

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

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List of documents submitted in support of the Qualifications File

1. Qualification Pack for Assembly Operator-RAC
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 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

Qualification Title:	Assembly Operator-RAC; ELE/Q3501		
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 – Refrigeration and Air-conditioning (RAC): RAC Assembly Operator assembles and connects together the various modules and parts of the refrigerator or air conditioner. The individual at work is responsible for assembling and wiring up of various components, modules or sub-assemblies and systems to make the complete product.		
Proposed level of the qualification in the NSQF.	4		
Anticipated volume of training/learning required to complete the qualification.	240		
Entry requirements / recommendations.	10th standard passed, ITI/Diploma (Electronics/RAC)		
Progression from the qualification.	Assembly Operator-RAC , Line Supervisor, Line Process Auditor		
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/N3506 Assemble Refrigerator	Mandatory	70	4
ELE/N3507 Assemble Air conditioner	Mandatory	70	4
ELE/N9902 Coordinate with colleagues	Mandatory	50	4
ELE/N9903 Maintain safe 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

Job Role	RAC Assembly Operator
QP #	ELE/Q3501
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 (400)	Out Of	Marks Allocation	
				Theory	Skills Practical
ELE/N3506 Assembly Refrigerator					
Interacting with customer prior to visit	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
Wiring the control panel	PC5. receive the formed and foamed cabinet		3	1	2
	PC6. place the evaporator inside the freezer section of the cabinet and connect		2	0	2
	PC7. cover the evaporator with the enclosure		2	0	2
	PC8. place the electrical control panel in the designated location within the cabinet and connect it to the micro-processor		3	1	2
	PC9. place the fridge side evaporator in the fridge section of the cabinet and connect		4	2	2
	PC10. attach the door of the refrigerator to the cabinet		4	2	2
	PC11. connect the compressors and the radiator to the assembly		5	2	3
	PC12. attach the expansion valves		4	2	2

	PC13. solder copper tubes to the compressor to be filled in with the refrigerant later		5	1	4
	PC14. inject refrigerant gas into the tubes through a charging gun		6	3	3
	PC15. weld the ends of the tube shut		6	3	3
	PC16. attach handles to the refrigerator door and place the necessary trays, shelves in their respective positions inside the cabinet		4	2	2
	PC17. use the drawings accurately to meet the specifications		6	2	4
	PC18. ensure that approved components or modules are available in good condition		6	3	3
Reporting to superior	PC19. highlight any errors in previous step of the assembly process identified		4	2	2
	PC20. report defective or inadequate number of components in time		4	2	2
	PC21. report about inadequate quantity of consumables such as screws, nuts, etc.		4	2	2
Achieving productivity, quality and safety standards	PC22. achieve 100% work schedule as planned for the day		2	1	1
	PC23. meet 100% daily or monthly target		2	1	1
	PC24. achieve zero errors in assembling as per company policy		2	0	2
	PC25. achieve zero component damage because of electrostatic discharge		2	0	2
	PC26. check any repetitive defects during the assembly process		1	0	1
	PC27. keep work area clean and organised		1	0	1
	PC28. identify problems on the assembly line and alert in time		1	0	1
	PC29. achieve 100% compliance with health and safety guidelines and rules		1	0	1
		TOTAL	100	40	60
ELE/N3507 Assembly Air Conditioner					
Interacting with customer prior to visit	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 instructions from supervisor		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
Wiring the control panel	PC5. attach the blower at the designated position on the base frame of the air conditioner and connect	100	8	2	6
	PC6. place the condenser coil unit on the frame		8	3	5
	PC7. place the evaporator coil on the already assembled sub system		9	3	6
	PC8. connect the electronic assembly (PCB) to the sub		8	3	5

	system assembled				
	PC9. place the control panel at appropriate position and make necessary connections		8	3	5
	PC10. place the supply unit assembly and the front panel of the system in place		8	3	5
	PC11. meets the required specifications of the completed assembly		8	3	5
Reporting to superior	PC12. highlight any errors in previous step of the assembly process identified		5	2	3
	PC13. report defective or inadequate number of components and consumables such as screws and nuts		5	2	3
Achieving productivity, quality and safety standards	PC14. accurately interpret drawings, wiring and job specifications/instructions		2	1	1
	PC15. achieve 100% work as per the scheduled work plan		2	1	1
	PC16. meet 100% target for number of products to be manufactured per day		2	1	1
	PC17. achieve zero error as per the company's standards		3	1	2
	PC18. achieve zero defect to components because of electrostatic discharge		2	1	1
	PC19. keep work area clean and organised		2	1	1
	PC20. identify problems on the assembly line and alert in time		2	1	1
	PC21. check any repetitive defects during the assembly process		2	1	1
		TOTAL	100	40	60
ELE/N9902 Coordinate with colleagues					
Interacting with superior	PC1. understand work requirements, targets and incentives	100	5	2	3
	PC2. receive work order/job instruction from the supervisor on time		5	2	3
	PC3. understand new operating procedures		5	2	3
	PC4. report problems encountered in the assembly process		5	2	3
	PC5. resolve personnel issues		5	2	3
	PC6. receive feedback on work standards and operating procedure		5	2	3
	PC7. communicate any potential hazards at work location		5	2	3
	PC8. meet given targets and deliver work of expected quality despite constraints		5	2	3
	PC9. highlight any errors in previous step of the assembly process		5	2	3
	PC10. report in time about shortage of consumables		5	2	3
Interacting with Colleagues	PC11. receive consumables/tools from tool room or stores		8	3	5
	PC12. report defective or inadequate number of		9	4	5

	components				
	PC13. deposit faulty modules and tools to stores		9	4	5
	PC14. communicate to colleagues errors identified in any step of the assembly process		8	3	5
	PC15. assist colleagues in any problems identified in their work process		8	3	5
	PC16. resolve conflicts and achieve smooth workflow		8	3	5
		TOTAL	100	40	60
ELE/N9903 Maintain Safe Work Environment					
Following Safety Measures And Standards	PC1. comply with general safety procedures followed in the company	100	7	3	4
	PC2. follow standard safety procedures while handling an equipment, hazardous material or tool		7	3	4
	PC3. use of safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.		7	3	4
	PC4. escalate about any hazardous materials or things found in the premises		6	2	4
	PC5. report about any breach of safety procedure in the company		6	3	3
	PC6. ensure zero accidents at work		7	3	4
	PC7. avoid damage of components due to negligence in ESD procedures		6	3	3
	PC8. regularly participate in fire drills or other safety related workshops organised by the company		7	3	4
	PC9. ensure no loss for company due to safety negligence		7	3	4
Maintaing Good Health And Posture	PC10. maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials	100	15	5	10
	PC11. Participate in company organised health sessions such as yoga, physiotherapy or games		10	4	6
	PC12. handle heavy and hazardous materials with care and using appropriate tools and handling equipment such as trolleys, jacks and ladders		15	5	10
		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?

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: Assembly Operator-RAC; ELE/Q3501					
Process Required	Professional Knowledge	Professional Skills	Core Skills	Responsibility	Level
<p>The job holder must be able to understand requirement from the supervisor, Assemble the refrigerator, Report problems to supervisor, Achieve productivity, and quality and safety standards as per company's norms. The job holder should be able to understand requirement from the supervisor, Assemble the air conditioner, Report problems to supervisor, Achieve productivity, quality, and safety standards as per company's policy Considering the repetitive nature, it is pegged at level 4.</p>	<p>The individual on the job needs to know and understand electro-mechanical assembly instructions, general principles of wiring and assembly, methods used and purpose of each, circuit knowledge and functioning of different modules of the air conditioner ,principles of refrigeration, understanding of sealed systems, methods of refrigeration and their uses, types of compressors such as reciprocating, rotary, centrifugal, scroll and their functioning, different types of refrigerants such as R12, R22, R134a, R290,</p>	<p>The individual on the job needs to know and understand how to operate on the conveyer system, door assembly, shaft assembly, core assembly, cable assembly, knob assembly, motor assembly, resister assembly, valve assembly, wheel assembly, bracket assembly, plate assembly, control assembly, electrical parts, mechanical parts, electronic parts and their wiring, colour codes, labels and specifications, packaging standards and product delivery modes, quality standards and pricing of product. Since he is required to</p>	<p>The individual on the job needs to know and understand how to SA1. Read warnings, instructions and other text material on product labels, components etc, read job sheets, work orders and instructions manual, read technical schematics in order to carry out assembling operation. The individual on the job needs to know and understand how to use computers for documentation or record keeping, complete forms such as work orders, invoices, maintenance records. Considering these outcomes, the job role is pegged at level 4.</p>	<p>The individual on the job needs to understand company's policies on: incentives, delivery standards and personnel management, reporting and documentation processes, importance of the individual's role in the workflow, reporting structure. The individual on the job needs to know and understand how to achieve smooth workflow and how to deliver product to next work process on time. The job holder is responsible for his own job and self-learning and no supervision of others and hence pegged at level 4.</p>	4

	<p>R600a, R410, R32, safety norms in handling hydro carbon gases, nitrogen, fundamentals of electricity such as Ohms law, difference between AC and DC, series and parallel connections, basic electronics of components such as diode, transformer, LED, photo transistor, capacitor, resistor, inductor, thermistor, how to read values of resistors, capacitors, diodes and integrated circuits with specific reference to colour coding, polarity, orientation, tolerance, specific safety precautions that need to be taken while working in an assembly unit, personal protective equipment/gear such as goggles, gloves, rubber base shoes, etc., to be worn while carrying out wiring activities, selection and</p>	<p>Recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts, this is pegged at level 4</p>			
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	<p>maintenance of various tools used during the assembly process, frequently occurring errors in the assembly process, causes and preventive measures</p> <p>Due the requirement of Factual knowledge of the job requirements, this is 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