Model Curriculum

Advanced Plastic Mould Manufacturing- Assistant

SECTOR: Rubber
SUB-SECTOR: Manufacturing / Plastics Processing
OCCUPATION: Plastics Mould Manufacturing
REF ID: RSC/Q4701 (CPC/Q5803), V1.0
NSQF LEVEL: 3

Skill India
कौशल भारत - कुशल भारत

RSDC
RUBBER SKILL DEVELOPMENT COUNCIL

N·S·D·C National Skill Development Corporation

Certificate

CURRICULUM COMPLIANCE TO
QUALIFICATION PACK - NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

RUBBER SKILL DEVELOPMENT COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: '**Advance Plastics Mould Manufacturing Assistant**'
QP No. '**RSC/Q4701 (CPC/Q5803) NSQF Level 3**'

Date of Issuance: December 23, 2018
Valid up to: December 22, 2023

**Valid up to the next review date of the Qualification Pack*

Authorised Signatory
(Rubber Skill Development Council)

TABLE OF CONTENTS

Advanced Plastic Mould Manufacturing- Assistant

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "Advanced Plastic Mould Manufacturing-Assistant", in the "Rubber" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	**Advanced Plastic Mould Manufacturing- Assistant**		
Qualification Pack Name & Reference ID	RSC/Q4701 (CPC/Q5803), v1.0		
Version No.	1.0	**Version Update Date**	29/05/2019
Pre-requisites to Training	VIIIth Standard		
Training Outcomes	**After completing this programme, participants will be able to:** • Describe basic concepts of engineering drawing. • Interpret the mould drawing. • Identify and arrange raw material and tools for mould making. • Assist in mould making process by use of different types of tools. • Perform measurement of mould parts against mould drawing. • Demonstrate setting up of a part on a vice for any operation. • Describe construction of different type of moulds. • Perform operations of conventional and CNC machines used in mould making. • Identify different mould parts for polishing and assembly. • Perform polishing activity on different mould parts. • Demonstrate mould assembly as per drawing. • Use appropriate communication techniques at work place. • Escalate the problem to appropriate authority. • Report the daily work status to superiors. • Comply with the health, safety and security procedures stated by the organisation.		

This course encompasses 7 out of 7 NOS (National Occupational Standards) of "Advanced Plastic Mould Manufacturing- Assistant" Qualification Pack issued by "Rubber Skill Development Council".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	**Introduction to Advanced Plastic Manufacturing** **Theory Duration** (hh:mm) 8:00 **Practical Duration** (hh:mm) 8:00 **Corresponding NOS Code** Bridge Module	• Discuss the history and development of plastics. • Describe current industrial scenario of plastics • Identify types of plastic. • Recognise major industrial associations of plastics • Identify equipment used for mould manufacturing process. • Describe role and responsibilities of an Advanced Plastics Mould Manufacturing - Assistant.	White board, marker, duster, laptop/PC, projector, flipcharts, samples – plastic injection moulded products, plastic extruded products, plastic blow moulded products
2	**Health and safety at the workplace** **Theory Duration** (hh:mm) 16:00 **Practical Duration** (hh:mm) 8:00 **Corresponding NOS Code** RSC/N4101 (CPC/N0411)	• Demonstrate safe working practices while dealing with hazards to ensure the safety of self and others. • Use the appropriate fire extinguishers on different types of fires. • Demonstrate rescue techniques applied during fire hazard. • Demonstrate good housekeeping in order to prevent fire hazards. • Identify activities which can cause potential injury. • Inform the concerned authorities about the potential risks identified. • Perform the sorting process for the tools, fixtures and jigs. • Perform segregation of waste in hazardous/ non-hazardous waste. • Demonstrate the technique of waste disposal and waste storage as per standard operating procedure (SOP). • Demonstrate the proper labeling mechanism of instruments/ boxes/ containers.	White board, marker, duster, laptop/PC, projector, safety goggles, rubber gloves, heat protecting gloves, fire extinguisher, apron, helmet, first aid box
3	**Basics of engineering drawing** **Theory Duration** (hh:mm) 24:00 **Practical Duration** (hh:mm) 24:00	• Describe the difference between orthographic and isometric projection of drawing. • Describe the scale used for mould dimensions in the drawing. • Interpret various symbols used in mould drawing. • Interpret the drawing for dimension and tolerances of the individual mould part. • Describe various engineering information available in mould drawing.	White board, marker duster, laptop/PC, projector, plastic samples, engineering drawings, steel ruler, micrometer, vernier caliper, radius gauge, feeler gage, Steel measuring tape,

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Corresponding NOS Code RSC/N4701 (CPC/N5802)	• Analyze the Bill of Material (BOM) of mould from mould drawing. • Select the raw material for making different mould parts as per the drawing. • Select major dimensions of mould drawing • Develop mould making plan based on mould drawing. Follow the process of escalation of the queries to supervisor	weighing balance, hammer, screw driver set, allen key hexagonal, file triangular, hacksaw, adjustable, spanner set double side, adjustable spanner, crimping tools, calculator, wrenches, pliers, cutters, striking tools, vice, clamps, snips, saws, drills and knives
4	**Assist in the mould making** **Theory Duration** (hh:mm) 24:00 **Practical Duration** (hh:mm) 72:00 **Corresponding NOS Code** RSC/N4702 (CPC/N5803)	• Describe different units of measurement of mould. • Identify different hand tools which are used in mould making process. • Select appropriate tools for the particular job in mould making process. • Use different hand tools in mould making process. • Identify different measuring instrument which are used in the measurement of the mould parts. • Select appropriate measuring instrument for the measurement of the mould parts. • Identify dimensions from mould drawing for inspection. • Perform measurement of mould parts. • Describe purpose for calibration of measuring instrument. • Demonstrate setting process on different types of vices. • Perform material handling during mould making process. • Use appropriate Personal Protective Equipment (PPE) while performing different mould making operations.	White board, marker duster, laptop/PC, projector, steel ruler, micrometer, vernier caliper, radius gauge, feeler gage, Steel measuring tape, weighing balance, hammer, screw driver set, allen key hexagonal, file triangular, hacksaw, adjustable, spanner set double side, adjustable spanner, crimping tools, calculator, wrenches, pliers, cutters, striking tools, vice, clamps, snips, saws, drills and knives, two plate mould, three plate mould, compression mould, blow mould and transfer mould, safety goggles, rubber gloves, heat protecting gloves, fire extinguisher, apron, helmet, first aid box

Sr. No.	Module	Key Learning Outcomes	Equipment Required
5	**Types of moulds for plastic parts** **Theory Duration** (hh:mm) 24:00 **Practical Duration** (hh:mm) 56:00 **Corresponding NOS Code** RSC/N4703 (CPC/N5804)	• Describe the process of construction of the two plate injection mould. • Describe the process of construction of the three plate injection mould. • Describe the process of construction of mould feed system. • Describe the process of construction of the types of gate in mould. • Describe the process of construction of types of cooling system. • Describe working procedure of the different ejection system of a mould.	White board, marker duster, laptop/PC, projector, two plate mould, three plate mould, compression mould, blow mould and transfer mould CNC machine, mould polishing and assembly kit, safety goggles, rubber gloves, heat protecting gloves, fire extinguisher, apron, helmet, first aid box
6	**Operating conventional & CNC Machines** **Theory Duration** (hh:mm) 16:00 **Practical Duration** (hh:mm) 80:00 **Corresponding NOS Code** RSC/N4704 (CPC/N5805)	• Demonstrate the setting of the work piece on different machines. • Demonstrate the setting of the cutting tools on different machines. • Demonstrate working of the lathe machine. • Demonstrate working of the milling machine. • Perform grinding of the mould plates with the help of surface grinding machine. • Demonstrate operation of the cylindrical grinding. • Demonstrate troubleshooting techniques while performing operation on the conventional machines. • Demonstrate the setting of the work piece on different CNC machines. • Demonstrate the setting of the tools on CNC machines. • Perform operation on CNC Lathe machine • Demonstrate operation of CNC Milling machine	White board, marker duster, laptop/PC, projector, steel ruler, micrometer, vernier caliper, radius gauge, feeler gage, hammer, screw driver set, allen key hexagonal, file triangular, hacksaw, adjustable, calculator, vice, clamps, snips, saws, drills and knives, Lathe, Milling machine, Surface grinder, Cylindrical grinder, CNC lathe, CNC milling machine, safety goggles, rubber gloves, heat protecting gloves, fire extinguisher, apron, helmet, first aid box
7	**Mould polishing and mould assembly**	• Demonstrate polishing of the core and cavity. • Perform the polishing of the mating parts of mould.	White board, marker duster, laptop/PC, projector, steel

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Theory Duration (hh:mm) 16:00 **Practical Duration** (hh:mm) 64:00 **Corresponding NOS Code** RSC/N4705 (CPC/N5806)	• Identify different parts of the mould. • Select tools for polishing of mould. • Perform assembly of the mould, independently. • Identify the defects in assembly of mould. • Demonstrate the troubleshooting of the issues encountered while polishing of mould. • Evaluate the functioning of mould post assembly.	ruler, micrometer, vernier caliper, radius gauge, feeler gage, steel measuring tape, weighing balance, hammer, screw driver set, allen key hexagonal, file triangular, hacksaw, adjustable, spanner set double side, adjustable spanner, crimping tools, calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vice, clamps, snips, saws, drills and knives, two plate mould, three plate mould, compression mould, blow mould and transfer mould mould polishing and assembly kit, safety goggles, rubber gloves, heat protecting gloves, fire extinguisher, apron, helmet, first aid box
8	**Working effectively at work place** **Theory Duration** (hh:mm) 16:00 **Practical Duration** (hh:mm) 24:00 **Corresponding NOS Code** RSC/N4203 (CPC/N7014)	• Use appropriate communication at work place. • Apply active listening skills while interacting with others at work. • Demonstrate disciplined behavior at the workplace. • Use best practices for accurately receiving information and passing on the information. • Describe one's job responsibility accurately. • Describe hierarchy of the organisation. • Demonstrate the process of escalating grievances and problems to the appropriate authority.	White board, marker, duster, Laptop/PC, projector, flipcharts

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Interpret the organisation's working procedure. • Interpret the organisation's safety procedure. • Identify the reports formats related to his/ her job. • Create documentation related to his/ her job. • Use time management to carry out his / her daily tasks.	
	Total Duration: **Theory Duration 144:00** **Practical Duration 336:00**	**Unique Equipment Required:** White board, marker duster, laptop/PC, projector, steel ruler, micrometer, vernier caliper, radius gauge, feeler gage, Steel measuring tape, weighing balance, hammer, screw driver set, allen key hexagonal , file triangular, hacksaw, adjustable, spanner set double side, adjustable spanner, crimping tools, calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vice, clamps, snips, saws, drills and knives, two Plate mould, three plate mould, compression mould, blow mould and transfer mould, CNC machine, mould polishing and assembly kit, lathe, milling machine, grinding machine, shaper machine, CNC lathe, CNC milling machine, CNC grinding machine, safety goggles, rubber gloves, heat protecting gloves, fire extinguisher, apron, helmet, first aid box.	

Grand Total Course Duration: 480 Hours, 0 Minutes.

*(This syllabus/ curriculum has been approved by **Rubber Skill Development Council)***

Trainer Prerequisites for Job role: "Advanced Plastic Mould Manufacturing- Assistant" mapped to Qualification Pack: "RSC/Q4701 (CPC/Q5803), v1.0"

Sr. No.	Area	Details
1	**Description**	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack "RSC/Q4701 (CPC/Q5803) Version 1.0".
2	**Personal Attributes**	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well- organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field.
3	**Minimum Educational Qualifications**	Any Graduate preferably in plastic technology.
4a	**Domain Certification**	Certified for Job Role: "Advanced Plastic Mould Manufacturing- Assistant" mapped to QP: "RSC/Q4701 (CPC/Q 5803)". Minimum accepted score as per SSC guidelines is 80%.
4b	**Platform Certification**	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "MEP/ Q2601". Minimum accepted score as per SSC guidelines is 80%.
5	**Experience**	5+ years of relevant work-experience, above supervisor level.

Annexure: Assessment Criteria

Assessment Criteria	
Job Role:	**Advanced Plastic Mould Manufacturing- Assistant**
Qualification Pack Code:	**RSC/Q4701 (CPC/Q 5803)**
Sector Skill Council:	**Rubber Skill Development Council**

S. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2	The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criterion.
5	To pass the Qualification Pack, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
6	In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Assessable Outcome	Assessment Criteria	Total Mark (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
RSC/N4101 (CPC/N0411) Maintain basic health and safety practices at the workplace, 5S	PC1. Wear protective clothing / equipment for specific tasks and work conditions.	40	2.5	0.5	2
	PC2. Carry out safe working practices while dealing with hazards to ensure the safety of self and others.		2.5	0.5	2
	PC3. Keep good housekeeping practices at all times.		2.5	0.5	2
	PC4. Use the various appropriate fire extinguishers on different types of fires correctly.		2.5	0.5	2
	PC5. Demonstrate rescue techniques applied during fire hazard, demonstrate good housekeeping in order to prevent fire hazards, demonstrate the correct use of a fire extinguisher.		2.5	0.5	2
	PC6. Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals, loud noise, and Identify areas in the plant which are potentially hazardous / unhygienic in nature. Conduct regular checks with support of the maintenance team on machine health to identify potential hazards due to wear and tear of machine.		2.5	0.5	2
	PC7. Inform the concerned authorities on the potential risks identified in the processes, workplace area / layout; materials used etc., inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations.		2.5	0.5	2
	PC8. Create awareness amongst other by sharing information on the identified risks.		2.5	0.5	2
	PC9. Follow the sorting process and check that the tools, fixtures and jigs that are lying on workstations are the ones in use and un- necessary items are not cluttering the workbenches or work surfaces.		2.5	0.5	2
	PC10. Ensure segregation of waste in hazardous/ non Hazardous waste as per the sorting work Instructions.		1.5	0.5	1
	PC11. Follow the technique of waste disposal and waste storage in the proper bins as per SOP.		1.5	0.5	1
	PC12. Segregate the items which are labelled as red tag items for the process area and keep them in the correct places.		1.5	0.5	1
	PC13. Sort the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5S guidelines/ work instructions.		1.5	0.5	1
	PC14. Ensure that areas of material storage areas are not overflowing.		1.5	0.5	1

Assessable Outcome	Assessment Criteria	Total Mark (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC15. Properly stack the various types of boxes and containers as per the size/ utility to avoid any fall of items / breakage and also enable easy sorting when required.				
	PC16. Return the extra material and tools to the designated sections and make sure that no additional material/ tool are lying near the work area.		1.5	0.5	1
	PC17. Follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards.		1.5	0.5	1
	PC18.Followtheproper labelling mechanism of instruments / boxes / containers and maintaining reference files / documents with the codes and the lists.		1.5	0.5	1
	PC19.Check that the items in the respective areas have been identified as broken or damaged.		1.5	0.5	1
	PC20. Follow the given instructions and check for levelling of fluids, oils, lubricants, solvents, chemicals etc. and proper storage of the same To avoid spillage, leakage, fire etc.		1.5	0.5	1
	PC21. Make sure that all material and tools are stored in the designated places and in the manner indicated in the 5S instructions.		1.5	0.5	1
	Total		**40**	**10**	**30**
RSC/N4701 (CPC/N5802) To understand basic concepts of engineering drawing & can able to study the job drawing/ blue print & dimensional tolerances job	PC1. Interact with the head mould maker and understand the mould drawing.	**50**	7.5	2.25	5.25
	PC2. Help in planning the day's mould making activities based on the Drawing.		7.5	2.25	5.25
	PC3. Ensure availability of tools and raw materials for production in sufficient quantity as per production plan/operators instructions.		5	1.5	3.5
	PC4. Clearly understand the Drawing, Dimension and Tolerances of the individual part before making it.		5	1.5	3.5
	PC5. Understand the Assembly Drawing and Detail Drawing of Mould / Mould Parts.		5	1.5	3.5
	PC6. Ensure that the required raw material / Tools is procured from the store / Tool Crib before starting the work		5	1.5	3.5
	PC7. Understand the Tools required to execute the required Mould Making Process and ensure that the same is available in shop floor		5	1.5	3.5
	PC8. If tool is not available collect the tools from tool crib.		5	1.5	3.5

Assessable Outcome	Assessment Criteria	Total Mark (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC9. Understand the raw material like steel material for different mould parts from the drawing		5	1.5	3.5
	Total		**50**	**15**	**35**
RSC/N4702 (CPC/N5803) Assist in performing the Mould making Process by use of different types of Hand tools	PC1. Perform handling and using of different hand tools.	**50**	10	3	7
	PC2. Hands on skill and accruing practices on measurement of mould parts.		10	3	7
	PC3. Select different tools for particular job.		10	3	7
	PC4. Perform to handle the vernier Caliper, micrometer etc.		10	3	7
	PC5. Can able to set job on different types of vices.		10	3	7
	Total		**50**	**15**	**35**
RSC/N4703 (CPC/N5804) Study of types of plastics mould	PC1. Study the two plate injection mould and three plate injection mould.	**50**	20	6	14
	PC2. Study the mould feed system, types of gate.		10	3	7
	PC3. Study the different types of cooling system.		10	3	7
	PC4. Study the different ejection system of mould.		10	3	7
	Total		**50**	**15**	**35**
RSC/N4704 (CPC/N5805) Machining practice on conventional & CNC machines	PC1. To Set the work piece and Set the cutting tools.	**86.5**	10	2	8
	PC2. To operate the Lathe Machine and to perform different operation.		10	2	8
	PC3. To operate CNC Lathe.		10	2	8
	PC4. To set the work piece and Set the cutting tools.		10	2	8
	PC5. To operate the Milling machine and to perform different operation.		10	2	8
	PC6. To operate CNC Milling machine to perform different operations.		10	2	8
	PC7. To grind the mould plates and inserts using Surface Grinding machine.		10	2	8
	PC8. To operate the Cylindrical Grinding and to perform different operation.		10	2	8
	PC9. To perform Grinding on Guide Pillar and Bush.		6.5	1.5	5
	Total		**86.5**	**17.5**	**69**

Assessable Outcome	Assessment Criteria	Total Mark (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
RSC/N4705 (CPC/N5806) To study about mould polishing and mould assembly	PC1. Polish the core and cavity.	**110**	50	15	35
	PC2. Polish the mating parts of mould.		20	5	15
	PC3. Identify the mould parts.		20	5	15
	PC4. Assemble the mould independently.		20	5	15
	Total		**110**	**30**	**80**
(RSC/N 4203 (CPC/ N 7014) Effective working with others	PC1. Follow appropriate communication etiquette while working.	**13.5**	2	1	1
	PC2. Display active listening skills while interacting with others at work.		2	1	1
	PC3. Demonstrate responsible and disciplined behaviours at the workplace.		2	1	1
	PC4. Accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required.		1.5	0.5	1
	PC5. Accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt.		1.5	0.5	1
	PC6. Display helpful behaviour by assisting others in performing tasks in a positive manner, where required and possible.		1.5	0.5	1
	PC7. Consult with and assist others to maximize effectiveness and efficiency in carrying out tasks.		1.5	0.5	1
	PC8. Escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict.		1.5	0.5	1
	Total		**13.5**	**5.5**	**8**
	Grand Total	**400**	**400**	**100**	**300**
	Percentage Weightage:			**25%**	**75%**
	Minimum Pass% to qualify (aggregate):			**70%**	