

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Directorate General of Training (DGT)
Government of India, Ministry of Skill Development and Entrepreneurship,
1st and 2nd Floor, CIRTES Building
Next to Pusa ITI, Pusa Campus
New Delhi – 110012.

Name and address of submitting body:

Directorate General of Training (DGT)
Government of India, Ministry of Skill Development and Entrepreneurship,
1st and 2nd Floor, CIRTES Building
Next to Pusa ITI, Pusa Campus
New Delhi – 110012.

Name and contact details of individual dealing with the submission

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Position in the organisation: Deputy Director General

Address if different from above:

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List of documents submitted in support of the Qualifications File

1. Competency-based curriculum with following details:

Model Curriculum to be added which will include the following:

- a) Indicative list of tools/equipment to conduct the training: Enclosed with curriculum
- b) Trainers qualification: Indicated in the curriculum
- c) Lesson Plan: All DGT curricula are designed indicating specific practical to be carried out during training along with details of trade theory. Based on this the concerned instructor prepares the Lesson Plan and Demonstration Plan with support of IMPs developed by NIMI,DGT.
- d) Distribution of training duration into theory/practical indicated in the curriculum.

2. Curriculum for Core Skills (Employability Skills)

NSQC Approved

● SUMMARY

1	Qualification Title	'REFRIGERATION AND AIR CONDITIONING TECHNICIAN'
2	Qualification Code, if any	DGT/1010
3	NCO code and occupation	7127.0100 - Mechanic Refrigeration and Air Conditioner
4	Nature and purpose of the qualification (Please specify whether qualification is short term or long term)	Prepare skilled Technician to undertake the job roles of Refrigeration and Air Conditioning Technician and will install and repair refrigeration or air conditioning plant by replacing or repairing defective parts, re-seating valves, refitting coils, insulating, requiring electrical connections, soldering etc. It is along term qualification.
5	Body/bodies which will award the qualification	Directorate General of Training (DGT).
6	Body which will accredit providers to offer courses leading to the qualification	Directorate General of Training (DGT) accredits the Training providers (ITIs/ NSTIs/MSTIs/BTCs/BTPs / Industries / Establishments).
7	Whether accreditation/affiliation norms are already in place or not , if applicable (if yes, attach a copy)	Yes. The accreditation/ affiliation norms and any amendments made from time to time are available on DGT web portal.
8	Occupation(s) to which the qualification gives access	Mechanic Refrigeration and Air Conditioner
9	Job description of the occupation	The individual will install at site assembled air conditioning unit and refrigerators giving necessary power connections and making changes to units as necessary to attain desired results. Dismantles equipment partly or completely according to nature of defects to remove damaged or worn out parts, replaces or repairs defective parts, sets plant to desired cooling conditions, prevents leakage and ensures attainment and maintenance of required temperature.
10	Licensing requirements	NOT REQUIRED

11	Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)	NOT APPLICABLE																												
12	Level of the qualification in the NSQF	Level 4																												
13	Anticipated volume of training/learning required to complete the qualification	<table><tr><th rowspan="2">S No</th><th rowspan="2">Course Element</th><th colspan="2">Notional Training Hours</th></tr><tr><th>1st Year</th><th>2nd Year</th></tr><tr><td>1</td><td>Professional Skill (Trade Practical)</td><td>840</td><td>840</td></tr><tr><td>2</td><td>Professional Knowledge (Trade Theory)</td><td>240</td><td>300</td></tr><tr><td>3</td><td>Employability Skills</td><td>120</td><td>60</td></tr><tr><td></td><td>Total</td><td>1200</td><td>1200</td></tr><tr><td colspan="2">On the Job Training (OJT)/ Group Project</td><td>150</td><td>150</td></tr></table>			S No	Course Element	Notional Training Hours		1 st Year	2 nd Year	1	Professional Skill (Trade Practical)	840	840	2	Professional Knowledge (Trade Theory)	240	300	3	Employability Skills	120	60		Total	1200	1200	On the Job Training (OJT)/ Group Project		150	150
S No	Course Element	Notional Training Hours																												
		1 st Year	2 nd Year																											
1	Professional Skill (Trade Practical)	840	840																											
2	Professional Knowledge (Trade Theory)	240	300																											
3	Employability Skills	120	60																											
	Total	1200	1200																											
On the Job Training (OJT)/ Group Project		150	150																											
14	Indicative list of training tools required to deliver this qualification	As per Annexure -I of curriculum.																												
15	Entry requirements and/or recommendations and minimum age	Passed 10th class examination with Science and Mathematics or with vocational subject in same sector or its equivalent. Minimum age 14yearsas on first day of academic session																												
16	Progression from the	An Individual can proceed for:																												

	qualification (Please show Professional and academic progression)	Professional • RAC Technician • Senior RAC Technician • Supervisor • Manager • Entrepreneur	Technical / Academic ATS CITS Diploma/ Advance Diploma (Vocational)			
17	Arrangements for the Recognition of Prior learning (RPL)	Yes (For more details refer “Guidelines for Private candidate” in DGT website MIS portal).				
18	International comparability where known (research evidence to be provided)	-----				
19	Date of planned review of the qualification.	3 Yrs from the Date of Approval				
20	Formal structure of the qualification					
	Mandatory components					
	Title of component and identification code/NOSs/ Learning Outcomes	Estimated size (learning hours)		Level		
		Skills	Knowledge			
TRADE SPECIFIC						
(i)	Identify trade related hazards and safety procedures following safety precautions. NOS: ELE/N 1002	25	4	3		
(ii)	Produce fitting jobs as per drawing (Range of operations: marking, sawing, filing, drilling, reaming, taping and dieing etc.). NOS: ELE/N3114	25	5	4		
(iii)	Produce Sheet metal components (range of operation – marking, metal cutting, bending, riveting and soldering etc.). NOS: ELE/N3114	25	4	4		
(iv)	Identify electrical safety. Join different wire, measure power, currents, volts and earth resistance etc. Connect single phase, 3 phase motors i.e. star and delta connections.	35	6	4		

	NOS: ELE/N 1002			
(v)	Identify the electronic components and their colour code i.e. transistor, capacitor, diode, amplifier, I.C and able to work soldering. NOS: ELE/N3112	47	10	4
(vi)	Perform gas welding, brazing, soldering observing related safety. NOS: ELE/N3112	39	7	4
(vii)	Identify RAC tools and equipment and recognise different parts of RAC system. Perform copper tube cutting, flaring, swaging, brazing. NOS ELE/N 3108	100	15	4
(viii)	Test mechanical & electrical components. Perform leak test, vacuuming, gas charging, wiring & installation of refrigerator. NOS: ELE/N3112	49	10	4
(ix)	Identify electrical and mechanical components of a refrigerator. NOS: ELE/N3112	16	03	4
(x)	Test compressor motor terminal, start compressor Direct with relay & without relay, technique of flushing, leak testing, replacing capillary & filter drier, evacuation & gas charging. NOS: ELE/N3112	30	7	4
(xi)	Check components of frost-free refrigerator (electrical / mechanical), wiring of frost-free freeze & air distribution in refrigerator sector. Leak detection, evacuators & gas charging. NOS: ELE/N3112	42	10	4
(xii)	Dismantle, repair and assemble hermetic, fixed and variable speed compressor, and test performance. NOS: ELE/N3112	39	10	4
(xiii)	Identify the terminals of sealed compressor and their wiring and measure current, volts, watts and use of DOL starter with different types of motors. NOS: ELE/N3112	50	8	4
(xiv)	Perform selection of Hermetic compressor for different appliances, starting methods, testing controls & safety cut out used in sealed compressor. NOS: ELE/N3112	25	4	4
(xv)	Identify the components of control system of Inverter A.C and wiring of control system.	16	4	4

	NOS: ELE/N3114			
(xvi)	Perform servicing & de-scaling of condenser (internals & externals) used in different appliances. NOS ELE/N3114 Perform fitting & adjustment of drier, filter & refrigerant controls used in different refrigeration system. NOS: CSC/N9413	46	10	4
(xvii)	Perform servicing of different evaporator used in different appliances. NOS: CSC/N9414	16	5	4
(xviii)	Carry out Recovery and Recycling of Refrigerant used, alternative of CFC, HFC recover, transfer & handling of gas cylinders. NOS ELE/N3114	30	6	4
(xix)	Retrofit CFC/HFC machine with ozone friendly refrigerant with understanding of the compatibility. NOS ELE/N3114	22	7	4
(xx)	Pack thermal insulation and prevent cooling leakage. NOS ELE/N3114	13	2	4
(xxi)	Install window AC, test Electrical & electronics components & Fault diagnosis & remedial measures. NOS: ELE/N3114	50	7	4
(xxii)	Perform servicing of electrical & electronic control test, installation, wiring, fault finding & remedial measures of different split AC. NOS: ELE/N3114	100	18	4
(xxiii)	Perform servicing of car AC. Fault diagnosis & remedial measures. NOS: ELE/N3114			4
(xxiv)	Read and apply engineering drawing for different application in the field of work. NOS CSC/N9401		40	4
(xxv)	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. NOS CSC/N9402		38	4
(xxvi)	Carry out servicing, dismantling, checking different parts of different types of commercial compressor, re-placing worn out parts, Check lubrication system. Assemble & check performance. NOS- ELE/N3140	95	20	4

(xxvii)	Perform servicing of different types of water-cooled condenser. NOS- ELE/N3140	50	15	4
(xxviii)	Perform servicing and performance test of Cooling tower. NOS- ELE/N3141	15	6	4
(xxix)	Conduct Servicing, backwash & re-generate Water treatment plant of circulating water. NOS CSC/N9415	10	6	4
(xxx)	Perform Fitting of expansion valve, adjustment of refrigerant flow according to heat load. NOS- ELE/N3140	20	11	4
(xxxi)	Perform servicing of evaporator & chillers. NOS- ELE/N3140	60	13	4
(xxxii)	Carry out servicing and retrofit of Water cooler and dispenser. NOS CSC/N9416	40	5	4
(xxxiii)	Service, retrofit of visible cooler and bottle cooler and test performance. NOS CSC/N9417	45	5	4
(xxxiv)	Conduct servicing of deep freezer and test performance. NOS CSC/N9418	35	5	4
(xxxv)	Install, service, repair, gas charging and testing performance of Ice Cube machine. NOS CSC/N9419	15	5	4
(xxxvi)	Repair, servicing & retrofit of ice candy plant. NOS CSC/N9420	20	5	4
(xxxvii)	Perform servicing of Ice plant and evaporative condenser. NOS CSC/N9421	25	6	4
(xxxviii)	Perform Servicing and preventive maintenance of walk in cooler & cold storage. NOS CSC/N9422	55	12	4
(xxxix)	Study psychrometric chart and measure psychrometric properties using psychrometric, anemometer i.e. DBT, WBT, RH, air flow etc. NOS- ELE/N3140	50	11	4
(xl)	Perform servicing of motor and blowers used in different air conditioning system. NOS- ELE/N3141	20	7	4
(xli)	Construct, install, pack thermal and acoustic insulation of different air ducts. NOS- ELE/N3141	30	5	4

	Perform servicing and maintenance of different types of air filters. NOS- ELE/N3141			
(xlii)	Perform servicing, installation, fault diagnosis and remedial measures on Package AC with Air cooled condenser. NOS CSC/N9423	35	6	4
(xliii)	Carry out Servicing, installation, fault diagnosis and remedial measures in Package A.C. with water cooled condenser. NOS- ELE/N3140	25	15	4
(xliv)	Identify the various components of central AC test electrical components and make wiring. Servicing of A.H.U, damper, check air flow, De-scaling of condenser and CT servicing. NOS- ELE/N3141	30	7	4
(xlv)	Pump down the system, top up oil and gas and check temperature and pressure. NOS- ELE/N3140	10	7	4
(xlvi)	Identify components of DX system. Test components, make wiring of DX system. Test leak and evacuate, gas charge the system and check the performance. Maintenance, trouble shoot and operate the plant. NOS- ELE/N3140	20	5	4
(xlvii)	Identify the different parts of VRF/VRV system, check and service VRF/VRV system. NOS- ELE/N3141	20	6	4
(xlviii)	Identify different parts of indirect or chillers system. Check components and make wiring, leak test, evacuate and gas charge/ top up. Servicing the plant and trouble shoot. NOS- ELE/N3141	15	7	4
(xlix)	Identify chilled water pipe line. Servicing of dampers, FCU and water control valves. NOS- ELE/N3141	20	5	4
(l)	Troubles shoot both Central A.C. plant DX and indirect system. Check different control system, installation of other major components, servicing of all parts including cooling tower and water treatment plant. NOS- ELE/N3141	20	10	4

(li)	Perform Servicing, fault diagnosis, repair and maintenance of mobile A.C. leak test, evacuation, gas charging, check magnetic clutch and make wiring. Test performance after start. NOS- ELE/N3141	35	10	4
(lii)	Perform preventive maintenance of different plants. Maintain log book based on daily operation. NOS- ELE/N3141	25	5	4
(liii)	Read and apply engineering drawing for different application in the field of work. NOS CSC/N9401		40	4
(liv)	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. NOS CSC/N9402		40	4
CORE SKILL				
EMPLOYABILITY SKILLS				
(i)	Introduction to Employability Skills	-	180	-
(i)	Constitutional values - Citizenship	-		-
(ii)	Becoming a Professional in the 21st Century	-		-
(iii)	Basic English Skills	-		-
(iv)	Career Development & Goal Setting	-		-
(v)	Communication Skills	-		-
(vi)	Diversity & Inclusion	-		-
(vii)	Financial and Legal Literacy	-		-
(viii)	Essential Digital Skills	-		-
(ix)	Entrepreneurship	-		-
(x)	Customer Service	-		-
(xi)	Getting Ready for Apprenticeship & Jobs	-		-
		2400		
	OJT/ Group Project	300		

SECTION 1**ASSESSMENT**

21	Body/Bodies which will carry out assessment: Controller of Examinations, DGT
22	How will RPL assessment be managed and who will carry it out? DGT will carry out the RPL assessment following the below mentioned eligibility criteria for Trainee: Applicants aspiring to appear as Private Candidates in the AITT under CTS for award of NTC, have been categorized based on their educational background and experience. Subsequently 'Private Candidates' may be admitted under one of the following categories. Category wise 'eligibility criteria' for appearing as 'Private Candidate' in AITT under CTS has been listed below: Category I: Ex-trainees (successful pass-outs) of ITI A. Ex-trainees of ITI who already possess NTC in one of the trades under CTS, are eligible for applying as Private candidate for an allied trade, provided he/ she fulfils all the conditions regarding educational qualification etc. prescribed for that allied trade. B. In addition, the applicant should possess minimum of 1 year experience (as on date of submission of application) post the date of AITT result declaration in the desired allied trade in establishments implementing Apprenticeship Training Scheme (ATS)/ establishments registered under the Apprenticeship portal or registered MSMEs or Entities registered with any government/local authorities / shops covered under Factories Act 1948 and Shops and Establishments Act applicable for the concerned State. Category II: 'Ex-trainees (successful pass-outs) and current trainees under CoE scheme A. The applicant should have the minimum prescribed entry qualification and should fulfil eligibility criteria for the desired trade under CTS, in which he/she intends to appear for AITT as Private Candidate. CoE candidates must register as 'Private Candidate' under CTS in the relevant/mapped CTS trade only. B. There should be a minimum gap of 1 year between successful completions of CoE training i.e. from the date of result declaration to the date of submission of application for 'Private Candidate' certification. C. During this gap of 1 year, the candidate must have undergone Industry training or gained experience in desired trade in establishments implementing Apprenticeship Training Scheme (ATS)/ establishments registered under the Apprenticeship portal or registered MSMEs or Entities

	registered with any government/local authorities / shops covered under Factories Act 1948 and Shops and Establishments Act applicable for the concerned State. Category III: SCVT Candidates (admitted till August 2018 session) A. No special provisions have been made for SCVT Trainees to enrol as 'Private Candidate'. Going forward, SCVT trainees have been granted equivalence vide G.S.R 186(E) dated 2nd March 2017 for undergoing apprenticeship training under the Apprentices Act 1961 to obtain 'NAC'. B. Only for SCVT trainees admitted till August 2018 batch, provision has been made for obtaining NTC by appearing in AITT under 'Private Candidate'. Such trainees will continue to be governed by old guidelines for 'Private Candidate'. Category IV: Other Candidates (candidate not falling in any of the above 3 categories, including SCVT trainees enrolled from admission session 2019 onwards) A. The applicant should have the minimum prescribed entry qualification and should fulfil eligibility criteria for the relevant trade under CTS, in which he/she desires to appear for AITT as Private Candidate. B. Applicant should be minimum 21 years of age on the date of submission of application. There is no upper age limit. C. The applicant should possess minimum of 3 years' experience (on the date of submission of application) in the relevant trade in establishments implementing Apprenticeship Training Scheme (ATS)/ establishments registered under the Apprenticeship portal or registered MSMEs or Entities registered with any government/local authorities / shops covered under Factories Act 1948 and Shops and Establishments Act applicable for the concerned State. For detail and updated information please refer to DGT web portal.
23	Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF. (1) Assessment process: The assessment for the qualification is carried out by conducting formative assessments, and end of year examinations (Summative). The formative assessments in respect of each Learning Outcome for practical and related theory are conducted by the concerned instructors for evaluating the knowledge and skill acquired by trainees and the behavioural

transformation of the trainees. This formative assessment is primarily carried out by collecting evidence of competence gained by the trainees by evaluating them at work based on assessment criteria, asking questions and initiating formative discussions to assess understanding and by evaluating records and reports. Summative assessment is carried out by All India Trade Test on Trade Theory, Trade practical, and Employability Skills. The question papers for the theory Examinations contain objective type questions.

The marking pattern and distribution of marks for the qualification are as under:

Marking Pattern				
Sl. No.	Type of assessment	Subject for the trade test	Marks for the 1st Year	Marks for the 2nd Year
1	Summative Assessment	Practical	250	250
2		Trade Theory	100	100
3		Employability Skills	50	50
6	Formative assessment based on Learning Outcomes		200	200
TOTAL:			600	600

(2) Minimum pass marks:

The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%. There will be no Grace marks.

Testing and certifications for the course:

Controller of examinations, DGT carries out the assessment and issues National Trade Certificate (NTC) following the norms and guidelines issued by the Directorate from time to time.

Overall assessment strategy:

Assessment of the qualification evaluates trainees to show that they can integrate knowledge, skills and values for carrying out relevant tasks as per

the defined learning outcomes and assessment criteria. The trainees may choose the preferred language for assessment. The underlying principle of assessment is fairness and transparency. While assessing the trainee, assessor is directed to assess as per the defined assessment criteria against the learning outcomes. The evidence of the competence acquired by the trainees can be obtained by conducting theory and practical examinations, observing the trainees at work, asking questions and initiating discussions to assess, understand and evaluate records and reports. The ultimate objective of the assessment is to assess the candidates as per the defined assessment criteria for the learning outcomes.

Specific Arrangements for assessment:

- Assessment is outcome-based.
- There are formative and summative assessments in Theory and Practical.
- Assessment is carried out in Trade theory, Trade Practical, Employability Skills.
- While Trade Theory and Trade Practical are used for assessing Trade-related jobs, Workshop Calculation and Science is used to test trainee's numerical and logical skills, Drawing is used to test the ability of the trainee to draw and read sketches and Employability skills is used to test the communication, professional language, leadership, entrepreneurship and team-work abilities of the trainee.
- In addition to demonstration of theory and practical knowledge, trainees get a chance to present total personality.

Quality assurance activities:

Question papers are set by external paper setters/ software generated.

Evaluation of Theory Examinations in Trade, and Employability Skill is done by third-party agency.

Trade Practical is examined by External Examiner.

24. Assessment evidences

Title of Component: Formative Assessment Breakup

(on half yearly average of the learning assessment covered)

Means of assessment

Assessment will be evidence based comprising the following for each Learning Outcome:

Serial No.	Terminal Competency	Maximum Weightage (%)

1	Safety consciousness	15
2	Workplace hygiene	5
3	Attendance/ Punctuality	10
4	Ability to follow Manuals/ Written instructions	5
5	Application of Knowledge	10
6	Skills to handle tools / equipment/ Instruments/ Devices	10
7	Economical use of materials	5
8	Working Strategy	10
9	Quality in workmanship/ Performance	15
10	VIVA	15
	Total Maximum Weightage (%)	100

Pass/Fail

The minimum pass percentage is 60% marks for formative assessment.

LEARNING OUTCOME WITH ASSESSMENT CRITERIA

LEARNING OUTCOME	ASSESSMENT CRITERIA
FIRST YEAR	
1. Identify trade related hazards and safety procedures following safety precautions. NOS ELE/N 1002	Demonstrate Safety precautions.
	Demonstrate First aid.
	Demonstrate firefighting.
	Demonstrate working at height using PPE's.
2. Produce fitting jobs as per drawing (Range of operations: marking, sawing, filing, drilling, reaming, tapping and dieing etc.) . NOS ELE/N3114	Fix saw blade and cut materials as per requirements.
	Filing flat surface on M.S. plates.
	Marking as per drawing.
	Make the job as per drawing by filing, drilling, tapping, etc.
	Make external thread by die.
	Check the job for its dimensional accuracy.
3. Produce Sheet metal components (range of operation – marking, metal cutting, bending, riveting and soldering etc.) NOS ELE/N3114	Mark sheet as per drawing
	Cut G.I. sheet as per drawing.
	Bend the sheet, fold, rivet and / or solder to join the sheet as per drawing.
	Check the job for its dimensional accuracy.
4. Identify electrical safety. Join different wire, measure power, currents, volts and earth resistance etc. Connect single phase, 3 phase motors i.e. star and delta connections. NOS ELE/N 1002	Cut wire and prepare different types of joints.
	Measure current, voltage, resistance, power, frequency, energy using analog and digital meter and identify the terminals of motor.
	Test continuity, insulation and earthing using megger.
	Make star and delta connection and show line voltage, line current, phase voltage and phase current.
	Measure power and power factor.
5. Identify the electronic components and their colour code i.e. transistor, capacitor, diode, amplifier, I.C and able to work soldering. NOS ELE/N3112	Identify the electronic components and their colour code.
	Verify Ohm's Law
	Construct and test full wave rectifier, bridge rectifier, series voltage regulator circuit, power supply, electronic timer
6. Perform gas welding, brazing, soldering observing related safety. NOS ELE/N3112	Setting of Oxy-acetylene cylinders, regulators etc and gas flame with proper pressure.
	Perform brazing between Cu to Cu and Cu to MS, Cu to aluminum pipe.

	Join metal plates by using gas welding (lap joint, butt joint, etc)
	Check the welded component and its measurements.
7. Identify RAC tools and equipment and recognise different parts of RAC system. Perform copper tube cutting, flaring, swaging, brazing. NOS ELE/N 3108	Identify the RAC tools and equipment. Identify the condensing and cooling unit. Copper pipe cutting, bending, swaging, flaring and brazing as per requirements and test pressure.
8. Test mechanical & electrical components. Perform leak test, vacuuming, gas charging, wiring & installation of refrigerator. NOS ELE/N3112	Leak testing of RAC unit use dry nitrogen. Evacuation the unit and test vacuum level. Gas charging unit. Make wiring of refrigerator. Install, run and check the performance.
9. Identify electrical and mechanical components of a refrigerator. NOS ELE/N3112	Install different types of electrical component of Refrigerator. Check and test different fault of electrical and other system of refrigerator
10. Test compressor motor terminal, start compressor Direct with relay & without relay, technique of flushing, leak testing, replacing capillary & filter drier, evacuation & gas charging. NOS ELE/N3112	Trace and test compressor / motor terminals. Start the compressor Direct / without relay. Start the compressor with relay. Flushing, cleaning of condenser, Evaporator coils. Joining of condensers, Evaporator capillary fitter drier by brazing. Test leakage, Evacuation and charge gas Test performance.
11. Check components of frost-free refrigerator (electrical / mechanical), wiring of frost-free freeze & air distribution in refrigerator sector. Leak detection, evacuators & gas charging. NOS ELE/N3112	Identification of frost-free refrigerator parts. Check electrical components and make wiring. Check air distribution duct and door cooling system. Leak test, evacuation, gas charging and test performance

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12. Dismantle, repair and assemble hermetic, fixed and variable speed compressor, and test performance. NOS ELE/N3112	Remove oil and cut the compressor dome.
	Separate the compressor assembly from dome.
	Dismantle and check worn out parts.
	Clean the parts and assemble.
	Welds the dome and pressure check test the welded joints.
13. Identify the terminals of sealed compressor and their wiring and measure current, volts, watts and use of DOL starter with different types of motors. NOS ELE/N3112	Measure starting current and running current of hermetic compressor motor.
	Measure starting current and running current and changing of DOR of CSIR motor.
	Measure starting current and running current and changing of DOR of shaded pole motor.
14. Perform selection of Hermetic compressor for different appliances, starting methods, testing controls & safety cut out used in sealed compressor. NOS ELE/N3112	Select and Install hermetic compressor in the system.
	Braze the major mechanical components.
	Test Pressure.
	Test electrical components and safety cut outs.
	Make wiring, run the machine and check performance.
15. Identify the components of control system of Inverter A.C and wiring of control system. NOS ELE/N3114	Identify components of control system of Inverter ACs.
	Make wiring of the control system.
16. Perform servicing & de-scaling of condenser (internals &externals) used in different appliances. NOS	Perform servicing of Air-cooled condenser (external and internal bycleaning, flushing and leak test)
	Remove Water cooled condenser head.
	De- scaling by brush and chemical cleaning.

ELE/N3114	Re assembles and test performance.
17. Perform Fitting & adjustment of drier, filter & refrigerant controls used in different refrigeration system. NOS CSC/N9413	Clean filter/strainer and refill desiccates in drier.
	Install different diameter capillary tube used in different type of cooling machines.
	Install with different types of expansion valves.
	Make adjustment of refrigerant feeding as per the heat load. Use A.E.V./T.E.V in RAC unit.
	Test and adjust the expansion valves fitted with machines.
18. Perform servicing of different evaporator used in different appliances. NOS CSC/N9414	Service evaporator coil: Strip out the evaporator coil from the system.
	Perform leak test, Flush and clean by dry Nitrogen.
	Re-Join the coil after removing oil and debris and test performance.
19. Carry out Recovery and Recycling of Refrigerant used, alternative of CFC, HFC re-cover, transfer & handling of gas cylinders. NOS ELE/N3114	Recover refrigerant (CFC/HFC).
	Transfer of refrigerant from cylinders to cylinders.
	Measure pressure-temperature of refrigerants and Identify flammability and toxicity of A3 and A2L of refrigerants.
	Demonstrate Good servicing practices on Test leak, evacuation and charge refrigerant in refrigerator by weight in capillary system.
20. Retrofit CFC/HFC machine with ozone friendly refrigerant with understanding of the compatibility. NOS ELE/N3114	Retrofit CFC/HFC unit by ozone friendly refrigerants.
	Run the machine and check the cooling performance.

21. Pack thermal insulation, prevent cooling leakage. NOS ELE/N3114	Pack thermal insulation in RAC unit.
	Check heat leakage and sweating problem.
22. Install window AC, test Electrical & electronics components & Fault diagnosis & remedial measures. NOS ELE/N3114	Test Electrical controls of Window AC.
	Test electronic components / PCB.
	Install, make wiring of window A.C and run the machine.
	Diagnosis the faults, remedies and check performance.
23. Perform servicing of electrical & electronic control test, Installation, wiring, fault finding & remedial measures of different split AC. NOS ELE/N3114	Test electrical components of split A.C.
	Test electronic components / PCB.
	Install, make wiring and run the machine.
	Diagnosis the faults, remedies and check performance.
24. Perform servicing of car AC. Fault diagnosis & remedial measures. NOS ELE/N3114	Make wiring and install car A.C.
	Servicing of Car A.C and test run.
	Diagnosis Fault, remedial measures and check performance
25. Read and apply engineering drawing for different application in the field of work. NOS CSC/N9401	Read & interpret the information on drawings and apply in executing practical work.
	Read & analyze the specification to ascertain the material requirement, tools and assembly/maintenance parameters.
	Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.

26. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. NOS CSC/N9402	Solve different mathematical problems
	Explain concept of basic science related to the field of study
SECOND YEAR	
27. Carry out servicing, dismantling, checking different parts of different types of commercial compressor, re-placing worn out parts, Check lubrication system. Assemble & check performance. NOS-ELE/N3140	Identify different parts of commercial compressor
	Dismantling of compressor parts.
	Servicing of different parts and check. (Gasket making, lapping valve parts etc.)
	Replace/ renew the defective parts.
	Check lubrication system/ pump.
	Check / service capacity control system.
	Assemble and check performance.
28. Perform servicing of different types of water-cooled condenser. NOS-ELE/N3140	Service water-cooled condenser.
	Remove head, Pump down gas, cut gasket, test leakage, and De-scale.
	Assemble and check performance.
29. Perform servicing and performance test of Cooling tower. NOS-ELE/N3141	Service cooling tower, clean sump, nozzle, screws, pipe line.
	Check water supply and delivery pipe line.
	Service water pump.
	Assemble and Test performance.

30. Conduct Servicing, backwash & re-generate Water treatment plant of circulating water. NOS CSC/N9415	Dismantle, Servicing of impeller of water treatment plant.
	Repair defective parts of water treatment plant back wash and re-generate.
	Assemble and test performance.
31. Perform Fitting of expansion valve, adjustment of refrigerant flow according to heat load. NOS- ELE/N3140	Install refrigerant control device as per head load.
	Adjust refrigerant flow.
	Check cooling performance.
32. Perform servicing of evaporator & chillers. NOS- ELE/N3140	Service coil evaporator.
	Service flooded chiller.
	Identify feeding device used in flooded chiller (Float valve, level master control, EXV etc.)
33. Carry out servicing and retrofit of Water cooler and dispenser. NOS CSC/N9416	Service water cooler (Pressure type/Storage type.)
	Service water cooler (Instant cooling type)
	Make wiring, thermostat setting, fault diagnosis and remedies.
	Retrofit CFC/HFC charged water cooler.
34. Service, retrofit of visible cooler and bottle cooler and test performance. NOS CSC/N9417	Service, Evacuation, flushing and retrofit with refrigerant the visible cooler.
	Service, Evacuation, flushing and retrofit with refrigerant the bottle cooler.
	Check wiring circuit, test components, replace and Test performance of the machine.

35. Conduct servicing of deep freezer and test performance. NOS CSC/N9418	Service and troubleshooting of deep freezer.
	Check wiring circuit, test and replace defective components.
	Retrofit CFC charged deep freezer and test performance.
36. Install, service, repair, gas charging and testing performance of Ice Cube machine. NOS CSC/N9419	Service different components of Ice cube machine
	Check Electric circuit, solenoid valve, pressure cut out, thermostat etc. of ice cube machine.
	Check and service flow system of gases, Test leakage, evacuation and charge gas at set pressure.
	Check defrosting system and overall performance
37. Repair, servicing & retrofit of ice candy plant. NOS CSC/N9420	Service, test, trouble shoot, and replace defective components of ice candy plant.
	Check function of agitator.
	Check wiring circuit, Test different electrical and mechanical controls, motor belts.
	Retrofit CFC charged ice candy (R22 with R134a) and Test performance.
38. Perform servicing of Ice plant and evaporative condenser. NOS CSC/N9421	Check function of agitator.
	Check motor and wiring circuit, service and trouble shoot, Test components and replace defective parts.
	Service evaporative condenser.
	Service brine tank and descale of chilling pipe line.
	Evacuate and charge gas.
	Run the plant and record different parameters of performance.

39. Perform Servicing and preventive maintenance of walk in cooler & cold storage. NOS CSC/N9422	Service and trouble shoot, check wiring circuit, Test component and replace defective parts of walk in cooler / cold storage.
	Install gauge manifold, leak test, evacuate and charge gas.
	Service, Diagnosis faults and remedial measures.
	Preventive maintenance and record the log sheet
40. Study psychrometric chart and measure psychrometric properties using psychrometric, anemometer i.e. DBT, WBT, RH, air flow etc. NOS- ELE/N3140	Read Psychrometric chart and identify the different properties.
	Use Psychrometric and measure properties of air.
	Measure air velocity by anemometer.
41. Perform servicing of motor and blowers used in different air conditioning system. NOS- ELE/N3141	Service blower motor and test performance on power Input.
	Service blower and fans and check performance.
42. Construct, installation, pack thermal and acoustic insulation of different air ducts. NOS- ELE/N3141	Construct and install duct as per layout drawing.
	Check air flow through Duct.
	Pack / Insulate duct, check for proper insulation and observe the noise.
43. Perform servicing and maintenance of different types of air filters. NOS- ELE/N3141	Disassemble and Service Air filters.
	Check performance and replace Air filter
44. Perform servicing,	Service, Leak test, evacuate, charge gas on Package AC

installation, fault diagnosis and remedial measures on Package AC with Air cooled condenser. NOS CSC/N9423	with Air cooled condenser.
	Install, run the A.C. and diagnose faults and rectify defects.
45. Carry out servicing, installation, fault diagnosis and remedial measures in Package A.C. with water cooled condenser. NOS-ELE/N3140	Service, descale, Leak test, evacuate, charge gas on Package AC with water cooled condenser.
	Install, run the A.C. and diagnose faults and rectify defects.
46. Identify the various components of central AC test electrical components and make wiring. Servicing of A.H.U, damper, check air flow, De-scaling of condenser and CT servicing. NOS-ELE/N3141	Check electrical accessories and make wiring with the safety cut outs and accessories.
	Service A.H.U., damper and check air circulation.
	De-scaling of condenser and cooling tower.
	Run and check the performance.
47. Pump down the system, top up oil and gas and check temperature and pressure. NOS-ELE/N3140	Pump down gas from central A.C. system.
	Top up oil and gas.
	Run the machine and check pressure and temperature.
48. Identify components of DX system. Test components, make wiring of DX system. Test leak and evacuate, gas charge the system and check the performance. Maintenance, trouble shoot and operate the plant. NOS- ELE/N3140	Service DX system.
	Test controls and re-connect the cut out and controls.
	Run the machine and check operation.
	Pump down the less cooling machine for repair.
	Leak test, evacuate, gas charge and test performance.

49. Identify the different part of VRF/VRV system, check and service VRF/VRV system. NOS- ELE/N3141	Identify the parts of VRF/VRV machine.
	Check and service VRV/VRF machine.
	Identify error code
50. Identify different part of indirect or chillers system. Check components and make wiring, leak test, evacuate and gas charge/ top up. Servicing the plant and trouble shoot. NOS- ELE/N3141	Service indirect (chiller) system.
	Run and check the performance.
	Top up oil/refrigerant.
	Diagnosis faults and rectify.
51. Identify chilled water pipe line. Servicing of dampers, FCU and water control valves. NOS- ELE/N3141	Check chill water line insulation and water flow.
	Service F.C.U. and related controls.
	Run and check performance.
52. Troubles shoot both central A.C. plant DX and indirect system. Check different control system, installation of other major components, servicing of all parts including cooling tower and water treatment plant. NOS- ELE/N3141	Service and Fault diagnosis of central A.C.
	Check machine and electrical controls, cut outs.
	Service cooling tower and pumps.
	Identify the water treatment plant components.
	Service water softening plant, re-generate, back wash and check the performance.
	Run the machine and check the performance.
53. Perform Servicing, fault diagnosis, repair and maintenance of mobile A.C. leak test, evacuation, gas charging, check	Identify the parts of mobile A.C.
	Run the machine and check the different parameters i.e. pressure, temperature etc.
	Check magnetic clutch and other controls.

magnetic clutch and make wiring. Test performance after start. NOS-ELE/N3141	Observe the cooling performance, air velocity inside the compartment.
	Check leakage.
	Evacuate and charge gas.
	Test run and check the cooling performance.
54. Perform Preventive maintenance of different plants. Maintain log book based on daily operation. NOS- ELE/N3141	Preventive maintenance of central A.C. DX system.
	Maintain operation data on log sheet.
	Preventive maintenance of central A.C. indirect system (Chiller system).
	Record chiller water in and out temperature.
	Cooling tower functioning data, i.e. CT range, Approach, condenser in and out water temperature.
	Condense and cooling tower pump maintenance water pressure check.
	A.H.U and Damper functioning servicing air filter and check air velocity etc.
55. Read and apply engineering drawing for different application in the field of work. NOS CSC/N9401	Read & interpret the information on drawings and apply in executing practical work.
	Read & analyze the specification to ascertain the material requirement, tools and assembly/maintenance parameters.
	Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
56. Demonstrate basic mathematical concept and principles to perform practical operations.	Solve different mathematical problems
	Explain concept of basic science related to the field of

Understand and explain basic science in the field of study. NOS CSC/N9402	study

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LEARNING OUTCOME(CORE SKILL)	
LEARNING OUTCOME	ASSESSMENT CRITERIA
EMPLOYABILITY SKILLS	
1. Introduction to Employability Skills	Outline the importance of Employability Skills for the current job market and future of work
	List different learning and employability related GOI and private portals and their usage
	Research and prepare a note on different industries and the available opportunities
2. Constitutional values - Citizenship	Explain the essential civic rights and duties required to be followed to become a responsible citizen
	Discuss the role of personal values and ethics in personal and social development
	Identify and practice different environmentally sustainable practices
3 Becoming a Professional in the 21st Century	Discuss relevant 21st century skills required for employment
	Highlight the importance of practicing 21st century skills like Self-Awareness, Behavior Skills, Positive attitude, self - motivation, problem solving, and time management skills in personal or professional life
	Create a pathway for adopting a learning mindset for personal and professional development
4. Basic English Skills	Use appropriate grammar and sentences while interacting with others
	Read English text with appropriate articulation
	Role play a situation on how to talk appropriately to a customer in English, over the phone or in person
	Write a short note/paragraph / letter/e -mail using correct English
5. Career Development & Goal Setting	Research and identify trends and different skills required to match the current market requirement for a job
	Create a career development plan with well-defined short- and long-term goals
6. Communication Skills	Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette
	Write a short note/paragraph on a familiar topic
	Explain the importance of communication etiquette including active listening for effective communication
	Role play a situation on how to work collaboratively with

	others in a team
7. Diversity and Inclusion	Exhibit how to behave, communicate and conduct oneself appropriately with all genders and PwD
	Discuss the POSH Act and its significance
8. Financial and Legal Literacy	Discuss various financial institutions, products, and services
	Demonstrate how to carry out offline and online financial transactions, safely and securely and check passbook/statement
	Explain the common components of salary such as Basic, PF, Allowances (HRA, TA, DA, etc.), tax deductions
	Calculate income and expenditure for budgeting
	Discuss the legal rights, laws, and aids
9. Essential Digital Skills	Describe the role of digital technology in day-to-day life and the workplace
	Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
	Demonstrate how to connect devices securely to internet using different means
	Follow the dos and don'ts of cyber security to protect against cyber crimes
	Discuss the significance of displaying responsible online behaviour while using various social media platforms
	Create an e-mail id and follow e- mail etiquette to exchange e-mails
	Show how to create documents, spreadsheets and presentations using appropriate applications
10. Entrepreneurship	Describe the types of entrepreneurship and enterprises
	Discuss the process of identifying opportunities for potential business and relevant regulatory and statutory requirements
	Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
	Create a sample business plan, for the selected business opportunity
	Discuss various sources of funding and identify associated financial and legal risks with its mitigation plan

11. Customer Service	Describe different types of customers
	Role play a situation on how to identify customer needs and respond to them in a professional manner
	Explain various tools used to collect customer feedback
12. Getting ready for apprenticeship & Jobs	Draft a professional Curriculum Vitae (CV)
	Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
	Demonstrate how to apply to identified job openings using offline /online methods as per requirement
	Discuss the significance of maintaining hygiene and dressing appropriately
	Discuss how to prepare for an interview
	Role play a mock interview
	List the steps for searching and registering for apprenticeship opportunities

SECTION 2

25. EVIDENCE OF LEVEL

OPTION A

Title/Name of qualification/component: REFRIGERATION AND AIR CONDITIONING TECHNICIAN Level: 4			
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
Process	Requires Well Developed Skill - Produce fitting jobs as per drawing (Range of operations: marking, sawing, filing, drilling, reaming, taping and dyeing etc.). - Produce Sheet metal components (range of operation – marking, metal cutting, bending, riveting and soldering etc.). - Identify electrical safety. Join different wire, measure power, currents, volts and earth resistance etc. Connect single phase, 3 phase motors i.e. star and delta connections. Clear choice of procedures in familiar context - Identify the electronic components and their colour code i.e. transistor, capacitor, diode, amplifier, I.C and able to work soldering.	The learner requires demonstrating well developed skill for example 'Identify electrical safety. Join different wire, measure power, currents, volts and earth resistance etc. Connect single phase, 3 phase motors i.e. star and delta connections' and 'Identify RAC tools and equipment and recognise different parts of RAC system. Perform copper tube cutting, flaring, swaging, brazing'. One needs to perform complex set of activities for these outcomes and there is no scope for error as these could cause fatal accidents if not done correctly. The learner requires applying clear choice of procedures in familiar context as per the client's requirement or identifying and faulting and deciding how to rectify it or plan as per the layout and	4

Title/Name of qualification/component: REFRIGERATION AND AIR CONDITIONING TECHNICIAN Level: 4			
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	- Perform gas welding, brazing, soldering observing related safety. - Identify RAC tools and equipment and recognise different parts of RAC system. Perform copper tube cutting, flaring, swaging, brazing.	conditions available. Hence NSQF Level is 4 for this descriptor.	
Professional knowledge	Knowledge of facts in the field of work or study - Function, use and specifications of refrigeration tools, instruments and equipment. - Function, construction, working, use, and application, specification of Sheet metal tools, instruments and equipment. Knowledge of Principles and general concepts in the field of work or study - Introduction to Electronics. Basic Principles of semiconductors, Principles and application of Diodes. Solder – its composition and paste.	The learner requires demonstrating knowledge of facts, principles, processes and general concepts; in the field of work or studying as per the learning outcomes 'Introduction to Electronics. Basic Principles of semiconductors, Principles and application of Diodes' and 'Compressor efficiency factors, wet compression, oil, properties, lubrication methods'etc. The learner requires to demonstrate knowledge of facts, principles, processes and general concepts, in a field of work or study related to refrigeration, work, power, energy, force, Heat and Temperature, Different temperature scales, Thermometers, Units of heat, sensible heat, latent heat, super heating	4

Title/Name of qualification/component: REFRIGERATION AND AIR CONDITIONING TECHNICIAN Level: 4			
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	- Basic principle of refrigeration, working, use, specifications of refrigeration tools, instruments and equipment. Knowledge of processes in the field of work or study - Compressor efficiency factors, wet compression, oil, properties, lubrication methods. - Function of condenser, types, Construction of air-cooled condenser.	and sub-cooling, saturation temperature , pressure, types, units. Hence NSQF Level is 4 for this descriptor.	
Professional skill	- Test mechanical & electrical components. Perform leak test, vacuuming, gas charging, wiring & installation of refrigerator. - Perform door alignment, door gasket fitting, replace door switch. - Test compressor motor terminal, start compressor Direct with relay & without relay, technique of flushing, leak testing, replacing capillary & filter drier, evacuation	The learning outcomes indicated in the adjacent cell all require cognitive and practical skills to accomplish tasks that involve testing mechanical & electrical components, test and repair compressor motor terminal, start compressor direct with and without relay and checking of components of different types of refrigerator all of which involve solving problems by selecting and applying basic	4

Title/Name of qualification/component: REFRIGERATION AND AIR CONDITIONING TECHNICIAN Level: 4			
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	& gas charging. • Check components of frost free refrigerator (electrical / mechanical), wiring of frost free freeze & air distribution in refrigerator sector. Leak detection, evacuators & gas charging.	methods, tools, materials and information. Hence NSQF Level is 4 for this descriptor.	
Core skill	Desired Mathematical Skills • Demonstrate mathematical concept and principles to perform practical operations. • Explain science in the field of study including simple machine. Understanding of social/political • Apply the concept in productivity & quality management in day to day work to improve productivity & quality. • Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources. Organizing information and	The learning outcomes for example 'Demonstrate mathematical concept and principles to perform practical operations' and 'Apply the concept in productivity & quality management in day to day work to improve productivity & quality' display the learning outcomes where the learner needs to display desired mathematical skill; understanding of social, political; and some skill of collecting and organising information, communication. Hence NSQF Level is 4 for this descriptor.	4

Title/Name of qualification/component: REFRIGERATION AND AIR CONDITIONING TECHNICIAN Level: 4			
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	communication Utilize computer applications and internet to take benefit of IT developments in the industry.		
Responsibility	- Perform servicing & de-scaling of condenser (internals & externals) used in different appliances. - Perform fitting & adjustment of drier, filter & refrigerant controls used in different refrigeration system. - Troubles shoot both Central A.C. plant DX and indirect system. Check different control system, installation of other major components, servicing of all parts including cooling tower and water treatment plant. - Perform Servicing, fault diagnosis, repair and maintenance of mobile A.C. leak test, evacuation, gas charging, check magnetic clutch and make wiring. Test performance after start. - Perform preventive maintenance of different plants. Maintain log book based on daily operation.	The role of Refrigeration & Air-condition Technician is independently responsible to perform the work as per specifications and their own analysis of what needs to be done based on their understanding of mechanical working processes, principles and standards. Learning outcomes like 'Perform fitting & adjustment of drier, filter & refrigerant controls used in different refrigeration system', 'Perform Servicing, fault diagnosis, repair and maintenance of mobile A.C. leak test, evacuation, gas charging, check magnetic clutch and make wiring' etc. reveal the same. The learner is independently responsible to perform the work as per specifications followed by analysis of what needs to be done to achieve desired outcome.	4

Title/Name of qualification/component: REFRIGERATION AND AIR CONDITIONING TECHNICIAN Level: 4			
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
		Hence NSQF Level is 4 for this descriptor.	

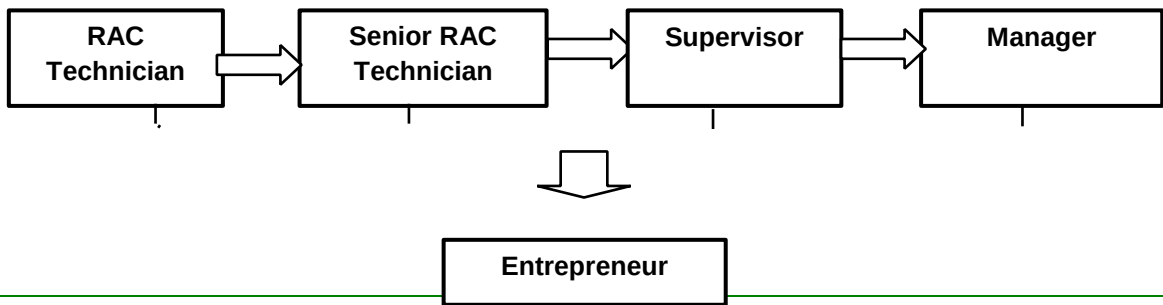
SECTION 3**EVIDENCE OF NEED**

26	What evidence is there that the qualification is needed? What is the estimated uptake of this qualification and what is the basis of this estimate? <table border="1"> <thead> <tr> <th data-bbox="339 551 625 696">Basis</th><th data-bbox="625 551 1386 696">In case of other Awarding Bodies (Institutes under Central Ministries and states departments)</th></tr> </thead> <tbody> <tr> <td data-bbox="339 696 625 1122">Need of the qualification</td><td data-bbox="625 696 1386 1122">Capital Goods and Manufacturing Sector has a significant presence of organized as well as unorganized skilled manpower requirement. This sector is poised to grow exponentially in the years to come and is highly labour intensive and there are many emerging trends in this sector. Hence the qualification has been designed keeping in view to cater to the ever-increasing demand of skilled manpower in consultation with stakeholders.</td></tr> <tr> <td data-bbox="339 1122 625 1541">Industry Relevance</td><td data-bbox="625 1122 1386 1541">The job role defined for the qualification is as per the National Classification of Occupations 2015 which is developed by Employment Directorate under the ministry of Labour and Employment in collaboration with different industry partners and as per ILO guidelines. Moreover, the training is imparted in ITIs/NSTIs/MSTIs/BTC/ BTPs/ Industries / Establishments etc. where such requirement is available. This justifies the qualification is very much relevant for industry.</td></tr> <tr> <td data-bbox="339 1541 625 1671">Usage of the qualification</td><td data-bbox="625 1541 1386 1671">The Proposed qualification will create skilled Technician for various establishments in different Sectors.</td></tr> <tr> <td data-bbox="339 1671 625 1742">Estimated uptake</td><td data-bbox="625 1671 1386 1742">The present seating capacity is 41080.</td></tr> </tbody> </table>	Basis	In case of other Awarding Bodies (Institutes under Central Ministries and states departments)	Need of the qualification	Capital Goods and Manufacturing Sector has a significant presence of organized as well as unorganized skilled manpower requirement. This sector is poised to grow exponentially in the years to come and is highly labour intensive and there are many emerging trends in this sector. Hence the qualification has been designed keeping in view to cater to the ever-increasing demand of skilled manpower in consultation with stakeholders.	Industry Relevance	The job role defined for the qualification is as per the National Classification of Occupations 2015 which is developed by Employment Directorate under the ministry of Labour and Employment in collaboration with different industry partners and as per ILO guidelines. Moreover, the training is imparted in ITIs/NSTIs/MSTIs/BTC/ BTPs/ Industries / Establishments etc. where such requirement is available. This justifies the qualification is very much relevant for industry.	Usage of the qualification	The Proposed qualification will create skilled Technician for various establishments in different Sectors.	Estimated uptake	The present seating capacity is 41080.
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Usage of the qualification	The Proposed qualification will create skilled Technician for various establishments in different Sectors.										
Estimated uptake	The present seating capacity is 41080.										
27	Recommendation from the concerned Line Ministry of the Government/Regulatory Body. To be supported by documentary evidences. The qualification, originally designed for Craftsman Training Scheme is in										

	existence for many years and approved by DGT (Regulatory Body) under Ministry of Skill Development and Entrepreneurship, Govt. of India.
28	What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF? Give justification for presenting a duplicate qualification The qualification is originally designed and approved by DGT for the Craftsman Training Scheme and is in existence for many years. No such duplicate qualification of same duration and competencies exists.
29	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? Specify the review process here • The research wing of CSTARI & DGT reviews and updates the qualification, in consultation with industries and other stakeholders, on a regular basis by conducting trade committee meetings. • DGT will monitor any duplicity by comparing existing qualifications with upcoming ones in the National Qualifications Register (NQR) and relevant sectors.

SECTION 4

EVIDENCE OF PROGRESSION

30	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? Show the career map here to reflect the clear progression On completion of the training the trainee will have an opportunity to move in vertical/horizontal pathways to promote to higher designations. The learner can further undergo other specialised courses to excel in the relevant field.  <pre> graph LR A[RAC Technician] --> B[Senior RAC Technician] B --> C[Supervisor] C --> D[Manager] B --> E[Entrepreneur] </pre>
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