

Model Curriculum

Lab Chemist (Latex)

SECTOR: RUBBER INDUSTRY
SUB-SECTOR: Latex
OCCUPATION: Lab Chemist
REF ID: RSC/Q0302, V2.0
NSQF LEVEL: 5



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: '**Lab Chemist (Latex)**'
QP No. '**RSC/Q0302 NSQF Level 5**'

Date of Issuance: August 09, 2019

Valid up to: June 18, 2020

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



Authorised Signatory
(Rubber Skill Development Council)

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Lab Chemist (Latex)

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Lab Chemist (Latex),” in the “Rubber” Sector/Industry and aims at building the following key competencies amongst the learner.

Program Name	Lab Chemist (Latex)		
Qualification Pack Name & Reference ID	RSC/Q0302, v2.0		
Version No.	2.0	Version Update Date	16/08/2019
Pre-requisites to Training	Diploma		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Prepare lab testing equipment for latex products testing. • Perform lab testing for latex products at various stages of production. • Apply housekeeping techniques for maintaining cleanliness at workplace. • Perform reporting and documentation for lab testing operations. • Perform quality checks on lab testing activities. • Apply appropriate communication techniques at workplace. • Escalate the identified problems at the workplace to the appropriate authority. • Report the daily work status to the superiors. • Comply with the health, safety and security procedures stated by the organisation. 		

This course encompasses 6 out of 6 NOS (National Occupational Standards), of “Lab Chemist (Latex)” Qualification Pack issued by “Rubber Skill Development Council.”

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	Introduction of lab chemist - latex Theory Duration (hh:mm) 08:00 Practical Duration (hh:mm) 08:00 Corresponding NOS Code Bridge Module	<ul style="list-style-type: none"> Describe various stages of rubber developmental history. Explain current industrial scenario of rubber and its prospects in future. Identify different types of rubber. Describe usage of rubber for making different products. Recognise major industrial associations in rubber industry and their functions. Identify equipment used for the latex lab testing. Describe role and responsibilities of a lab chemist (latex). 	Samples – RSS sheets, crepe rubber, TSR rubber, synthetic rubber, reclaimed rubber, rubber latex parts – 10 different types
2	Preparation for Lab testing for latex products Theory Duration (hh:mm) 32:00 Practical Duration (hh:mm) 40:00 Corresponding NOS Code RSC/N0308	<ul style="list-style-type: none"> Describe the sample selection process as per the organisation’s SOP. Select sample for testing as per sampling plan. Describe the importance of identification and traceability. Identify the sample by labelling as per Standard Operating Procedure (SOP). Explain the implication of sample contamination. Demonstrate steps as per organisation’s SOP for maintaining integrity of the test sample. Interpret Lab chemical’s Material Safety Data Sheet (MSDS) being used in the tests. Demonstrate storage of the samples for future testing as per SOP. Describe the requirements to carry out to test latex, such as Specify Gravity, Volatile loss, Moisture, Particle size, Ash Content, Melting Point, Boiling Point, Softening Point, pH, etc. Describe tests requirements to carry out Volumetric, Gravimetric or Instrumental tests. Describe the process to carry out visual examination including tests with respect to appearance/colour and odour. Describe the requirements to carry out test such as: <ul style="list-style-type: none"> - Dispersion, - Cure characteristic properties, 	Flask, beaker and other lab apparatus, chemicals for rubber latex testing, rubber latex product specific testing equipment, like – tensile tester, ozone tester, muffle furnace, melting point tester, ash content testing equipment, wallace plastimeter, high voltage insulating testing machine, abrasion tester, environmental chambers, specific gravity tester, thickness gauge, safety goggle, safety shoes, safety gloves, mask

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> - Rheometry, - Mooney viscosity, - Hardness, - Tensile strength, - Elongation, Modulus, Tear, - Low temperature properties, - Ozone resistance, - Aging properties, - Abrasion resistance, - Rebound resilience, - Set properties, - Electrical properties, - Tear resistance, - Dispersion, - Heat build up, - Swell. • Describe the requirements to carry out test, such as: <ul style="list-style-type: none"> - Stress-Strain properties (TS, M300, EB, Tear), - Abrasion Resistance (Volume Loss), - Set properties (compression, Tension, permanent etc.), - Fatigue test (crack initiation, crack growth), - Rebound Resilience, - Hardness Testing (Shore A/Shore D), - Hysteresis properties, • Determine the most appropriate equipment for testing as per the SOP. • Demonstrate equipment set up for testing as per SOP. • Perform calibration of the testing equipment periodically as per the SOP. • Examine the reagents and materials used for testing are of desired quality as per SOP. 	
3	Lab testing for latex products Theory Duration (hh:mm) 48:00 Practical Duration (hh:mm) 64:00 Corresponding NOS	<ul style="list-style-type: none"> • Describe the procedure to carry out tests for latex, such as: <ul style="list-style-type: none"> - Specify Gravity, - Volatile loss, - Moisture, - Particle size, - Ash Content, - Melting Point, Boiling Point, Softening Point, - pH, etc. 	Flask, beaker and other lab apparatus, chemicals for rubber latex testing, rubber latex product specific testing equipment, like – tensile tester, ozone tester, muffle furnace, melting point tester, ash content testing equipment, wallace

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Code RSC/N0308	<ul style="list-style-type: none"> • Describe the procedure to carry out Volumetric, Gravimetric or Instrumental tests. • Describe the procedure to carry out visual examination including tests with respect to appearance/colour and odour. • Describe the procedure to carry out test, such as: <ul style="list-style-type: none"> - Dispersion, - Cure characteristic properties, - Rheometry, - Mooney viscosity, - Hardness, - Tensile strength, - Elongation, Modulus, Tear, - Low temperature properties, - Ozone resistance, - Aging properties, - Abrasion resistance, - Rebound resilience, - Set properties, - Electrical properties, - Tear resistance, - Dispersion, - Heat build- up, - Swell. • Describe the procedure for carrying out test, such as: <ul style="list-style-type: none"> - Stress-Strain properties (TS, M300, EB, Tear), - Abrasion Resistance (Volume Loss), - Set properties (compression, Tension, permanent etc.), - Fatigue test (crack initiation, crack growth), - Rebound Resilience, - Hardness Testing (Shore A/Shore D), - Hysteresis properties, • Perform lab tests as per the organisation's SOP. • Record test observations with accuracy. • Describe the techniques available for test result evaluation. • Identify and use appropriate technique in evaluating result. • Determine whether to release or hold the 	plastimeter, high voltage insulating testing machine, abrasion tester, environmental chambers, specific gravity tester, thickness gauge, safety goggles, safety shoes, safety gloves, mask

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>material as per finding for further processing.</p> <ul style="list-style-type: none"> Report and discuss the test results with appropriate authority. Report matters in case of any accidents, spills etc. Perform waste disposal and left-over tested material safely as per organisation's SOP. 	
4	<p>Carry out housekeeping</p> <p>Theory Duration (hh:mm) 08:00</p> <p>Practical Duration (hh:mm) 24:00</p> <p>Corresponding NOS Code RSC/N5001</p>	<ul style="list-style-type: none"> Explain the importance and purpose of housekeeping. Describe the meaning of '5S.' Demonstrate the methodology of each 'S' in 5S philosophy of housekeeping. Identify housekeeping equipment. Demonstrate the housekeeping of machines, tools, equipment and work area with the specified equipment and material. Prepare the machines and work area for 5S audit as per the organisation's Standard Operating Procedure (SOP). 	Cleaning equipment, cleaning brush, broom, cleaning agents/ solvents, water, wiping cloth
5	<p>Reporting and documentation</p> <p>Theory Duration (hh:mm) 08:00</p> <p>Practical Duration (hh:mm) 16:00</p> <p>Corresponding NOS Code RSC/N5002</p>	<ul style="list-style-type: none"> Explain the importance of documentation. Explain the importance of reporting. Create reports for operations related issues. Describe policies and guidelines related to reporting in rubber industry Describe the purpose of procedures in an organization. Describe the different work instructions related to operations and process to follow. Describe the principles of effective communication at workplace. Explain the ways of overcoming general problems encountered in communication at workplace. Describe the traits of active listening. Demonstrate the best practices used for good writing skill while writing any piece of information. Describe the process of resolving conflict with a team member. Determine priority of work from the pending work list as per the work management principles. 	Sample of the documentations, sample of the reports, sample of the procedure, sample of work instructions
6	Quality Checks	<ul style="list-style-type: none"> Describe the need of quality control in lab testing. 	ISO 17025:2017 standard, NABL

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Theory Duration (hh:mm) 16:00 Practical Duration (hh:mm) 24:00 Corresponding NOS Code RSC/N5003	<ul style="list-style-type: none"> Describe the requirement of lab quality standard, such as: <ul style="list-style-type: none"> ISO 17025:2017 NABL standard Select appropriate techniques for quality control in lab testing. Perform quality control during lab testing as per SOP defined by the organisation. Describe the purpose of calibration. Perform calibration of the measuring equipment available in the lab. Describe purpose and importance of repeatability and reproducibility (R&R) study in lab quality effectiveness. Perform repeatability and reproducibility (R&R) for lab instruments as per defined frequency. Identify issues generated during lab testing process. Describe implication of quality issues generated during lab testing. 	standard
7	Problem identification and escalation Theory Duration (hh:mm) 08:00 Practical Duration (hh:mm) 16:00 Corresponding NOS Code RSC/N5004	<ul style="list-style-type: none"> Describe regular problems encountered during a rubber hose extrusion process, such as: <ul style="list-style-type: none"> Instrument maintenance issue Test chemical non-availability Manpower non-availability Quality issue in test chemical Explain how to deal with various problems during the lab testing process. Describe the purpose of hierarchy in any rubber manufacturing organisation. Describe the purpose of problem escalation. Explain the process of escalating a problem during the lab testing process. 	Measuring instrument with maintenance issue, lab chemical with quality issue
8	Carry out health and safety Theory Duration (hh:mm) 12:00 Practical Duration (hh:mm) 18:00 Corresponding NOS Code RSC/N5007	<ul style="list-style-type: none"> 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 the rubber industry. Describe common injuries in the rubber 	Sample of PPEs – safety goggles, safety shoes, safety gloves, mask, earmuff, first aid box, fire extinguisher, eye-wash station.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		industry. <ul style="list-style-type: none"> List the constituents of a first-aid box. Assess and ensure availability of lab safety accessories, such as - eye wash station. Demonstrate how to handle fire emergencies. Select suitable fire extinguisher as per fire type and class. Demonstrate how to use a multi-purpose fire extinguisher. 	
	Total Duration: Theory Duration 140:00 Practical Duration 210:00	Unique Equipment Required: Flask, beaker and other lab apparatus, chemicals for rubber latex testing, rubber latex product specific testing equipment, like – tensile tester, ozone tester, muffle furnace, melting point tester, ash content testing equipment, wallace plastimeter, high voltage insulating testing machine, abrasion tester, environmental chambers, specific gravity tester, thickness gauge, measuring instrument with maintenance issue, lab chemical with quality issue, cleaning equipment, cleaning brush, broom, cleaning agents/ solvents, water, wiping cloth, safety goggle, safety shoes, safety gloves, mask, eye-wash station. Classroom aids (White board + marker) or (Blackboard + chalk), duster, (Laptop/PC + Projector), flipcharts, participant handbook	

Grand Total Course Duration: 350 Hours, 0 Minutes.

(This syllabus/ curriculum has been approved by [Rubber Skill Development Council](#))

Trainer Prerequisites for Job role: “Lab Chemist (Latex)” mapped to Qualification Pack: “RSC/Q0302, v2.0.”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ <u>RSC/Q0302 Version 1.0</u> ”.
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 rubber or polymer.
4a	Domain Certification	Certified for Job Role: “ <u>Lab Chemist (Latex)</u> ” mapped to QP: “ <u>RSC/Q0302 Version 2.0</u> ”. Minimum accepted score as per SSC guidelines is 80%.
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “ <u>Trainer</u> ,” mapped to the Qualification Pack: “ <u>MEP/ Q2601</u> ”. Minimum accepted score as per SSC guidelines is 80%.
5	Experience	5+ years of relevant work-experience, above supervisor level.

Note: Please refer to the QP PDF for the Assessment Criteria.