

NSQF QUALIFICATION FILEApproved in 24th NSQC Dated 27th Feb,2020

NSDA Code

2020/CCM/DGT/03652

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,
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Name and contact details of individual dealing with the submission

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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:

- Indicative list of tools/equipment to conduct the training: Enclosed with curriculum
- Trainers qualification: Indicated in the curriculum
- 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.
- Distribution of training duration into theory/practical/OJT component: Indicated in the curriculum.

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2. Curriculum for Core Skills (Workshop Calculation & Science, Engineering Drawing and Employability Skills)

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- SUMMARY

1	Qualification Title	'MARINE FITTER'
2	Qualification Code, if any	DGT/1095
3	NCO code and occupation	7233.2200 –Marine Fitter
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 Marine Fitter and will enable the trainee to repair, service and overhaul engines and accessories of ships, boats etc. It is long 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	7233.2200–Marine Fitter
9	Job description of the occupation	Marine Fitter repairs, services and overhauls engines and accessories of ships, boats etc. under guidance of Marine Engineer/other designated expert examining drawings and other specifications; Checks, measures parts, removes defect by chipping, filing etc., assembles engines & auxiliary machinery in position, tests completed assembly and makes necessary adjustments; Installs below deck auxiliaries; Tests and inspects installed machinery and equipment during dock and sea trials and removes defects, if any.
10	Licensing requirements	NOT REQUIRED
11	Statutory and Regulatory requirement of the relevant sector (documentary evidence)	NOT APPLICABLE

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	to be provided)		
12	Level of the qualification in the NSQF	Level 5	
13	Anticipated volume of training/learning required to complete the qualification	Sl. No.	Course Element
		1	Professional Skill (Trade Practical)
		2	Professional Knowledge (Trade Theory)
		3	Workshop Calculation & Science
		4	Engineering Drawing
		5	Employability Skills
			Total
	Notional Training Hours	2000	640
		160	160
		240	3200
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 10 th Class examination with Science and Mathematics. Minimum age 14years as on first day of academic session	
16	Progression from the qualification (Please show Professional and academic progression)	An Individual can proceed for:	
		Professional <ul style="list-style-type: none"> • Technician • Senior Technician • Supervisor • Manager • Entrepreneur 	Technical / Academic <div style="margin-left: 20px;"> </div>
17	Arrangements for the Recognition of Prior learning (RPL)	<ul style="list-style-type: none"> • Yes (For more details refer “Guidelines for Private candidate” in DGT website MIS portal). 	
18	International comparability where known (research	-	

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	evidence to be provided)			
19	Date of planned review of the qualification.	5 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)	Recognize and comply Safe Working Practice, and illustrate Survival Technique.	75	21	4
(ii)	Explain general aspects of shipping and illustrate the nautical & engineering technology as per ship model/ video/ on board.	50	14	4
(iii)	Plan and organize the work to make job as per specification applying different types of basic fitting operation and Check for dimensional accuracy. (Basic fitting operation – marking, Hacksawing, Chiseling, Filing, Drilling, Taping and Grinding etc. Accuracy: $\pm 0.25\text{mm}$)	125	35	5
(iv)	Identify various electrical & electronic components measurement testing of same to ensure functionality.	150	42	4
(v)	Demonstrate different joining operations observing standard procedure. [Different joints: - Bolt joints, Gas welding, Arc welding, Brazing]	75	21	5
(vi)	Perform surface preparation & painting of marine structure following safety procedure.	25	7	5

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(vii)	Perform dismantling & assembling of multi-cylinder marine engine as per makers manual and check functionality.	175	49	4
(viii)	Perform appropriate modification of valves & valve seats as per requirement and reassemble to ensure proper functioning.	75	21	5
(ix)	Test fuel injector fuel pump and governor system and ensure its proper functioning.	75	21	5
(x)	Check the cooling & lubrication system and conduct necessary maintenance as per requirement.	75	21	5
(xi)	Recognize engine room duties and demonstrate engine room cleanliness.	50	14	5
(xii)	Diagnose and troubleshoot various defects of OBM engine.	25	7	5
(xiii)	Perform the assembling of various power transmission systems with proper alignment and check functionality. (Various power transmission: - steering gear, propeller, gear box)	25	7	5
(xiv)	Identify and maintain various auxiliary equipment as per standard procedure. (Various Auxiliary equipment:- pumps, valves)	75	27	5
(xv)	Carryout pipe joints using gaskets, gland packing and check for any leakage.	75	27	4
(xvi)	Identify hydraulic & pneumatic compound and construct various circuit to check functionality.	125	45	5
(xvii)	Troubleshoot and maintain marine refrigeration and air conditioning check performance.	100	36	5
(xviii)	Set various electrical sub-systems and measure its parameters. (Various sub-system:- motor, DC machine, starter motor, DC compound motor, alternator, induction motors, DOL system, dynamo)	100	36	5

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(xix)	Summarize the properties of material for lagging & insulation and the same for use.	25	9	5
(xx)	Shift machinery items using various lifting devices and maintain cargo handling & storage equipment.	100	36	5
(xxi)	Identify types of storage tanks & check for any leakage.	50	18	4
(xxii)	Operate, maintain and trouble shoot marine engine on board.	150	54	5
(xxiii)	Maintain marine & auxiliary machines as per schedule.	50	18	5
(xxiv)	Illustrate bunkering procedure and identify SOPEC equipment.	50	18	5
(xxv)	Plan & prepare for docking and maintain vessel to ensure quality compliance.	100	36	5
CORE SKILL				
EMPLOYABILITY SKILLS				
(i)	Apply safe working practices.	-	30	5
(ii)	Comply with environment regulation and housekeeping.	-	30	5
(iii)	Interpret & use formal and technical communication.	-	30	5
(iv)	Apply the concept in productivity & quality management in day to day work to improve productivity & quality.	-	30	5
(v)	List and interpret various acts of labour welfare legislation.	-	30	5
(vi)	Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	-	30	5
(vii)	Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	-	30	5
(viii)	Utilize computer applications and internet	-	30	5

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	to take benefit of IT developments in the industry.			
WORKSHOP CALCULATION & SCIENCE				
(i)	Demonstrate mathematical concept and principles to perform practical operations.	-	80	5
(ii)	Explain science in the field of study including simple machine.	-	80	5
ENGINEERING DRAWING				
(i)	Read and apply engineering drawing for different application in the field of work.	-	160	5
	Total		3200	

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ASSESSMENT

21	<p>Body/Bodies which will carry out assessment: Controller of Examinations, DGT</p>
22	<p>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:</p> <p>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:</p> <p>Category I: Ex-trainees (successful pass-outs) of ITI</p> <p>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.</p> <p>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.</p> <p>Category II: 'Ex-trainees (successful pass-outs) and current trainees under CoE scheme</p> <p>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.</p> <p>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.</p> <p>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</p>

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	<p>concerned State.</p> <p>Category III: SCVT Candidates (admitted till August 2018 session)</p> <p>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'.</p> <p>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'.</p> <p>Category IV: Other Candidates (candidate not falling in any of the above 3 categories, including SCVT trainees enrolled from admission session 2019 onwards)</p> <p>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.</p> <p>B. Applicant should be minimum 21 years of age on the date of submission of application. There is no upper age limit.</p> <p>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.</p> <p>For detail and updated information please refer to DGT web portal.</p>
23	<p>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.</p> <p>(1) Assessment process:</p> <p>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</p>

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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, Workshop Calculation & Science, Engineering Drawing 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
4		Workshop Calculation and Science.	50	50
5		Engineering Drawing	50	50
6	Formative assessment based on Learning Outcomes		200	200
TOTAL:			700	700

(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:

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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, Workshop

Calculation and Science, Engineering Drawing and 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, Workshop Calculation & Science, Engineering Drawing 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)

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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.

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LEARNING OUTCOME WITH ASSESSMENT CRITERIA:

LEARNING OUTCOME (TRADE SPECIFIC)	
LEARNING OUTCOMES	ASSESSMENT CRITERIA
FIRST YEAR	
1. Recognize and comply Safe Working Practice, and illustrate Survival Technique following safety precautions.	Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements.
	Recognize and report all unsafe situations according to site policy.
	Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	Identify, handle and store/ dispose of dangerous/unsalvageable goods and substances according to site policy and procedures following safety regulations and requirements.
	Identify and observe site policies and procedures in regard to illness or accident.
	Identify safety alarms accurately.
	Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	Identify and observe site evacuation procedures according to site policy.
	Identify Personal Productive Equipment (PPE) and use the same as per related working environment.
	Identify basic first aid and use them under different circumstances.
	Identify different fire extinguisher and use the same as per requirement.
	Avoid waste and dispose waste as per procedure.
	Illustrate survival techniques
2. Explain general aspects of shipping and illustrate the nautical & engineering technology as per ship model/ video/ on board.	Explain role of shipping
	Identify location of all Continents & Ocean / sea route
	Illustrate the role of Nautical Department.
	Explain the working of various parts, space of the ships and its structure.
	Explain berthing, anchoring, mooring system.
3. Plan and organize the	Plan & identify tools, instruments and equipments for

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work to make job as per specification applying different types of basic fitting operation and Check dimensions. accuracy. (Basic fitting operation – marking, Hacksawing, Chiseling, Filing, Drilling, Taping, Turning and Grinding etc.)	marking and make this available for use in a timely manner.
	Select raw material and visual inspection for defects.
	Mark as per specification applying desired mathematical calculation and observing standard procedure.
	Measure all dimensions in accordance with standard specifications and tolerances.
	Identify hand tools for different fitting operations and make these available for use in a timely manner.
	Prepare the job for Hacksawing, chiselling, filing, drilling, tapping, grinding.
	Perform basic fitting operations viz., Hacksawing, filing, drilling, tapping and grinding to close tolerance as per specification to make the job.
	Make jobs by performing basic lathe operations.
	Observe safety procedure during above operation as per standard norms and company guidelines.
	Check for dimensional accuracy as per standard procedure.
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
4. Identify various electrical & electronic components and carryout testing, measurement to ensure functionality. (<i>Various electrical & electronic components:-Resistor, capacitor, inductor, transformer, fuse, relays, semiconductor devices, battery, etc</i>)	Identify various electrical & electronic components for the work and make it available timely.
	Set up workplace/ assembly location with due consideration to operational stipulation for measurement and testing.
	Plan work in compliance with standard safety norms and collecting desired information.
	Demonstrate possible solutions and agree tasks within the team.
	Test components for functionality.
	Measure different parameters and record.
5. Demonstrate different joining operations observing standard procedure. (Different joints: - Bolt joints, Gas welding, Arc welding, Brazing)	Plan and select appropriate tools and materials for the work and make it available timely.
	Set the equipments observing safety procedure.
	Perform joining as per requirement following standard procedure.
	Check the joint for conformity of standard requirement.
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.

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6. Perform surface preparation & painting of marine structure following safety procedure.	Plan & select different tools & machines to carry out the work.
	Observe safety while performing the task.
	Perform surface preparation & painting as per standard guidelines.
	Solve problems during operation by selecting and applying basic methods, tools, materials and collect and organize information for quality output
	Check/gauge the surface to painting.
7. Perform dismantling & assembling of multi-cylinder marine engine as per Makers' manual and check functionality.	Plan & select appropriate tools equipment for the work and make it available timely.
	Dismantle the different components of multi cylinder marine engine.
	Check for any defects/correctness & measure dimensions of the components using appropriate instruments.
	Demonstrate possible solutions within the team using desired mathematical skills, knowledge of facts, principles, processes and general concept in the field of work.
	Solve problems during operation by selecting and applying basic methods, tools, materials and collect and organize information for quality output
	Assemble components & check functionality of engine.
8. Perform appropriate modification of valves & valve seats as per requirement and reassemble to ensure proper functioning.	Plan & select appropriate tools equipment for the work and make it available timely.
	Dismantle the rocker arm assembly, cylinder head, valves & other related parts as per standard procedure.
	Clean and check various parameters of valves & valve guide.
	Demonstrate possible solutions and agree tasks to be carried within team
	Recondition valve seat as per requirement
	Assemble and test the functioning of valves.
9. Test fuel injector fuel pump and governor system and ensure proper functioning.	Plan & select appropriate tools equipment for the work and make it available timely.
	Dismantle fuel injector and remove fuel pump.
	Test to check for the proper functioning.
	Assemble and adjust idle speed of engine with mechanic & hydraulic governor.
	Check the performance as per set procedure.

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10. Check the cooling & lubrication system and conduct necessary maintenance as per requirement.	Identify various parts of cooling and lubrication system and their functions.
	Plan & select appropriate tools to carry out the work
	Remove the parts of cooling & lubrication system and perform required maintenance as per standard procedure.
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
	Observe safety/ precaution during the work.
	Test the cooling & lubrication system to check functionality
11. Recognize engine room duties and demonstrate engine room cleanliness.	Recognize the different engine room duties.
	Identify different signs & symbols commonly found in engine room.
	Perform different operation and maintenance related work of engine room.
	Carryout engine room cleanliness for its proper up keeping.
12. Diagnose and troubleshoot various defects of OBM engine.	Plan and collect relevant information to perform trouble shooting of OBM engine.
	Diagnose the various defects & faults of OBM
	Demonstrate possible solutions within the team using desired mathematical skills, knowledge of facts, principles, processes and general concept in the field of work.
	Solve/ Trouble shoot problems during operation by selecting and applying basic methods, tools, materials and collect and organize information for quality output
	Check the functionality of OBM engines
13. Perform the maintenance/ assembling of various power transmission systems with proper alignment and check functionality. (Various power transmission: - steering gear, propeller, gear box)	Plan and select appropriate method to perform the maintenance/ assembling.
	Carryout repair and maintenance of various power transmission system
	Check accuracy/ correctness of components with gauge or instruments for their usage.
	Demonstrate possible solutions within the team using desired mathematical skills, knowledge of facts, principles, processes and general concept in the field of work.
	Assemble and fit the components with proper alignment
	Check functionality of the transmission system
SECOND YEAR	
14. Identify and maintain	Plan & select appropriate tools & equipment to carryout

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various equipments as per standard (Various equipments:- Valves)	auxiliary as per procedure.	maintenance work.
	Auxiliary Pumps,	Collect relevant information from appropriate source for proper techniques for dismantling and assembling of auxiliary equipment
		Demonstrate possible solutions within the team using desired mathematical skills, knowledge of facts, principles, processes and general concept in the field of work.
		Solve problem during execution by selecting and applying basic methods, tools, materials and collecting information for quality output.
		Maintain the equipment observing standard and practice.
15. Carryout pipe joints using gaskets, gland packing and check for any leakage.		Plan & identify different tools & jigs to perform pipe joints.
		Carryout pipe joints observing standard practice and as requirement
		Test for leakage
16. Identify hydraulic & pneumatic components and construct various circuits to check functionality.		Identify various hydraulic & pneumatic components and their functions.
		Construct various circuit as per requirement
		Demonstrate possible solutions within team using desired knowledge of facts, principles, process and general concept in the field of work while preparing circuit.
		Solve problem during execution by selecting and applying basic methods, tools, materials and collecting information for quality output.
		Check the functionality of system.
17. Troubleshoot and maintain marine refrigeration and air conditioning check performance.		Identify various refrigeration & air-conditioning system
		Select appropriate tools & raw materials to conduct maintenance work.
		Comply with safety rules when performing the work
		Troubleshoot and maintain marine refrigeration & air-conditioning system observing standard procedure.
		Check the performance of refrigeration & air-conditioning system.
18. Set various electrical sub-systems and measure its parameters. (Various sub-system:- motor, DC machine, starter motor, DC compound motor,		Plan and identify tools, instruments and equipment for the work and make it available timely.
		Set up workplace/ assembly location with due consideration to operational stipulation.
		Plan work in compliance with standard safety norms and collecting desired information.

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alternator, induction motors, DOL system, dynamo)	Demonstrate possible solutions and agree tasks within the team.
	Set electrical sub-system and measure the parameters.
	Record the parameters as per format/site instructions.
19. Summarize the properties of material for lagging & insulation and select the same for use.	Identify and explain properties of common materials used for lagging and insulation.
	Read and analyse the specification to ascertain material requirement.
	Select the material as per requirement.
20. Shift machinery items using various lifting devices and maintain cargo handling & storage equipment.	Plan and identify lifting devices and acquaint with functional application of each device.
	Shift the machinery to desired location.
	Observe safety procedure during shifting work
	Solve problem during execution.
	Maintain cargo handling and storage equipment as per standard procedure.
21. Identify types of storage tanks & check for any leakage.	Identify types of storage tank
	Comply safety guidelines related with different tanks.
	Clean the tanks and check for leakage in fuel lines.
22. Operate, maintain and trouble shoot marine engine on board.	Identify and collect relevant information for executing the operation and maintenance.
	Plan as per guidelines before starting marine engine.
	Identify defects and carryout needful maintenance work as per standard procedure.
	Solve problem during execution by selecting and applying basic methods, tools, materials and collecting information during on board.
	Observe safety & comply maintenance procedure during the operation and maintenance work
23. Maintain marine & auxiliary machines as per schedule.	Collect and interpret maintenance schedule for marine & auxiliary machines.
	Prepare inspection report as per schedule/site rule.
	Maintain log book while undertaking maintenance of marine & auxiliary machines
	Observe safety which executing the task.
24. Illustrate bunkering procedure and identify	Collect relevant information related to bunkering and SOPEP equipment from appropriate source.

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SOPEC equipment.	Illustrate bunkering procedure
	Identify SOPEP equipment and explain their utilization.
25. Plan & prepare for docking and maintain vessel to ensure quality compliance.	Plan & prepare for docking as per standard guidelines
	Prepare for stopping engine and auxiliaries machines/system.
	Carryout docking as per laid procedure.
	Identify appropriate tools and machinery for maintenance of vessel
	Check different parameters to undertake maintenance
	Prepare report as the laid procedure.
	Ensure quality as per standard defined.
	Prepare report of different work executed.

LEARNING OUTCOME (CORE SKILL)	
LEARNING OUTCOMES	ASSESSMENT CRITERIA
EMPLOYABILITY SKILLS	
1. Apply safe working practices	Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements and according to site policy.
	Recognize and report all unsafe situations according to site policy.
	Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	Identify, handle and store / dispose off dangerous goods and substances according to site policy and procedures following safety regulations and requirements.
	Identify and observe site policies and procedures in regard to illness or accident.
	Identify safety alarms accurately.
	Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	Identify and observe site evacuation procedures according to site policy.
	Identify Personal Protective Equipment (PPE) and use the same as per related working environment.

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	Identify basic first aid and use them under different circumstances.
	Identify different fire extinguisher and use the same as per requirement.
2. Comply with environment regulation and housekeeping	Identify environmental pollution & contribute to the avoidance of instances of environmental pollution.
	Deploy environmental protection legislation & regulations
	Take opportunities to use energy and materials in an environmentally friendly manner.
	Avoid waste and dispose waste as per procedure
	Recognize different components of 5S and apply the same in the working environment.
3. Interpret & use formal and technical communication.	Obtain sources of information and recognize information.
	Use and draw up technical drawings and documents.
	Use documents and technical regulations and occupationally related provisions.
	Conduct appropriate and target oriented discussions with higher authority and within the team.
	Present facts and circumstances, possible solutions & use English special terminology.
	Resolve disputes within the team.
	Conduct written communication.
4. Apply the concept in productivity & quality management in day to day work to improve productivity & quality.	Explain the concept of productivity and apply during execution of job.
	Explain the concept of quality tools and apply during execution of job.
5. List and interpret various acts of labour welfare legislation.	Explain concept of labour welfare legislation, adhere to responsibilities and remain sensitive towards such laws.
	Knows benefits guaranteed under various acts.
6. Explain energy conservation, global warming and pollution and contribute in day	Explain the concept of energy conservation, global warming, pollution and utilize the available resources optimally & remain sensitive to avoid environment pollution.
	Explain standard procedure for disposal of waste.

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to day work by optimally using available resources.	
7. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	<p>Explain personnel finance and entrepreneurship.</p> <p>Explain role of various schemes and institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non-financing support agencies to familiarize with the policies/ programmes, procedure & the available scheme.</p> <p>Prepare a report to become an entrepreneur for submission to financial institutions.</p>
8. Utilize computer applications and internet to take benefit of IT developments in the industry.	<p>Explain the hardware of personal computer.</p> <p>Use common application software viz., word, excel, power point etc., in day to day work.</p> <p>Awareness about useful internet websites, search relevant information pertaining to the assigned tasks.</p>
WORKSHOP CALCULATION & SCIENCE	
1. Demonstrate mathematical concept and principles to perform practical operations.	<p>Solve different problems like phase angle, etc. with the help of a calculator.</p> <p>Demonstrate conversion of Fraction to Decimal and vice versa.</p> <p>Explain BCD code, conversion from decimal to binary and vice-versa, all other conversions.</p>
2. Explain science in the field of study including simple machine.	<p>Explain concept of science related to the field such as Material science, Mass, weight, density, speed, velocity, heat & temperature, force, motion, pressure, heat treatment, centre of gravity, friction.</p> <p>Explain levers and its types.</p> <p>Explain relationship between Efficiency, velocity ratio and Mechanical Advantage.</p> <p>Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials.</p> <p>Solve simple problems on lifting tackles like crane-Solution of problems with the aid of vectors.</p>
ENGINEERING DRAWING	
1. Read and apply engineering drawing for different application in the field of work.	<p>Read & interpret the information on drawings and apply in executing practical work.</p> <p>Read & analyse the specification to ascertain the material requirement, tools and assembly/maintenance parameters.</p> <p>Encounter drawings with missing/unspecified key information and make own calculations to fill in missing</p>

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	dimension/parameters to carry out the work.
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25. EVIDENCE OF LEVEL

OPTION A

Title/Name of qualification/component: Marine Fitter		Level: 5	
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
Process	<p>Requires Well Developed Skill</p> <ul style="list-style-type: none"> Identify various electrical & electronic components and carryout testing, measurement to ensure functionality. (<i>Various electrical & electronic components:-Resistor, capacitor, inductor, transformer, fuse, relays, semiconductor devices, battery, etc</i>) Demonstrate different joining operations observing standard procedure. (Different joints: - Bolt joints, Gas welding, Arc welding, Brazing) Perform dismantling & assembling of multi-cylinder marine engine as per Makers' manual and check functionality. Test fuel injector fuel pump and governor 	<p>The learner requires to demonstrate a well-developed skill for example 'Identify various electrical & electronic components and carryout testing, measurement to ensure functionality' as indicated in the learning outcomes to achieve the tolerance levels and accuracy demanded as per the job.</p> <p>The learner requires to apply clear choice of procedures in familiar context as indicated in the learning outcomes: "Diagnose and troubleshoot various defects of OBM engine"and"Troubleshoot and maintain marine refrigeration and air conditioning check performance".</p>	5

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Title/Name of qualification/component: Marine Fitter		Level: 5	
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	<p>system and ensure proper functioning.</p> <ul style="list-style-type: none"> • Check the cooling & lubrication system and conduct necessary maintenance as per requirement. <p>Clear choice of procedures in familiar context</p> <ul style="list-style-type: none"> • Diagnose and troubleshoot various defects of OBM engine. • Troubleshoot and maintain marine refrigeration and air conditioning check performance. • Shift machinery items using various lifting devices and maintain cargo handling & storage equipment. 	<p>In all these learning outcomes the learner has to apply ones knowledge and decide what needs to be done to either meet the client's requirement or identify a fault and decide how to rectify it or plan as per requirements and resources available.</p> <p>Hence NSQF Level is 5 for this descriptor.</p>	
Professional knowledge	<p>Knowledge of facts in the field of work or study</p> <ul style="list-style-type: none"> • Various types of paints coatings and application on marine structure • Valve Mechanism System • Classification of Fuels and its merit and demerits <p>Knowledge of Principles and general</p>	<p>The learner requires to demonstrate knowledge of facts, principles, processes and general concepts, in a field of work or study which is Science related to different types of Valves and its applications, Air compressors types, Heat engines and refrigeration, Working principle of motors, Classification of Cargo, Engine Handling & Maintenance Operation, preparation of</p>	5

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Title/Name of qualification/component: Marine Fitter		Level: 5	
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	<p>concepts in the field of work or study</p> <ul style="list-style-type: none"> • Various Type of filter and its construction and use • Air compressors types, its function and uses • Classification of Cargo <p>Knowledge of processes in the field of work or study</p> <ul style="list-style-type: none"> • Foundations for diesel engine in marine • Need of maintenance, Check up in Marine engines – preparation of maintenance schedule from charts of popular makes of engine. 	<p>maintenance schedule from charts of popular makes of engine, etc.</p> <p>Hence NSQF Level is 5 for this descriptor.</p>	
Professional skill	<ul style="list-style-type: none"> • Test fuel injector fuel pump and governor system and ensure proper functioning. • Check the cooling & lubrication system and conduct necessary maintenance as per requirement. • Diagnose and troubleshoot various defects of OBM engine. • Perform the maintenance/ assembling of various power transmission systems with 	<p>The learning outcomes for example 'Test fuel injector fuel pump and governor system and ensure proper functioning, 'Perform the maintenance/ assembling of various power transmission systems with proper alignment and check functionality. (Various power transmission: - steering gear, propeller, gear box)', 'Troubleshoot and maintain marine refrigeration and air conditioning check performance. 'require</p>	5

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Title/Name of qualification/component: Marine Fitter		Level: 5	
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	<p>proper alignment and check functionality. (Various power transmission: - steering gear, propeller, gear box)</p> <ul style="list-style-type: none"> • Troubleshoot and maintain marine refrigeration and air conditioning check performance. • Shift machinery items using various lifting devices and maintain cargo handling & storage equipment. • Operate, maintain and trouble shoot marine engine on board. 	<p>cognitive and practical skills to accomplish tasks that involve understanding requirements; then as per requirements deciding which operations/procedure/tools will achieve desired result; planning the sequence of operations to maximum effectiveness; constantly checking and reviewing plan, etc , all of which involve problem solving and decision making.</p> <p>Hence NSQF Level is 5 for this descriptor.</p>	
Core skill	<p>Desired Mathematical Skills</p> <ul style="list-style-type: none"> • Measure dimension of the components & record data to analyse the with given drawing/measurement • Mark as per specification applying desired mathematical calculation and observing standard procedure. <p>Understanding of social/political</p> <ul style="list-style-type: none"> • Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using 	<p>The work of Marine Fitter involves Service, Repair & Maintenance of Marine Vessel Systems which requires competence in written language with required clarity in order to understand the work enlisted in the job card/service card.</p> <p>The learner will also need to communicate with team supervisor to understand the job and explain ones work which requires competence in oral language, with required clarity.</p>	5

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Title/Name of qualification/component: Marine Fitter		Level: 5	
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	<p>available resources.</p> <ul style="list-style-type: none"> • Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth. <p>Organising information and communication</p> <ul style="list-style-type: none"> • Interpret & use company and technical communication • Present facts and circumstances, possible solutions & use English special terminology. 	<p>The learner will also need to have basic understanding of social political and natural environment as mentioned in the learning outcome for example 'Comply environment regulation and housekeeping'</p> <p>Hence NSQF Level is 5 for this descriptor.</p>	
Responsibility	<ul style="list-style-type: none"> • Test fuel injector fuel pump and governor system and ensure proper functioning. • Check the cooling & lubrication system and conduct necessary maintenance as per requirement. • Plan & prepare for docking and maintain vessel to ensure quality compliance. • Perform the maintenance/ assembling of various power transmission systems with proper alignment and check functionality. (Various power transmission: - steering 	<p>The role of Marine Fitter 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 Marine Vessel, Marine Engine Operation and basic Electrical & Electronics concepts, processes, principles and standards.</p> <p>Hence NSQF Level is 5 for this descriptor</p>	5

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Title/Name of qualification/component: Marine Fitter			Level: 5
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	gear, propeller, gear box) <ul style="list-style-type: none"> • Carryout pipe joints using gaskets, gland packing and check for any leakage. • Maintain marine & auxiliary machines as per schedule. 		

NSQF QUALIFICATION FILE

Approved in 24th NSQC Dated 27th Feb,2020**SECTION 3****EVIDENCE OF NEED**

26	<p>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?</p> <table border="1" data-bbox="339 562 1390 1711"> <thead> <tr> <th data-bbox="339 562 627 707">Basis</th> <th data-bbox="627 562 1390 707">In case of other Awarding Bodies (Institutes under Central Ministries and states departments)</th> </tr> </thead> <tbody> <tr> <td data-bbox="339 707 627 1088">Need of the qualification</td> <td data-bbox="627 707 1390 1088">Capital goods & 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 1088 627 1514">Industry Relevance</td> <td data-bbox="627 1088 1390 1514">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 1514 627 1637">Usage of the qualification</td> <td data-bbox="627 1514 1390 1637">The Proposed qualification will create skilled Technician for various establishments in different Sectors.</td> </tr> <tr> <td data-bbox="339 1637 627 1711">Estimated uptake</td> <td data-bbox="627 1637 1390 1711">The present seating capacity is 210.</td> </tr> </tbody> </table>	Basis	In case of other Awarding Bodies (Institutes under Central Ministries and states departments)	Need of the qualification	Capital goods & 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 210.
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Estimated uptake	The present seating capacity is 210.										
27	<p>Recommendation from the concerned Line Ministry of the Government/Regulatory Body. To be supported by documentary evidences.</p> <p>The qualification,originally designed for Craftsman Training Scheme is in existence for many years and approved by DGT (Regulatory Body) under</p>										

NSQF QUALIFICATION FILE

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	Ministry of Skill Development and Entrepreneurship, Govt. of India.
28	<p>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</p> <p>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.</p>
29	<p>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</p> <ul style="list-style-type: none"> • 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	<p>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</p> <p>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.</p> <pre> graph LR A[Technician] --> B[Senior Technician] B --> C[Supervisor] C --> D[Manager] A --- E[] B --- E C --- E D --- E E --> F[Entrepreneur] </pre>
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