Model Curriculum

Line Assembler – Telecom Products

SECTOR: TELECOM
SUB-SECTOR: HANDSET
OCCUPATION: COMMUNICATION ELECTRONICS
REF ID: TEL/Q2502, V1.0
NSQF LEVEL: 4

Skill India
कौशल भारत-कुशल भारत

Telecom Sector Skill Council

N·S·D·C National Skill Development Corporation
Transforming the skill landscape

Certificate

COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

TELECOM SECTOR SKILL COUNCIL

for

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: 'Line Assembler - Telecom Products'
QP No. '**TEL/Q2502 NSQF Level 4**'

Date of Issuance: **Nov 10th, 2017**

Valid up to*: **Nov 10th , 2021**

**Valid up to the next review date of the Qualification Pack or the 'Valid up to' date mentioned above (whichever is earlier)*

Authorised Signatory
(Telecom Sector Skill Council)

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Line Assembler – Telecom Products

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "Line Assembler – Telecom Products", in the "Telecom" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	**Line Assembler – Telecom Products**		
Qualification Pack Name & Reference ID. ID	TEL/Q2502, v1.0		
Version No.	1.0	**Version Update Date**	24-01-2018
Pre-requisites to Training	ITI/Diploma or Qualified on Handset Repair Engineer QP with 1 yr exp.		
Training Outcomes	**After completing this programme, participants will be able to:** • **Preparing workspace for assembly operations:** arranging of components /parts and assembly bench also arranging tools and equipment's required for assembly. • **Assembly operations in production line:** performing assembly operation of telecom devices/products and its post assembly activities • **ESD Safe Procedures and Practices:** understand and perform safe procedures while handling ESD sensitive components, sub-assemblies and product. • **Health and Safety:** understand and compliance to the industry norms wrt. the safety of self and equipment's.		

This course encompasses 4 out of 4 National Occupational Standards (NOS) of 'Line Assembler – Telecom Products" Qualification Pack issued by "Telecom Skill Council of India".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	**Introduction to basic electronics and PCB** **Theory Duration** (hh:mm) 10:00 **Practical Duration** (hh:mm) 00:00 Corresponding **NOS Code** NA	• Understand the fundamentals of electronics • Understanding various Active & Passive components and also about Resistors, capacitors, inductors and colour coding of capacitors and resistors. • Understand Diode – Switch and rectifier, Transistor – amplifier and switch, Logic Gates • Basic knowledge of electronic circuits and functions (transmitters, receivers, switches, power supplies, amplifiers, multiplexers, couplers, registers, memory and all RF circuits in telecom equipment • Introduction to PCB • Multi layered PCB – important concepts • Understanding the properties of copper – clad laminates (CCL), layout design and planning • Cleaning of Boards before pattern transfer	NA
2	**Preparing Workspace for assembly operations** **Theory Duration** (hh:mm) 25:00 **Practical Duration** (hh:mm) 25:00 **Corresponding NOS Code** TEL/N2506	• Drawing correct components from the store by understanding different types of electronic parts/ components. • safe handling practices of electronic components • Identifying the tools and equipment's after understanding the types of mechanical parts like screws, nuts, securing clips and their applicability • Applicability of basic assembly tools and range of hand tools • Types of semi-automatic tools used for electronics components fitment/ forming/ preparation like thermal wire strippers, adjustable electronic board holders, led free soldering tools, precision screw driver set, work station. • Different types of consumables used for soldering and their applicability	• Complete Knock Down Kits for handsets/smartphones • Workbench (ESD Safe) - Tools & Equipment (Precision Screwdrivers, Soldering Station (temp control), Solder, flux, jumper wires, cutter, tweezer, wire strippers etc),Fume extractor, Flux, Sponge, Brass wool (for bit cleaning), ESO Brush (only at cleaning Stage),IPA, lint free cloth, automatic screwing machine

Sr. No.	Module	Key Learning Outcomes	Equipment Required
			• Anti-Static arrangements (Anti-Static mats, Anti-static aprons, wrist straps, anti-static gloves etc)
3	**Assembly operations in production line** **Theory Duration** (hh:mm) 30:00 **Practical Duration** (hh:mm) 50:00 **Corresponding NOS Code** TEL/N2507	• Ascertain availability of all parts/components, tools and equipment's of telecom devices/ products • Knowledge on Basic units of measurement used in Voltage, current, resistance and power measurements • work on basic assembly tools and range of hand tools • Understand basic concepts of shop floor work productivity including waste reduction, efficient material usage and optimization of time. • Handling of critical parts during assembly and consumables • Hands-on with basic soldering techniques, type of soldering defects, their effect on performance and re-work process • Handling of different kinds of electronic parts/components & connectors and understanding of specifications • Understand Handset Assembly operation stages • Undertake assembly operation • Fire-up the handset by uploading OS and core Apps	• All equipment as mentioned in Sl 2 above • OS and App upload setup
4	**RF Measurements & Electronic Component Specifications & Testing** **Theory Duration** (hh:mm) 10:00 **Practical Duration** (hh:mm) 30:00 **Corresponding NOS Code** TEL/N2507	• Understand Electronic Component Specifications & undertake Testing • Undertake RF Measurement and use of related equipment's (Network Analysers, Spectrum Analysers, Signal Generators, Power meters, Oscilloscopes) to ascertain performance of assembled handset	RF Test setup (Signal Generators, Analysers, meters etc)
5	**ESD safe procedures and practices** **Theory Duration**	• Basics of ESD and it's effects on electronic components/performance • Classification of ESD materials	• Anti-Static mats • Anti-static aprons • wrist straps • Anti-static gloves

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	(hh:mm) 20:00 **Practical Duration** (hh:mm) 40:00 **Corresponding NOS Code** TEL/N2508	• Documents that refer to ESD safety in workplace • ESD safety procedures during the assembly operations and safe handling ESD sensitive components, sub-assemblies and product • Levels of Electrostatic voltage generation during normal working environment on the shop floor like walking on various floors while soldering, cleaning etc. • Grounding paths and various methods/accessories used for grounding in the work area • Relevance of safe handling, storage/ stacking of parts, assembly/ sub-assemblies to avoid/prevent ESD failures • Basics of conducting ESD audits on various facility like work tables, flooring, straps, aprons, static/anti-static packaging etc. • relevance of safe handling, storage/ stacking of parts, assembly/ sub-assemblies to avoid/prevent ESD failures	
6	**Health & Safety** **Theory Duration** (hh:mm) 10:00 **Practical Duration** (hh:mm) 15:00 **Corresponding NOS Code** TEL/N2509	• Understand different safety Equipment's and their use/applicability • Organizational set up for work safety • General cause of accident and hazards • Importance of Safe working practice • Importance of General health • Reporting Procedure for safety hazards • Different types of firefighting Equipment's and their applicability in relation to the type of fire • Rescue techniques • Electrical safety practices • Read & understand Instructions and charts and signage	
7	**Industrial Education** **Theory Duration** (hh:mm) 10:00 **Practical Duration** (hh:mm) 10:00	• Communicate with Colleagues, peers and supervisor and stake holders • Liaising and Coordination skills • Listen effectively and orally communicate information accurately • QC Tools • Maintenance procedures and basic maintenance management \Objectives • Routine, Preventive Predictive, and Break down maintenance	NA

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Corresponding NOS Code NA	• Basic Store management • Industrial Act, Company Standards • ERP and Log sheet / Log book • Importance of standard operating procedure	
8	**Soft Skills** **Theory Duration** (hh:mm) 5:00 **Practical Duration** (hh:mm) 10:00 **Corresponding NOS Code** NA	• Outline and explain grooming guidelines with respect to a handset repair engineer • Understand the importance of grooming • Demonstrate professional grooming guidelines with respect to a handset repair engineer • Identify and understand the need for effective communication as a handset repair engineer • Understand and demonstrate effective process of communication at your work place • Demonstrate different types of communication • Demonstrate effective listening skills in your day-to-day life • Outline and explain and effective time management techniques and its benefits • Identify and time wasters time wasters from you daily schedule • Demonstrate effective time management skills by using building blocks	NA
	Total Duration **Theory Duration 120:00** **Practical Duration 180:00**	**Unique Equipment Required:** Laptop/PC, white board, marker, projector, first aid kit	

Grand Total Course Duration: **300Hours, 0 Minutes**

*(This syllabus/ curriculum has been approved by **Telecom Sector Skill Council)***

Trainer Prerequisites for Job role: "Line Assembler -Telecom Products" mapped to Qualification Pack: "TEL/Q2502, v1.0"

Sr. No.	Area	Details
1	**Description**	Line assembler is responsible for assembly of handsets and telecom equipment various stages of the production/ assembly line operations adhering to the stages/ process which are pre-defined. The outcome of the activity is fully/ partially assembled unit. The job includes assembly of electronic boards, components and related accessories using relevant tools as per work instructions and product specification drawings.
2	**Personal Attributes**	This job requires the individual to have technical appreciation of the processes, ability to understand technical details, logical thinking and clear approach to the defined processes with an eye for details. Individual needs to be focused, process oriented and should have ability to work with concentration during the shift hours.
3	**Minimum Educational Qualifications**	ITI/Diploma
4a	**Domain Certification**	Certified for Job Role: "Line Assembler – Telecom Products "mapped to QP: "TEL/Q2502, Version No. 1.0". Minimum accepted score as per respective TSSC guidelines.
4b	**Platform Certification**	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "MEP/Q0102, Version No. 1.0". Minimum accepted score as per respective SSC guidelines.
5	**Experience**	• The trainer should be certified by TSSC as 'Train the Trainer' and Assessor. • Worked on the shop floor of mobile manufacturing plant i.e. assembly of products for a minimum of one years.

Annexure: Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role : Line Assembler - Telecom Products
Qualification Pack : TEL/Q2502
Sector Skill Council : Telecom Sector Skill Council

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. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory and skill practical part for each candidate at each examination/ training center.
5. To pass the Qualification Pack , every trainee should score a minimum 70% of aggregate marks to successfully clear the assessment.
6. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Compulsory NOS		Total Marks: 400		Marks Allocation	
Assessment Outcomes	**Assessment Criteria**	**Total Marks (400)**	**Out Of**	**Theory**	**Skills Practical**
TEL/N2506 Arrangement of components/parts and assembly bench	PC1. draw correct components from stores as per the work instructions	100	10	5	5
	PC2. demonstrate understanding of the work instructions and familiarity with the assembly instructions		10	5	5
	PC3. demonstrate arrangement of components as per the assembly instructions		10	4	6
	PC4. verify specifications of all components as per the work instructions		15	8	7
Arranging tools and equipment required for assembly	PC5. Identify and draw tools and equipment requirement as per the work instructions		20	10	10
	PC6. ascertain compliance/correctness (calibrations) wherever required		20	10	10
	PC7. ascertain proper operation of all the tools/equipment		15	7	8
	Total	100	**100**	**48**	**52**
TEL/N2507 Assembly operations of telecom devices/products	PC1. ascertain availability of all parts/ components, vis-à-vis the specifications and assembly guidelines	100	10	6	4
	PC2. ascertain availability of all tools and equipment to carry out work		10	5	5
	PC3. ascertain work safety compliance before commencing work		10	7	3
	PC4. sequence the parts and subassemblies in correct order		10	5	5

	PC5.	demonstrate ability to read technical diagrams and specifications		5	2	3
	PC6.	demonstrate basic skills of component handling, component fitment, use of basic assembly tools and mechanical fitments (special purpose screws etc)		7	3	4
	PC7.	demonstrate assembly of the parts/componens using proper process, procedures, sequence and using right tools		10	4	6
	PC8.	demonstrate basic quality check procedures		10	5	5
Post assembly activities	PC9.	cross check intermediate and end of work compliance		6	3	3
	PC10.	secure the workplace by clearing any loose/leftover consumables, spare components etc.		6	2	4
	PC11.	account for all components used and match with the inventory issues		4	2	2
	PC12.	follow store compliances in terms of return of inventory (components, parts etc.) at the end of work		4	1	3
	PC13.	document work done and account for all components as per company policy		8	3	5
	TOTAL		100	**100**	**48**	**52**
TEL/N2508 ESD safe procedures and practices	PC1.	demonstrate safe work practices as per the ESD process and protocol	100	20	10	10
	PC2.	demonstrate grounding of all components in work area		20	10	10
	PC3.	demonstrate use of ESD tools/equipment (static voltage checker, wrist straps, shoe grounders, air ionizers)		15	8	7
	PC4.	demonstrate safe cleaning & clearing practices for removal of non-essential items and equipment carrying electrostatic generating potential		15	5	10
	PC5.	demonstrate the process of packing/unpacking of electronic components in compliance to ESD processes		15	7	8
	PC6.	demonstrate safe handling of all semi-finished products after assembly operations (use of ESD free trays, conveyor lines)		15	8	7
	TOTAL		100	**100**	**48**	**52**
TEL/N2509 Health and Safety	PC1.	ensure that work is carried out in accordance with the laid down safety, security policies and procedures of the organization		10	6	4

	PC2.	ensure that site is assessed for safety and emergency readiness compliance as per company's guidelines	100	12	6	6
	PC3.	ensure electrical safety compliances and EMI/EMC hygiene requirements are met as per the guidelines		15	9	6
	PC4.	identify and correct any hazards that you can deal with safely, competently and within the limits of your authority		15	10	5
	PC5.	report any hazards that you are not competent to deal with to the relevant person in line with organizational procedures and warn other people who may be affected		12	7	5
	PC6.	follow your organizations emergency procedures promptly, calmly and efficiently		12	6	6
	PC7.	identify and recommend opportunities for improving health, safety, security to the designated person		14	8	6
	PC8.	complete any health and safety records legibly and accurately		10	5	5
	TOTAL		100	**100**	**57**	**43**