

Revised Application Documentation: Version 5 /25 May, 2019

QUALIFICATION FILE – CONTACT DETAILS OF SUBMITTING BODY

Name and address of submitting body:

Electronics Sector Skills Council of India,

422, Okhla Industrial Estate, Phase – III, New Delhi - 110020

Name and contact details of individual dealing with the submission

Name: Rakesh Mathur

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List of documents submitted in support of the Qualifications File

1. Qualification Pack for Assembly Operator - PLC
2. Occupation Map
3. RFP for development of National Occupational Standards
4. Mapping of Manpower skills in IT Hardware and Electronics Industry – MAIT (2009)
http://www.essc-india.org/Essc/reports/MAIT0Report2008_15711.pdf
5. Approval of QP/ NOSs
 - a) Minutes of the meeting of GC
 - b) Composition of the Technical Committee
6. ESSCI IMaCSLMIS Report
7. List of Companies and industry associations which participated in the development of these qualifications packs
8. Assessment Procedure – Assessing bodies and Assessor

QUALIFICATION FILE SUMMARY

Qualification Title:	Assembly Operator - PLC; ELE/Q7305		
Body/bodies which will assess candidates	Electronics Sector Skills Council of India		
Body/bodies which will award the certificate for the qualification.	Electronics Sector Skills Council of India		
Body which will accredit providers to offer the qualification.	Electronics Sector Skills Council of India		
Occupation(s) to which the qualification gives access	Assembly Operator – Programmable Logic controller (PLC): The PLC Assembly Operator is responsible for completing the printed circuit board (PCB) and box assembly of the PLC components.		
Proposed level of the qualification in the NSQF.	3		
Anticipated volume of training/learning required to complete the qualification.	200		
Entry requirements / recommendations.	12th standard passed, ITI/Diploma (Electronics/Electrical)		
Progression from the qualification.	Supervisor, production Head		
Planned arrangements for RPL.	Will be done at the place where required lab. Facility could be arranged.		
International Comparability.	Not established.		
Formal structure of the qualification			
Title of unit or other component (include any identification code used)	Mandatory/ Optional	Estimated size (learning hours)	Level
ELE/N7303 Assemble PCB for PLC	Mandatory	50	3
ELE/N7304 Box assemble PLC	Mandatory	50	3
ELE/N9962 Interact with co-workers	Mandatory	50	3
ELE/N9963 Maintain safe work surroundings	Mandatory	50	3

Please attach any document giving further detail about the structure of the qualification – eg a Curriculum or Qualification Pack.

Give details of the document here:

Refer Page 1 for the list of attachments

SECTION 1

ASSESSMENT

Name of assessment body:

If there will be more than one assessment body for this qualification, give details.

- **Aspiring Minds**
- **Mettl**
- **IQAG**

Will the assessment body be responsible for RPL assessment? Yes.

Give details of how RPL assessment for the qualification will be carried out and quality assured.

RPL will be based on the same Qualification Pack and Assessment Criteria mentioned in the QP. The process of RPL assessment is under development.

Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF:

The emphasis is on practical demonstration of skills and knowledge based on the performance criteria. Assessment design team carries on research for understanding job details, followed with competencies mapping for the module and for the performance criteria. The assessment papers are created by the Subject Matter Experts and moderated by Assessment Designers of Assessment Partners as per the assessment criteria, for theory and practical questions considering the lab facility available for the assessments. The Assessment Sets prepared by Assessment Partners are reviewed by ESSCI for consistency and match with the level of the QP.

The assessment partners are instructed to hire assessors with integrity, reliability and fairness and have them sign an agreement confirming confidentiality, no conflict of interest or any other position, which may compromise the quality of assessment. The assessors need to have adequate hands-on experience in the domain, preferably at a level above the position for which they conduct the assessment.

Assessors are trained on the assessment process, and the question set. At the time of the assessment, the assessors check the identity of the candidates with a photo identification card and attendance during the training. They also take snapshots photographs of the practical assessments, and get the attendance for the assessment signed off by the candidate.

Please attach any documents giving further information about assessment and/or RPL.

Give details of the document(s) here:

ASSESSMENT EVIDENCE

Complete the following grid for each grouping of NOS, assessment unit or other component as listed in the entry on the structure of the qualification on page 1.

CRITERIA FOR ASSESSMENT OF TRAINEES

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role	PLC Assembly Operator
QP #	ELE/Q7305
Sector Skill Council	Electronics Sector Skills Council of India

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 criteria
5. To pass the Qualification Pack , every trainee should score a minimum of 70% in every NOS
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

Element	Performance Criteria	Total Marks	Out Of	Marks Allocation	
				Theory	Skills Practical
ELE/N7303 Assemble PCB for PLC					
Understanding work requirement	PC1. interact with the supervisor in order to understand the production schedule	100	4	2	2
	PC2. plan the day's production activities based on the supervisor's instructions		4	2	2
	PC3. use appropriate drawings, job instructions or work manuals		4	2	2
	PC4. check availability of materials required for assembly		4	2	2
Inserting components into the PCB	PC5. check kitting as per bill of material before commencing assembly		4	2	2
	PC6. collect the design and daily PCB-loading list from the supervisor		4	2	2
	PC7. mount the board on a holder or pallet		4	2	2

	PC8. insert the component one by one in the prescribed order or from smaller to bigger		4	2	2
	PC9. solder the component in the circuit boards using soldering station		4	2	2
	PC10. ensure that inserted components are placed straight		4	2	2
	PC11. ensure work bench is free of any other components		4	2	2
	PC12. cross-check the against sample		4	2	2
	PC13. visually check the assembled board with the help of magnifying glass for missed out components, wrong value components and dry soldering		4	2	2
	PC14. hand over the finished board to programming operators to in order to program the PLC		4	2	2
Reporting to superior	PC15. highlight any errors in previous step of the assembly process identified		4	2	2
	PC16. report defective or inadequate number of components in time		4	1	3
	PC17. report about inadequate quantity of consumables		4	1	3
Achieving productivity, quality and safety standards	PC18. achieve 100% work schedule as planned for the day		4	1	3
	PC19. meet 100% daily or monthly target		4	1	3
	PC20. achieve zero errors in assembling as per company policy		4	1	3
	PC21. achieve zero component damage because of electrostatic discharge		4	1	3
	PC22. check any repetitive defects during the assembly process		4	1	3
	PC23. keep work area clean and organised		4	1	3
	PC24. identify problems on the assembly line and alert in time		4	1	3
	PC25. achieve 100% compliance with health and safety guidelines and rules		4	1	3
		TOTAL	100	40	60
ELE / N7304 Box Assemble PLC					
Understanding work requirement	PC1. interact with the supervisor in order to understand the production schedule	100	5	2	3
	PC2. plan the day's production activities based on the supervisor's instructions		5	2	3
	PC3. use appropriate drawings, job instructions or work manuals		5	2	3
	PC4. check availability of materials required for assembly		5	2	3
Assembling various modules	PC5. collect programmed PLCs from the programming team		5	2	3

together	PC6. collect kit for PLC board, power supply, connectors and		5	2	3
	PC7. connect the battery pack to the test jig and verify its functioning		5	2	3
	PC8. solder verified batter pack to the power supply PCB		5	2	3
	PC9. connect both PCBs together following instructions on the work manual		5	2	3
	PC10. ensure that all components inserted on the PCB are straight		4	2	2
	PC11. ensure work bench is free of any other components		3	2	1
	PC12. cross-check the PCB and components received prior to final assembly against sample		3	2	1
	PC13. enclose the entire system into the plastic case or box		3	2	1
	PC14. set default settings on the PLC before passing it on to the testing team		3	1	2
	PC15. follow job instructions at every stage of the assembly process		3	1	2
	PC16. fill job sheet for completed assembly		3	1	2
Reporting to superior	PC17. highlight any errors in previous step of the assembly process identified		3	1	2
	PC18. report defective or inadequate number of components in time		3	1	2
	PC19. report about inadequate quantity of consumables		3	1	2
Achieving productivity, quality and safety standards	PC20. achieve 100% work schedule as planned for the day		3	1	2
	PC21. meet 100% daily or monthly target		3	1	2
	PC22. achieve zero errors in assembling as per company policy		3	1	2
	PC23. achieve zero component damage because of electrostatic discharge		3	1	2
	PC24. check any repetitive defects during the assembly process		3	1	2
	PC25. keep work area clean and organised		3	1	2
	PC26. identify problems on the assembly line and alert in time		3	1	2
	PC27. achieve 100% compliance with health and safety guidelines and rules		3	1	2
		TOTAL	100	40	60
ELE/N9962 Interact with co-workers					
Interacting with supervisor	PC1. understand work requirements, targets and incentives	100	6	3	3
	PC2. learn about new product models, their features and functions		6	3	3

	PC3. report problems identified in the field		6	3	3
	PC4. escalate customer concerns that cannot be handled on field		6	3	3
	PC5. resolve personnel issues		6	3	3
	PC6. receive feedback on work standards and customer satisfaction		6	3	3
	PC7. communicate any potential hazards at a particular location		6	2	4
	PC8. meet given targets		6	2	4
	PC9. deliver work of expected quality despite constraints		6	2	4
	PC10. have feedback from a happy and satisfied customer		6	2	4
Interacting with colleagues	PC11. resolve inter-personnel conflicts and achieve smooth workflow		6	2	4
	PC12. receive spares from tool room or stores		6	2	4
	PC13. deposit faulty modules and tools to stores		6	2	4
	PC14. pass on customer complaints to colleagues in a respective geographical area		6	2	4
	PC15. assist colleagues with resolving field problems		6	2	4
	PC16. share knowledge and experience gained through every day work		5	2	3
	PC17. clearly demarcate roles of each team member		5	2	3
		TOTAL	100	40	60
ELE/N9963 Maintain safe work surroundings					
Following safety measures and standards	PC1. comply with general safety procedures followed in the company	100	8	4	4
	PC2. follow standard safety procedures while handling an equipment, hazardous material or tool		8	3	5
	PC3. remove rings or any other metal objects before working on the unit		8	3	5
	PC4. use of safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.		8	3	5
	PC5. escalate about any hazardous materials or things found in the premises		8	3	5
	PC6. report about any breach of safety procedure in the company		8	3	5
	PC7. ensure zero accidents at work		8	3	5
	PC8. avoid damage of components due to negligence in ESD procedures		8	3	5
	PC9. regularly participate in fire drills or other safety related workshops organised		8	3	5

	by the company				
	PC10. ensure no loss for company due to safety negligence		7	3	4
Maintaining good health and posture	PC11. maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials		7	3	4
	PC12. participate in company organised health sessions such as yoga, physiotherapy or games		7	3	4
	PC13. handle heavy and hazardous materials with care and using appropriate tools and handling equipment such as trolleys, jacks and ladders		7	3	4
		TOTAL	100	40	60

SECTION 2

EVIDENCE OF NEED

What evidence is there that the qualification is needed?

Feedback from the industry was collected with respect to the past and projected industry growth, projected employee growth during next 5 years (Refer to Pages 14 to 27 of the LMIS report), skill gaps identified in entry level qualified workforce for the sub-sector (Refer to Page 31 of the LMIS report), and current employment number for the qualification (Refer to Occupation Map). This enabled prioritization of the development of the qualification packs.

What is the estimated uptake of this qualification and what is the basis of this estimate?

Estimated uptake of the qualification is obtained from the current employment (refer to the Occupation Map) times the projected employee growth for the sub-sector (Refer to Pages 21 to 27 of LMIS report). This is the basis for planning training with the industry and training providers.

What steps were taken to ensure that the qualification(s) does/do not duplicate already existing or planned qualifications in the NSQF?

NSDCQRC team checks and confirms this.

What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?

Technical Committee's inputs are sought from time-to-time as needed to check the relevance of QP/ NOSs, and the revision exercise is undertaken, as needed.

Please attach any documents giving further information about any of the topics above.

Give details of the document(s) here:

Refer Page 1 for the list of attachments

SECTION 3

SUMMARY EVIDENCE OF LEVEL

Level of qualification: 3

Summary of Direct Evidence (from learning outcomes):

Qualification Title and Classification Code: Assembly Operator - PLC; ELE/Q7305					
Process Required	Professional Knowledge	Professional Skills	Core Skills	Responsibility	Level
<p>The job holder must be able to check kitting as per bill of material before commencing assembly, collect the design and daily PCB-loading list from the supervisor, mount the board on a holder or pallet, insert the component one by one in the prescribed order or from smaller to bigger, solder the component in the circuit boards using soldering station, ensure that inserted components are placed straight, ensure work bench is free of any other components, cross-check the against sample, visually check the assembled board with the help of magnifying glass</p>	<p>The job holder needs to know and understand circuit knowledge and functioning of different modules of the PLC , safety norms in handling electronic components and electrostatic discharge , fundamentals such as Ohms law, difference between AC and DC, series and parallel connections , components such as diode, transformer, LED, transistor, capacitor, resistor, inductor, thermistor, ICs, etc. , how to read values, colour coding, polarity, orientation, tolerance ,</p>	<p>The job holder needs to know and understand how:to use hand tools such as lead forming tools, cutter, cutting machine, to use soldering station, to interact with supervisor to achieve the daily production target, to interact with co-workers in order to share and learn . Since job holder is required to Recall and demonstrate practical skill, routine and repetitive in narrow range of application, this is pegged at level 3</p>	<p>The job holder needs to know and understand how to:read warnings, instructions and other text material on product labels, components, etc., read drawings and job sheets or work orders . Considering requirement of Communication written and oral, with minimum required clarity, skill of basic arithmetic and algebraic principles, personal banking, basic understanding of social and natural environment, this is pegged at level 3</p>	<p>The job holder must be able to Understand requirement from the supervisor, Insert components into the PCB, solder and check, Report problems to supervisor, Achieve productivity, quality and safety standards as per company's norms, . The job holder works under Under close supervision and has some responsibility for own work within defined limit, hence pegged at level 3.</p>	<p>3</p>

<p>for missed out components, wrong value components and dry soldering, . Considering that job holder is required to carry out a job which may require limited range of activities routine and predictable. this is pegged at level 3</p>	<p>comparison between RoHS and Non-RoHS compliant solder , basics of soldering and types of soldering such as dry and cold solder , hand soldering technique, handling the soldering iron, iron temperature , common soldering defects such as solder short, dry solder, etc. , . Due to the requirement of Basic facts, process and principle applied in trade of employment, this is pegged at level 3</p>				
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Summary of other evidence (if used):

SECTION 4

EVIDENCE OF RECOGNITION OR PROGRESSION

What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?

Vertical mobility options are available in the Occupation map.

Please attach any documents giving further information about any of the topics above.

Give details of the document(s) here:

Refer Page 1 for the list of attachments