NSQF QUALIFICATION FILE
Approved in 24th NSQC Dated 27th Feb, 2020

NSDA Code
2020/CCM/DGT/03671

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

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

Name and address of submitting body:

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

Name and contact details of individual dealing with the submission

Name: Shri Deepankar Mallick

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

Address if different from above:

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List of documents submitted in support of the Qualifications File

1. Competency-based curriculum with following details:

Model Curriculum to be added which will include the following:

1. Indicative list of tools/equipment to conduct the training: Enclosed with curriculum
2. Trainers qualification: Indicated in the curriculum
3. 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.
4. Distribution of training duration into theory/practical/OJT component: Indicated in the curriculum.

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

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SUMMARY

1	**Qualification Title**	**'WELDER(STRUCTURAL)'**
2	**Qualification Code, if any**	**DGT/1123**
3	**NCO code and occupation**	7212.0100 – Welder, Gas 7212.0200 – Welder, Electric 7212.0300 – Welder, Machine 7212.0400 – Gas Cutter 7212.0500 – Brazer
4	**Nature and purpose of the qualification (Please specify whether qualification is short term or long term)**	Prepare skilled Technician tofuse metal parts on structures by different welding methods as per design drawings. The individual erects, joins, cuts and repairs different structural components to form complete structures or frameworks.
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**	• 7212.0100 – Welder, Gas • 7212.0200 – Welder, Electric • 7212.0300 – Welder, Machine • 7212.0400 – Gas Cutter • 7212.0500 – Brazer
9	**Job description of the occupation**	Welder (Structural) will be able tofuse metal parts on structures by different welding methods as per design drawings. The individual erects, joins, cuts and repairs different structural components to form complete structures or frameworks.
10	**Licensing requirements**	NOT REQUIRED
11	**Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)**	NOT APPLICABLE

<table>
<tr><td>12</td><td>Level of the qualification in the NSQF</td><td>Level 3</td></tr>
<tr><td>13</td><td>Anticipated volume of training/learning required to complete the qualification</td><td>
<table>
<tr><th>Sl. No.</th><th>Course Element</th><th>Notional Training Hours</th></tr>
<tr><td>1</td><td>Professional Skill (Trade Practical)</td><td>1000</td></tr>
<tr><td>2</td><td>Professional Knowledge (Trade Theory)</td><td>280</td></tr>
<tr><td>3</td><td>Workshop Calculation & Science</td><td>80</td></tr>
<tr><td>4</td><td>Engineering Drawing</td><td>80</td></tr>
<tr><td>5</td><td>Employability Skills</td><td>160</td></tr>
<tr><td></td><td>Total</td><td>1600</td></tr>
</table>
</td></tr>
<tr><td>14</td><td>Indicative list of training tools required to deliver this qualification</td><td>As per Annexure-I of curriculum.</td></tr>
<tr><td>15</td><td>Entry requirements and/or recommendations and minimum age</td><td>Passed 8th class examination.

Minimum age 14 years as on first day of academic session.</td></tr>
<tr><td>16</td><td>Progression from the qualification (Please show Professional and academic progression)</td><td>An Individual can proceed for:
<table>
<tr><td>Professional
Technician
Senior Technician
Supervisor
Manager
Entrepreneur</td><td>Technical / Academic
ATS
CITS
Diploma/ Advance Diploma (Vocational)</td></tr>
</table>
</td></tr>
<tr><td>17</td><td>Arrangements for the Recognition of Prior learning (RPL)</td><td>• Yes (For more details refer “Guidelines for Private candidate” in DGT website MIS portal).</td></tr>
<tr><td>18</td><td>International comparability where known (research evidence to be provided)</td><td>-</td></tr>
<tr><td>19</td><td>Date of planned review of the</td><td>5 Yrs from the Date of Approval</td></tr>
</table>

	qualification.			
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)	Join MS sheets by Gas welding in different positions following safety precautions.	25	7	3
(ii)	Join MS plates by SMAW in different positions.	25	7	3
(iii)	Perform straight, bevel & circular cutting on MS plate by Oxy-acetylene cutting process.	175	49	3
(iv)	Perform different type of MS pipe joints by Gas welding (OAW).	25	7	3
(v)	Weld different types of MS pipe joints by SMAW.	150	42	3
(vi)	Weld Stainless steel, Cast iron, Brass & Aluminum by OAW.	25	7	3
(vii)	Perform Arc gauging on MS plate.	50	14	3
(viii)	Perform Plasma Arc cutting.	25	7	3
(ix)	Perform fillet welding on M.S plates up to 1F, 2F, 3F, 4F & 5F positions by SMAW.	150	42	3
(x)	Perform Full penetration Single "V" butt joint on MS plates in 1G,2G,3G &4G position adapting root Inspection and clearance by D.P test.	75	21	3

(xi)	Perform welding of M.S, S.S and Aluminium sheets, M.S tubes (square butt T,Y,K joints) by GTAW in down hand position.	25	7	3
(xii)	Perform bending, straightening and edge planning for fabrication of structures.	75	21	3
(xiii)	Perform Double bevel butt joint on dissimilar thickness MS Flats in down hand positions by SMAW with root Inspection by D.P test and back gouging and with root Inspection by D.P test and back gouging and adapting skip welding & back step welding method for controlling distortion.	25	7	3
(xiv)	Perform welding of pipe joints in different positions by SMAW.	25	7	3
(xv)	Perform Lap, T, Corner joints on GMAW and Flux Cored Arc welding process on M.S in down hand position.	25	7	3
(xvi)	Perform Automatic Submerged Arc Welding.	25	7	3
(xvii)	Manufacture simple structures with L angles, I section and channel sections using welding fixture by SMAW.	25	7	3
(xviii)	Fabrication of pipe/cone on M.S. sheet by SMAW.	25	7	4
(xix)	Prepare a Weld test specimen as per a standard and carry out testing.	25	7	4
(xx)	Carry out non destructive testing of welds.			
CORE SKILL				
EMPLOYBILITY SKILLS				
(i)	Apply safe working practices.	-	20	4
(ii)	Comply with environment regulation and housekeeping.	-	20	3
(iii)	Interpret & use formal and technical communication.	-	20	4
(iv)	Apply the concept in productivity & quality management in day to day work to improve productivity & quality.	-	20	4
(v)	List and interpret various acts of labour welfare legislation.	-	20	3

(vi)	Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	-	20	3
(vii)	Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	-	20	3
(viii)	Utilize basic computer applications and internet to take benefit of IT developments in the industry.	-	20	4
WORKSHOP CALCULATION & SCIENCE				
(i)	Demonstrate basic mathematical concept and principles to perform practical operations.	-	40	4
(ii)	Explain basic science in the field of study including simple machine.	-	40	4
ENGINEERING DRAWING				
(i)	Read and apply engineering drawing for different application in the field of work.	-	80	4
	Total	1600		-

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SECTION 1
ASSESSMENT

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

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

evaluating them at work based on assessment criteria, asking questions and initiating formative discussions to assess understanding and by evaluating records and reports. Summative assessment is carried out by All India Trade Test on Trade Theory, Trade practical, 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:

Sl. No.	Type of assessment	Subject for the trade test	Marks
1	Summative Assessment	Practical	250
2		Trade Theory	100
3		Employability Skills	50
4		Workshop Calculation and Science.	50
5		Engineering Drawing	50
6	Formative assessment based on Learning Outcomes		200
TOTAL:			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:

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

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Title of Component: Formative Assessment Breakup
(on half yearly average of the learning assessment covered)

Means of assessment

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

Serial No.	Terminal Competency	Maximum Weightage (%)
1	Safety consciousness	15
2	Workplace hygiene	5
3	Attendance/ Punctuality	10
4	Ability to follow Manuals/ Written instructions	5
5	Application of Knowledge	10
6	Skills to handle tools / equipment/ Instruments/ Devices	10
7	Economical use of materials	5
8	Working Strategy	10
9	Quality in workmanship/ Performance	15
10	VIVA	15
	Total Maximum Weightage (%)	100

Pass/Fail

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

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LEARNING OUTCOME WITH ASSESSMENT CRITERIA:

LEARNING OUTCOME (TRADE SPECIFIC)	
LEARNING OUTCOMES	**ASSESSMENT CRITERIA**
1. Join MS sheets by Gas welding in different positions following safety precautions.	Plan and select the nozzle size, working pressure type of flame, filler rod as per requirement.
	Prepare, set and tack the pieces as per drawing.
	Setting up the tacked joint in specific position.
	Deposit the weld following proper welding technique and safety aspect.
	Carry out visual inspection to ascertain quality weld joint.
2. Join MS plates by SMAW in different positions.	Plan and select the type & size of electrode, welding current, type of edge preparation etc. as per requirement.
	Prepare, set and tack the pieces as per drawing.
	Set up the tacked pieces in specific position.
	Deposit the weld maintaining appropriate arc length, electrode angle, welding speed, weaving technique and safety aspects.
	Clean the welded joint thoroughly.
	Carry out visual inspection for appropriate weld joint.
	Inspect the weld using DPT/MPT.
3. Perform straight, bevel & circular cutting on MS plate by Oxy-acetylene cutting process.	Plan and mark on MS plate surface for straight/bevel/circular cutting.
	Select the nozzle size and working pressure of gases as per requirement.
	Set the marked plate properly on cutting table.
	Perform the straight and bevel cutting operation maintaining proper techniques and all safety aspects.
	Perform the circular cutting operation by using profile cutting machine maintaining proper techniques and all safety aspects
	Clean the cutting burrs and inspect the cut surface for soundness of cutting.
4. Perform different type of MS pipe joints by Gas welding (OAW).	Plan and prepare the development for a specific type of pipe joint.
	Mark and cut the MS pipe as per development.
	Select the size of filler rod, size of nozzle, working pressure etc.

	Set and tack the pieces as per drawing.
	Deposit the weld bead maintaining proper technique and safety aspects.
	Inspect the welded joint visually for poor penetration, uniformity of bead and surface defects.
5. Weld different types of MS pipe joints by SMAW.	Plan and prepare the development for a specific type of pipe joint.
	Mark and cut the MS pipe as per development.
	Select the electrode size and welding current for welding.
	Set and tack the pieces as per drawing.
	Deposit the weld bead maintaining proper technique and safety aspects.
	Insect the welded joint visually for root penetration, uniformity of bead and surface defects.
6. Weld Stainless steel, Cast iron, Brass & Aluminum by OAW.	Plan and prepare the pieces for welding.
	Select the type and size of filler rod and flux, size of nozzle, gas pressure, preheating method and temperature as per requirement.
	Set and tack plates as per drawing.
	Deposit the weld maintaining appropriate technique and safety aspects.
	Cool the welded joint by observing appropriate cooling method. Use post heating as per requirement.
	Clean the joint and inspect the weld for its uniformity and different types of surface defects.
7. Perform Arc gauging on MS plate.	Make Square Butt & Lap joint on M.S. sheet 2 mm thick by brazing.
	Make Single "V" butt joint C.I. plate 6mm thick in flat position.
	Plan and select the size of electrode for Arc gouging.
	Arc gouging on MS plate 10 mm thick.
	Select the polarity and current as per requirement.
	Perform gouging adapting proper gouging technique.
	Clean and check to ascertain the required stock removed.
8. Perform Plasma Arc cutting.	Plan and mark on MS plate surface for straight/bevel cutting.
	Set the plasma cutting machine
	Set the marked plate properly on cutting table.
	Perform the Plasma cutting on M.S plate by Plasma cutting maintaining proper techniques and all safety aspects.

	Clean the cutting burrs and inspect the cut surface for soundness of cutting.
9. Perform fillet welding on M.S plates up to 1F, 2F, 3F, 4F & 5F positions by SMAW.	Prepare, set and tack the pieces as per drawing.
	Set up the tacked pieces in 1F,2F,3F,4F& 5F position.
	Deposit the weld maintaining appropriate arc length, electrode angle, welding speed, weaving technique and safety aspects.
	Clean the welded joint thoroughly.
	Carry out visual inspection for appropriate weld joint.
	Inspect the weld using DPT/MPT.
	Prepare, set and tack the pieces as per drawing.
10. Perform Full penetration Single "V" butt joint on MS plates in 1G,2G,3G &4G position adapting root Inspection and clearance by D.P test.	Prepare, set and tack the pieces as per drawing.
	Set up the tacked pieces in specific position.
	Deposit the root pass weld maintaining appropriate arc length, electrode angle, welding speed, and safety aspects.
	Clean and inspect the weld using DPT.
	Deposit the intermediate and cover pass welds maintaining appropriate arc length, electrode angle, welding speed, weaving technique and safety aspects.
	Carry out visual inspection for appropriate weld joint
11. Perform welding of M.S, S.S and Aluminium sheets, M.S tubes (square butt T,Y,K joints) by GTAW in down hand position.	Plan and prepare M.S,SS, Aluminium sheets as per the drawing.
	Plan and prepare M.S tube for square butt joint as per the drawing.
	Plan and prepare the development templates for each type of pipe joints.
	Mark and development.
	Set up the A.C GTAW machine and set up welding current.
	Select the suitable filler rods, Gas nozzle, Tungsten electrode.
	Grind the edge of Tungsten electrode.
	Set and tack the Aluminium pieces.
	Deposit the weld on Aluminium sheets maintaining proper technique and safety aspects.
	Set up the D.C GTAW machine and set up welding current.
	Select the suitable filler rods, Gas nozzle, Tungsten electrode.
	Set and tack the M.S and S.S sheets
	Deposit the weld on M.S and S.S sheets maintaining proper

	technique and safety aspects.
	Set up and tack weld the pipe joints by GTAW.
	Deposit the weld M.S tube maintaining proper technique and safety aspects.
	Inspect the welded joints visually for poor penetration, uniformity of bead and surface defects.
12. Perform bending, straightening and edge planning for fabrication of structures.	Bend plates & pipe by using plate/pipe bending machine.
	Bend pipes to different angles and shapes by using Pipe bending machine
	Straighten plates by hammering (cold straightening)
	Straighten plates by heating and hammering (hot straightening).
13. Perform Double bevel butt joint on dissimilar thickness MS Flats in down hand positions by SMAW with root Inspection by D.P test and back gouging and with root Inspection by D.P test and back gouging and adapting skip welding & back step welding method for controlling distortion.	Plan and prepare the pieces for welding as per drawing.
	Select the Electrode as per requirement.
	Set and tack plates as per drawing.
	Deposit the root pass maintaining appropriate technique and safety aspects.
	Clean the joint and inspect the root pass weld for its uniformity and different types of surface defects using D.P test.
	Back gouge and grind the surface.
	Inspect the root for any defect using D.P test.
	Deposit the intermediate and cover passes adapting skip welding & back step welding method for controlling distortion.
	Inspect the welded joints visually for poor penetration, uniformity of bead and surface defects.
14. Perform welding of pipe joints in different positions by SMAW.	Plan and prepare the development templates for Elbow and T joints of pipe.
	Plan and prepare the development templates for Y and K joints of pipe.
	Mark and cut the MS pipe as per development.
	Select the suitable SMAW electrode.
	Set and tack weld the pipes.
	Weld Elbow and T joints on MS pipes by SMAW in flat position
	Weld K and y joint on M.S. pipe by SMAW in Horizontal positions
	Inspect the welded joints visually for poor penetration, uniformity of bead and surface defects.

15. Perform Lap, T, Corner joints on GMAW and Flux Cored Arc welding process on M.S in down hand position.	Set GMAW machine, select size of CO2 welding/Flux cored Arc welding electrode wire, welding voltage, gas flow rate, wire feed rate as per requirement.
	Prepare, set and tack weld the pieces as per drawing.
	Deposit the weld adapting proper welding technique and safety aspects.
	Carry out visual inspection to ensure quality of welded joint.
	Inspect the weld and rectify the effects if any
16. Perform Automatic Submerged Arc Welding.	Set Automatic Submerged Arc Welding machine suitable electrode wire and set the parameters.
	Fill the SAW flux in the Hooper
	Prepare set work pieces as per drawing.
	Start the Automatic Submerged Arc Welding machine and deposit the weld
	Carry out visual inspection to ensure quality of welded joint.
17. Manufacture simple structures with L angles, I section and channel sections using welding fixture by SMAW.	Plan and prepare the pieces of L angles, I section and channel sections as per the drawing.
	Select the Electrode as per requirement.
	Select suitable welding fixture and clamp the pieces
	Tack weld pieces of L angles, I section and channel sections as per the drawing as per drawing.
	Deposit the root pass maintaining appropriate technique and safety aspects.
	Clean the joint and inspect the root pass weld for its uniformity and surface defects & rectify the defects if any.
	Deposit the intermediate and cover passes maintaining appropriate welding sequence
18. Fabrication of pipe/cone on M.S. sheet by SMAW.	Plan and prepare the development templates for pipe/cone in M.S sheet.
	Mark and cut the sheets as per development.
	Roll or bend the plates to form pipe/cone and tack weld.
	Select the suitable SMAW electrode.
	Set and tack weld the pipes.
	Weld one side of pipe/cone by SMAW in flat position.
	Back ground up to sound weld metal.
	Weld the other side by SMAW in flat position.
	Inspect the welded joints visually and rectify the surface defect if any.

19. Prepare a Weld test specimen as per a standard and carry out testing.	Prepare and weld a single -V- butt joint as per AWS D1.1.
	Prepare weld test specimens for tensile and bend tests
	Prepare a fillet weld by SMAW process
	Prepare a fillet test specimens for fillet break test and macro etch test.
	Test the specimens for tensile and bend test in the Tensile Testing Machine.
20. Carry out non destructive testing of welds.	Inspect the welded joints by Liquid Penetrant testing.

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.
	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 basic 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 to day work by optimally using available resources.	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.

7. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	Explain personnel finance and entrepreneurship.
	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.
	Prepare a report to become an entrepreneur for submission to financial institutions.
8. Utilize basic computer applications and internet to take benefit of IT developments in the industry.	Explain the basic hardware of personal computer.
	Use common application software viz., word, excel, power point etc., in day to day work.
	Awareness about useful internet websites, search relevant information pertaining to the assigned tasks.
WORKSHOP CALCULATION & SCIENCE	
1. Demonstrate basic mathematical concept and principles to perform practical operations.	Solve different problems like phase angle, etc. with the help of a calculator.
	Demonstrate conversion of Fraction to Decimal and vice versa.
	Explain BCD code, conversion from decimal to binary and vice-versa, all other conversions.
2. Explain basic science in the field of study including simple machine.	Explain concept of basic 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.
	Explain levers and its types.
	Explain relationship between Efficiency, velocity ratio and Mechanical Advantage.
	Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials.
	Solve simple problems on lifting tackles like crane-Solution of problems with the aid of vectors.
ENGINEERING DRAWING	
1. Read and apply engineering drawing for different application in the field of work.	Read & interpret the information on drawings and apply in executing practical work.
	Read & analyse the specification to ascertain the material requirement, tools and assembly/maintenance parameters.
	Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.

SECTION 2

25. EVIDENCE OF LEVEL

OPTION A

Title/Name of qualification/component: Welder(Structural)		**Level: 3**	
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relates to the NSQF level descriptors**	**NSQF Level**
Process	**Require limited range of activities routine and predictable** • Join MS plates by SMAW in different positions. • Perform straight, bevel & circular cutting on MS plate by Oxy-acetylene cutting process. • Perform different type of MS pipe joints by Gas welding (OAW). • Perform Lap, T, Corner joints on GMAW and Flux Cored Arc welding process on M.S in down hand position. • Carry out non destructive testing of welds.	The learner is required to work in limited range of activities that are routine and predicable in nature by selecting standard procedures to form various structures by different welding methods as per design drawings as evident in 'Set and tack the pieces as per drawing'in learning outcomes like 'Perform different type of MS pipe joints by Gas welding (OAW)' etc. Hence the NSQF level as per this descriptor will be 3.	3
Professional knowledge	**Basic facts, process and principle applied in trade of employment** • Arc and Gas Welding terms and definitions. • Different process of metal joining methods: Bolting, riveting, soldering, brazing, seaming etc. • Pipe development for Elbow joint, "T" joint,	The learner requires the professional knowledge of basic facts, process and principles related to structural welding like'Arc and Gas Welding terms and definitions, Different process of metal joining methods: Bolting, riveting, soldering, brazing, seaming, Types of Tubular structures used on structural fabrication, GTAW	3

Title/Name of qualification/component: Welder(Structural)		Level: 3	
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relates to the NSQF level descriptors**	**NSQF Level**
	Y joint and branch joint. • Types of Tubular structures used on structural fabrication. • GTAW equipments.	equipments etc. Hence NSQF Level is 3 for this Descriptor.	
Professional skill	• Perform straight, bevel & circular cutting on MS plate by Oxy-acetylene cutting process. • Perform Double bevel butt joint on dissimilar thickness MS Flats in down hand positions by SMAW with root Inspection by D.P test and back gouging and with root Inspection by D.P test and back gouging and adapting skip welding & back step welding method for controlling distortion. • Weld Stainless steel, Cast iron, Brass & Aluminum by OAW.	The learner works in close supervision by recalling and demonstrating practical skills, routine and repetitive in narrow range of application for the learning outcomes such as 'Perform straight, bevel & circular cutting on MS plate by Oxy-acetylene cutting process, Weld Stainless steel, Cast iron, Brass & Aluminum by OAW' etc. Hence NSQF Level is 3 for this descriptor.	3
Core skill	**Language to communicate written or oral, with required clarity** • Interpret & use formal and technical communication. **Basic Mathematical Skills** • Demonstrate basic mathematical concept and principles to perform practical operations. • Utilize basic computer applications and	The work of Welder(Structural) involves understanding, visualization, planning and execution of Structural Welding Works which requires competence in written language with required clarity in order to understand the work enlisted. 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	3

Title/Name of qualification/component: Welder(Structural)		Level: 3	
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relates to the NSQF level descriptors**	**NSQF Level**
	internet to take benefit of IT developments in the industry. • Read and apply engineering drawing for different application in the field of work. **Basic understanding of social political and natural environment** • Comply with environment regulation and housekeeping. • Apply safe working practices. • List and interpret various acts of labour welfare legislation.	required clarity. The leaner is able to perform basic arithmetic, algebraic calculations; also can operate on computer as he possesses the basic knowledge of computer & its applications 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' Hence NSQF Level is 3 for this descriptor.	
Responsibility	• Join MS sheets by Gas welding in different positions following safety precautions. • Perform Full penetration Single "V" butt joint on MS plates in 1G,2G,3G &4G position adapting root Inspection and clearance by D.P test. • Manufacture simple structures with L angles, I section and channel sections using welding fixture by SMAW. • Prepare a Weld test specimen as per a standard and carry out testing. • Carry out non destructive testing of welds.	The role of Welder(Structural) is to perform structural welding work based on their understanding of related jobs in close supervision with some responsibility for own work within defined limit as evident in the learning outcomes like 'Perform Full penetration Single "V" butt joint on MS plates in 1G,2G,3G &4G position adapting root Inspection and clearance by D.P test, Carry out non destructive testing of welds' etc . Hence NSQF Level is 3 for this descriptor.	3

SECTION 3
EVIDENCE OF NEED

26 **What evidence is there that the qualification is needed? What is the estimated uptake of this qualification and what is the basis of this estimate?**

Basis	In case of other Awarding Bodies (Institutes under Central Ministries and states departments)
Need of the qualification	**Capital Goods And Manufacturing** Sector has a significant presence of organized as well as unorganized skilled manpower requirement. This sector is poised to grow exponentially in the years to come and is highly labour intensive and there are many emerging trends in this sector. Hence the qualification has been designed keeping in view to cater to the ever-increasing demand of skilled manpower in consultation with stakeholders.
Industry Relevance	The job role defined for the qualification is as per the National Classification of Occupations 2015 which is developed by Employment Directorate under the ministry of Labour and Employment in collaboration with different industry partners and as per ILO guidelines. Moreover, the training is imparted in ITIs/NSTIs/ MSTIs/BTC/ BTPs/ Industries / Establishments etc. where such requirement is available. This justifies the qualification is very much relevant for industry.
Usage of the qualification	The Proposed qualification will create skilled Technician for various establishments in different Sectors.
Estimated uptake	The present seating capacity is 189.

27 **Recommendation from the concerned Line Ministry of the Government/Regulatory Body. To be supported by documentary evidences.**

The qualification, originally designed for Craftsman Training Scheme is in existence for many years and approved by DGT (Regulatory Body) under Ministry of Skill Development and Entrepreneurship, Govt. of India.

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

SECTION 4
EVIDENCE OF PROGRESSION

30	**What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?** ***Show the career map here to reflect the clear progression*** On completion of the training the trainee will have an opportunity to move in vertical/horizontal pathways to promote to higher designations. The learner can further undergo other specialised courses to excel in the relevant field.