

NSQF QUALIFICATION FILE

NSDA Reference
To be added by NSDA

“Foundryman”

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Directorate General of Training (DGT)
Government of India, Ministry of Skill Development and Entrepreneurship,
Shram Shakti Bhavan, Rafi Marg
New Delhi-110001

Name and address of submitting body:

Directorate General of Training (DGT)
Government of India, Ministry of Skill Development and Entrepreneurship,
Shram Shakti Bhavan, Rafi Marg
New Delhi-110001

Name and contact details of individual dealing with the submission

Name: Shri Deepankar Mallick

Position in the organisation: Deputy Director General (C&P)

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List of documents submitted in support of the Qualifications File

1. Competency-based curriculum (Annexure 1)
2. Advertisements of different organisations for posts relevant to NTC in the trade.
3. Placement figures of few ITIs.

SUMMARY

Qualification Title	“Foundryman”																																
Qualification Code	N/A																																
Nature and purpose of the qualification	National Trade Certificate; to train the 10 th class pass students in “Foundryman” trade and thus creating an opportunity for the Trainee to get absorbed/ Job/Self Employment in Production & Manufacturing Sector.																																
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	National Council for Vocational Training (NCVT) affiliates the ITIs.																																
Body/bodies which will carry out assessment of learners	National Council for Vocational Training (NCVT)																																
Occupation(s) to which the qualification gives access	<p>On successful completion of this course, the candidates shall be gainfully employed as:</p> <ul style="list-style-type: none"> • Moulder, Die Casting Machine Operator, Core Maker and Annealer in Production & Manufacturing industries. • Trainees of Foundry man Trade have a wide scope of Employability ranging from self-employment, contractual employment to Industrial jobs. 																																
Licensing requirements	N/A																																
Level of the qualification in the NSQF	Level 4																																
Anticipated volume of training/learning required to complete the qualification	<table border="1"> <thead> <tr> <th>S. No.</th> <th>Course Element</th> <th>Notional Training Hours</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Professional Skill (Trade Practical)</td> <td>1075</td> </tr> <tr> <td>2</td> <td>Professional Knowledge (Trade Theory)</td> <td>258</td> </tr> <tr> <td>3</td> <td>Workshop Calculation & Science</td> <td>86</td> </tr> <tr> <td>4</td> <td>Engineering Drawing</td> <td>129</td> </tr> <tr> <td>5</td> <td>Employability Skills</td> <td>110</td> </tr> <tr> <td>6</td> <td>Library & Extracurricular Activities</td> <td>62</td> </tr> <tr> <td>7</td> <td>Project Work</td> <td>80</td> </tr> <tr> <td>8</td> <td>Revision & Examination</td> <td>280</td> </tr> <tr> <td></td> <td>Total</td> <td>2080</td> </tr> </tbody> </table>			S. No.	Course Element	Notional Training Hours	1	Professional Skill (Trade Practical)	1075	2	Professional Knowledge (Trade Theory)	258	3	Workshop Calculation & Science	86	4	Engineering Drawing	129	5	Employability Skills	110	6	Library & Extracurricular Activities	62	7	Project Work	80	8	Revision & Examination	280		Total	2080
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Entry requirements and/or recommendations	Passed 10th Class with Science and Mathematics under 10+2 system of Education or its equivalent																																
Progression from the qualification	<ul style="list-style-type: none"> • Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC) • Can join Crafts Instructor Training Scheme (CITS) in the relevant trade after which they will be employed in ITI/ Vocational Training Institute as instructor • Can join as skilled worker in the relevant industry • can become supervisor after doing diploma in relevant branch of Engineering through lateral entry 																																

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Planned arrangements for the Recognition of Prior learning (RPL)	<ol style="list-style-type: none"> At present the students who have passed 10th class with minimum 3 years’ experience in relevant field can appear for NCVT theory and practical semester examination directly. The students who have passed SCVT examination in “Foundryman” trade can also appear for the NCVT Examination in the relevant semester and Trade directly. 		
International comparability where known	<ol style="list-style-type: none"> Existence of any official document suggesting the comparability of the qualification with the qualifications in other countries is not known. 		
Date of planned review of the qualification. January 2023			
Formal structure of the qualification			
Title of component and identification code.	Mandatory/ Optional	Estimated size (learning hours)	Level
Semester-I			
i) Categorize different types of tools, equipment & raw material used in foundry.	Mandatory	40	4
ii) Prepare sand mix for moulding	Mandatory	40	4
iii) Perform different types of sand testing & find out result.	Mandatory	40	4
iv) Produce green sand moulds by using appropriate hand tools.	Mandatory	200	4
v) Produce different casting components by different metal with different moulding process and finish the casting as per requirement.	Mandatory	280	4
vi) Produce wooden joint, make pattern and repair defective pattern and boxes.	Mandatory	80	4
vii) Prepare mould with loose piece pattern and loose piece core box.	Mandatory	40	4

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viii)	Perform metal working such as marking, sawing, filling, grinding, drilling etc.	Mandatory	40	4
ix)	Make casting of aluminium/ magnesium by melting on Induction furnace & identify defects.	Mandatory	40	4
Semester – II				
x)	Prepare mould by different moulding process, make cast iron castings identify defects.	Mandatory	200	4
xi)	Make a casting, fettle the casting & calculation yield%	Mandatory	80	4
xii)	Prepare complete core by joining half cores.	Mandatory	40	4
xiii)	Make mould by various types of gate to produce different type of metal casting. Find out defects & visit industry to show different operation for casting making.	Mandatory	200	4
xiv)	Make an extra thick casting & finish it.	Mandatory	240	4
xv)	Reline & prepare different types of furnaces for melting cast metals.	Mandatory	120	4
xvi)	Make by using linseed oil & ivpoils.	Mandatory	40	4
xvii)	Prepare mould without pattern & with sweep pattern.	Mandatory	40	4
xviii)	Make casting by die casting process & yield % of casting.	Mandatory	40	4
xix)	Make casting by investment casting process & binder less process.	Mandatory	40	4
Generic Learning Outcomes				
i)	Recognize & comply safe working practices,			

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environment regulation and housekeeping.	Mandatory	25	4
ii) Understand and explain different mathematical calculation & science in the field of study including basic electrical.	Mandatory	15	4
iii) Interpret specifications, different engineering drawing and apply for different application in the field of work.	Mandatory	15	4
iv) Select and measure dimension of components and record data	Mandatory	10	4
v) Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality.	Mandatory	10	4
vi) Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	Mandatory	10	4
vii) Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	Mandatory	15	4
viii) Plan and execute the work related to the occupation	Mandatory	10	4

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

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

SECTION 1 **ASSESSMENT**

Body/Bodies which will carry out assessment:

National Council for Vocational Training (NCVT)

How will RPL assessment be managed and who will carry it out?

1. At present the students who have passed 10th class with minimum 3 years’ experience can appear for NCVT theory and practical semester examination directly.
2. The students who have passed SCVT examination in “Foundryman” trade can also appear for the NCVT Examination in the relevant semester and Trade directly. NCVT will carry out the assessment and State Directorates advertise in newspapers for informing the prospective candidates.

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 semester-based qualification is carried out by conducting formative assessments, and end-of-semester examinations. The internal assessments for theory subjects and practical are conducted by the concerned instructors for evaluating the knowledge and skill acquired by trainees and the behavioural transformation of the trainees. This internal 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, and sessional marks are awarded to them. Theory and practical examinations are conducted in Trade theory and Employability Skills. The question papers for the theory Examinations contain objective type questions. Trade practical examinations are conducted by the respective State Governments. However, the question papers for the Trade practical are prepared by NCVT.

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

Marking Pattern		
Sl. No.	Subject for the trade test	Maximum marks for the each subject
a)	Practical	100
b)	Trade Theory	80 Objective type Written test of 80 marks (Trade Theory 30 marks & Employability Skills 50 marks)
c)	Employability Skills	
d)	Internal assessment	20
TOTAL:		200

(2) Minimum pass marks:

40% for each Theory Examination and 25% for each part/section of the Examination separately, and 60%

marks for each Trade practical Examination.

(3) Testing and certifications for the course:

- OMR sheet based question paper.
- A panel of expert paper setters, who are graduates in the concerned field with minimum 5-7 years experience, is prepared for setting question papers for the Trade. The panel is vetted by the Member Secretary, NCVT.
- Paper setters are appointed from the panel after the approval of the competent authority for setting the question paper.
- The question papers are then moderated by the Board of Moderation to see if the paper is set as per the requirement and syllabus.
- The manuscripts of the moderated question papers are sent to Government Printing Presses for printing.
- Printed question papers, packed in sealed covers, are despatched to Banks/Police Stations for keeping in safe custody.
- The question papers are handed over to the Chairman/Principal of the Testing Centre two hours before the commencement of the Examination.
- An Examination Board consisting of representatives of industry/Employer/State Government are set up to supervise and monitor the conduct of Examinations at every Centre.
- Theory and practical Examinations are carried out with invigilators/examiners with the overall supervision of the Examination Board.
- Examiners called for evaluation of practical should have minimum technical qualification of a Diploma in the respective engineering field. However, when diploma holders not available, the qualification is suitably relaxed.
- Examiners for practical Examinations are appointed preferably from Polytechnics/Engineering colleges/ Industry of repute/ Government Departments or from amongst retired qualified personnel possessing requisite qualifications and sufficient experience in the trade/discipline.
- Each State Directorate prepares a panel of Examiners according to the norms as mentioned above and the Examiners are appointed from the panel.
- Flying squads from State Governments as well as the Central Government are constituted to check malpractices during the conduct of Examinations.
- OMR based answer sheets are evaluated by the third party evaluator only. Third party evaluator is selected for three years by open bidding process.
- Evaluation of every practical examination is carried out by the concerned examiner (from industry/ polytechnics) with the overall supervision of the Examination Board in a free and fair manner as per the assessment criteria.
- Till 2014, the marks were compiled by the State Governments as per NCVT guidelines and the results were declared by the State Governments. At present, the marks are compiled by NCVT on its portal www.ncvtmis.gov.in and the results are declared by the State Governments.
- The successful trainees are awarded National Trade Certificates.

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 assessable 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 assessable 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 formative discussions to assess understanding and evaluating records and reports. The ultimate objective of

the assessment is to assess the candidates as per the defined assessment criteria for the assessable/ 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 and Employability Skills.
- While Trade Theory and Trade Practical are used for assessing Trade-related jobs 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
- Evaluation of Theory Examinations is done by third-party agency. Third party evaluator is selected for three years by open bidding process.
- Trade Practical is examined by External Examiner (as explained above).

Please attach any documents giving further information about assessment and/or RPL.

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

ASSESSMENT EVIDENCE

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

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

Title of Component: Foundryman

Generic Assessable Outcome:

GENERIC LEARNING/ ASSESSABLE OUTCOME	
LEARNING/ ASSESSABLE OUTCOMES	ASSESSMENT CRITERIA
1. Recognize & comply safe working practices, environment regulation and housekeeping.	1.1 Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements.
	1.2 Recognize and report all unsafe situations according to site policy.
	1.3 Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	1.4 Identify, handle and store / dispose off dangerous/unsalvageable goods and substances according to site policy and procedures following safety regulations and requirements.
	1.5 Identify and observe site policies and procedures in regard to illness or accident.
	1.6 Identify safety alarms accurately.
	1.7 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.
	1.8 Identify and observe site evacuation procedures according to site policy.
	1.9 Identify Personal Productive Equipment (PPE) and use the same as per related working environment.
	1.10 Identify basic first aid and use them under different circumstances.
	1.11 Identify different fire extinguisher and use the same as per requirement.
	1.12 Identify environmental pollution & contribute to avoidance of same.
	1.13 Take opportunities to use energy and materials in an environmentally friendly manner
	1.14 Avoid waste and dispose waste as per procedure
	1.15 Recognize different components of 5S and apply the same in the working environment.
2. Understand and explain different mathematical calculation & science in the field of study including basic electrical. <i>[Different</i>	2.1 Explain concept of basic science related to the field such as Material science, Mass, weight, density, heat & temperature, heat treatment.
	2.2 Measure dimensions as per drawing
	2.3 Use scale/ tapes to measure for fitting to specification.

<p><i>mathematical calculation & science -Work, Power & Energy, Algebra, Geometry, Mensuration, Trigonometry, Heat & Temperature, elasticity]</i></p>	2.4 Comply given tolerance.
	2.5 Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials.
	2.6 Ensure dimensional accuracy of assembly by using different instruments/gauges.
	2.7 Explain basic electricity, insulation & earthing.
<p>3. Interpret specifications, different engineering drawing and apply for different application in the field of work. <i>[Different engineering drawing- Geometrical construction, Dimensioning, Layout, Method of representation, Symbol, Different Projections, Assembly drawing, Sectional views, Estimation of material]</i></p>	3.1 Read & interpret the information on drawings and apply in executing practical work.
	3.2 Read & analyse the specification to ascertain the material requirement, tools, and assembly /maintenance parameters.
	3.3 Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
<p>4. Select and measure dimension of components and record data.</p>	4.1 Select appropriate measuring scale/tape/gauges.
	4.2 Measure dimension of the components/assembly & compare with given drawing/measurement.
<p>5. Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality.</p>	5.1 Explain the concept of productivity and quality tools and apply during execution of job.
	5.2 Understand the basic concept of labour welfare legislation and adhere to responsibilities and remain sensitive towards such laws.
	5.3 Knows benefits guaranteed under various acts
<p>6. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.</p>	6.1 Explain the concept of energy conservation, global warming, pollution and utilize the available recourses optimally & remain sensitive to avoid environment pollution.
	6.2 Dispose waste following standard procedure.
<p>7. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for</p>	7. 1.Explain personnel finance and entrepreneurship.
	7. 2.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 familiarizes

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personal & societal growth.	with the Policies /Programmes & procedure & the available scheme.
	7. 3.Prepare Project report to become an entrepreneur for submission to financial institutions.
8. Plan and execute the work related to the occupation.	8. 1.Use documents, drawings and recognize hazards in the work site.
	8. 2.Plan workplace/ assembly location with due consideration to operational stipulation
	8. 3.Communicate effectively with others and plan project tasks
	8. 4.Execute the task effectively.

Specific Assessable Outcomes:

SPECIFIC LEARNING/ ASSESSABLE OUTCOME	
LEARNING/ ASSESSABLE OUTCOMES	ASSESSMENT CRITERIA
Semester-I	
9. Categorize different types of tools, equipment & raw material used in foundry.	9.1 Select appropriate tools & equipments
	9.2 Identify every raw materials used in foundry
	9.3 Ensure function of every raw materials
	9.4 Ensure proper used of every tools and equipments.
	9.5 Indentify wrong & defective tools & equipments.
10. Prepare sand mix for moulding.	10.1 Plan & identify tools, equipment required for the job.
	10.2 Select raw materials required for preparing sand mix.
	10.3 Prepare the proper mixing of the sand
	10.4 Check the correct proportion of the mixing sand.
	10.5 Check the moisture content of the mixing sand
11. Perform different types of sand testing & find out result.	11.1 Identify testing specific equipment for particular test.
	11.2 Check accuracy of the equipments
	11.3 Perform sand test correctly
	11.4 Evaluate testing result.
12. Produce green sand moulds by using appropriate hand tools.	12.1 Plan & Identify tools & equipments required for producing green sand mould.
	12.2 Select the raw materials, pattern required for making mould & channels.
	12.3 Make necessary mould with the given pattern and cut channel cutting & gate cutting observing standard procedure.

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	12.4 Make coating of pattern observing standard procedure.
	12.5 Repair the mould if necessary
13. Making different types of core. Produce different casting components by different metal with different moulding process and finish the casting as per requirement.	13.1 Plan & identify proper tools and equipments for making different casting components.
	13.2 Select all raw materials required for the mould, different metal melting.
	13.3 Select pattern for the mould
	13.4 Make the floor and level it and level checked with spirit level & straight edge.
	13.5 Make the core with the help of core box and assemble the mould with core
	13.6 Select all charging materials for casting
	13.7 Prepare the furnace for melting the metal as per type of metal
	13.8 Pour melting metal into the mould cavity with special care. (maintain all safety measure)
	13.9 Fettle the casting carefully
14. Produce wooden joint, make pattern and repair defective pattern and boxes.	14.1 Plan & identify proper tools for making wooden joint, making pattern and for repair patterns & core boxes
	14.2 Study the design for the wooden joints
	14.3 Perform all operations and make the joints
	14.4 Observe safety procedure during above operations
	14.5 Check dimensional accuracy as per standard procedure
	14.6 Avoid waste
15. Prepare mould with loose piece pattern and loose piece core box.	15.1 Plan & identify proper tools and equipments required.
	15.2 Select loose piece pattern
	15.3 Select loose piece core box
	15.4 Select raw material for sand mixer.
	15.5 Mix the sand with write quantity
	15.6 Make the mould with loose piece pattern
	15.7 Make core with loose piece core box
	15.8 Make the mould and assemble it
	15.9 Observe all step of operation during working
	15.10 Check correctness of the job
16. Perform metal working such as marking, sawing, filling, grinding, drilling etc.	16.1 Identify tools & equipments for making sawing, chipping, filling, grinding & drilling.
	16.2 Select appropriate material & the above operation
	16.3 Perform above operation carefully.
	16.4 Observe safety & precaution during operation
	16.5 Check the accuracy of the job.
17. Make casting of aluminum/ magnesium by melting on	17.1 Observe the furnace for save working for melting metal
	17.2 Select raw materials for charging of furnace

Induction furnace & identify defects.	17.3	Select raw materials for making mould
	17.4	Select pattern for making mould
	17.5	Make mould & pour molten metal to the mould
	17.6	Observe all safety & precaution maintained during metal handling & pouring
	17.7	Fettled the casting & observe defects
Semester-II		
18. Make cast iron castings by different moulding process and identify defects.	18.1	Plan & identify proper tools and equipments for making the iron casting
	18.2	Plan & identify proper tools and equipments for making specific mould
	18.3	Select all raw materials and prepare mould
	18.4	Select pattern required for the job
	18.5	Select core box for making cover core
	18.6	Make the mould and insert core carefully
	18.7	Pour the molten metal carefully
	18.8	Safety should be maintain during handling and pouring of molten metal
	18.9	Fettle the job.
	18.10	Check the job as per specification.
19. Make a casting, fettle the casting & calculation yield %	19.1	Plan and identify the tools and equipments required for making casting.
	19.2	Check the core box.
	19.3	Select the pattern and check the pattern.
	19.4	Identify raw materials.
	19.5	Make mould and assemble mould.
	19.6	Identify chills & densers.
	19.7	Locate position for chills.
	19.8	Pour molten metal by observing safety.
	19.9	Check the accuracy and quality of the job.
	19.10	Calculate % of field.
20. Prepare complete core by joining half cores.	20.1	Identify and check core box for making jobs.
	20.2	Maintain heating temperature of core baking oven.
	20.3	Control the mixed sand composition.
	20.4	Check accuracy of dimensions and hardness of the core.
21. Make mould by various types of gate to produce different type of metal casting and find out defects.	21.1	Plan and identify all hand tools and equipments.
	21.2	Identify all raw materials.
	21.3	Select the pattern and check it.
	21.4	Mix the sand with correct proportion.
	21.5	Maintain Core during meeting.
	21.6	Maintain correct actions during working.
	21.7	Identify defects if any
	21.8	Repair the mould if necessary

22. Make an extra thick casting & finish it.	22.1 Plan and identify tools and equipments required
	22.2 Select raw material required for the job.
	22.3 Identify pattern and core box.
	22.4 Mix the moulding sand with correct proportion and quantity.
	22.5 Follow every steps for performing mould.
	22.6 Repair mould if needed.
	22.7 Follow safety rule during carrying molten metal.
	22.8 Find out defect and check quality of the job.
23. Reline & prepare different types of furnaces for melting cast metals.	23.1 Identify tools required for relining and repairing of furnace.
	23.2 Identify raw materials required for reline and repair.
	23.3 Maintain correct proportion of charge materials.
	23.4 Maintain relining thickness
	23.5 Maintain preheating temperature and heating time.
	23.6 Maintain quality of charge metal for muffle furnace.
	23.7 Maintain all safety and precaution during melting practice.
	23.8 Check quality of casting.
24. Make core by using linseed oil & IVP oils.	24.1 Plan and identify tool requirements.
	24.2 Identify raw materials requirements for the job.
	24.3 Maintain correct ratio for mixing the sand.
	24.4 Check hardness of cores after curing.
	24.5 Check quality and finishing of the core.
25. Prepare mould without pattern & with sweep pattern	25.1 Plan and identify the tools and equipments required for the mould.
	25.2 Select suitable sweep pattern for sweep moulding.
	25.3 Identify raw materials for the mould.
	25.4 Mix the sand properly.
	25.5 Check dimensions of mould cavity after mould making without pattern.
	25.6 Check the dimension of the mould cavity after mould making by sweep pattern.
26. Make casting by die casting process & yield % of casting	26.1 Identify the machine required for gravity die casting.
	26.2 Ensure the quality of the machine is useable.
	26.3 Observe releasing agent in applied in the metallic dies.
	26.4 Maintain pouring temperature of molten metal.
	26.5 Check the quality of the castings.
	26.6 Calculate yield % of casting.
27. Make casting by investment casting process & binder less	27.1 Identify raw materials required for making mould.
	27.2 Maintain melting temperature of wax for investment

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process.	casting.
	27.3 Follow steps of making the mould.
	27.4 Maintain heating temperature for removal of wax from the mould.
	27.5 Extra care for handling the investment mould.
	27.6 Check the quality of the casting.

Means of assessment 1

Assessment will be evidence based comprising the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voice
- Progress chart
- Attendance and punctuality
- Assignment
- Project work

Means of assessment 2

Pass/Fail

The minimum pass percentage is 60% marks for each Trade practical Examination, 40% for each Theory Examination and 25% for each part/section of the Examination separately.

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SECTION 2 EVIDENCE OF LEVEL

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OPTION A

Title/Name of qualification/component: Foundryman		Level: 4	
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
Process	<ul style="list-style-type: none"> • Categorize different types of tools, equipment & raw material used in foundry. • Prepare sand mix for moulding • Perform different types of sand testing & find out result. • Produce green sand moulds by using appropriate hand tools. • Produce different casting components by different metal with different moulding process and finish the casting as per requirement. • Produce wooden joint, make pattern and repair defective pattern and boxes. • Prepare mould with loose piece pattern and loose piece core box. • Perform metal working such as marking, sawing, filling, grinding, drilling etc. 	<p>The learner will apply clear choice of procedures in familiar context as indicated in the learning outcomes like “Categorize different types of tools, equipment & raw material used in foundry, Prepare sand mix for moulding, Produce different casting components by different metal with different moulding process and finish the casting as per requirement”.</p> <p>In the learning outcomes like “Perform metal working such as marking, sawing, filling, grinding, drilling etc, Make casting of aluminium/ magnesium by melting on Induction furnace & identify defects” the learner has to apply ones knowledge and work as per requirements and resources available.</p> <p>Hence NSQF Level is 4 for this descriptor</p>	4

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Title/Name of qualification/component: Foundryman		Level: 4	
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<ul style="list-style-type: none"> • Make casting of aluminium/ magnesium by melting on Induction furnace & identify defects. • Prepare mould by different moulding process; make cast iron castings identify defects. • Make a casting, fettle the casting & calculation yield% • Prepare complete core by joining half cores. • Make mould by various types of gate to produce different type of metal casting. Find out defects & visit industry to show different operation for casting making. • Make an extra thick casting & finish it. • Reline & prepare different types of furnaces for melting cast metals. • Make by using linseed oil & ivpoils. • Prepare mould without pattern & with sweep pattern. • Make casting by die casting process & yield % 		

NSQF QUALIFICATION FILE

“Foundryman”

Title/Name of qualification/component: Foundryman		Level: 4	
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<p>of casting.</p> <ul style="list-style-type: none"> • Make casting by investment casting process & binder less process. 		
Professional knowledge	<p>Factual Knowledge of field of Knowledge or study</p> <ul style="list-style-type: none"> • Specification tools & equipments. • Procedure of use of different tools & equipments. • Sand testing different methods of moisture content test permeability test. • Different types of Gate cutting system with different tools used & repairs of gates. • Self Core making procedure. • Moulding boxes [As per IS 1280-1958] • Definition of green sand Advantage and disadvantage of green sand mould. • Operation & maintenance of oil fire furnace pattern- pattern materials. • Methods of repairing the pattern & core boxes. • Types of grinders – Brief information about other metal cutting equipments. • Induction furnace types- construction, operation and maintenance. • Slush casting process, continuous casting process, permanent mould casting process. 	<p>The learner demonstrates factual knowledge of field of Metals and Moulding, Specification of Tools and Equipments, Sand testing different methods of moisture content test permeability test, Different types of Gate cutting system with different tools used & repairs of gates.</p> <p>The learner also demonstrates knowledge of Foundry and Furnace Operation. The learner understands and is able to demonstrate knowledge of “Operation & maintenance of oil fire furnace pattern- pattern materials, Classification of iron ores & its treatments, Manufacturing process of copper base alloys, aluminium base alloys and magnesium base alloys” etc.</p> <p>This can be ascertained by reading the Assessment Criteria.</p> <p>Also the learner demonstrates knowledge of “Calculation of ferrostatic pressure calculation of weight required on a mould, Calculation of molten metal required for different size mould (Aluminium, brass, copper, C.I. etc.), Cost</p>	4

NSQF QUALIFICATION FILE

“Foundryman”

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NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<ul style="list-style-type: none"> • Fettling of casting knock out and removal and removal of casting from mould removal of gates & risers. • Binders - Common binders used in foundry and their application and their grades as per I.S. • Different between ferrous & non ferrous metals. Physical & mechanical properties of metals. • Classification of iron ores & its treatments. • Steel manufacturing process classification common steel alloys and use. • Manufacturing process properties and use of aluminium, tin, zinc, lead etc. • Manufacturing process of copper base alloys, aluminium base alloys and magnesium base alloys. • Brief information about blast furnace, electric furnaces such as arc furnace & induction furnace. • Calculation of ferrostatic pressure calculation of weight required on a mould. • Calculation of molten metal required for different size mould (Aluminium, brass, copper, C.I. etc.) • Cost estimate of simple castings of 	<p>estimate of simple castings of different metals. Low pressure, high pressure, gravity die casting process, Foundry mechanization- layout of a small foundry- list of material handling equipments and their use”.</p> <p>Hence NSQF Level is 4for this descriptor.</p>	

NSQF QUALIFICATION FILE

“Foundryman”

Title/Name of qualification/component: Foundryman		Level: 4	
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<p>different metals. Low pressure, high pressure, gravity die casting process.</p> <ul style="list-style-type: none"> • Foundry mechanization- layout of a small foundry- list of material handling equipments and their use. 		
Professional skill	<ul style="list-style-type: none"> • Categorize different types of tools, equipment & raw material used in foundry. • Prepare sand mix for moulding • Perform different types of sand testing & find out result. • Produce green sand moulds by using appropriate hand tools. • Produce different casting components by different metal with different moulding process and finish the casting as per requirement. • Produce wooden joint, make pattern and repair defective pattern and boxes. • Prepare mould with loose piece pattern and loose piece core box. 	<p>The learner after the trainer will be able to work independently and recall and demonstrate practical skill, routine and repetitive in narrow range of application for the learning outcomes such as ‘Produce green sand moulds by using appropriate hand tools, Produce different casting components by different metal with different moulding process and finish the casting as per requirement’.</p> <p>This can be ascertained by reading the Assessment Criteria.</p> <p>Hence NSQF Level is 4 for this descriptor</p> <p>The learning outcomes like “Make casting of aluminium/ magnesium by melting on Induction furnace & identify defects, Prepare mould by different moulding process; make cast iron castings identify defects”, all of which</p>	4

NSQF QUALIFICATION FILE

“Foundryman”

Title/Name of qualification/component: Foundryman		Level: 4	
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<ul style="list-style-type: none"> • Perform metal working such as marking, sawing, filling, grinding, drilling etc. • Make casting of aluminium/ magnesium by melting on Induction furnace & identify defects. • Prepare mould by different moulding process; make cast iron castings identify defects. • Make a casting, fettle the casting & calculation yield% • Prepare complete core by joining half cores. • Make mould by various types of gate to produce different type of metal casting. Find out defects & visit industry to show different operation for casting making. • Make an extra thick casting & finish it. • Reline & prepare different types of furnaces for melting cast metals. • Make by using linseed oil & ivpoils. • Prepare mould without pattern & with sweep 	<p>involve making independent decisions using appropriate rule and tools.</p> <p>The same can be ascertained by reading the Assessment Criteria.</p> <p>Hence NSQF Level is 4 for this descriptor</p> <p>The learning outcomes like” Make casting by die casting process & yield % of casting, Make casting by investment casting process & binder less process ” requires the learner to perform the tasks assigned using a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools.</p> <p>Hence NSQF Level is 4 for this descriptor</p> <p>The learner will also be responsible for own quality of work and will have to use quality tools to check own work to ensure conformance to requirements of the job.</p> <p>Hence NSQF Level is 4 for this descriptor</p>	

NSQF QUALIFICATION FILE

“Foundryman”

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NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<p>pattern.</p> <ul style="list-style-type: none"> • Make casting by die casting process & yield % of casting. • Make casting by investment casting process & binder less process. 		
Core skill	<p>Desired Mathematical Skills</p> <ul style="list-style-type: none"> • Measure dimensions as per drawing • Ensure dimensional accuracy of assembly by using different instruments/gauges. • 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. • Measure all dimensions in accordance with standard specifications and tolerances. <p>Understanding of social/political</p> <ul style="list-style-type: none"> • Understand and explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality. • Explain energy conservation, global warming and pollution and contribute in day to day work by 	<p>The learning outcomes for example ‘Measure dimension of the components & record data’ and ‘Mark as per specification’ 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.</p> <p>Hence NSQF Level is 5 for this descriptor</p>	5

NSQF QUALIFICATION FILE

“Foundryman”

Title/Name of qualification/component: Foundryman		Level: 4	
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<p>optimally using 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. 		
Responsibility	<ul style="list-style-type: none"> • Categorize different types of tools, equipment & raw material used in foundry. • Prepare sand mix for moulding • Perform different types of sand testing & find out result. • Produce green sand moulds by using appropriate hand tools. • Produce different casting components by different metal with different moulding process and finish the casting as per requirement. • Produce wooden joint, make pattern and repair defective pattern and boxes. • Prepare mould with loose piece pattern and loose piece core box. • Perform metal working such as marking, 	<p>The Foundryman is responsible to perform the work as per specific guidelines/ procedures based on their understanding of “Perform metal working such as marking, sawing, filling, grinding, drilling etc, Make casting of aluminium/ magnesium by melting on Induction furnace & identify defects., Make mould by various types of gate to produce different type of metal casting. Find out defects, Make casting by die casting process & yield % of casting ” hence is responsible for own work and learning .</p> <p>Hence NSQF Level is 4 for this descriptor</p>	4

NSQF QUALIFICATION FILE

“Foundryman”

Title/Name of qualification/component: Foundryman		Level: 4	
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<p>sawing, filling, grinding, drilling etc.</p> <ul style="list-style-type: none"> • Make casting of aluminium/ magnesium by melting on Induction furnace & identify defects. • Prepare mould by different moulding process; make cast iron castings identify defects. • Make a casting, fettle the casting & calculation yield% • Prepare complete core by joining half cores. • Make mould by various types of gate to produce different type of metal casting. Find out defects & visit industry to show different operation for casting making. • Make an extra thick casting & finish it. • Reline & prepare different types of furnaces for melting cast metals. • Make by using linseed oil & ivpoils. • Prepare mould without pattern & with sweep pattern. 		

NSQF QUALIFICATION FILE

“Foundryman”

Title/Name of qualification/component: Foundryman		Level: 4	
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<ul style="list-style-type: none"> • Make casting by die casting process & yield % of casting. • Make casting by investment casting process & binder less process. 		

SECTION 3

EVIDENCE OF NEED

What evidence is there that the qualification is needed?

The Foundryman pass-outs will be mainly absorbed as Moulder, Die casting Machine Operator, Annealer, Core Maker in ‘Production & Manufacturing Sector’. The trainees can also be a part of major Employers like NTPC, SAIL, Ordnance Factory etc.

Placement records from few ITIs are enclosed.

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

The employment prospect for this qualification is very high. There is also high demand for starting the training programme on this trade amongst new institutes. As of now the total seating capacity of the training programme is 2583 (including 30% supernumeraries) approximately in 146 ITIs.

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

The qualification is a long term course of one year originally designed and approved by NCVT for the Craftsmen Training Scheme and is in existence for the last 60 years. NCVT has been entrusted with the responsibilities of prescribing standards and curricula for craftsmen training, advising Government of India on the overall policy and programmes, conducting All India Trade Tests and awarding National Trade Certificates.

No existing course is available with same content and duration.

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?

- Mentor Council (MC) for Production & Manufacturing Sector was formed in 2014 to review the curriculum of this qualification under the sector.
- CSTARI, the research wing of DGT, reviews and updates the qualification, in consultation with industries and other stakeholders, on a regular basis by conducting trade committee meetings.
- DGT will keep on doing continuous comparative study in the trade by referring to relevant upcoming qualifications in the National Qualifications Register (NQR) and relevant sectors.

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?

- Qualifying trainee will obtain an NCVT Certificate in Foundry man trade which gives the following options of progression to the trainee:
 1. Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC)
 2. Can join Crafts Instructor Training Scheme (CITS) in the relevant trade after which they will be employed in ITI/ Vocational Training Institute as instructor
 3. Can join as skilled worker in the relevant industry
 4. can become supervisor after doing diploma in relevant branch of Engineering

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.