

Revised Application Documentation: Version 5 /25 May, 2015

## **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

**Position in the organisation:** Senior Vice President

**Address if different from above**

**Tel number(s)**

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## **List of documents submitted in support of the Qualifications File**

1. Qualification Pack for Assembly Operator – PMD and X-Ray
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](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 IMaCS LMIS 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

<b>Qualification Title:</b>	Assembly Operator – PMD and X-Ray; ELE/Q7801		
<b>Body/bodies which will assess candidates</b>	Electronics Sector Skills Council of India		
<b>Body/bodies which will award the certificate for the qualification.</b>	Electronics Sector Skills Council of India		
<b>Body which will accredit providers to offer the qualification.</b>	Electronics Sector Skills Council of India		
<b>Occupation(s) to which the qualification gives access</b>	Assembly Operator – PMD and X-Ray: The Assembly Operator assembles all parts and modules of a patient monitoring device (PMD) or X-Ray machine to complete the product. The individual at work fits together different electronics and electro-mechanical parts and modules and connects them to manufacture the PMD or X-Ray machine as per product design.		
<b>Proposed level of the qualification in the NSQF.</b>	4		
<b>Anticipated volume of training/learning required to complete the qualification.</b>	240		
<b>Entry requirements / recommendations.</b>	ITI, Diploma		
<b>Progression from the qualification.</b>	Assembly Operator – PMD and X-Ray, Box Assembly Operator, Functional Tester , Manager Production		
<b>Planned arrangements for RPL.</b>	Will be done at the place where required lab. Facility could be arranged.		
<b>International Comparability.</b>	Not established.		
<b>Formal structure of the qualification</b>			
<b>Title of unit or other component</b> (include any identification code used)	<b>Mandatory/ Optional</b>	<b>Estimated size (learning hours)</b>	<b>Level</b>
ELE/N7801 Perform kitting of parts and modules	Mandatory	30	4
ELE/N7802 Install brass inserts into the plastic mould	Mandatory	40	4
ELE/N7803 Perform baking process and conformal coating	Mandatory	40	4
ELE/N7804 Assemble High Voltage Tank	Mandatory	30	4
ELE/N9909 Coordinate with colleagues and co-workers	Mandatory	50	4
ELE/N9910 Maintain safe and secure work environment	Mandatory	50	4

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

<b>Job Role</b>	<b>Assembly Operator – PMD and X-Ray</b>
<b>QP #</b>	<b>ELE/Q7801</b>
<b>Sector Skill Council</b>	<b>Electronics Sector Skills Council of India</b>

### **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 (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
<b>ELE/N7801 Perform kitting of parts and modules</b>					
<b>Understanding work requirements</b>	PC1. understand the product and model for which the day's work is assigned	<b>100</b>	8	4	4
	PC2. understand the daily targets on number of assemblies to complete		8	4	4
	PC3. assess the requirements of different electronics and electro-mechanical parts to meet the given targets		8	4	4
<b>Indenting for parts and modules</b>	PC4. indent for different kinds of electrical and electronic modules, plastic parts, rubber parts, filaments, aluminium tanks, X-ray tubes and accessories such as connectors, wires, cables, glue and soldering paste		8	4	4
	PC5. indent for different kinds of Printed Wiring Assemblies (PWA), front and rear panel assembly, moulding and brass inserts as per the Patient Monitoring Device (PMD) design and specifications		8	4	4
	PC6. document the number of components and modules received from the stores or supervisor		8	4	4

<b>Storing and binning received material at work station</b>	PC7. segregate the received material into electrical, electronic and mechanical parts		8	2	6
	PC8. unpack the materials received from stores or supervisor		8	2	6
	PC9. follow standard operating procedure (SOP) for handling electronic components and modules, e.g., follow ESD precautions for handling PWAs		8	2	6
	PC10. put received material in respective bins and keep them at pre-assigned locations of work station as per the SOP		8	2	6
<b>Achieving productivity and quality standards</b>	PC11. identify missing parts or shortages so that workflow is not disrupted		7	3	4
	PC12. complete 100% binning before assembly as per bill-of-material		6	2	4
	PC13. ensure to indent quantity of component for achieving daily target of assemblies		7	3	4
		<b>TOTAL</b>	<b>100</b>	<b>40</b>	<b>60</b>
<b>ELE/N7802 Install brass inserts into the plastic mould</b>					
<b>Preparing brass inserts</b>	PC1. Clean brass inserts thoroughly with electronic grade Isopropyl alcohol (IPA)		5	2	3
	PC2. dry the cleaned brass inserts at room temperature for 24 hours		5	2	3
	PC3. ensure that proper documentation is done by noting down time and date of washing brass inserts		5	2	3
<b>Installing brass inserts into plastic mould using Hot Press-in machine</b>	PC4. ensure that outline, shape and size of the brass inserts matched with that of holes in the plastic mould		5	2	3
	PC5. put the plastic mould on to the steel framed locating fixture and load it on the Hot Press-in machine		5	2	3
	PC6. ensure that steel framed locating fixture with plastic mould is placed under the Hot Press-in machine after aligning the holes with brass inserts		5	2	3
	PC7. put the weight plate at the designated place of Hot Press-in machine as per the product specifications given in the SOP		5	2	3
	PC8. switch on Hot Press-in machine and adjust the temperature setting as per product specifications given in the SOP to generate required heat		5	2	3
	PC9. rotate the handle of Hot Press-in machine and apply pressure as per the work instructions given in the SOP		5	2	3
	PC10. install the brass inserts into the mould without breaking it		5	2	3
<b>Installing brass inserts into</b>	PC11. ensure that outline, shape and size of the brass inserts matched with that of holes in the		5	2	3

<b>plastic mould using Ultrasonic machine</b>	plastic mould				
	PC12. put the plastic mould on to the steel framed locating fixture and load it on the Ultrasonic machine		5	2	3
	PC13. ensure that steel-framed locating fixture with plastic mould is placed under the Ultrasonic machine after aligning the holes with brass inserts		5	2	3
	PC14. wear the ear mask before operating the machine for protection from loud vibrations		5	2	3
	PC15. switch on Ultrasonic machine and adjust the pressure of compressed air setting as per product specifications given in the SOP		5	2	3
	PC16. operate the machine by pushing side buttons with two hands simultaneously for specified time		5	2	3
	PC17. insert the brass inserts into the mould without breaking it		5	2	3
<b>Achieving productivity and quality standards</b>	PC18. achieve the daily target of number of moulds with brass inserts		7	3	4
	PC19. ensure quality as per standard to avoid rework		8	3	5
			<b>100</b>	<b>40</b>	<b>60</b>
<b>ELE/N7803 Perform baking process and conformal coating</b>					
<b>Preparing Printed Wire Assembly and perform baking process</b>	PC1. switch on the baking machine and set it at 600 temperature.		8	4	4
	PC2. mask the conductive connections of Printed Wire Assembly with masking tape		9	4	5
	PC3. place the Printed Wire Assembly into the baking machine once 600 temperature of baking machine is achieved		9	4	5
	PC4. set the time to one hour		9	4	5
<b>Applying conformal coating on Printed Wire Assembly</b>	PC5. take out the Printed Wire Assembly from the baking machine and place it at pre-designated area to cool off		9	4	5
	PC6. ensure that when temperature of Printed Wire Assembly comes down to room temperature, it is taken to conformal coating machine	<b>100</b>	9	4	5
	PC7. ensure that Printed Wire Assembly is placed in the conformal coating machine as specified in the SOP		9	4	5
	PC8. ensure the conformal coating spray containing modified acrylic resin is done uniformly on Printed Wire Assembly as per model specifications mentioned in the SOP		9	4	5
	PC9. cool off Printed Wire Assembly under high power exhaust fans for 15 minutes		9	4	5
PC10. achieve the daily target of number of Printed Wire Assemblies prepared for production	10		4	6	
<b>Achieving productivity and quality</b>	PC11. meet the quality standard to avoid rework		10	4	6

standards					
		<b>TOTAL</b>	100	44	56
<b>ELE/N7804 Assemble High Voltage Tank</b>					
<b>Preparing plastic and rubber parts</b>	PC1. wash plastic and rubber parts under the running water with soap for removing dusts from them	<b>100</b>	10	2	8
	PC2. place them at designated place after washing for drying at room temperature		10	3	7
<b>Assembling components</b>	PC3. fix voltage multiplier, filaments, X-ray tube, plastic parts and circuit board into the aluminium tank to make high voltage tank as per product design		6	3	3
	PC4. connect these components as per the circuit diagram with the help of cables and soldering		6	3	3
	PC5. send the high voltage tank to functional tester for electrical connectivity and leak testing		6	3	3
	PC6. receive the high voltage tank back from functional tester once it clears electrical connectivity and leak test		6	3	3
	PC7. close the high voltage tank after functional test and take it to vacuum oven		6	3	3
<b>Placing high voltage tank in vacuum oven</b>	PC8. open the vacuum oven, place the high voltage tank inside for removing moisture from it and put funnel on it		5	2	3
	PC9. close the door, set the vacuum oven parameters such as vacuum gauge, temperature, oil temperature as per SOP		5	2	3
	PC10. switch on the vacuum oven		5	2	3
	PC11. note reading of set parameters of vacuum oven and document it every four hours		5	2	3
	PC12. Switch off the vacuum oven after 52 hours, open it and bring out high voltage tank		5	2	3
	<b>Fixing PCB on high voltage tank</b>		PC13. Place and fix the PCB in the high voltage tank	5	2
PC14. conduct cable harnessing assay by connecting them with cables			5	2	3
PC15. send the high voltage tank to functional tester for lead chamber testing			5	2	3
PC16. achieve the daily target of number of high voltage tank assemblies			5	2	3
PC17. meet the quality standard to avoid rework			5	2	3
	<b>TOTAL</b>	100	40	60	
<b>ELE/N9909 Coordinate with colleagues and co-workers</b>					
<b>Interacting with supervisor</b>	PC1. understand and assess work requirements	<b>100</b>	5	2	3
	PC2. understand the targets and incentives		5	2	3
	PC3. understand new operating procedures and constraints		5	2	3
	PC4. report problems in the field		5	2	3

	PC5. resolve personnel issues		5	2	3
	PC6. receive feedback on work standards and customer satisfaction		5	2	3
	PC7. communicate any potential hazards at a particular location		5	2	3
	PC8. meet given targets		5	2	3
	PC9. deliver work of expected quality despite constraints		5	3	2
	PC10. receive positive feedback on behaviour and attitude shown during interaction		5	3	2
<b>Coordinating with colleagues</b>	PC11. interact with colleagues from different functions and understand the nature of their work		9	3	6
	PC12. receive spares from tool room or stores; deposit faulty modules and tools to stores		9	3	6
	PC13. pass on customer complaints to colleagues in a respective geographical area		8	3	5
	PC14. assist colleagues with resolving field problems		8	3	5
	PC15. resolve conflicts and achieve smooth workflow		8	3	5
	PC16. follow the company policy during cross functional interaction		8	3	5
		<b>TOTAL</b>	<b>100</b>	<b>40</b>	<b>60</b>
<b>ELE/N9910 Maintain safe and secure work environment</b>					
<b>Following safety measures</b>	PC1. comply with safety procedures followed in the company	<b>100</b>	5	2	3
	PC2. take adequate safety measures while handling hazardous materials or tools		7	3	4
	PC3. follow Electrostatic Discharge (ESD) measures for electronic components		5	2	3
	PC4. escalate matters about hazardous materials or things found in the premises		5	2	3
	PC5. use safety materials such as gloves, goggles, masks, etc.		5	2	3
	PC6. take adequate safety measures while on work to prevent accidents		8	3	5
	PC7. ensure zero accidents in work		5	2	3
	PC8. avoid damage of components due to negligence in ESD procedures		5	2	3
	PC9. ensure no loss for company due to safety negligence		5	2	3
<b>Participating in drills and workshops</b>	PC10. participate in regular safety drills for being prepared in the event of a fire or natural calamity		10	4	6
	PC11. help others during the drill or calamity		10	4	6
	PC12. administer basic first aid		10	4	6
	PC13. participate in company organised games and fitness sessions such as yoga, etc.		10	4	6
	PC14. maintain good posture for working so that long term health problems do not arise		10	4	6



	<b>TOTAL</b>	100	40	60
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## **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?**

NSDC QRC 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: 4

Summary of Direct Evidence (from learning outcomes):

Qualification Title and Classification Code: <b>Assembly Operator – PMD and X-Ray; ELE/Q7801</b>					
Process Required	Professional Knowledge	Professional Skills	Core Skills	Responsibility	Level
The job holder is required to ensure that outline, shape and size of the brass inserts matched with that of holes in the plastic mould, put the plastic mould on to the steel framed locating fixture and load it on the Hot Press-in machine, ensure that steel framed locating fixture with plastic mould is placed under the Hot Press-in machine after aligning the holes with brass inserts and install the brass inserts into the mould without breaking it. The individual is required to take out the Printed Wire Assembly from the baking machine and place it at pre-	The individual on the job needs to know and understand, in which product and model ultrasonic method is to be used for installing the brass insert into the mould, safe handling of plastic moulds and brass inserts, different types of PWAs and their functionalities, baking requirement of different PWAs, proper use of conformal coating spray to get the uniform coating, handling of PWAs, electrostatic Discharge (ESD) precautions and quality standards to be followed Due the	The user/individual on the job needs to know and understand how different types of plastic moulds and brass inserts behave at different temperatures and pressures, to resolve work related problems like temperature setting knob is not working in Hot press-in machine, to use Hot press-in machine, to use Ultrasonic machine, baking and conformal coating machine work, to use baking machine. Since job holder is required to Recall and demonstrate practical skill, routine and repetitive using appropriate rule	The job holder must know how to to read job sheet, to read assembling procedures for different models and read baking and conformal coating process for different PWAs. The individual must know how to to document the activities performed in Device History Record (DHR), listen to supervisor for taking specific work related instructions and product wise monthly production targets and share technical and non-technical information with seniors and colleagues for benchmarking best assembling	The job holder is required to Understand work requirements, Indent for and arrange parts and modules as per bill-of-material, Store and bin the received material at work station, Prepare and install brass inserts into plastic mould using Hot Press-in machine and Ultrasonic machine, Prepare Printed Wire Assembly and perform baking process, Apply conformal coating on Printed Wire Assembly and Achieve productivity and quality standards The job holder is responsible for	4

<p>designated area to cool off, ensure that after cooling the conformal coating spray containing modified acrylic resin is done uniformly on Printed Wire Assembly and cool off Printed Wire Assembly under high power exhaust fans. Considering the repetitive nature, it is pegged at level 4.</p>	<p>requirement of Factual knowledge of the job requirements, this is pegged at level 4</p>	<p>and tool, this is pegged at level 4</p>	<p>practices Considering these outcomes, the job role is pegged at level 4.</p>	<p>his own job and self-learning and no supervision of others and hence pegged at level 4.</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**