

NSQF QUALIFICATION FILE GUIDANCE

Version 6: Draft of 24 May 2017

NSDA Reference

To be added by NSDA

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Name and address of submitting body:

Directorate General of Training (DGT),
Ministry of Skill Development & Entrepreneurship (MoSDE)
Shram Shakti Bhawan, Rafi Marg,
New Delhi

Name and contact details of individual dealing with the submission

Name: Smt. Sandhya Salwan

Position in the organisation: Director(SDI)

Address if different from above:

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List of documents submitted in support of the Qualifications File

1. Curriculum attached – Repair And Maintenance Of Central Air Conditioning Plant
2. QP Mapping : REF-701 Service Technician of Central Air Conditioning Plant
3. List of number of trainees of trained under MES in 2015-16 & 2016-17.
4. List of candidates' placed for this course in 2016-17.

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SUMMARY

Qualification Title	Repair And Maintenance Of Central Air Conditioning Plants
Qualification Code	REF- 701
Nature and purpose of the qualification	NCVT Certificate in job role of Service Technician Repair And Maintenance Of Central Air Conditioning Plant - Main Purpose of the Qualification is to get familiar with the commercial refrigeration appliances also to serve in the organisation As service Technician of Central Air Conditioning Plant
Body/bodies which will award the qualification	National Council for Vocational Training (NCVT)
Body which will accredit providers to offer courses leading to the qualification	GOI Ministries and State departments who have adopted MES qualifications accredit training providers for their programs and schemes (only in case of SDIS schemes Training providers accredited by States on behalf of NCVT)
Body/bodies which will carry out assessment of learners	Independent Agency empanelled as Assessing Bodies (ABs)
Occupation(s) to which the qualification gives access	After completion of the course the trainees shall be qualified for one or more of the following job roles: 5. Serve in organisation as Central Air Conditioning Plant technician 6. Self employment as Central Air Conditioning Plant technician
Licensing requirements	-NA-
Level of the qualification in the NSQF	Level 3
Anticipated volume of training/learning required to complete the qualification	500 Hours
Entry requirements and/or commendations	Passed 8 th Class + 14 years of age
Progression from the qualification	<p>Academic :</p> <p style="text-align: center;">Repair And Maintenance Of Central Air Conditioning Plants DGT/MES/: REF-701</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Repair And Maintenance Of Central Air Conditioning Plants Supervisor DGT/MES/: REF-701</p> </div> <div style="text-align: center;">  <p>Repair And Maintenance Of Central Air Conditioning Plants Support Engineer DGT/MES/: REF-701</p> </div> </div>

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	1) Professional: Service technician ->Senior Service technician -> Service Supervisor		
Planned arrangements for the Recognition of Prior learning (RPL)	Yes RPL arrangements are already exist under this qualification		
International comparability where known	-NA-		
Date of planned review of the qualification.	2 years after approval of the Qualification preferable September 2019		
Formal structure of the qualification <ol style="list-style-type: none"> 1. "K" grade Cooper tube flaring, Swaging & Brazing, 2. Checking Electrical & mechanical components of Central Air Conditioning Plants 3. Check the three phase wiring circuit of Central Air Conditioning Plants 4. De-scaling of water cooled condenser, evaporator of Central Air Conditioning Plants of 5. Leak Testing, Evacuation, Gas Charging & performance checking of Central Air Conditioning Plants 6. Dismantle & assemble of open type compressor 7. Installation of Central Air Conditioning Plants 8. Performance checking of Central Air Conditioning Plants 			
Title of component and identification code.	Mandatory/ Optional	Estimated size (learning hours)	Level
(I) Identification of components of Central Air Conditioning Plants (following safety)	M	20	3
(ii) Tracing out three phase Circuit of Central Air Conditioning Plants (following safety)	M	20	3
(III) Cooper tube operation including brazing (following safety)	M	30	3
(iv) servicing of Central Air Conditioning Plants cleaning , flushing, Evacuation charging (following safety)	M	150	3
(v) Fault finding & Rectification of Central Air Conditioning Plants (following safety)	M	100	3
(vi) Dismantle & assemble of open type compressor of Central Air Conditioning Plants	M	50	3
(vi) Installation of Central Air Conditioning Plants (following safety)	M	100	3
Performance checking of Central Air Conditioning Plants (following norms)	M	30	3
Total		500	3

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Dealing with customer, form filling educated customer	M	20	3
Understand and practice soft skills, OSH&E, working with Computer and communicate with required clarity.	M	100	3

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

Curriculum for Repair And Maintenance Of commercial Cooler Sector for Modular Employable Scheme (MES) attached as annexure.

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

Relevant documents available in MES Syllabus

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SECTION 1 **ASSESSMENT**

Body/Bodies which will carry out assessment:

Criteria for selection of Assessment body

Minimum Eligibility Criteria

- The applicant shall be a legal entity, registered in India.
- The applicant should have in last two years carried out competency / skill assessment for minimum 1000 persons or should have trained minimum 1000 persons and got tested by some agencies such as NCVT, Sector Skill Council, State, board/ council and reputed industry Association. Organizations having experience in testing of competencies would be preferred.
- In case more number of applications is received, preference will be given to those organizations that have trained/assessed larger number of persons.
- The applicant is not a Training Provider (TP) in the same sector and in same State, but it can be TP in other States, other Sectors or other scheme.
- The applicant shall have access to technically qualified personnel of repute and integrity in different industrial trades and technology.
- The applicant shall develop dedicated human resource for handling the processes in assessment process.
- The applicant shall declare its linkages with other organization(s), if any to ensure independence and avoid any conflict of interest.
- Institutions/ Firms blacklisted by any Government Department shall not be considered in this RFP.
- The Applicant shall provide the information and supporting documents towards their claims.
- Initially provisional empanelment will be awarded to the organizations based on the evaluation of eligibility of the Assessing Body based on the criteria.
- Based on the module and sector that will be handled by the assessor, the assessing body shall send its assessor for competency evaluation in the institutions which will be notified by DGT time to time. The assessor will be assessed to ascertain the competency to carry out competency based assessment.
- Final empanelment would be granted subject to the Assessing Body fulfilling the following conditions of getting the competencies of 2 assessors of each module per State evaluated in the institutes notified by the DGT. Testing charges for evaluating the competencies of the assessors will be borne by the Assessing Bodies.

(1) Assessment process:

The assessment process aims to test and certify the competency of the persons through Assessing Bodies who seek certification of their skills acquired informally or the persons who have been trained at the registered TPs. The competency assessment of the candidate is being done by the Assessor Competency Evaluation (ACE) qualified assessor of the independent Assessing Bodies (AB) which is not involved in training delivery, to ensure an impartial assessment. ACE is conducted to evaluate the competency of the assessor. In the assessment process, identification of competency, ways to measure the competency and deciding on the type of evidence that has to be collected are the responsibility of the Assessing bodies whereas administering the assessment and collecting the evidence and reporting the results are the responsibility of the assessors. The assessment process consists of following components:

Theory Test:

- It must assess the knowledge which is essential for a person to do the job. Without this knowledge, the person will not be able to do the job.
- The questions shall be of objective type involving selection of correct response.
- The question paper should contain sketches/ diagrams/ photographs/ drawing to overcome the problems of reading comprehension.
- The test shall be of short duration.

Practical Test:

It shall be able to test:

- Manipulative skills to handle tools and equipment.

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- Speed in doing work.
Accuracy maintained
- Quality in workmanship.
- Sequence of performance.
- Economical use of material.
- Neatness & housekeeping.
- All the competencies prescribed in the course curriculum.

The Assessment Parameters adopted during assessment:

- Knowledge of equipment, limitation of use of tools and equipment, and methods & procedure.
- Understanding of functioning of equipment & tool, criteria to be used in selecting tools for given job, and the process of measurement.
- Skill in finishing to required measurement, handling measurement & calculations, handling tools and equipment with ease, finishing neatly.
- Abilities to take corrective steps, use correct work habits, take measurements, complete the job within stipulated time, and adopt safe practices.
- Attitude towards the work, accurate & precise work and co-workers and supervisor.

(2) Duration of Test:

The duration of test vary according to the task. Theory test shall be of 1 hour duration and practical test for engineering trade shall be 6 to 8 hours minimum and non-engineering it shall be of 4 hours minimum. Assessing Bodies while preparing practical test shall ensure that candidate shall be tested on all the competencies prescribed in the course module.

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

Terminal competency	Maximum marks
Application of knowledge	30
Care for tools & equipment	15
Economic use of materials	15
Safety consciousness	10
Speed	10
Accuracy	15
Quality of workmanship	20
Amount of work	15
No. of attempts	10
Attitude	10
Total maximum marks for Practical	150
Maximum marks for theory	50

(3) **Minimum pass mark:**

Minimum passing marks for Practical is 60%

Minimum pass marks for theory is 40%

(4) **Testing and certifications process for the course:**

Pre- Assessment

- Regional Directorate of Apprenticeship Training (RDAT) allot batches to the Assessing Bodies on rotational basis depending on the presence of assessing body in that region sector wise and the assessing body in coordination with Training Provider and assessor should confirm and schedule the assessment.
- The Assessing Body confirms the date of assessment in consultation with Training Provider and communicate to the RDAT/State.
- The Assessing Body forms a panel of ACE qualified assessors of high repute and integrity, sector wise and location wise.
- The assessment of the candidates is done by the Assessing Bodies in designated Testing Centre (TC). The Testing Centre where the assessment is carried out and Testing Centre can be Training Center also. The Assessing Body select the TC based on the location, accessibility and the infrastructure facilities available for conducting the test.

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- The testing center is approved by the RDAT in case of courses run by DGT, MSDE. In case where the courses are run by the State Govt., TC is approved by State Govt.. Training conducted by other dept. at their accredited Training Centre, same training centre is designated as Testing centre.
- The Assessing Body provide details of selected TC along with skill areas in which assessment can be done at the TC, to the RDAT and respective States/UTs.
- The Assessing Bodies depute ACE qualified assessors for assessments whose details are furnished by Assessing Bodies to DGT in advance.
- Assessing Body has to communicate to the Testing Centre following:
 - Details of the candidates to appear for assessment in various MES courses.
 - Details of Assessors selected with their contact details.
 - Requirement of infrastructure, raw material etc.
 - Testing charges to be reimbursed to Testing Centre

Preparation of assessment tools and prerequisites:

- The assessment tools contain components for testing the knowledge, application of knowledge and demonstration of skill. The knowledge test is objective paper based test or short structured questions based. The application of knowledge is verified based on questioning or seeking response for a case. Demonstration of skill is verified based on practical demonstration by the candidate.
- The type of assessment tools to be used for assessment are to be prepared in advance by the assessing body in accordance to the guidelines as prescribed below:
 - Define the performance objective – This is based on the course objectives and competency in workplace as prescribed by MES curriculum. The written tests and practical tests assess all the competencies mentioned in course curriculum.
 - In case of practical test, the operations which are to be observed in case of process test (how a particular task is being carried out) are clearly mentioned and the specifications of the final product in case of product test (the task in itself).
 - List of tools, infrastructure, and equipment to carry out the assessment are prepared based on the test instruments that are planned to be used.
 - Written directions are given to the candidates before the task is attempted.
 - Scoring system, observations and rating is prepared for each competency which is going to be assessed.

Pre-assessment activities for Assessor at the Testing Centre

- Verification of student credentials: The assessor check the application form submitted by the candidates and verify the photo pasted on the forms with candidates who are taking assessment in accordance with checklist
- Verification of testing centre for adequate infrastructure, tools and equipment: The assessor verifies the availability of infrastructure, tools and equipment for carrying out both theory and practical assessments. The minimum requirement prescribed under the MES modules is used as benchmark.
- Attendance verification: The assessor checks the attendance register of candidates and instructors until the time biometric attendance system is put in place. Once the biometric attendance system is in place, the biometric attendance of assessors along with that of trainees/candidates has to be captured during the assessment at the start as well as end of theory and practical test.
- Attendance during assessment: The assessor takes the attendance of all the students who appear for assessment after the successful verification of the student credentials and before the start of the assessment. The assessor also provides his/her attendance during start and end of the practical and theory test.
- Verification of the documents related test carried out by Training Provider/ Testing Centre (TC) for candidates who were not able to produce document in support of having passed the qualification.

Assessment activities

- Before the start of assessment, read out the instructions to the students.
- The written test & practical test is for fixed duration as prescribed.
- It is ensured that individual attention is given to all the candidates during the practical test.
- The assessor takes photographs during the assessment process of all the students in the testing centre, the students during theory and practical tests, practical lab/workshop showing the equipment to be used for assessment, the assessor along with the students appearing for the assessment.

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Post-assessment activities

- The assessor consolidates all the theory and practical test papers and ensures that all the mandatory information is filled. The total score for each student should be calculated and recorded in result sheet.
- The assessor send the attendance sheet, result sheet, answer papers by courier/post to the assessing body immediately after the completion of assessment
- Uploading outcome of the assessment and photos in portal by assessing body
- Assessing body upload the results within one week of the assessment date.
- Photos taken by the assessors during assessment are sent to respective RDATs through e-mail only. Non dispatch of photos of assessment to RDAT makes assessment void. Re-assessment of such batch is done by the Assessing Bodies on their own expenses.
- Details of assessors are emailed to RDAT at the time of uploading the outcome of the assessment. Outcome of the assessment is not accepted in case details of assessors are not emailed to respective RDAT.
- Maintaining assessment records
- Publishing of results and Certificate issue
- RDAT verifies the outcome of the assessment, details of assessors, photos and print and sign the certificates for successful candidates and send it to the respective candidates. In case of direct candidate's assessment, the Certificates are sent to the Assessing Body.
- Certificates which will be issued carry photograph of the trainee, name of Training Provider, start date & end date of training and duration of training once the systems for the same are put in place.
- The certificate is issues under the aegis of NCVT. All the communications are done through portal.

ASSESSMENT EVIDENCE

Complete a grid for each component as listed in “Formal structure of the the qualification” in the Summary.

NOTE: this grid can be replaced by any part of the qualification documentation which shows the same information – ie Learning Outcomes to be assessed, assessment criteria and the means of assessment.

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Title of Component:- REPAIR AND MAINTENANCE OF COOLE and split air conditioners

Outcomes to be assessed	Assessment criteria	Means of Assesment
Leaning out come	Assessment criteria	
DGT/MES/: REF-701 /No1: Shall be able to identify the Basic components of Central Air Conditioning Plant	AO1. Installation of Central Air Conditioning Plant	Practical Test
	AO2. Tracing out and draw three phase DOL starter connection of Central Air Conditioning Plant	Theory Test
	AO3. Identification of Electrical/mechanical components of Central Air Conditioning Plant	Practical Test
	AO4. Identification the control of Central Air Conditioning Plant	Practical Test
	AO5 Testing of open type compressor & hermetic sealed compressor.	Practical Test
	AO6. Identification of pressure control devise	Practical Test
	AO7. Identification of different types of Filter	Theory Test
DGT/MES/: REF-701 /No2: Shall be able to identify the servicing of Central Air Conditioning Plant	AO1. Servicing sequence of Central Air Conditioning Plant	Theory Test
	AO2. Cleaning & servicing the filter , of Central Air Conditioning Plant .	Practical Test
	AO3. Servicing the open type compressor of Central Air Conditioning Plant	Theory Test
	AO4. Pump down of the Central Air Conditioning Plant	Practical Test
	AO5 Assembling of control valve	Practical Test
	AO6. Connection of water line pipe	Practical Test
	AO7 Check the ampere drawn by Plant	Practical Test
	AO8 Retro fitting of Plant	Practical Test
	AO9 Fault finding of central air conditioning plant	
DGT/MES/: REF-701 /No3 Installation of Central Air Conditioning Plant	AO1. Power supply checking of III phase supply of plant	Practical Test
	AO2. Installation of the components of package unit	Practical Test

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	AO3.Installation of float valve in cooling tower	Theory Test
	AO4.Replace chilling water pump	Practical Test
	AO4 Install water inlet valve	Practical Test
	AO5.Replace filter of AHU	Theory Test

Means of assessment 1

The assessment comprise of

- Theory Examination MCQ, VIVA Voce Practical assessment Role plays, Demonstration

Pass/Fail

The trainee is judged as pass in the qualification if minimum passing marks is obtained in each test i.e Theory and Pra

Minimum pass mark:

Minimum passing marks for Practical is 60%

Minimum pass marks for theory is 40%

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SECTION 2

EVIDENCE OF LEVEL

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OPTION A

Title/Name of qualification/component: Enter the title here			Level: Add level number
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
Process	<p>The job holder is expected to have the knowledge and display expertise skills in the field of work like:</p> <ul style="list-style-type: none"> – Basic handling of R& A/C tools & equipments – Repairing & servicing of water, Bottle, Visi cooler and deep Freezer – Adoption of safety procedure – Identification of water, Bottle, Visi cooler and deep Freezer 	The job requires range of activities routine and predictable like commercial refrigeration in an organisation	Lable-3
Professional knowledge	<p>The job holder is required to have knowledge in the related field of work like:</p> <ul style="list-style-type: none"> – Periodical maintenance of water, Bottle, Visi cooler and deep Freezer. – Servicing of air conditioner. – Recovery, Evacuation, cleaning, flushing & Charging of water, Bottle, Vici cooler and deep Freezer – Installation of water, Bottle, Visi cooler and deep Freezer – Performance testing/Checking. 	The job holder understands the basic facts , process and principles involved in his job role like basics of Servicing, repair , maintenance & Installation water, Bottle, Visi cooler and deep Freezer..	Lable-3
Professional skill	<p>The job holder needs to know and understand :</p> <ul style="list-style-type: none"> – Servicing procedure – Identification of tools & Equipments – Identification of components of water, Bottle, Visi cooler and deep Freezer – Performance testing/Checking procedure, 	The job role only includes the maintaining of commercial refrigeration unit with safety	Lable-3

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Title/Name of qualification/component: Enter the title here			Level: Add level number
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
Core skill	<p>The job holder is expected to possess knowledge and skills regarding:</p> <ul style="list-style-type: none"> – Knowledge of maintaining performance of unit – Quality of mechanic to arrest leakage of the unit – After servicing performance should be like new. – Retro fitting of the unit. – Fault finding of related job 	The Mechanic will able to repair and maintenance of the commercial refrigeration unit	Lable-3
Responsibility	<p>The job holder is expected to possess knowledge and skills regarding:</p> <ul style="list-style-type: none"> – Repairing of unit in time – Rectification of fault – Hassle free operation of the unit – Take care of the customer safety – Retro fitting o the unit. – Customer satisfaction 	The mechanic will able to communicate clear picture of the unit to be repaired. Also able to find out fault and rectify the same in stipulated time with safety.	Lable-3

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SECTION 3

EVIDENCE OF NEED

What evidence is there that the qualification is needed?

1. The increase demand in R& A/C industry would be driven by increasing Commercial, Industrial Equipments
2. Challenges and Solutions in bridging the gap of Skilled human Resource (HR) in repair and maintenance of plant .
3. Proposal to NSDC on the formation of Sector Skills Council: Repair And Maintenance Of Central Air Conditioning Plants
4. Employability and skills set of newly graduated in Indian market every year demand of Central Air Conditioning Plant is increasing . Now a days more than 90% public places , like mall, offices, cinema hall using plant technology
5. Human Resource and skill Requirements in the field of Repair And Maintenance Of Central Air Conditioning Plants

“so self Employment growth was high during FY10–17 period. The sector is expected to employ about 6 million professionals directly in FY20 and exports are likely to dominate More recover more than 25000 individuals have been trained under this scheme in 2015-16 & 2016-17, which shows there is huge requirement of this skill in the Market.

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

According to the NSDC, Modularised skill building in these areas is required to ensure constant up-gradation of skills in the projected workforce of 5.1 million persons by 2022. Out of this about 70% to 80 % would be in the junior to midlevel streams (about 4-5 million). Building skills in this workforce is critical for industry to maintain its competitive edge and innovate

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

The Qualification has been mapped with the National Qualification Register, maintained by NSDA to ensure the qualification does not duplicate. Qualification with the title of Account Executive (Payable & receivable) and Account Executive (Payroll) is available in NQR with some similar outcomes. Theses qualifications are small job role specific and for small duration. The present qualification is of generic nature and covers wide range of accounting techniques and methods.

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?

- 1) DGT interacts with training providers to gather feedback in implementation and updation of qualification.
- 2) Monitoring of results of assessments
- 3) Employer feedback will be sought post-placement

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- 4) In a recent initiative, a Mentor Council (MC) for the relevant sector has been formed to review the curriculum of this qualification under the sector.
- 5) CSTARI, the research wing of DGT, reviews and updates the qualification, in consultation with industries and other stakeholders, on a regular basis. The qualification is reviewed after every 2 years for updation according to latest Technologies and practices.

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

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

SECTION 4

EVIDENCE OF 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?

1. After acquiring the skill in REF-701 , they can further proceed for other courses under MES- REF 702-706 which will be help full for them to work at different Refrigeration and Air conditioner sector [Domestic, Commercial, Industrial] now a days every industries required R& Air conditioning mechanic in different refrigeration & Air-conditioning sector.

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

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.