Model Curriculum

Testing & Quality Control for Plastic Materials & Products – Supervisor

SECTOR: Rubber
SUB-SECTOR: Plastics Processing
OCCUPATION: Testing and Quality Control
REF ID: RSC/Q5002 (CPC/Q8104), V1.0
NSQF LEVEL: 4

Skill India

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: **'Testing & Quality Control for Plastics Materials & Products - Supervisor'** QP No. **'RSC/Q4807 (CPC/Q0105) NSQF Level 4'**

Date of Issuance: December 23, 2017

Valid up to: December 22, 2022

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

Authorised Signatory
(Rubber Skill Development Council)

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Testing & Quality Control for Plastic Materials & Products – Supervisor

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "Testing & Quality Control for Plastic Materials & Products – Supervisor", in the "Rubber" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	**Testing & Quality Control for Plastic Materials & Products – Supervisor**		
Qualification Pack Name & Reference ID	RSC/Q5002 (CPC/Q 8104), v1.0		
Version No.	1.0	**Version Update Date**	29/05/2019
Pre-requisites to Training	X Standard		
Training Outcomes	**After completing this programme, participants will be able to:** • Perform supervision for quality assurance, independently at all the stages of production by using appropriate equipment/ apparatus. • Perform supervision for the lab testing operations independently and safely by choosing appropriate test procedures. • Perform supervisory operations required post-testing, such as: recording and analyzing all test results. • Identify abnormal situations and perform timely escalation for the matters which are beyond his / her job role, to the appropriate authority as per the organisation's hierarchy. • Record and document inspection status, equipment status, batch traceability status, product testing status for the tests conducted.		

This course encompasses 5 out of 5 NOS (National Occupational Standards) of "Testing & Quality Control for Plastic Materials & Products – Supervisor" Qualification Pack issued by "Rubber Skill Development Council".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	**Introduction** **Theory Duration** (hh:mm) 16:00 **Practical Duration** (hh:mm) 8:00 **Corresponding NOS Code** Bridge Module	• Explain the developmental history of plastics. • Describe current industrial scenario of plastics and prospects. • Identify types of plastic. • Recognise major industrial associations. • Identify equipment used for plastic testing and quality control. • Describe the roles and responsibilities for a "Testing & Quality Control of Plastic Materials & Products – Supervisor".	White board, marker duster, laptop/PC, projector, flipcharts, samples – Plastic injection moulded products, plastic extruded products, plastic blow moulded products
2	**Supervise instrument readiness for in-process inspection** **Theory Duration** (hh:mm) 32:00 **Practical Duration** (hh:mm) 64:00 **Corresponding NOS Code** RSC/N5006 (CPC/Q 8109)	• Identify the instruments used for inspection during plastic production. • Select appropriate instrument for carrying out the test as per the Standard Operating Procedure (SOP). • Perform calibration of the measuring instruments used in carrying out the test. • Perform repeatability and reproducibility study of the measuring instrument used in carrying out the test. • Demonstrate the setup of appropriate equipment/ apparatus for testing as per the SOP. • Identify defective equipment/ apparatus and take action as per the SOP. • Perform verification process for scheduling preventive maintenance of the equipment.	White board, marker duster, laptop/PC, projector, steel ruler, vernier caliper, radius gauge, feeler gage, steel measuring tape, height gauge, hardness tester, weighing balance, universal testing machine, safety goggles, rubber gloves, asbestos gloves, fire extinguisher, apron, helmet, first aid box
3	**Supervise manpower readiness** **Theory Duration** (hh:mm) 24:00 **Practical Duration** (hh:mm) 72:00 **Corresponding NOS**	• Determine the inspection and testing requirement of the process as per SOP. • Determine the requirement of manpower for carrying out in-process inspection. • Determine the availability of the Quality Assurance (QA) inspectors to cover all the operational shifts as per the production plan. • Perform training sessions for the	White board, marker duster, laptop/PC, projector, steel ruler, vernier caliper, radius gauge, feeler gage, steel measuring tape, height gauge, hardness tester, weighing balance, universal testing machine, safety goggles, rubber

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Code RSC/N5006 (CPC/Q 8109)	manpower, for handling QA issues. • Assess effectiveness level of QA manpower, as per the assessment plan. • Prepare layered audit plan for in-process inspection.	gloves, asbestos gloves, fire extinguisher, apron, helmet, first aid box
4	**Supervise quality assurance process during production** **Theory Duration** (hh:mm) 24:00 **Practical Duration** (hh:mm) 72:00 **Corresponding NOS Code** RSC/N5006 (CPC/Q 8109)	• Perform in-process inspection as per SOP. • Perform the audit of the in-process inspection sheets. • Perform the audit of the production process to verify the effectiveness of in-process inspection, carried out by QA inspectors. • Determine the violations of the specified conditions during production process thru in-process inspection. • Perform recording of in-process inspection data. • Perform Statistical Process Control (SPC) on critical process parameter. • Analyze inspection data to find root cause for rejection. • Demonstrate segregation of suspected material. • Perform disposal of rejected material.	White board, marker duster, laptop/PC, projector, steel ruler, vernier caliper, radius gauge, feeler gage, steel measuring tape, height gauge, hardness tester, weighing balance, universal testing machine, safety goggles, rubber gloves, asbestos gloves, fire extinguisher, apron, helmet, first aid box
5	**Preparation for lab testing supervision** **Theory Duration** (hh:mm) 32:00 **Practical Duration** (hh:mm) 64:00 **Corresponding NOS Code** RSC/N5007 (CPC/Q 8110)	• Identify the i instruments used for Inspection during plastic production. • Select appropriate instrument for carrying out the test as per the standard operating procedure (SOP). • Perform calibration of the measuring instruments used for carrying out the test. • Perform repeatability and reproducibility study of the measuring instrument used for carrying out the test. • Demonstrate the setup of appropriate equipment/ apparatus for testing as per SOP. • Identify defective equipment/ apparatus and take action as per SOP. • Perform the verification process of scheduling preventive maintenance of the equipment.	White board, marker duster, laptop/PC, projector, steel ruler, vernier caliper, radius gauge, feeler gage, steel measuring tape, height gauge, weighing balance, universal testing machine, hot air circulating oven, contour cutter, melt flow measurement equipment, bulk density measurement apparatus, muffle furnace, constant temperature water bath, opacity tester, safety goggles, rubber gloves, asbestos gloves, fire extinguisher, apron, helmet, first aid box

Sr. No.	Module	Key Learning Outcomes	Equipment Required
6	**Manpower readiness for the lab testing** **Theory Duration** (hh:mm) 32:00 **Practical Duration** (hh:mm) 64:00 **Corresponding NOS Code** RSC/N5007 (CPC/Q 8110)	• Determine the lab testing requirement for the plastic parts ,as per the SOP. • Determine the requirement of manpower for carrying out lab testing. • Determine the availability of the lab testing inspectors, to cover all the operational shifts as per the production plan. • Perform the training sessions of the manpower, for carrying out the lab tests. • Assess effectiveness level of lab testing manpower as per the assessment plan. • Prepare audit plan for lab testing, in phases	White board, marker duster, laptop/PC, projector, steel ruler, vernier caliper, radius gauge, feeler gage, steel measuring tape, height gauge, weighing balance, universal testing machine, hot air circulating oven, contour cutter, melt flow measurement equipment, bulk density measurement apparatus, muffle furnace, constant temperature water bath, opacity tester, safety goggles, rubber gloves, asbestos gloves, fire extinguisher, apron, helmet, first aid box
7	**Supervise the lab testing** **Theory Duration** (hh:mm) 24:00 **Practical Duration** (hh:mm) 72:00 **Corresponding NOS Code** RSC/N5007 (CPC/Q 8110)	• Create plan for the lab testing considering the priority. • Perform the verification process of availability of test procedures for each testing requirement. • Assess whether the test methods are in line with the required quality and accuracy of testing. • Compare and confirm that the approved material is as per the specifications and standard defined. • Perform the audit of the lab tests to verify the effectiveness of testing carried out by lab testing inspectors. • Determine the violations of the specified conditions during audits of lab testing. • Perform study of lab testing equipment s to ensure repeatability and reproducibility of test and person conducting the test. • Assess that the testing and test results reported are true with NO manipulations. • Apply all safety norms during testing. • Perform first aid, general medication etc. as per the need.	White board, marker duster, laptop/PC, projector, steel ruler, vernier caliper, radius gauge, feeler gage, steel measuring tape, height gauge, weighing balance, universal testing machine, hot air circulating oven, contour cutter, melt flow measurement equipment, bulk density measurement apparatus, muffle furnace, constant temperature water bath, opacity tester, safety goggles, rubber gloves, asbestos gloves, fire extinguisher, apron, helmet, first aid box

Sr. No.	Module	Key Learning Outcomes	Equipment Required
8	**Conduct post-testing supervisory operation** **Theory Duration** (hh:mm) 32:00 **Practical Duration** (hh:mm) 64:00 **Corresponding NOS Code** RSC/N5008 (CPC/Q 8111)	• Perform recording of all the test results. • Calculate and report test results in the same units as requested. • Accept or reject the production lot basis the results of the test conducted. • Suggest further action on the failed sample. • Perform disposal of rejected material. • Present the lab test results to the superiors.	White board, marker duster, laptop/PC, projector, flip charts
9	**Problem identification and escalation** **Theory Duration** (hh:mm) 24:00 **Practical Duration** (hh:mm) 64:00 **Corresponding NOS Code** RSC/N5009 (CPC/Q 8108)	• Explain what is defined as a problem in an organization • Describe how to identify a problem in an organization • Describe hierarchies. • Define hierarchy in plastic part producing organization. • Describe the need for escalation in an organization. • Explain how to escalate problem in an organization.	White board, marker, duster, Laptop/PC, projector, flipcharts
10	**Reporting and documentation** **Theory Duration** (hh:mm) 24:00 **Practical Duration** (hh:mm) 64:00 **Corresponding NOS Code** RSC/N5004 (CPC/Q 8104)	• Describe the importance of documentation in industry. • Describe common documentation used in the plastic industry. • Explain what is reporting. • Describe the importance of reporting. • Describe the use of defined rules in an organization. • Understand the meaning of organization policies and guidelines. • Describe the purpose of having SOPs in an organization. • Explain work instructions used in plastic testing lab. • Define the importance of communication. • Describe communication process in industry. • Explain various problems in communication. • Explain traits of active listening.	White board, marker, duster, Laptop/PC, projector, flipcharts, sample of documentations, sample of reports, sample of procedure, sample of work instructions

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Use effective writing skill. • Explain how to resolve conflict with a team member. • Use the procedures defined by the organisation for reporting and documentation. • Prioritise and schedule the work, from pending work list.	
11	**Health and safety** **Theory Duration** (hh:mm) 24:00 **Practical Duration** (hh:mm) 64:00 **Corresponding NOS Code** Bridge Module	• Identify various hazards in a rubber industry. • Explain the health and safety requirements for a rubber industry. • Discuss requirement of Personal Protective Equipment (PPE) in rubber industry. • Identify different types of Personal Protective Equipment (PPE) used in the rubber industry. • Demonstrate the use of different Personal Protective Equipment (PPE). • Describe various emergency situations in industry. • Describe common injuries in the industry. • Describe first aid box and its constituents. • Demonstrate how to handle fire emergencies. • Demonstrate how to use a multi-purpose fire extinguisher. • Select suitable fire extinguisher as per fire type and class.	White board, marker, duster, laptop/PC + projector, flipcharts, first aid kit, sample of PPEs – safety goggle, safety shoes, safety gloves, safety hat, mask, earmuff, first aid box, fire extinguisher
	Total Duration: **Theory Duration** **288:00** **Practical Duration** **672:00**	**Unique Equipment Required:** White board, marker duster, laptop/PC, projector, steel ruler, vernier caliper, radius gauge, feeler gage, steel measuring tape, height gauge, hardness tester, weighing balance, universal testing machine, hot air circulating oven, contour cutter, melt flow measurement equipment, bulk density measurement apparatus, muffle furnace, constant temperature water bath, opacity tester, safety goggles, rubber gloves, asbestos gloves, fire extinguisher, apron, helmet, first aid box	

Grand Total Course Duration: 960 Hours, 0 Minutes.

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

Trainer Prerequisites for Job role: "Testing & Quality Control for Plastic Materials & Products – Supervisor" mapped to Qualification Pack: "RSC/Q5002 (CPC/Q 8104), 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/Q5002 (CPC/Q8104) 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- organized 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: "Testing & Quality Control for Plastic Materials & Products – Supervisor" mapped to QP: "RSC/Q5002 (CPC/Q 8104)". 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:	**Testing & Quality Control for Plastic Materials & Products – Supervisor**
Qualification Pack Code:	**RSC/Q5002 (CPC/Q 8104)**
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 (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
RSC/N5006 (CPC/N8109) Supervise quality assurance at all the stages of production	PC1. Ensure the setup of appropriate equipment / apparatus to be used for testing correctly as per ISO or any other International Standard and SOP	130	5	1	4
	PC2. Ensure that QA inspectors uses the standard certified tools such as needle and surface pyrometer, non contact pyrometer, measuring tape and protractor for checking.		5	1	4
	PC3. Ensure that all the test equipment is duly calibrated and are operational.		5	1	4
	PC4. Identify defective equipment/apparatus and take action as per SOP.		5	1	4
	PC5. Ensure that maintenance schedule of the equipment is compiled well.		5	1	4
	PC6. Ensure that the QA inspectors are available to cover the shift.		5	1	4
	PC7. Arrange for the substitute in case of absenteeism of any team member due to any injury, accident, leave etc.		5	1	4
	PC8. Delegate the task and inform the team members well in time about the QA requirements.		5	1	4
	PC9. Train the manpower for handling QA issues.		6	2	4
	PC10. Ensure QA inspectors conducts required mandatory process checks at each of his assigned unit/area.		6	2	4
	PC11. Ensure QA checks the compliance of specification by the operators at their assigned areas.		6	2	4
	PC12. Ensure that QA inspectors fill up the audit sheets in their allotted area of inspection.		6	2	4
	PC13. Ensure that any violation of the specified conditions are reported to area supervisor and the product produced in that unit held up for Technical departments disposition		6	2	4
	PC14. Ensure that QA inspectors records the details of the checks made indicating the process detail, date, time, batch number, temperature, pressure readings as per the guidelines issued by technical on the process being checked		7	3	4
	PC15.Ensure QA system compliances.		7	3	4
	PC16.Ensures strict compliance on technical specification and prevents off specification process is stopped till corrections are made		7	3	4
	PC17. Ensure that the product made during the wrong/incorrect process conditions are held up for technical department's disposition.		7	3	4
	PC18.Follow up on QA violations with production supervision.		7	3	4

Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC19.Record and maintain data as per company standards (SOP).		5	1	4
	PC20. Prepare a summary sheet of the shift performance of the QA inspectors under his supervision and indicates the assistance provided to QA inspectors and production management in resolving any issues affecting production		5	1	4
	PC21. Ensure that reports/records are accurate and clear		5	1	4
	PC22. Take up the results of the findings with supplier/appropriate authority.		5	1	4
	PC23. Inform concerned persons for rectifications, if needed in specified time limit		5	1	4
	Total		**130**	**38**	**92**
RSC/N5007 (CPC/N8110) Supervise the lab testing operations	PC1. Ensure that test procedures for each testing requirement are available in writing –applicable current revisions must be available.	**125**	10	3	7
	PC2. Carry out tests ASTM or as per company SOP.		10	3	7
	PC3. Ensure that test methods confirms to the required quality and accuracy of testing.		10	3	7
	PC4. Ensure that the approved materials confirm to the specifications and standard		10	3	7
	PC5. Ensure that Gage studies are conducted regularly to ensure repeatability and reproducibility of test and person conducting the test		10	3	7
	PC6. Return the sample to the source if the testing is complete and the results discussed and NO more testing is required		10	3	7
	PC7. Ensure NO short cuts are employed while testing and the testing and test results reported are true with NO manipulations		10	3	7
	PC8. Ensure that team members adhere to all safety norms (such as wearing protective gloves, masks, goggles and safety shoes).		10	3	7
	PC9. Arrange for hospitalization in case of accident.		9	2	7
	PC10. Manage first aid, general medication etc. of the team members.		9	2	7
	PC11.Avoid spillage and in case of spillage occur, follow safety measures as laid down by safety department.		9	2	7
	PC12.Comply with health, safety, environment guidelines and regulations in accordance with international/national standards or the organizational standards.		9	2	7

Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC13. Have shower and eye washing equipment in case any chemical burnt /other mishaps.		9	2	7
	Total		**125**	**34**	**91**
(RSC/N5008 (CPC/N8111) Conduct post- testing supervisory operation	PC1. Ensure that test procedures for each testing requirement are available in writing –applicable current revisions must be available.	**125**	10	3	7
	PC2. Carry out tests ASTM or as per company SOP.		10	3	7
	PC3. Ensure that test methods confirms to the required quality and accuracy of testing.		10	3	7
	PC4. Ensure that the approved materials confirm to the specifications and standard.		10	3	7
	PC5. Ensure that Gage studies are conducted regularly to ensure repeatability and reproducibility of test and person conducting the test.		10	3	7
	PC6. Return the sample to the source if the testing is complete and the results discussed and NO more testing is required.		10	3	7
	PC7. Ensure NO short cuts are employed while testing and the testing and test results reported are true with NO manipulations.		10	3	7
	PC8. Ensure that team members adhere to all safety norms (such as wearing protective gloves, masks, goggles and safety shoes).		10	3	7
	PC9. Arrange for hospitalization in case of accident.		9	2	7
	PC18. Manage first aid, general medication etc. of the team members.		9	2	7
	PC10.Avoid spillage and in case of spillage occur, follow safety measures as laid down by safety department.		9	2	7
	PC11.Comply with health, safety, environment guidelines and regulations in accordance with international/national standards or the organizational standards.		9	2	7
	PC12.Have shower and eye washing equipment in case any chemical burnt/other mishaps.		9	2	7
	Total		**125**	**34**	**91**

Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
RSC/N5009 (CPC/N8108) To carry out problem identification and escalation	PC1. Identify defects/ indicators of problems.	150	6	2	4
	PC2. Identify any wrong practices that may lead to problems.		6	2	4
	PC3. Identify practices that may impact the final product quality.		6	2	4
	PC4. Identify if the problem has occurred before.		6	2	4
	PC5. Identify other operations that might be impacted by the problem.		6	2	4
	PC6. Ensure that no delays are caused as a result of failure to escalate problems.		6	2	4
	PC7. Take appropriate materials and sample, conduct tests and evaluate results to establish reasons to confirm suspected reasons for non-conformance (where required).		8	2	6
	PC8. Consider possible reasons for identification of problems.		8	2	6
	PC9. Consider applicable corrections and formulate corrective action.		8	2	6
	PC10. Take Formulate action in a timely manner.		8	2	6
	PC11.Communicate problem/remedial action to appropriate parties.		7	1	6
	PC12. Take corrective action in a timely manner.		7	1	6
	PC13. Take corrective action for problems identified according to the company procedures.		7	1	6
	PC14. Report/document problem and corrective action in an appropriate manner.		7	1	6
	PC15. Monitor corrective action.		7	1	6
	PC16. Evaluate implementation of corrective action taken to determine if the problem has been resolved.		7	1	6
	PC17.Ensure that corrective action selected is viable and practical.		5	1	4
	PC18. Ensure that correct solution is identified to an identified problem.		5	1	4
	PC19. Take corrective action for problems identified according to the company procedures.		5	1	4
	PC20. Ensure that no delays are caused as a result of failure to take necessary action.		5	1	4
	PC21. Escalate problem as per laid down escalation matrix.		5	1	4
	PC22. Escalate the problem within stipulated time.		5	1	4
	PC23. Escalate the problem in an appropriate manner.		5	1	4

Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC24. Ensure that no delays are caused as a result of failure to escalate problems.		5	1	4
	Total		**150**	**34**	**116**
RSC/N5004 (CPC/N8104) To carry out reporting and Documentation	PC1. Report data/problems/incidents as applicable in a timely manner.	**70**	7	1	6
	PC2. Report to the appropriate authority as laid down by the company.		7	1	6
	PC3. Follow reporting procedures as prescribed by the company.		7	1	6
	PC4. Identify documentation to be completed relating to one's role.		7	1	6
	PC5. Record details accurately an appropriate format.		7	1	6
	PC6. Complete all documentation within stipulated time according to company procedure.		7	1	6
	PC7. Ensure that the final document meets with the requirements of the persons who requested it or make any amendments accordingly.		7	1	6
	PC8. Make sure documents are available to all appropriate authorities to inspect.		7	1	6
	PC9. Respond to requests for information in an appropriate manner whilst following organizational procedures.		7	1	6
	PC10. Inform the appropriate authority of requests for information received.		7	1	6
	Total		**70**	**10**	**60**
	Grand Total	**600**	**600**	**150**	**450**
	Percentage Weightage:			**25%**	**75%**
	Minimum Pass% to qualify (aggregate):			**70%**	