Contents

What are Occupational Standards(OS)?

➢ OS describe what individuals need to do, know and understand in order to carry out a particular job role or function

➢ OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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Introduction

Qualifications Pack - Telecom Surface Mount Technology (SMT) Technician

SECTOR: TELECOM

SUB-SECTOR: Handset

OCCUPATION: Communication Electronics

REFERENCE ID: TEL/Q2501

ALIGNED TO: NCO – 2015/Nil

Brief Job Description: Telecom SMT Technician is responsible for handling end-to-end SMT process. Core functionality includes, screen printing, component placement, reflow soldering, cleaning and inspection, including re-work to address defects. The technician will be handling high end machinery/equipment towards achieving the above functionality.

Personal Attributes: This job requires the individual to have technical appreciation of the processes, analytical skills, eye for details and work towards optimal throughput. Individual needs to be focused, process oriented and should have ability to work with concentration during the shift hours.

Qualification Pack for Telecom Surface Mount Technology (SMT) Technician

Job Details	Qualifications Pack Code	TEL/Q2501		
	Job Role	Telecom Surface Mount Technology Technician		
	Credits(NSQF)	TBD	Version number	1.0
	Sector	Telecom	Drafted on	14/06/2017
	Sub-sector	Handset	Last reviewed on	10/11/2017
	Occupation	Communication Electronics	Next review date	10/11/2021
	NSQF Clearance on	DD/MM/YYYY		

Job Role	Telecom Surface Mount Technology Technician
Role Description	Telecom SMT Technician handles all stages of SMT production line processes, including QA and re-work to address defects.
NSQF level	4
Minimum Educational Qualifications* Maximum Educational Qualifications*	ITI NA
Minimum Job Entry Age	18 Years
Experience	NIL
Applicable National Occupational Standards (NOS)	Compulsory: 1. TEL/N2503 (Screen printing of telecom boards) 2. TEL/N2504 (Component placement on telecom boards) 3. TEL/N2505 (Re-flow soldering on telecom boards) 4. TEL/N2502 (Cleaning and inspection of telecom boards) 5. TEL/N2509 (Health and safety)
Performance Criteria	As described in the relevant OS units

Qualification Pack for Telecom Surface Mount Technology (SMT) Technician

Keywords/ Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OSs, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard, which is denoted by an 'N'.
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS, they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual need in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

Definitions

Keywords/ Terms	Description
SMT	Surface Mount Technology
BGA	Ball Grid Array
PCB	Printed Circuit Board
ICs	Integrated Circuits
MSDS	Material Safety Data Sheet
ESD	Electrostatic discharge
QA	Quality Assurance
QC	Quality Checks

Acronym

National Occupational Standard
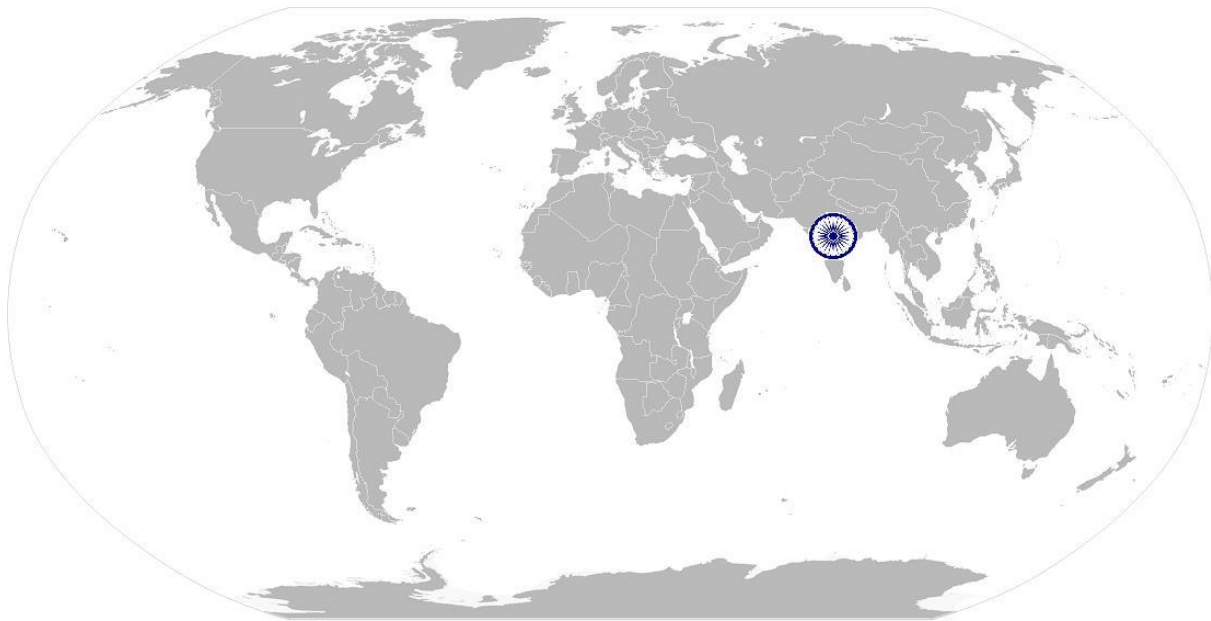
Overview

This unit is about the screen printing process of telecom boards and the associated preparatory activities.

National Occupational Standard

Unit Code	TEL/N2503
Unit Title (Task)	Screen printing of telecom boards
Description	This unit is screen printing of telecom boards and associated processes with the aim to achieve uniform deposition of solder paste on the required positions on the boards.
Scope	This unit/ task covers the following: • Baking of boards • Screen printing process

Performance Criteria (PC) w.r.t. the Scope

Element	Performance Criteria
Baking of boards	To be competent, the user/ individual on the job must be able to: PC1. ascertain the baking requirements as per the customer specifications or standard processes PC2. demonstrate proper stacking/ placement of boards in the oven rack PC3. demonstrate setting of temperature and timer of the over as per the requirement
Screen printing process	To be competent, the user/ individual on the job must be able to: PC4. identify and select correct tools and accessories (stencil matching the part/ pattern number vis-à-vis the PCB for screen printing, squeeze as per PCB size, correct solder paste/ combination as per the specifications) PC5. demonstrate proper cleaning of the stencil, before and after use, using the specified process and solvents PC6. demonstrate process for even deposition of paste on boards PC7. demonstrate process of properly thawing the solder pastes and setting of solder paste parameters as per the specifications PC8. demonstrate correct positioning of stencil, solder paste & squeeze and related parameters in the screen printer and undertake screen printing operation PC9. carry out paste thickness measurement as part of post printing process and check the thickness for conformance to the specification

Knowledge and Understanding (K)

A. Organizational Context (Knowledge of the company / organization and its processes)	The user/ individual on the job needs to know and understand: KA1. process and procedures for drawing stores, drawings, specification and their safe keeping KA2. risk and impact of not following defined procedures/ work instructions and timelines. KA3. escalation matrix for reporting identified incidents, troubles and/ or emergencies KA4. records to be maintained and implications of non-maintenance of the same KA5. SHE and OHS guidelines and regulations as per company's norms
B. Technical knowledge	The user/ individual on the job needs to know and understand: KB1. impact of moisture on PCBs and relevance of baking KB2. importance of selecting soldering paste with desired characteristics KB3. relevance of proper thawing of soldering paste, cleaning of stencils and even application of soldering paste on the PCB KB4. impact of temperature and humidity on the process KB5. impact of proper alignment and supporting of screen by proper locating of support pins KB6. operation of screen printing machine

		KB7. importance of proper stowage of consumables
		KB8. quality requirements of PCBs like warpage issues/ fiducial mark availability etc.
Skills (S) [Optional]		
A. Core Skills/ **Generic Skills**	**Writing Skills**	
	Not applicable	
	Reading Skills	
	The user/individual on the job needs to know and understand how to:	
	SA1. read technical literature/ parameters	
	SA2. read and comprehend part/ pattern/ drawing numbers	
	SA3. read and comprehend parameters as per the project report/ chart	
	SA4. read and understand manuals, requirement documents, health and safety instructions, memos, reports etc.	
	Oral Communication (Listening and speaking skills)	
	The user/individual on the job needs to know and understand how to:	
	SA5. communicate with colleagues, peers and supervisor	
	SA6. liaising and co-ordination skills	
B. Professional skills	**Decision Making**	
	Not applicable	
	Plan and Organize	
	The user/ individual on the job needs to know and understand how to:	
	SB1. set-up the screen printing environment	
	SB2. ensure proper handling of all consumables	
	SB3. establish and undertake sequential flow of all activities leading to screen printing	
	SB4. undertake sample checks to ensure QA compliance	
	SB5. take decision on re-work, if required	
	SB6. read and comprehend/ understand equipment operations manual	
	SB7. interpret screening requirements from user specifications	
	SB8. achieve proper application of soldering paste conforming to thickness and other properties/ specifications	
	SB9. properly handle the components during operations and post completion processing/ storage	
	Customer Centricity	
	Not applicable	
	Problem Solving	
	Not applicable	
	Analytical Thinking	
	Not applicable	
	Critical Thinking	
	Not applicable	

NOS Version Control

NOS Code	TEL/N2503		
Credits (NSQF)	TBD	Version number	1.0
Industry	Telecom	Drafted on	14/06/2017
Industry Sub-sector	Handset	Last reviewed on	10/11/2017
Occupation	Communication Electronics	Next review date	10/11/2021
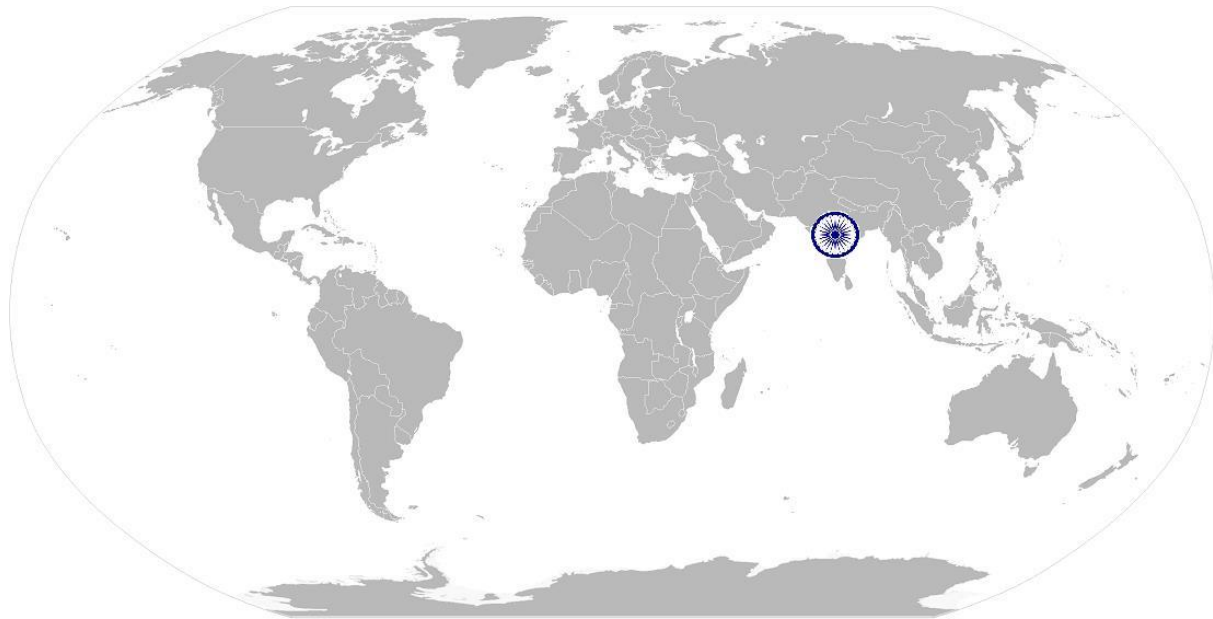
National Occupational Standard
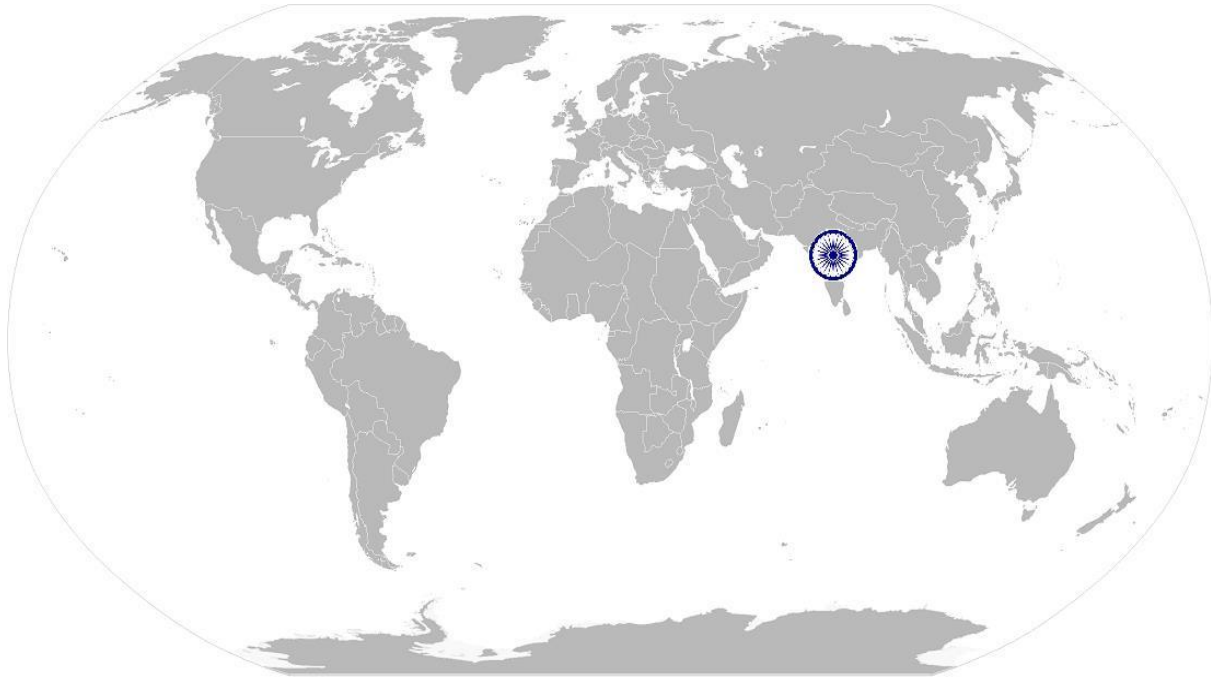
Overview

This unit is about component placement on telecom boards using chip shooter and fine pitch placer equipment.

Unit Code	TEL/N2504
Unit Title (Task)	**Component placement on telecom boards**
Description	This unit is screen printing of boards and associated processes with the aim to achieve uniform deposition of solder paste on the required positions of components on the board using chip shooter and pitch placer equipment.
Scope	This unit/ task covers the following: • Feeding placement data • Loading of chip-component rolls • Loading of chip component trays • Operating chip shooter and fine pitch placer and functional/ QA checks on the PCB

Performance Criteria (PC) w.r.t. the Scope

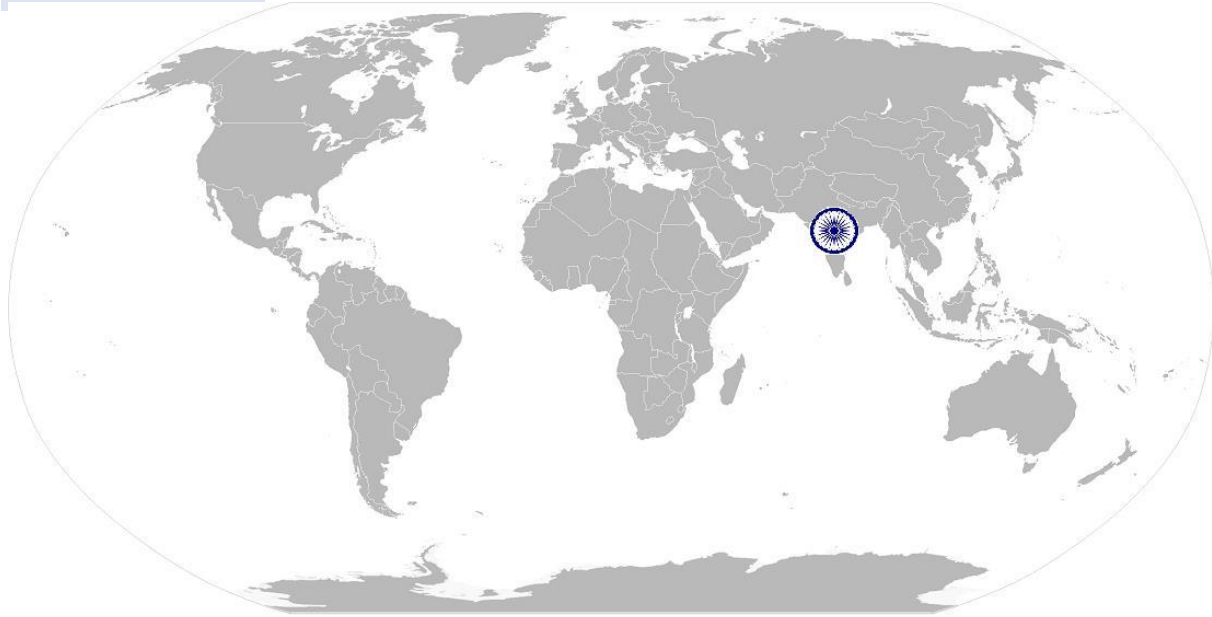| Element	Performance Criteria
Feeding placement data	To be competent, the user/ individual on the job must be able to: PC1. read specifications of board and map to the correct software version of chip shooter/ pitch placer PC2. read and interpret Gerber data, x-y coordinate data PC3. work with user interface and features of the machine/ equipment software and demonstrate the same. PC4. demonstrate data entry/ loading of component placement program to the chip shooter/ fine pitch placer
Loading of chip component rolls	To be competent, the user/ individual on the job must be able to: PC5. check operation of the roll feeder mechanism PC6. feed Gerber data and insert feeder rolls on the suggested slots of the chip shooter PC7. verify component rolls as per the Part number/ work specification PC8. demonstrate loading of chip component rolls in the feeder PC9. feed X-Y co-ordinate date for correct positioning of components
Loading of chip component trays	To be competent, the user/individual on the job must be able to: PC10. load components on the tray as per the placement program PC11. place the components with correct orientation in the feeder tray PC12. check operation of the mechanism including vision cameras
Operating chip shooter and fine pitch placer and functional/ QA checks on the PCB	To be competent, the user/individual on the job must be able to: PC13. verify correct loading of boards, program and component rolls/ trays PC14. check placement vacuum pressure PC15. check for feeder mechanism functions and ensure its error free operation PC16. operate the component placement equipment PC17. use tape board technique to verify the placement accuracy PC18. verify the correctness of components and placement (under microscope) for the first sample board

Knowledge and Understanding (K)

A. Organizational Context (Knowledge of the company/ organization and its processes)	The user/ individual on the job needs to know and understand:
	KA1. work/project management concepts and applications
	KA2. procedure for drawing components/ drawings and impact of non-adherence to the procedures
	KA3. escalation matrix for reporting non-compliance
	KA4. process and work records to be maintained
	KA5. SHE and OHS guidelines and regulations as per company's norms (precautions against solder fumes, basic electrical precautions)
B. Technical knowledge	The user/ individual on the job needs to know and understand:
	KB1. system specifications, part/ pattern numbers and Bill of Material
	KB2. operating parameters of component placement machines/ equipment
	KB3. understanding of Gerber and x-y co-ordinate data
	KB4. operations cycle of the component placement machine/ equipment
	KB5. reading/ verifying components under microscope to check correct placement and connectivity (no bend pins/ legs etc.)
	KB6. ESD precautions and hygiene
	KB7. type of SMT defects like tombstone and solder short

Skill (s) [Optional]

A. Core Skills/ Generic Skills	**Writing Skills**
	The user/individual on the job needs to know and understand how to:
	SA1. technical writing (flow, process steps etc.)
	Reading Skills
	The user/individual on the job needs to know and understand how to:
	SA2. read work specifications, drawing and part/pattern numbers
	SA3. reading of technical literature/requirements
	SA4. technical writing (flow, process steps etc.)
	SA5. read and understand manuals, work orders, health and safety instructions, memos, reports etc.
	Oral Communication (Listening and speaking skills)
	The user/individual on the job needs to know and understand how to:
	SA6. communicate with colleagues, peers, management and stakeholders
	SA7. liaising and coordination skills
B. Professional skills	**Decision Making**
	Not applicable
	Plan and Organize
	The user/ individual on the job needs to know and understand how to:
	SB1. sequence operations
	SB2. fulfil parameters for successful completion of each stage
	SB3. schedule work/ activities to comply to task time frame
	SB4. optimal programming skills required for machine/ equipment operation
	SB5. handling components tapes, tubes and trays
	SB6. checking operations of various machine components (feeder system, vacuum system, machine malfunction etc.)
	Customer Centricity
	Not applicable
	Problem Solving

	Not applicable
	Analytical Thinking
	Not applicable
	Critical Thinking
	Not applicable

NOS Version Control

NOS Code	TEL/N2504		
Credits (NSQF)	TBD	Version number	1.0
Industry	Telecom	Drafted on	14/06/2017
Industry Sub-sector	Handset	Last reviewed on	10/11/2017
Occupation	Communication Electronics	Next review date	10/11/2021
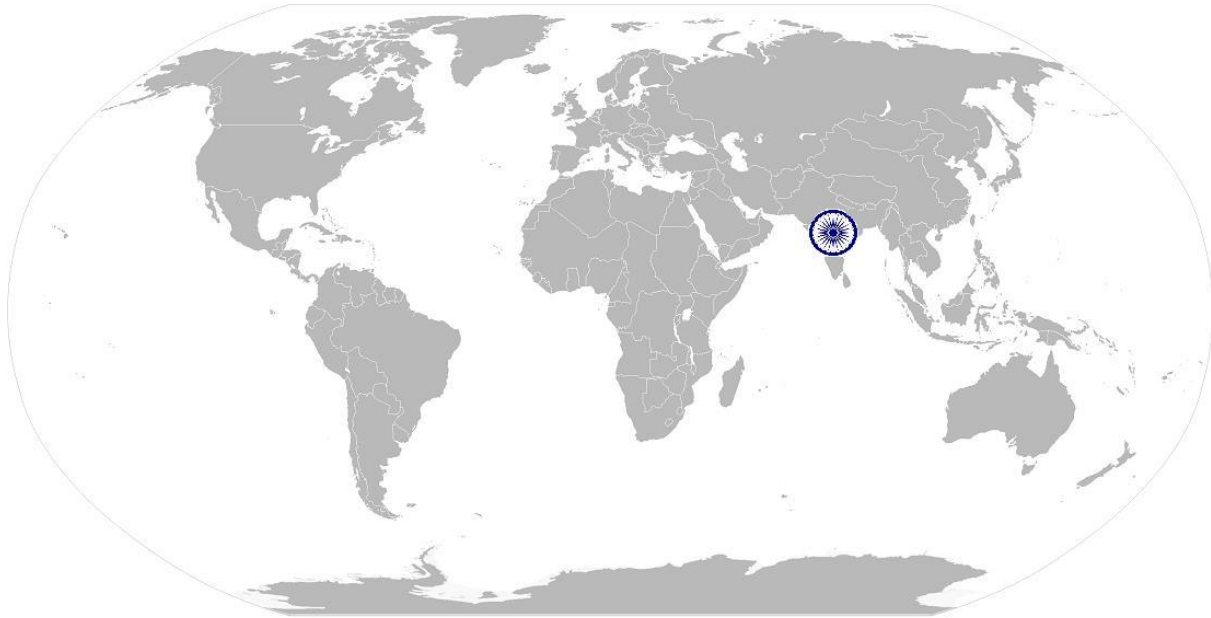
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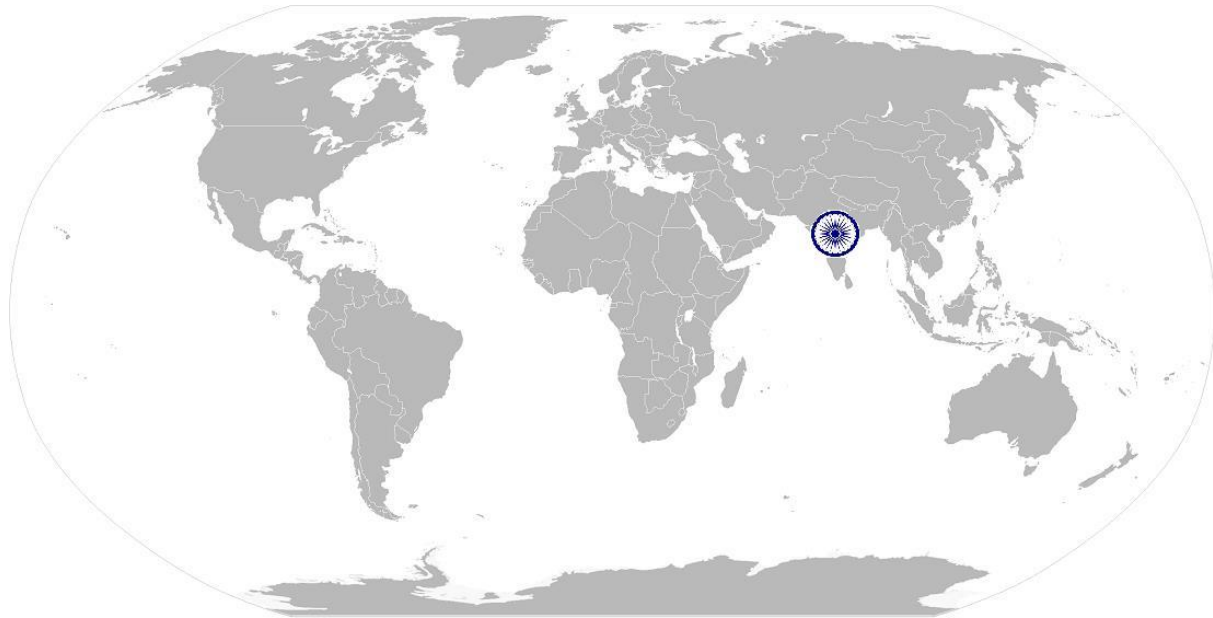
Overview

This unit is about undertaking re-flow soldering on telecom boards and all related processes.
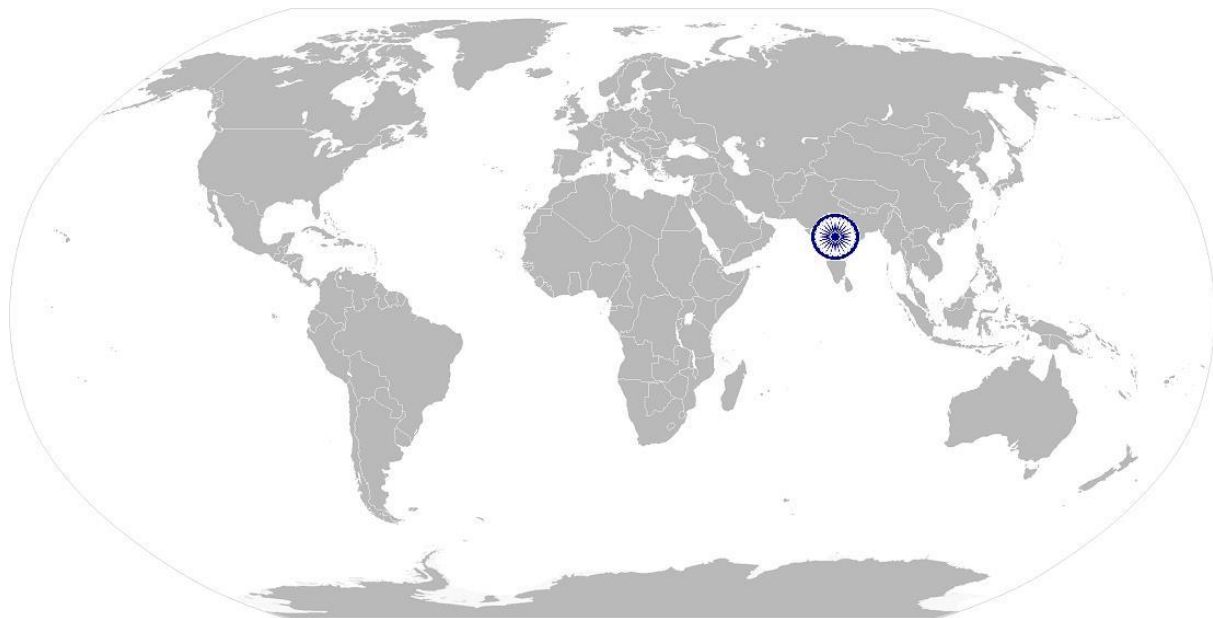
National Occupational Standard

Unit Code	TEL/N2505
Unit Title (Task)	Reflow soldering on telecom boards
Description	This unit is about re-flow soldering of telecom boards including all related processes and operations.
Scope	This unit/ task covers the following: • preparing the re-flow machine • re-flow operation on the PCB and its QA checks

Performance Criteria (PC) w.r.t. the Scope

Element	Performance Criteria
Preparing the re-flow machine	To be competent, the user/ individual on the job must be able to: PC1. interpret solder paste parameters from the datasheet and suggested parameters from re-flow machine PC2. demonstrate loading of parameters in the re-flow machine PC3. demonstrate passing a sample PCB through the re-flow machine, with reading being recorded using thermal probes PC4. match the readings with the desired outcome and undertake corrective settings
Re-flow operation on the PCB and its QA checks	To be competent, the user/ individual on the job must be able to: PC5. undertake setting of machines is set as per the parameters as ascertained during the preparatory process PC6. prepare and pass the loaded PCB (with solder and components placed) through the re-flow machine PC7. safely remove the PCB at the end of the cycle PC8. check for any dry solder, ascertain even reflow, tombstone, de-lamination, misalignment and/ or disturbed components and any other damage to PCB

Knowledge and Understanding (K)

A. Organizational context (Knowledge of the company/ organization and its processes)	The user/ individual on the job needs to know and understand: KA1. work/ project Management concepts and applications KA2. work instructions and operating guidelines for reflow machines/ processes and impact of non-adherence to the defined processes KA3. escalation matrix for reporting an incident KA4. records to be maintained and implications of non-maintenance of the same KA5. SHE and OHS guidelines and regulations as per company's norms
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. solder characteristic at various temperature points KB2. effect of non-compliance of solder characteristic on the PCB performance KB3. setting of re-flow machine chamber temperature and PCB carrying belt speed to meet the desired characteristic. KB4. effects of dry-solder, cracked joints, voids, uneven reflow and delamination of PCB

Skill (s) [Optional]		
A. Core Skills/ Generic Skills	**Writing Skills**	
	The user/individual on the job needs to know and understand how to:	
	SA1. record performance/ test results	
	SA2. maintain proper records as per given format	
	Reading Skills	
	The user/individual on the job needs to know and understand how to:	
	SA3. read and understand technical documentation	
	Oral Communication (Listening and speaking skills)	
	The user/individual on the job needs to know and understand how to:	
	SA4. communicate with stakeholders	
	SA5. liaison and coordination skills	
B. Professional Skills	**Decision Making**	
	Not applicable	
	Plan and Organize	
	The user/individual on the job needs to know and understand how to:	
	SB1. setup re-flow process environment	
	SB2. setup test PCB with thermal sensors for recording parameters	
	SB3. analyze results and undertake corrective setting	
	SB4. read, understand and set-up solder parameters for re-flow process	
	SB5. design and conduct test re-flow run	
	SB6. obtain test results for analysis and corrective action	
	SB7. technical appreciation of characteristic charts and performance curves	
	Customer Centricity	
	Not applicable	
	Problem Solving	
	Not applicable	
	Analytical Thinking	
	Not applicable	
	Critical Thinking	
	Not applicable	

NOS Version Control

NOS Code	TEL/N2505		
Credits (NSQF)	TBD	**Version number**	1.0
Industry	Telecom	**Drafted on**	14/06/2017
Industry Sub-sector	Handset	**Last reviewed on**	10/11/2017
Occupation	Communication Electronics	**Next review date**	10/11/2021

National Occupational Standard
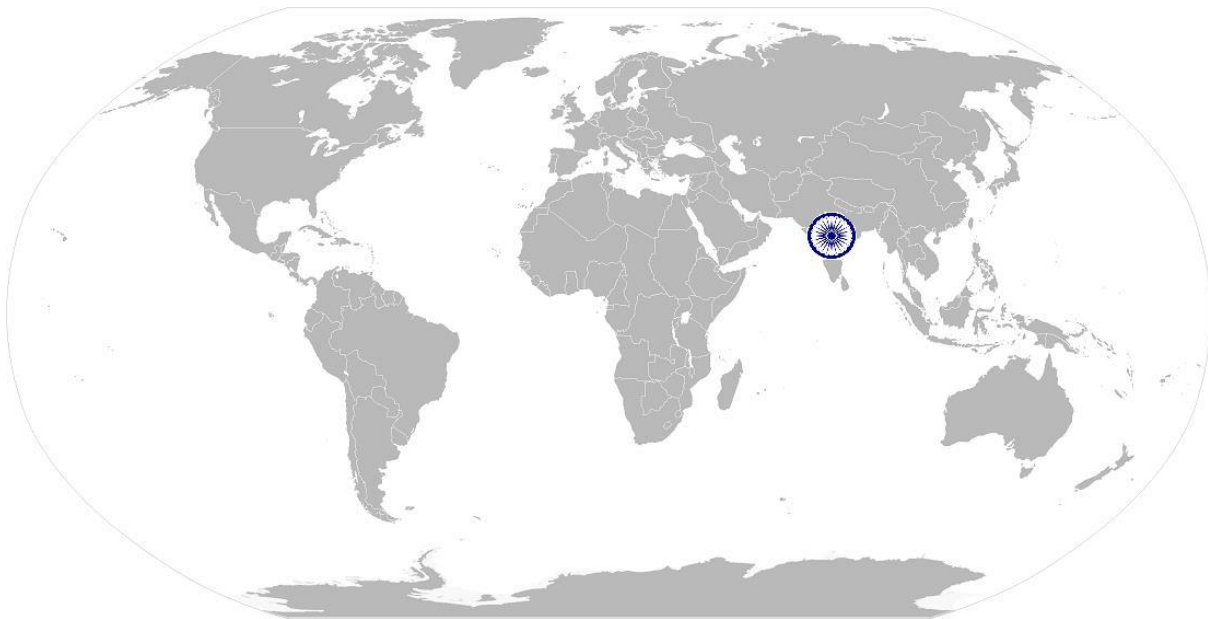
Overview

This unit is about cleaning and inspection of completed (with all components and soldering) telecom boards.

Unit Code	TEL/N2502
Unit Title (Task)	Cleaning and inspection of telecom boards
Description	This unit is about cleaning and inspection of completed telecom boards.
Scope	This unit/ task covers the following: • Cleaning of telecom boards • Inspection – quality checks and assurance

Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Cleaning of telecom boards	To be competent, the user/ individual on the job must be able to: PC1. demonstrate ability to clean the board from flux residues, white patches and/or powder, using correct and specified solvent PC2. operate vapor de-greaser (boil, rinse, vaporize and dry) to clean the boards PC3. demonstrate safe packaging and storage of telecom boards, using the specified wrapping material
Inspection – quality checks and assurance	To be competent, the user/individual on the job must be able to: PC4. demonstrate ability to check telecom boards for any missing components, wrongly mounted components (location, value) or improper placement, vis-à-vis the specifications PC5. demonstrate ability to check the telecom boards for soldering workmanship and defects, proper placement of board identifier, adherence to specifications, conformal coatings PC6. demonstrate complaint handling and escalation processes PC7. undertake checks of shop floor with respect to adherence to the processes and parameters (temperature, humidity)

Knowledge and Understanding (K)	
A. Organizational context (Knowledge of the company/ organization and its process relevant to area of responsibilities)	The user/individual on the job needs to know and understand: KA1. work/ project management concepts and applications KA2. risk and impact of not following defined procedures/ work instructions KA3. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures, fire and power failures KA4. records to be maintained and implications of non-maintenance of the same KA5. SHE and OHS guidelines and regulations as per company's norms
B. Technical knowledge	The user/ individual on the job needs to know and understand: KB1. use of cleaning chemicals/ solvents for PCBs KB2. process of cleaning KB3. use of vapor de-freezer equipment for PCB cleaning KB4. QA/QC parameters relating to the manual soldering KB5. IPC standards of soldering

National Occupational Standard
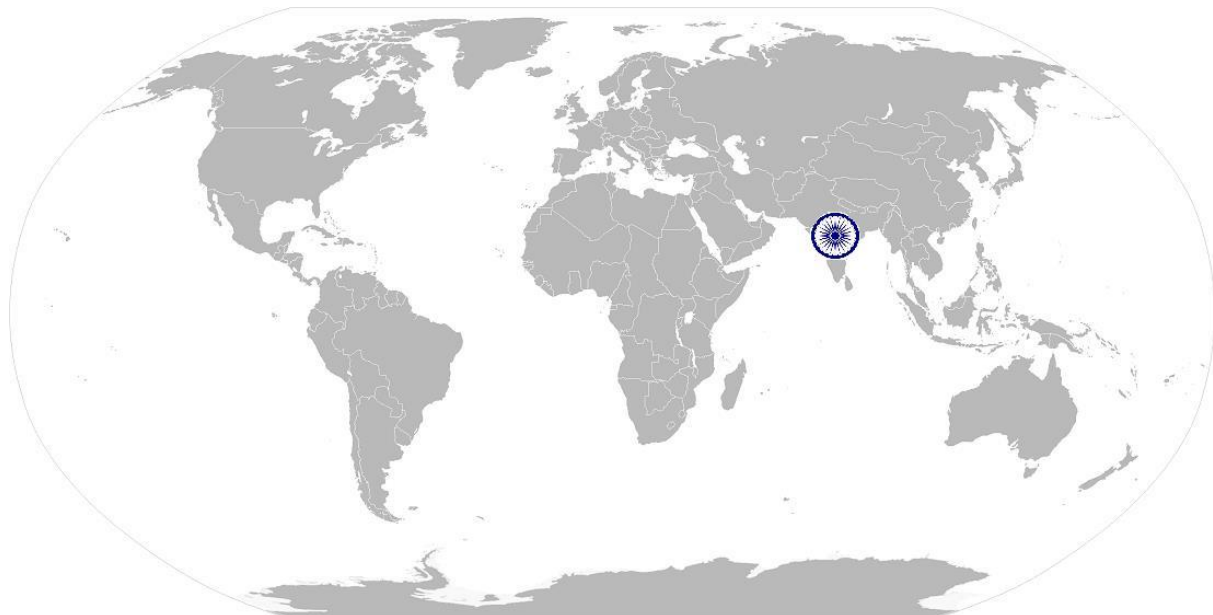
Skill (s) [Optional]	
	Writing Skills
A. Core Skills/ Generic Skills	The user/ individual on the job needs to know and understand how to: SA1. record performance/ test results SA2. maintain proper records as per given format
	Reading Skills
	The user/ individual on the job needs to know and understand and comprehend: SA3. work related technical documentation and drawings SA4. process and guidelines to be followed
	Oral Communication (Listening and speaking Skills)
	The user/ individual on the job needs to know and understand how to: SA5. communicate with stakeholders (co-workers, superiors) SA6. liaison and co-ordinate with team members and supervisors
B. Professional skills	**Decision Making**
	Not applicable
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB1. setup PCB cleaning environment SB2. apply health and safety guidelines to PCB cleaning SB3. analyze QA/QC and undertake corrective setting SB4. undertake cleaning of PCBs SB5. ascertain parameters and operational characteristics of jigs, equipment and process parameters SB6. understand QA/QC parameters and implications of their non-adherence
	Customer Centricity
	Not applicable
	Problem Solving
	Not applicable
	Analytical Thinking
	Not applicable
	Critical Thinking
	Not applicable

NOS Version Control

NOS Code	TEL/N2502		
Credits (NSQF)	TBD	Version number	1.0
Industry	Telecom	Drafted on	14/06/2017
Industry Sub-sector	Handset	Last reviewed on	10/11/2017
Occupation	Communication Electronics	Next review date	10/11/2021

National Occupational Standard

Overview

This unit is about monitoring the working environment and making sure it meets requirements for health, safety and security.

Unit Code	TEL/N2509
Unit Title (Task)	Health and Safety
Description	This unit is about monitoring the working environment and making sure it meets requirements for health, safety and security.
Scope	This unit/ task covers the following: Health & Safety: Compliance and emergency procedures

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Health & Safety: Compliance and emergency procedures	To be competent, the user/individual on the job must be able to: PC1. ensure that work is carried out in accordance with the laid down safety, security policies and procedures of the organization PC2. ensure that site is assessed for safety and emergency readiness compliance as per company's guidelines PC3. ensure electrical safety compliances and EMI/ EMC hygiene requirements are met as per the guidelines PC4. identify and correct any hazards that you can deal with safely, competently and within the limits of your authority 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 PC6. follow your organizations 's emergency procedures promptly, calmly and efficiently PC7. identify and recommend opportunities for improving health, safety, security to the designated person PC8. complete any health and safety records legibly and accurately

| Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. legislative requirements and organizations procedures for health, safety and security and role and responsibilities in relation to this KA2. what is meant by hazard, including the different types of health and safety hazards that can be found in the workplace KA3. how and when to report hazards KA4. limits of your responsibility for dealing with hazards KA5. your organization's emergency procedures for different emergency situations and the importance of following these KA6. the importance of maintaining high standards of health, safety and security KA7. implications that any non – compliance with health, safety and security may have on individuals and the organization

B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. different types of breaches in health, safety and security and how and when to report these KB2. evacuation procedures for works and visitors KB3. how to summon medical assistance and the emergency services, where necessary KB4. how to use the health, safety and accident reporting procedures and the importance of these KB5. Disposal practices for hazardous chemicals KB6. government agencies in the area of safety, health and security and their norms and services

Skills (S) [Optional]	
A. Core Skills/ Generic Skills	**Writing Skills**
	The user/individual on the job needs to know and understand how to: SA1. complete accurate well-written work with attention to detail
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA2. read instructions, guidelines, procedures rules and service level agreements
	Oral Communication (Listening and Speaking Skills)
	The user/individual on the job needs to know and understand how to: SA3. listen effectively and orally communicate information accurately
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. make decisions on suitable course location
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB2. plan and organize your work to meet health, safety and security requirements
	Customer Centricity
	Not applicable
	Problem Solving
	The user/ individual on the job needs to know and understand how to: SB3. apply problem solving approaches in different situations
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB4. analyze data and activities
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB5. apply balanced judgments to different situations SB6. apply, analyze and evaluate the information gathered from observation, experience, reasoning or communication, as guide to thought and action

NOS Version Control

NOS Code	TEL/N2509		
Credits (NSQF)	TBD	Version number	1.0
Industry	Telecom	Drafted on	14/06/2017
Industry Sub-sector	Handset	Last reviewed on	10/11/2017
Occupation	Communication Electronics	Next review date	10/11/2021
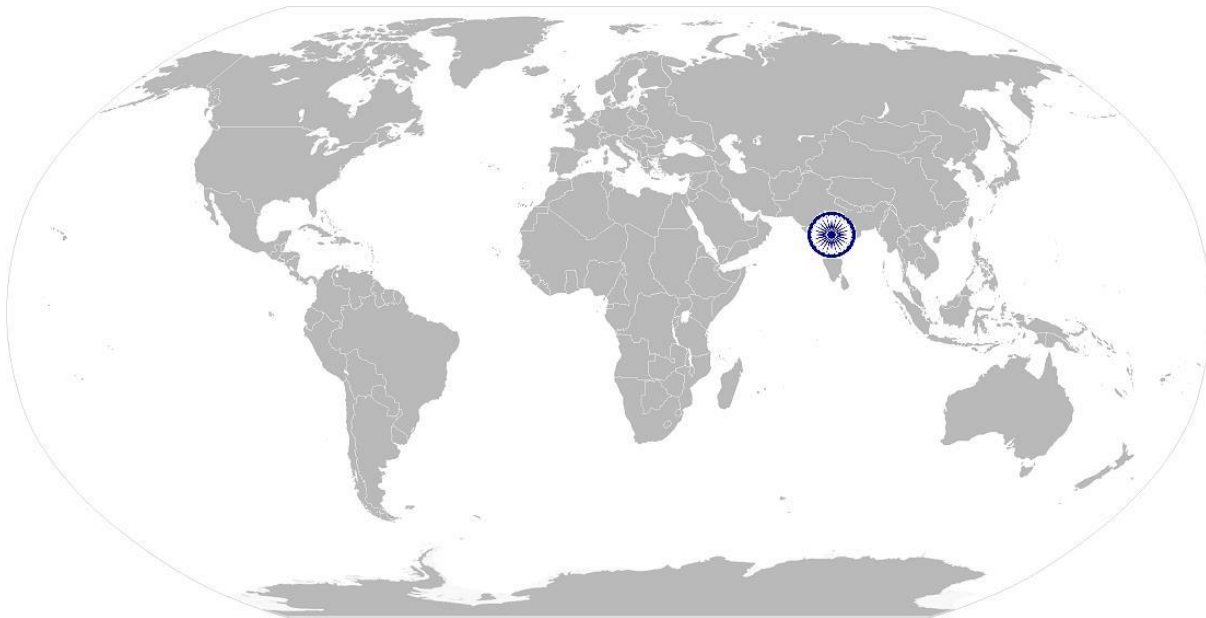
Annexure

Nomenclature for QP and NOS

Qualifications Pack

9 characters

[ABC]/ Q2501

[Insert 3 letter code for SSC]

Q denoting Qualifications Pack

QP number (2 numbers)

Occupation (2 numbers)

Occupational Standard

9 characters

An example of NOS with 'N'
[ABC] / N 2501

[Insert 3 letter code for SSC]

N denoting National Occupational Standard

OS number (2 numbers)

Occupation (2 numbers)
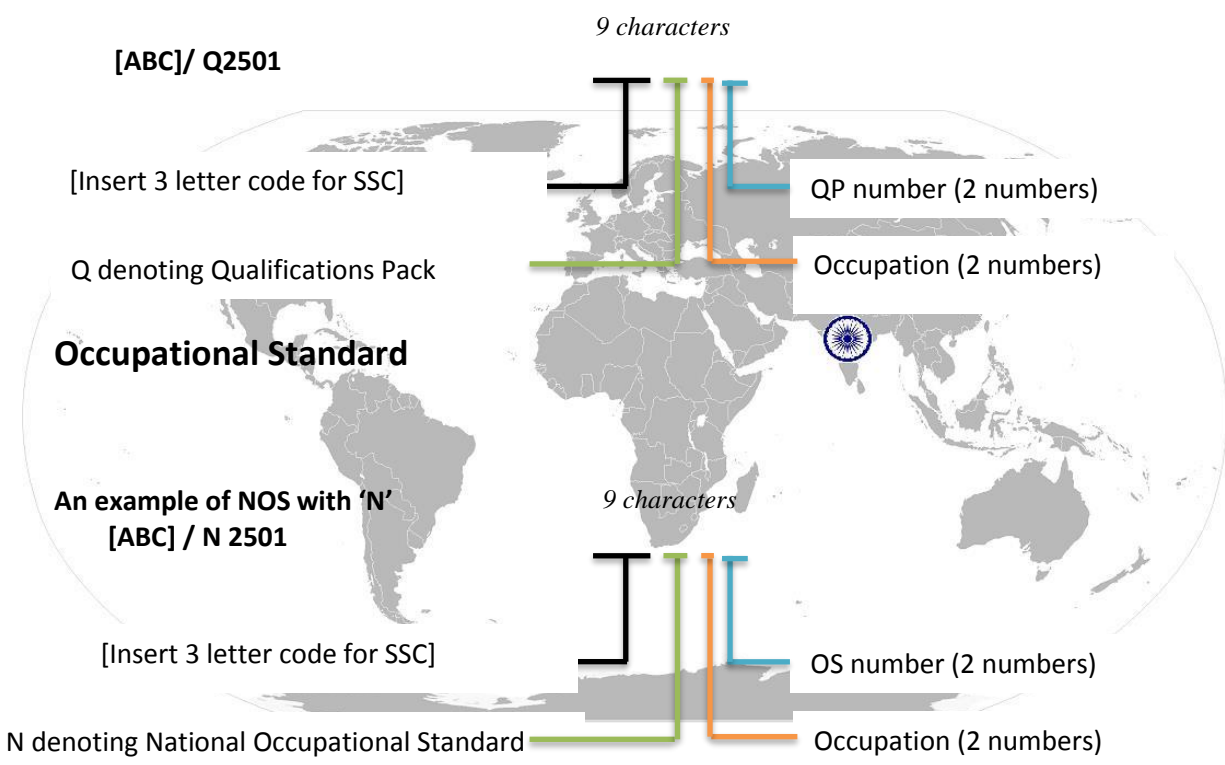
The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
Service	01- 20
Handset	21 – 40
Passive Infra	41 – 60
Network managed	61 – 80

Sequence	Description	Example
Three letters	Industry name	TEL
Slash	/	/
Next letter	Whether **Q**P or NOS	Q
Next two numbers	Occupation code	01
Next two numbers	OS number	01

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role : **Telecom Surface Mount Technology Technician**
Qualification Pack : **TEL/Q2501**
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 re-assessment on the Qualification Pack.

Compulsory NOS		Total Marks: 400		Marks Allocation	
Assessable Outcomes	**Assessment criteria for outcomes**	**Total Marks (400)**	**Out of**	**Theory**	**Skills Practical**
TEL/N2503 Baking of boards	PC1. ascertain the baking requirements as per the customer specifications or standard processes		8	5	3
	PC2. demonstrate proper stacking/ placement of boards in the oven rack		9	4	5
	PC3. demonstrate setting of temperature and timer of the over as per the requirement		14	5	9
Screen printing process	PC4. select correct tools and accessories (stencil matching the part/ pattern number vis-à-vis the PCB for screen printing, squeegee as per PCB size, correct solder paste/ combination as per the specifications)	100	12	4	8
	PC5. demonstrate proper cleaning of the stencil, before and after use, using the specified process and solvents		8	2	6
	PC6. demonstrate process for even deposition of paste on boards		9	3	6
	PC7. demonstrate process of properly thawing the solder pastes and setting of solder paste parameters as per the specifications		14	5	9
	PC8. demonstrate correct positioning of stencil, solder paste & squeeze and related parameters in the screen printer and undertake screen printing operation		12	4	8
	PC9. carry out paste thickness measurement as part of post printing process and check the thickness for conformance to the specification		14	3	11
	Total	100	**100**	**35**	**65**

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TEL/N2504 Feeding placement data	PC1. read specifications of board and map to the correct software version of chip shooter/ pitch placer		5	0	5
	PC2. read and interpret Gerber data, x-y coordinate data		5	0	5
	PC3. work with user interface and features of the machine/ equipment software and demonstrate the same		6	3	3
	PC4. demonstrate data entry/ loading of component placement program to the chip shooter/ fine pitch placer		6	4	2
Loading of chip component rolls	PC5. check operation of the roll feeder mechanism		4	1	3
	PC6. feed Gerber data and insert feeder rolls on the suggested slots of the chip shooter		4	2	2
	PC7. verify component rolls as per the Part number/ work specification		7	2	5
	PC8. demonstrate loading of chip component rolls in the feeder		6	2	4
	PC9. demonstrate manual data entry of X-Y co-ordinates	100	5	2	3
Loading of chip component trays	PC10. load components on the tray as per the placement program		5	2	3
	PC11. place the components with correct orientation in the feeder tray		6	2	4
	PC12. check operation of the mechanism including vision cameras		7	1	6
Operating chip shooter and fine pitch placer and functional/ QA checks on the PCB	PC13. verify correct loading of boards, program and component rolls/ trays		6	2	4
	PC14. check placement vacuum pressure		4	2	2
	PC15. check for feeder mechanism functions and ensure its error free operation		6	0	6
	PC 16. operate the component placement equipment		5	2	3
	PC17. use tape board technique to verify the placement accuracy		7	2	5
	PC18. verify the correctness of components and placement (under microscope) for the first sample board		6	4	2
	Total	**100**	**100**	**33**	**67**
TEL/N2505 Preparing the re-flow machine	PC1. interpret solder paste parameters from the datasheet and suggested parameters from re-flow machine	100	12	5	7
	PC2. demonstrate loading of parameters in the re-flow machine		10	4	6

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	PC3. demonstrate passing a sample PCB through the re-flow machine, with reading being recorded using thermal probes		16	8	8
	PC4. match the readings with the desired outcome and undertake corrective settings		12	4	8
Re-flow operation on the PCB and its QA checks	PC5. undertake setting of machines is set as per the parameters as ascertained during the preparatory process		10	5	5
	PC6. prepare and pass the loaded PCB (with solder and components placed) through the re-flow machine		14	7	7
	PC7. safely remove the PCB at the end of the cycle		12	4	8
	PC8. check for any dry solder, ascertain even reflow, tombstone, de-lamination, mis-alignment and/ or disturbed components and any other damage to PCB		14	6	8
	TOTAL	**100**	**100**	**43**	**57**
TEL/N2502 Cleaning of telecom boards	PC1. demonstrate ability to clean the board from flux residues, white patches and/ or powder, using correct and specified solvent	100	15	5	10
	PC2. operate vapour de-greaser (boil, rinse, vapourise and dry) to clean the boards		15	7	8
	PC3. demonstrate safe packaging and storage of telecom boards, using the specified wrapping material		15	4	11
Inspection - QA/QC	PC4. demonstrate ability to check telecom boards for any missing components, wrongly mounted components (location, value) or improper placement, vis-à-vis the specifications		12	7	5
	PC5. demonstrate ability to check the telecom boards for soldering workmanship and defects, proper placement of board identifier, adherence to specifications, conformal coatings		13	6	7
	PC6. demonstrate complaint handling and escalation processes		15	8	7
	PC7. undertake checks of shop floor with respect to adherence to the processes and parameters (temperature, humidity)		15	7	8
	Total	100	**100**	**44**	**56**
TEL/N2509 Health & safety compliance and emergency procedures	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 's 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**