Performance Criteria
CU1. Interpret drawing	<p>P1. Make list of material required.(BoM)</p> <p>P2. Identify machining process required.</p> <p>P3. Identify material heat treatment process</p> <p>P4. Identify surface finish required for different components</p> <p>P5. Identify standard fasteners required.</p> <p>P6. Identify limits, fits and tolerances for different parts</p>
CU2. Carry out machining process of mold components	<p>P1. Check available raw material with measuring tools.</p> <p>P2. Plan machining operations as required</p> <p>P3. Perform required machining operations</p> <p>P4. Perform heat treatment of required components</p> <p>P5. Perform finishing operation according to the drawings</p> <p>P6. Perform final inspection as per drawing</p>
CU3. Carryout assembly of mold	<p>P1. Collect all manufactured parts at assigned area</p> <p>P2. Assemble cavity side according to the standard procedure.</p> <p>P3. Assemble core side according to the standard procedure.</p> <p>P4. Assemble both halves (moving & fixed side).</p>
CU4. Perform inspection	<p>P1. Mount mould on spotting machine</p> <p>P2. Check alignment of cavity & core</p> <p>P3. Check mold spotting in case of bearing faces/sliders /lifters (loose core)</p> <p>P4. Check over all assembly</p>



Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Interpret mold design/drawing
- Describe the use of measuring & inspection instruments
- Describe the usage of all type of relevant machines
- Define the heat treatment processes
- Describe the process of polishing
- Describe assembly sequence
- Define mold making hints
- Describe mold spotting process

Critical Evidence(s) Required

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

- Fabricate a Mold as per given drawing/design.

Tools and Equipment required

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

Sr. No	Items
1.	Spotting press
2.	Tool maker bench
3.	Vise
4.	Chain hoist
5.	Hand grinders
6.	Pneumatic grinder (Micro mini)
7.	Polishing stone
8.	Diamond compound
9.	Rotatory diamond file
10.	Files set 12" & 16"
11.	Needle file set
12.	Diamond file set
13.	Allen key set
14.	Screw driver set (1.5 ft.)
15.	Cabinet & Almirah
16.	Copper mallet (500gm)
17.	Two leg puller (6in)
18.	Pliers & spanner set
19.	C clamps (4in to 12in)
20.	Feeler gauges



071500978 Carry out maintenance of dies & molds

Overview: This standard defines the advanced knowledge, skills and understanding required to carry out preventive & breakdown maintenance of dies & molds.

Competency Unit	Performance Criteria
CU1. Prepare maintenance plan	<p>P1. Identify type of dies and molds</p> <p>P2. Identify minimum number of shots / production for maintenance</p> <p>P3. Prepare check list</p> <p>P4. Identify relevant skilled person for maintenance</p>
CU2. Perform preventive maintenance	<p>P1. Clean the tool from dirt and dust.</p> <p>P2. Check all the screws, if found loosen tighten it.</p> <p>P3. Check worn out parts and replace if required.</p> <p>P4. Lubricate all moving parts & surfaces.</p> <p>P5. Insure tool number & store the tool at designated place.</p> <p>P6. Follow preventive maintenance schedule/check list.</p> <p>P7. Generate final report & maintain the records</p>
CU3. Perform shutdown/breakdown maintenance	<p>P1. Interpret the shutdown/breakdown report</p> <p>P2. Carry out visual inspection to check out damages</p> <p>P3. Disassemble the dies/mold</p> <p>P4. Rectify/ replace damaged parts where required.</p> <p>P5. Assemble the dies/mould.</p> <p>P6. Do the lubrication where required</p> <p>P7. Prepare maintenance report & maintain the records</p>

Knowledge & Understanding

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore he/she must be able to:

- Define scheduled and shutdown/breakdown maintenance procedures/techniques
- Define & interpret relevant reports
- Define possible causes of shutdown/breakdown & its remedies
- Describe the process of assembling & dis assembling dies and molds
- Describe & interpret preventive maintenance schedule/checklist
- Describe the rectification methods. (Machining, welding & polishing etc.)



Critical Evidence(s) Required

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

- Assemble & dis assemble dies & molds components

Tools and Equipment required

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

Sr. No	Items
1.	Hammer (250-500g)
2.	Copper mallet (1000g)
3.	Allen key set
4.	Spanner set
5.	Hand grinder (4in)
6.	Pin grinder (3mm to 6mm)
7.	Hoist (5 ton)
8.	Shackles (different sizes)
9.	Eye bolts (different sizes)
10.	Tool trolley
11.	Stalker (1-3 ton)
12.	Screw driver set
13.	Polishing aids
14.	Feeler gauges
15.	Thread pitch gauge
16.	Plug gauge
17.	Ring gauge
18.	Personal Protective Equipment (PPEs)
19.	Radius gauges (R2-R15)
20.	Work holding devices
21.	Pin punch set
22.	Work bench



001100853 Perform Advanced Communication

Overview: This unit describes the performance outcomes, skills and knowledge required to develop communication skills used professionally. It covers plan and organise work and conduct trainings at workplace, along with demonstrating professional skills independently.

Competency Units	Performance Criteria
CU1. Demonstrate professional skills	<p>P1. Use different modes of communication to communicate</p> <ul style="list-style-type: none"> • Speaking • Reading • Writing • Listening • Presentation • visual representation etc <p>P2. Develop CV Skills according requirements</p> <p>P3. Upgrade professional skills by attending trainings, webinars, conferences etc.</p> <p>P4. Perform Continuous professional development as required at workplace</p> <p>P5. Develop interview skills</p>
CU2. Plan and Organize work	<p>P1. Identify task requirements.</p> <p>P2. Plan steps to complete tasks.</p> <p>P3. Review planning and organizing process.</p> <p>P4. Organize work.</p>
CU3. Provide trainings at workplace	<p>P1. Assess the need for training</p> <p>P2. Prepare trainees for the learning experience</p> <p>P3. Present training session</p> <p>P4. Support trainees in managing their own learning</p> <p>P5. Facilitate group learning</p> <p>P6. Provide opportunity for practice</p> <p>P7. Provide feedback on progress on trainees</p> <p>P8. Review delivery experience</p>



Knowledge and 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:** Explaining the training skills
- K2:** Identification of the professional skills
- K3:** Describing the advanced language skills
- K4:** Understanding of the assessment and trainees feedback methods
- K5:** Direct and indirect communication methods
- K6:** Explaining the need of the training type at the work place

Critical Evidence(s) Required

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

- Job sheet
- Office emails and coordination reports
- Feedback proforma



061100858 Develop Advance Computer Application Skills

Overview: This unit provides an overview of Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards, i.e. Data Entry, Power Point Presentation and managing data base and graphics for Design

It applies to individuals employed in a range of work environments who need to be able to present a set range of data in a simple and direct forms

Competency Units	Performance Criteria
CU1. Manage Information System to complete a task	P1. Perform Data Entry in MS office P2. Manage File/folder in MS office P3. Perform Scanning of document P4. Maintain Office Record in drives P5. Perform Printing of document P6. Search required Files/Folders P7. Convert Files in required format. P8. Manage sizes of Files/Folders <ul style="list-style-type: none">• Compress• Zip /unzip
CU2. Prepare Presentation using computers	P1. Prepare presentation as per requirements, i.e. <ul style="list-style-type: none">• Open blank presentation and add text / graphics• Create a simple design for a presentation• Apply existing styles within a presentation• Use presentation template and slides to create a presentation• Use various tools to improve the look of the presentation• Save presentation to the appropriate storage device and folder with required name P2. Customize basic settings to meet user requirements P3. Format presentation as require <ul style="list-style-type: none">• Develop organizational charts• Add objects and manipulate to meet presentation purposes• Modify slide layout, including text and colours, to meet



	<p>presentation requirements</p> <ul style="list-style-type: none">• Save presentation in another format• Save to storage device and close presentation <p>P4. Add slide show effect into presentation as required to enhance the presentation</p> <ul style="list-style-type: none">• Incorporate pre-set Animation• Apply Multimedia effects• Record Narration• Apply hyperlink• Apply video• Rehearse Timings• Test presentation for overall effect <p>P5. Print the presentation</p> <ul style="list-style-type: none">• Select appropriate print format for presentation• Select preferred slide orientation• Add notes and slide numbers• Preview slides and run spell check before presentation• Print selected slides and submit presentation to appropriate person for feedback <p>P6. Practice verbal presentation</p> <p>P7. Practice presentation through AV Aids</p>
<p>CU3. Use Microsoft Access to manage database</p>	<p>P1. Collect the data using a standard data base package.</p> <p>P2. Start access to manage database .i.e.</p> <ul style="list-style-type: none">• identify problem statement of Data• Develop a table with fields /attributes according to database usage/ user requirements• Create a primary key and establish an index for each table• Modify table layout and field attributes as required• Create a relationship between the two tables• Add data in a table according to information requirements• Add records as required• delete records as required• Save database to storage area



	<ul style="list-style-type: none">• close down database to storage area• Apply criteria in the following Query• SQL view of Query• Wildcards of query• Query Criteria <p>P3. Customize basic settings:</p> <ul style="list-style-type: none">• Adjust page layout to meet user requirements• Open and view different toolbars• Format font as appropriate for the purpose of the database entries• Create reports• Design reports to present data in a logical sequence• Modify reports to include or exclude additional requirements• Distribute reports to appropriate person in a suitable format <p>P4. Create forms</p> <ul style="list-style-type: none">• Use a wizard to create a simple form• Open existing database and modify records through a simple form• Rearrange objects within the form to accommodate information requirements
<p>CU4. Develop graphics for Design</p>	<p>P1. Develop graphic design concepts based on a thorough understanding of the communication need</p> <p>P2. Use design techniques confidently to produce designs</p> <p>P3. Integrate design tools skillfully to produce designs</p> <p>P4. Evaluate the success of completed designs to meet objectives</p> <p>P5. evaluate feedback from client / peers</p>



Knowledge and 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:** List basic technical terminology to read help files and prompts
- K2:** Outline the different types of formal and informal presentations
- K3:** Explain Power point presentation
- K4:** Segregation of Data
- K5:** Define the relation among data
- K6:** Define criteria in the query
- K7:** Creates and modify reports and forms.
- K8:** Outline basic database design principles
- K9:** Current graphic design software
- K10:** Discuss features of current and emerging technologies used in graphic design practice and the options they present for effective graphic design solution

Critical Evidence(s) Required

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

- Design and develop a simple database using a standard database package
- Create, format and prepare presentations for distribution and display
- Customize basic settings
- Add slide show effects.
- Generate employment report from given data by using Microsoft Access.

041300869 Manage Human Resource Services

Overview: This unit describes the skills and knowledge required to plan, manage and evaluate delivery of human resource services, integrating business ethics. It applies to individuals with responsibility for coordinating a range of human resource services across an organization. They may have staff reporting to them.



Competency Units	Performance Criteria
<p>CU1. Determine strategies for delivery of human resource services</p>	<p>P1. Analyze business strategy and operational plans to determine human resource requirements</p> <p>P2. Review external business environment that likely impact on organization’s human resource requirements</p> <p>P3. Consult line and senior managers to identify human resource needs in their areas</p> <p>P4. Review organization’s requirements for diversity in the workforce</p> <p>P5. Deliver human resource services that comply with business goals</p> <p>P6. Develop strategic action plan for delivery of human resource services</p> <p>P7. Develop roles and responsibilities of human resource team</p> <p>P8. Develop quality assurance policy</p>
<p>CU2. Manage the delivery of human resource services</p>	<p>P1. Communicate human resource strategies and services to internal and external stakeholders</p> <p>P2. Develop and negotiate service agreements between</p> <ul style="list-style-type: none"> • The human resource team, • Service providers • Client groups <p>P3. Document service specifications, performance standards and timeframes</p> <p>P4. Document /communicate service</p> <ul style="list-style-type: none"> • Specifications, • Performance standards • Timeframes <p>P5. Monitor Quality assurance processes</p> <p>P6. Ensure that services are delivered by appropriate providers, according to service agreements and operational plans</p> <p>P7. Identify underperformance of human resource team or service providers</p>
<p>CU3. Evaluate human resource service delivery</p>	<p>P1. Establish Management information system for human resource services</p> <p>P2. Conduct survey to determine level of satisfaction</p>



	<p>P3. Analyze feedback of survey</p> <p>P4. Recommend changes to service delivery</p> <p>P5. Support agreed change processes across the organization</p>
<p>CU4. Manage integration of business ethics in human resource practices</p>	<p>P1. Ensure ethics in personal behavior</p> <p>P2. Ensure code of conduct is observed across the organization,</p> <p>P3. Observe confidentiality requirements in dealing with all human resource information</p> <p>P4. Deal promptly with unethical behavior</p> <p>P5. Ensure all persons responsible for human resource functions understand requirements regarding their ethical behavior</p>

Knowledge and 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:** Identify the key provisions of legal and compliance requirements that apply to managing human resources
- K2:** Summarize the organization's code of conduct
- K3:** Explain human resource strategies and planning processes and their relationship to business and operational plans
- K4:** Describe performance and contract management
- K5:** Explain how feedback is used to modify the delivery of human resources.

Critical Evidence(s) Required

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

A person who demonstrates competency in this unit must be able to provide evidence of the ability to manage human resource services. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments.



Performance requirements

This competency is to be assessed using standard and authorized work practices, safety requirements and environmental constraints. Demonstrated evidence is required of the ability to:

- Plan and manage human resource delivery within legislative, organizational and business ethics frameworks
- Communicate effectively with a range of senior personnel
- Identify and arrange training support where appropriate
- Calculate human resource return on investment within the organization.



041300860 Develop Entrepreneurial Skills

Overview: This Competency Standard identifies the competencies required to develop entrepreneurial skills, in accordance with the organization's approved guidelines and procedures. You will be expected to develop a business plan, collect information regarding funding sources, develop a marketing plan and develop basic business communication skills. Your underpinning knowledge regarding entrepreneurial skills will be sufficient to provide you the basis for your work

Competency Units	Performance Criteria
CU1. Develop a business plan	P1. Conduct a market survey to collect following information <ul style="list-style-type: none">• Customer /demand• Tools, equipment, machinery and furniture with rates• Raw material• Supplier• Credit / funding sources• Marketing strategy• Market trends• Overall expenses• Profit margin P2. Select the best option in terms of cost, service, quality, sales, profit margin, overall expenses P3. Compile the information collected through the market survey, in the business plan format
CU2. Collect information regarding funding sources	P1. Identify the available funding sources based on their terms and conditions, maximum loan limit, payback time, interest rate P2. Choose the best available option according to investment requirement P3. Prepare documents according to the loan agreement requirement P4. Include the information of funding sources in the business plan
CU3. Develop a marketing plan	P1. Make a marketing plan for the business including product, price, placement, promotion, people, packaging and positioning



	P2. Include the information of marketing plan in the business plan
CU4. Develop basic business communication skills	<p>P1. Communicate with internal customers e.g.: labor, partners and external customers e.g.: suppliers, customers etc., using effective communication skills</p> <p>P2. Use different modes of communication to communicate internally and externally e.g.: presentation, speaking, writing, listening, visual representation, reading etc.</p> <p>P3. Use specific business terms used in the market</p>

Knowledge and 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:** Explain the 7ps of marketing including product, price, placement, promotion, people, packaging and positioning
- K2:** Describe 7Cs of business communication
- K3:** Define different modes of communication and their application in the industry
- K4:** Enlist specific business terms used in the industry
- K5:** Enlist the available funding sources
- K6:** Explain how to get loan to start a new business
- K7:** Explain market survey and its tools e.g: questionnaire, interview, observation etc
- K8:** Describe the market trends for specific product offering
- K9:** State the main elements of business plan
- K10:** Explain how to fill the business plan format

Critical Evidence(s) Required

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

A person who demonstrates competency in this unit must be able to provide evidence of the ability to develop Entrepreneurial Skills.



Performance requirements

- Conduct market survey and formulate business plans in terms of feasibility, investment potential, risk, and completeness.
- Demonstrate the use of both verbal and non-verbal business communication.
- Effectively present business ideas and profile



3. Complete List of Tools and Equipment

List of machines and tools

S. No.	Items
1.	Vernier caliper (0-150mm)
2.	Micrometer (0-25mm, 25-50mm,50-75mm,75-100mm)
3.	Steel rule (0-300mm)
4.	Tri square (0-100mm)
5.	Centre & dot Punch (6 in)
6.	Scriber (8in)
7.	Hammer (ball peen 250-500gm)
8.	Power disc cutter (14inch)
9.	Hacksaw blades (18-24 TPI)
10.	Second cut files 8-12in (Flat , Round, Triangle, Square)
11.	Drill bits of different sizes (1-13mm)
12.	Drill bits with morse taper shank (13-30mm)
13.	Bench vices 6 inches
14.	Pedestal drill machine (13mm)
15.	Drill chuck (1-6mm , 2-13mm)
16.	Countersinking & counter boring tools (8-30mm)
17.	Hand grinder (4inch & 7inch)
18.	Pin grinder (3mm)
19.	Hand reamers with handle (8-16mm)
20.	Tap set with handle (M3-M12)
21.	Lathe machines (6ft) with all standard accessories (tool room)
22.	High speed steel (HSS tools 12mm x 12mm x 150mm) , T-max holders with carbide bits
23.	Centre drills (1.5-5mm) & HSS drill bits (Standard set, step set)
24.	Knurling tools (straight & diamond)
25.	Thread pitch gauges (1/2 in, 13mm)
26.	Thread ring gauge (M8-M16)
27.	Vernier calipers (0-150mm)
28.	Dial indicator with magnetic stand (0.01mm)
29.	Micrometer (0-25mm, 25-50mm , 50-75mm)
30.	Radius gauge internal & external (R2 – R15)
31.	Plug gauges (dia 8 to 20mm)
32.	Ring gauges (dia 8 to 20mm)
33.	Universal milling machine (400 x 200 mm bed size) with all standard accessories
34.	Lever gauge least count=0.01 (0-3mm)
35.	Parallel blocks set
36.	Step clamps standard set
37.	Machine vice standard size



38.	Indexing head (with 40 & 60 worm wheel)
39.	Rotary table 150 mm
40.	Shell end mill cutter (dia 60 – 100 mm)
41.	Face mill cutter (dia 40-100mm)
42.	End mill cutter (dia 10- 30 mm)
43.	Surface grinding machine (400-500mm magnetic bed length)
44.	Cylindrical grinding machine (150mm center height)
45.	Pedestal grinder (dia 10 inch)
46.	Single lip grinder-standard
47.	Tool sharpener (13-26mm)
48.	Grinding wheel (Aluminum oxide & silicon carbide)
49.	Diamond wheel dresser with stand
50.	Wheel balancing device for grinding wheel
51.	Supporting block-standard
52.	Grinding vice universal type.
53.	Sine bar device
54.	Electrode discharge machine (EDM) – 50 ampere
55.	Clamping devices (Strap screws, Toggles, C-clamps, parallel clamps)
56.	Magnetic table (150 x 300mm)
57.	Exhaust system
58.	Environment control system (Air conditioner)
59.	Tools cabinets as per requirement
60.	Di-electric fluid(for wire cut) as per requirement
61.	Wire cut machine (4inch work height)
62.	Wire spool (0.18 – 0.2mm)
63.	Computer Aided Design / Computer Aided Manufacturing(CAD/CAM) software
64.	Data storage device (USB, portable hard drive) for program transfer
65.	Complete set of computer system with printer
66.	V-block and precise grinded spacer
67.	Wire tension pulley for wire alignment
68.	Clamping set
69.	Personal Protective Equipment (PPEs.)
70.	Computerized Numerical Control(CNC) Lathe machine / turning center along with standard accessories
71.	Lathe tooling (assorted range)
72.	Measuring instruments (Vernier, inside/outside micrometer, steel rule, Try square, bevel protector, bore gauge etc.
73.	Measuring gauges standard
74.	Tooling catalogs
75.	CNC manual
76.	Complete set of computer systems with multimedia projector
77.	3 axis CNC (500*400*350 mm) milling/machining center along with standard accessories
78.	Milling tooling (assorted range)



79.	CNC programming manual
80.	Heat treatment furnaces (Gas, Electric & Vacuum Furnaces also Gas Torch) (1 cubic feet)
81.	Quenching drum as per requirement
82.	Tempering furnace or bath
83.	Holding devices (such as tong & hooks)
84.	Hand tool of wiring of work piece (pliers, wire cutter & file etc.)
85.	Trolley for quenching drum
86.	Face shield
87.	Stainless steel box for work piece as per requirement
88.	Rockwell Hardness tester or Tools
89.	Visual Testing Material Such as Dye penetrant & magnifiers
90.	Hardness scale (table)
91.	Hardness standard gauges
92.	Injection molding machine (50-100ton)
93.	Mechanical press (50ton)
94.	Hydraulic press (100-200 ton)
95.	Etching machine (for manual marking)
96.	Die spotting press(100ton)
97.	Number/Alphabet punch standard
98.	Hammer (250-500g)
99.	Allen key set
100.	Spanner set standard
101.	Hand grinder (4in)
102.	Pin grinder (3mm to 6mm)
103.	Hoist (5 ton)
104.	Shackles (different sizes)
105.	Eye bolts (different sizes)
106.	Tool trolley standard
107.	Stacker (1-3 ton)
108.	Screw driver set
109.	Polishing aids
110.	Mold spotting press (100 ton)
111.	Tool maker (bench with pressure motor & gauges)
112.	Diamond compound
113.	Rotatory diamond file
114.	Files set 12" & 16"
115.	Needle file set
116.	Diamond file set
117.	Cabinet & Almirah



Consumable Items:

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

S. No.	Items
1.	Hacksaw blades (18 & 24teeth per inch)
2.	MS plate 15 mm thickness (different sizes for bench work practice)
3.	Grinding disk 4 inch
4.	MS bar dia 30mm & 50mm for lathe operations practice
5.	MS plate 30 mm thickness for milling operations practice
6.	MS plate 15 mm thickness for grinding practice
7.	MS bar dia 25 mm for cylindrical grinding
8.	Di-electric fluid for EDM
9.	Copper dia 30 mm for EDM electrode
10.	MS plate 20 mm thickness for EDM practice
11.	MS plate 20 mm thickness for wire cut practice
12.	Wire spool dia 0.18mm molybdenum for wire cut
13.	Di-electric fluid for wire cut
14.	Soluble oil as coolant for wire cut
15.	MS bar dia 30mm for CNC lathe practice
16.	Indexing carbide inserts and holders
17.	MS/Aluminum plate 25mm for CNC milling practice
18.	HSS bar for single lip tool
19.	Cutting oil for CNC milling machine
20.	Hydraulic oil for CNC milling machine
21.	Steel wire for heat treatment workpiece clamping
22.	Charcoal for heat treatment
23.	Quenching oil
24.	Tempering oil
25.	High carbon steel block for heat treatment practice
26.	Emery paper fine grade
27.	Polishing stone
28.	Polishing paste
29.	Polishing abrasive with grease
30.	Kerosene oil
31.	Cotton waste
32.	Pin grinding wheel
33.	Color paste for spotting
34.	Socket head bolts M6, M8
35.	Dowel pins
36.	Plastic/wax shims
37.	Polymer (high density polymer) HDP for tool trial
38.	MS plate 300x200x30mm for Die set
39.	MS Striper plate 150 x 150 x 25mm
40.	Tool steel die plate 150 x 150 x 40



41.	Tool steel punch dia 50 x 100 mm
42.	MS Punch holder plate 150 x 150 x 25 mm
43.	MS punch back plate 150 x 150 x 25 mm
44.	Carbon steel bar dia 25 x 200 mm for guide pillar
45.	Carbon steel bar dia 50 x 80 mm for guide bush
46.	MS plate 200 x 200 x 20mm for mold back plate fixed side
47.	Carbon steel plate 200 x 170 x 25mm for cavity plate fixed side
48.	Carbon steel plate 200 x 170 x 25mm for punch plate
49.	MS plate 200 x 170 x 20mm for punch back plate
50.	MS plate 200 x 90 x 60mm for spacers
51.	MS plate 200 x 200 x 20mm for back plate moving side
52.	MS plate 200 x 100 x 12mm for ejector plate
53.	Carbon steel plate 200 x 100 x 12mm for ejector back plate
54.	Carbon steel bar dia 16mm x 300 mm for pillars
55.	Carbon steel bar dia 24mm x 150mm for guide bush
56.	Carbon steel bar dia 12 x 350 mm for return pin
57.	Standard ejector pins dia 2 , 3 , 4 , 5 mm
58.	Tool steel plate 100 x 100 x 50mm for punch
59.	Tool steel plate 100 x 100 x 50mm for cavity

List of Stationary

S. No.	Items
1.	Pencils
2.	Erasers
3.	Pencil sharpeners
4.	Paper cutter
5.	Scissors
6.	Color pencils
7.	White chart paper
8.	Brown sheets
9.	White board markers (red, blue, green, black)
10.	Permanent markers (black)
11.	File covers
12.	A3 & A4 sheets
13.	Tagging card

