

**NSQF QUALIFICATION FILE****Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020****NSDA Code****2020/CCM/DGT/03667****CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE**

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

**Name and address of submitting body:**

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

**Name and contact details of individual dealing with the submission**

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

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**List of documents submitted in support of the Qualifications File****1. Competency-based curriculum with following details:**

Model Curriculum to be added which will include the following:

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

**2. Curriculum for Core Skills (Workshop calculation & science, Engineering Drawing and Employability Skills)**

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

- SUMMARY

1	<b>Qualification Title</b>	<b>'WELDER'</b>
2	<b>Qualification Code, if any</b>	<b>DGT/1004</b>
3	<b>NCO code and occupation</b>	7212.0100- Welder, Gas 7212.0200- Welder, Electric 7212.0700- Welder, Resistance 7212.0400- Gas Cutter 7212.0500- Brazer 7212.0105- Tungsten Inert Gas Welder 7212.0303- Gas Metal Arc Welder/Metal Inert Gas/Metal Active Gas/Gas Metal Welder (MIG/MAG/GMAW) 7212.0111- Repair Welder 7212.0402- Plasma Cutter – Manual
4	<b>Nature and purpose of the qualification (Please specify whether qualification is short term or long term)</b>	Prepare skilled Technician to undertake the job roles of Welder and will enable the trainee to fuse metal parts together using welding rods and oxygen acetylene flame in factories, workshops power house, business and residential premises etc.  It is a long term qualification.
5	<b>Body/bodies which will award the qualification</b>	Directorate General of Training (DGT).
6	<b>Body which will accredit providers to offer courses leading to the qualification</b>	Directorate General of Training (DGT) accredits the Training providers (ITIs/ NSTIs/MSTIs/BTCs/BTPs / Industries / Establishments).
7	<b>Whether accreditation/affiliation norms are already in place or not , if applicable (if yes, attach a copy)</b>	Yes. The accreditation/ affiliation norms and any amendments made from time to time are available on DGT web portal.
8	<b>Occupation(s) to which the qualification gives access</b>	<ul style="list-style-type: none"> <li>7212.0100- Welder, Gas</li> <li>7212.0200- Welder, Electric</li> <li>7212.0700- Welder, Resistance</li> <li>7212.0400- Gas Cutter</li> <li>7212.0500- Brazer</li> <li>7212.0105- Tungsten Inert Gas Welder</li> <li>7212.0303- Gas Metal Arc Welder/ Metal</li> </ul>

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

		Inert Gas/Metal Active Gas/ Gas Metal Welder (MIG/ MAG/GMAW)																					
		<ul style="list-style-type: none"> <li>• 7212.0111- Repair Welder</li> <li>• 7212.0402- Plasma Cutter – Manual</li> </ul>																					
9	<b>Job description of the occupation</b>	Welder will be able to fuse metal parts such as Steel, stainless steel Aluminium metals together using welding rod using arc- welding power source and checks for any welding defects. The learner is responsible for examining parts to be welded, cleans portion to be joined, holds them together by some suitable device and if necessary makes narrow groove to direct flow of molten metal to strengthen joint.																					
10	<b>Licensing requirements</b>	NOT REQUIRED																					
11	<b>Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)</b>	NOT APPLICABLE																					
12	<b>Level of the qualification in the NSQF</b>	Level 4																					
13	<b>Anticipated volume of training/learning required to complete the qualification</b>	<table border="1"> <thead> <tr> <th>Sl. 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>1000</td> </tr> <tr> <td>2</td> <td>Professional Knowledge (Trade Theory)</td> <td>280</td> </tr> <tr> <td>3</td> <td>Workshop Calculation &amp; 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><b>Total</b></td> <td><b>1600</b></td> </tr> </tbody> </table>	Sl. No.	Course Element	Notional Training Hours	1	Professional Skill (Trade Practical)	1000	2	Professional Knowledge (Trade Theory)	280	3	Workshop Calculation & Science	80	4	Engineering Drawing	80	5	Employability Skills	160		<b>Total</b>	<b>1600</b>
Sl. No.	Course Element	Notional Training Hours																					
1	Professional Skill (Trade Practical)	1000																					
2	Professional Knowledge (Trade Theory)	280																					
3	Workshop Calculation & Science	80																					
4	Engineering Drawing	80																					
5	Employability Skills	160																					
	<b>Total</b>	<b>1600</b>																					
14	<b>Indicative list of training tools required to deliver this qualification</b>	As per Annexure-I of curriculum.																					
15	<b>Entry requirements and/or recommendations and</b>	Passed 8 <sup>th</sup> Class examination Minimum age 14years as on first day of																					

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

	<b>minimum age</b>	academic session.		
<b>16</b>	<b>Progression from the qualification (Please show Professional and academic progression)</b>	An Individual can proceed for:		
		Professional	Technical	Academic
		<ul style="list-style-type: none"> <li>• Technician</li> <li>• Senior Technician</li> <li>• Supervisor</li> <li>• Manager</li> <li>• Entrepreneur</li> </ul>	/	
			 ATS          Diploma/ CITS          Advance Diploma (Vocational)	
<b>17</b>	<b>Arrangements for the Recognition of Prior learning (RPL)</b>	Yes (For more details refer "Guidelines for Private candidate" in DGT website MIS portal).		
<b>18</b>	<b>International comparability where known (research evidence to be provided)</b>	-----		
<b>19</b>	<b>Date of planned review of the qualification.</b>	5 Yrs from the Date of Approval		
<b>20</b>	<b>Formal structure of the qualification</b>			
	<b>Mandatory components</b>			
	<b>Title of component and identification code/NOSs/ Learning Outcomes</b>	<b>Estimated size (learning hours)</b>		<b>Level</b>
		<b>Skills</b>	<b>Knowledge</b>	
<b>TRADE SPECIFIC</b>				
(i)	Set the gas welding plant and join MS sheet in different position following safety precautions. <i>[Different position: - 1F, 2F, 3F, 1G, 2G, 3G.]</i>	75	21	3
(ii)	Set the SMAW machine and perform different type of joints on MS in different position observing standard procedure. <i>[different types of joints- Fillet ( T-joint, lap &amp; Corner), Butt (Square &amp; V); different position - 1F, 2F, 3F,4F, 1G, 2G, 3G, 4G]</i>	250	70	4
(iii)	Set the oxy- acetylene cutting plant and perform different cutting operations on MS plate. <i>[Different</i>	25	7	4

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

	<i>cutting operation – Straight, Bevel, circular]</i>			
(iv)	Perform welding in different types of MS pipe joints by Gas welding (OAW). <i>[Different types of MS pipe joints – Butt, Elbow, T-joint, angle (45°) joint, flange joint]</i>	50	14	4
(v)	Set the SMAW machine and perform welding in different types of MS pipe joints by SMAW. <i>[Different types of MS pipe joints – Butt, Elbow, T-joint, angle (45°) joint, flange joint]</i>	50	14	4
(vi)	Choose appropriate welding process and perform joining of different types of metals and check its correctness. <i>[appropriate welding process – OAW, SMAW; Different metal – SS, CI, Brass, Aluminium]</i>	50	14	3
(vii)	Demonstrate arc gouging operation to rectify the weld joints	25	7	4
(viii)	Test welded joints by different methods of testing. <i>[different methods of testing- Dye penetration test, Magnetic particle test, Nick break test, Free band test, Fillet fracture test]</i>	25	7	4
(ix)	Set GMAW machine and perform welding in different types of joints on MS sheet/plate by GMAW in various positions by dip mode of metal transfer. <i>[different types of joints- Fillet ( T-joint, lap, Corner), Butt (Square &amp; V); various positions- 1F, 2F, 3F,4F, 1G, 2G, 3G]</i>	200	56	4

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

(x)	Set the GTAW machine and perform welding by GTAW in different types of joints on different metals in different position and check correctness of the weld. <i>[different types of joints- Fillet ( T-joint, lap, Corner), Butt (Square &amp; V) ; different metals- Aluminium, Stainless Steel; different position- 1F &amp; 1G]</i>	100	28	4
(xi)	Perform Aluminium & MS pipe joint by GTAW in flat position.	25	7	4
(xii)	Set the Plasma Arc cutting machine and cut ferrous & non-ferrous metals.	25	7	4
(xiii)	Set the resistance spot welding machine and join MS & SS sheet.	25	7	5
(xiv)	Perform joining of different similar and dissimilar metals by brazing operation as per standard procedure. <i>[different similar and dissimilar metals- Copper, MS, SS]</i>	50	14	5
(xv)	Repair Cast Iron machine parts by selecting appropriate welding process. <i>[Appropriate welding process- OAW, SMAW]</i>	12	3	4
(xvi)	Hard facing of alloy steel components/ MS rod by using hard facing electrode.	13	4	4
<b>CORE SKILLS</b>				
<b>EMPLOYABILITY SKILLS</b>				
(i)	Apply safe working practices.	---	20	4
(ii)	Comply with environment regulation and housekeeping.	---	20	4
(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

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

(v)	List and interpret various acts of labour welfare legislation.	---	20	4
(vi)	Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	---	20	4
(vii)	Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	---	20	4
(viii)	Utilize basic computer applications and internet to take benefit of IT developments in the industry.	---	20	4
<b>WORKSHOP CALCULATION &amp; SC</b>				
(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
<b>ENGINEERING DRAWING</b>				
(i)	Read and apply engineering drawing for different application in the field of work.	---	80	4
<b>Total</b>			<b>1600</b>	

**NSQF QUALIFICATION FILE****Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020****SECTION 1****ASSESSMENT**

21	<p><b>Body/Bodies which will carry out assessment:</b> Controller of Examinations, DGT</p>
22	<p><b>How will RPL assessment be managed and who will carry it out?</b> 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 concerned State.</p>



## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

	<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. (For detail and updated information please refer to DGT web portal.)</p>
23	<p><b>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.</b></p> <p><b>(1) Assessment process:</b></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 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 &amp; Science, Engineering Drawing and</p>

**NSQF QUALIFICATION FILE****Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020**

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
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:**

**NSQF QUALIFICATION FILE****Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020**

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)

**Means of assessment**

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

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

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

**Pass/Fail**  
The minimum pass percentage is 60% marks for formative assessment.

LEARNING OUTCOME (TRADE SPECIFIC)	
LEARNING OUTCOMES	ASSESSMENT CRITERIA
1. Set the gas welding plant and join MS sheet in different position. [Different position: - 1F, 2F, 3F, 1G, 2G, 3G.]	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.
	Set 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. Set the SMAW machine and perform different type of joints on MS in different position observing standard procedure. [different types of joints- Fillet ( T-joint, lap & Corner), Butt (Square & V);	Plan and select the type & size of electrode, welding current.
	Prepare edge as per requirement
	Prepare, set SMAW machine and tack the pieces as per drawing.
	Set up the tacked pieces in specific position.

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

<i>different position - 1F, 2F, 3F,4F, 1G, 2G, 3G, 4G]</i>	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 & check by gauges.
3. Set the oxy- acetylene cutting plant and perform different cutting operations on MS plate. [ <i>Different cutting operation – Straight, Bevel, circular]</i> ]	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.
	Set the cutting plant & perform the cutting operation maintaining proper techniques and all safety aspects.
	Clean the cutting burrs and inspect the cut surface for soundness of cutting.
4. Perform welding in different types of MS pipe joints by Gas welding (OAW). [ <i>Different types of MS pipe joints – Butt, Elbow, T-joint, angle (45°) joint, flange joint]</i> ]	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. Set the SMAW machine and perform welding in different types of MS pipe joints by SMAW. [ <i>Different types of MS pipe joints – Butt, Elbow, T-joint, angle (45°) joint, flange joint]</i> ]	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.
	Inspect the welded joint visually for root penetration, uniformity of bead and surface defects.
6. Choose appropriate welding	Plan and prepare the pieces for welding.

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

process and perform joining of different types of metals and check its correctness. <i>[appropriate welding process – OAW, SMAW; Different metal – SS, Cl, Brass, Aluminium]</i>	Select the type and size of filler rod and flux/electrode, size of nozzle and gas pressure/welding current, preheating method and temperature as per requirement.
	Set and tack metals as per drawing.
	Deposit the weld maintaining appropriate technique and safety aspects.
	Cool the welded joint by observing appropriate cooling method. Use post heating, peening etc. as per requirement.
7. Demonstrate arc gouging operation to rectify the weld joints.	Clean the joint and inspect the weld for its uniformity and different types of surface defects.
	Plan and select the size of electrode for Arc gouging.
	Select the polarity and current as per requirement.
	Perform gouging adapting proper gouging technique.
8. Test welded joints by different methods of testing. <i>[different methods of testing- Dye penetration test, Magnetic particle test, Nick break test, Free band test, Fillet fracture test]</i>	Clean and check to ascertain the required stock removed.
	Plan and select the job and clean the surface thoroughly.
	Select the appropriate testing methods.
	Perform testing of welded joints adapting standard operating procedure.
9. Set GMAW machine and perform welding in different types of joints on MS sheet/plate by GMAW in various positions by dip mode of metal transfer. <i>[different types of joints- Fillet ( T-joint, lap, Corner), Butt (Square &amp; V); various positions- 1F, 2F, 3F,4F, 1G, 2G, 3G]</i>	Record the test result & compare with standard parameter/ result value.
	Accept/reject the job based on test result.
	Select size of electrode wire, welding voltage, gas flow rate, wire feed rate as per requirement.
	Prepare, set (machine & Job) and tack the pieces as per drawing and type of joints.
9. Set GMAW machine and perform welding in different types of joints on MS sheet/plate by GMAW in various positions by dip mode of metal transfer. <i>[different types of joints- Fillet ( T-joint, lap, Corner), Butt (Square &amp; V); various positions- 1F, 2F, 3F,4F, 1G, 2G, 3G]</i>	Set up the tacked joint in specific position.
	Deposit the weld adapting proper welding technique and safety aspects.
	Carry out visual inspection to ensure quality of welded joint.
9. Set GMAW machine and perform welding in different types of joints on MS sheet/plate by GMAW in various positions by dip mode of metal transfer. <i>[different types of joints- Fillet ( T-joint, lap, Corner), Butt (Square &amp; V); various positions- 1F, 2F, 3F,4F, 1G, 2G, 3G]</i>	Inspect the weld using Dye-penetration Test (DPT)/Magnetic particle Test (MPT).

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

10. Set the GTAW machine and perform welding by GTAW in different types of joints on different metals in different position and check correctness of the weld. <i>[different types of joints- Fillet ( T-joint, lap, Corner), Butt (Square &amp; V) ; different metals- Aluminium, Stainless Steel; different position- 1F &amp; 1G]</i>	Select power source as per material, size and type of Tungsten electrode, welding current, gas nozzle size, gas flow rate and filler rod size as per requirement.
	Prepare, set (machine & Job) and tack the pieces as per drawing and type of joints.
	Set up the tacked joint in specific position.
	Deposit the weld by adapting proper welding technique and safety aspects.
	Carry out visual inspection to ensure quality of welded joint.
	Inspect the weld using Dye-penetration Test (DPT)/Magnetic particle Test (MPT).
11. Perform Aluminium & MS pipe joint by GTAW in flat position.	Plan and prepare development or edge preparation for specific type of pipe joint.
	Mark and cut the MS pipe as per development.
	Select the type of welding current, size and type of tungsten electrode, size of nozzle, gas flow rate and welding current as per requirement.
	Set and tack the piece as per drawing.
	Deposit the weld bead maintaining proper technique and safety aspects.
	Inspect the welded joint visually for root penetration, bead uniformity and surface defects.
12. Set the Plasma Arc cutting machine and cut ferrous & non-ferrous metals.	Plan and mark on Ferrous/Non ferrous metal plates surface for plasma cutting.
	Select the torch/nozzle size, current and working pressure of gas as per requirement.
	Set the marked plate properly on cutting table.
	Set the plasma cutting machine and perform the cutting operation by adapting proper techniques and safety aspects.
	Clean and inspect the cut surface for quality of cutting.
13. Set the resistance spot welding machine and join MS & SS sheet.	Plan and select the material and clean the surface thoroughly.
	Set the spot welding parameters on machine.
	Spot weld the joint adapting appropriate techniques

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

	and safety.
	Inspect the joint for soundness of weld.
14. Perform joining of different similar and dissimilar metals by brazing operation as per standard procedure. <i>[different similar and dissimilar metals- Copper, MS, SS]</i>	Plan and select the nozzle size, working pressure type of flame, filler rod and flux as per requirement.
	Prepare, set and tack the pieces as per drawing.
	Braze the joint adapting proper brazing technique and safety aspect.
	Carry out visual inspection to ascertain quality weld joint.
15. Repair Cast Iron machine parts by selecting appropriate welding process. <i>[Appropriate welding process- OAW, SMAW]</i>	Plan and prepare the job as per requirement.
	Select the type & size of electrode, power source, polarity, welding current as per requirement
	Set the part properly.
	Deposit the weld adapting appropriate welding technique and safety aspects.
	Clean the welded joint thoroughly.
	Carry out visual inspection to ascertain quality of weld joint.
16. Hard facing of alloy steel components / MS rod by using hard facing electrode.	Plan and prepare the component by cleaning the surface thoroughly.
	Select the type & size of electrode, power source, welding current as per requirement.
	Deposit the weld observing standard practice and safety.
	Clean the welded surface thoroughly
	Carryout visual inspection to ascertain quality of weld.

LEARNING OUTCOME(CORE SKILL)	
LEARNING OUTCOME	ASSESSMENT CRITERIA
<b>EMPLOYBILITY SKILLS</b>	
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



## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

	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.

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

	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.
<b>WORKSHOP CALCULATION &amp; SCIENCE</b>	
1. Demonstrate basic mathematical concept and	Solve different problems like phase angle, etc. with the help of a calculator.

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

principles to perform practical operations.	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.
<b>ENGINEERING DRAWING</b>	
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.

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020SECTION 2

## 25. EVIDENCE OF LEVEL

## OPTION A

Title/Name of qualification/component: WELDER			Level: 4
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
Process	<p><b>Work in familiar, predictable, routine, situation of clear choice</b></p> <ul style="list-style-type: none"> <li>Set the gas welding plant and join MS sheet in different position. [Different position: - 1F, 2F, 3F, 1G, 2G, 3G.]</li> <li>Set the SMAW machine and perform different type of joints on MS in different position observing standard procedure. [different types of joints- Fillet ( T-joint, lap &amp; Corner), Butt (Square &amp; V); different position - 1F, 2F, 3F,4F, 1G, 2G, 3G, 4G]</li> <li>Set the oxy- acetylene cutting plant and perform different cutting operations on MS plate. [Different cutting operation – Straight, Bevel, circular]</li> <li>Perform welding in different types of MS</li> </ul>	<p>The learner requires to work in familiar and predictable work for example 'Set the gas welding plant and join MS sheet in different position ' and 'Set the SMAW machine and perform different type of joints on MS in different position observing standard procedure'. One needs to perform routine set of activities in a situation of clear choice.</p> <p>The learner requires to 'Set the oxy- acetylene cutting plant and perform different cutting operations on MS plate' and ' Perform welding in different types of MS pipe joints by Gas welding (OAW)'. In all these learning outcomes the learner has to apply one's knowledge to meet the client's requirement in familiar, predictable and routine situation with clear choice of</p>	4

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

Title/Name of qualification/component: WELDER			Level: 4
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	pipe joints by Gas welding (OAW). [Different types of MS pipe joints – Butt, Elbow, T-joint, angle (45°) joint, flange joint]	procedures.  Hence NSQF Level is 4 for this descriptor.	
Professional knowledge	<b>Factual knowledge of field of knowledge or study</b> <ul style="list-style-type: none"> <li>• Different process of metal joining methods: Bolting, riveting, soldering, brazing, seaming etc.</li> <li>• Principle of arc welding and characteristics of arc.</li> <li>• Weld quality inspection, common welding mistakes and appearance of good and defective welds.</li> <li>• Acetylene gas Purifier, Hydraulic back pressure valve and Flash back arrestor.</li> <li>• Advantages of GMAW welding over SMAW, limitations and applications.</li> </ul>	<p>The learner requires demonstrating factual knowledge of work or study. He applies the processes and general concepts, in the field of work or study related to Welder Trade like 'Different process of metal joining methods: Bolting, riveting, soldering, brazing, seaming etc.' and 'Principle of arc welding and characteristics of arc' etc.</p> <p>Hence NSQF Level is 4 for this descriptor.</p>	4
Professional skill	<ul style="list-style-type: none"> <li>• Choose appropriate welding process and perform joining of different types of metals and check its correctness. [appropriate</li> </ul>	As per the learning outcomes indicated in the adjacent cell the learner recalls and demonstrates practical skill such as 'Choose appropriate welding process and perform joining	4

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

Title/Name of qualification/component: WELDER			Level: 4
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	<p>welding process – OAW, SMAW; Different metal – SS, CI, Brass, Aluminium]</p> <ul style="list-style-type: none"> <li>• Test welded joints by different methods of testing. [different methods of testing- Dye penetration test, Magnetic particle test, Nick break test, Free band test, Fillet fracture test]</li> <li>• Set GMAW machine and perform welding in different types of joints on MS sheet/plate by GMAW in various positions by dip mode of metal transfer. [different types of joints- Fillet ( T-joint, lap, Corner), Butt (Square &amp; V); various positions- 1F, 2F, 3F,4F, 1G, 2G, 3G]</li> </ul>	<p>of different types of metals and check its correctness' and 'Test welded joints by different methods of testing'. The learner does routine and repetitive jobs in narrow range of application, using appropriate rule and tool like oxy-acetylene gas cutting machine, welding transformer, D.C Arc welding etc.</p> <p>Hence NSQF Level is 4 for this descriptor.</p>	
Core skill	<p><b>Basic Mathematical and Algebraic principles</b></p> <ul style="list-style-type: none"> <li>• Demonstrate basic mathematical concept and principles to perform practical operations.</li> <li>• Understand and explain basic science in the field of study including simple machine.</li> </ul>	<p>The learning outcomes for example 'Demonstrate basic mathematical concept and principles to perform practical operations' and 'Understand and explain basic science in the field of study including simple machine ' display the learning outcomes where the learner needs to display basic mathematical and algebraic principles; understanding of social, political; and</p>	4

## NSQF QUALIFICATION FILE

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

Title/Name of qualification/component: WELDER			Level: 4
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	<ul style="list-style-type: none"> <li>Read and apply engineering drawing for different application in the field of work.</li> </ul> <p><b>Basic understanding of social political and natural environment</b></p> <ul style="list-style-type: none"> <li>Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.</li> <li>Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal &amp; societal growth.</li> </ul> <p><b>Language to communicate written or oral, with required clarity</b></p> <ul style="list-style-type: none"> <li>Interpret &amp; use formal and technical communication.</li> <li>List and interpret various acts of labour welfare legislation.</li> </ul>	<p>some skill of collecting and organising information, communication.</p> <p>Hence NSQF Level is 4 for this descriptor.</p>	
Responsibility	<ul style="list-style-type: none"> <li>Set the GTAW machine and perform welding by GTAW in different types of joints on different metals in different position and</li> </ul>	The role of Welder is independently responsible to perform the work as per specifications and their own analysis of what needs to be done	4

**NSQF QUALIFICATION FILE**

**Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020**

Title/Name of qualification/component: <b>WELDER</b>			Level: <b>4</b>
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	<p>check correctness of the weld.</p> <ul style="list-style-type: none"> <li>• Perform Aluminium &amp; MS pipe joint by GTAW in flat position.</li> <li>• Set the Plasma Arc cutting machine and cut ferrous &amp; non-ferrous metals.</li> <li>• Perform joining of different similar and dissimilar metals by brazing operation as per standard procedure. [different similar and dissimilar metals- Copper, MS, SS]</li> <li>• Repair Cast Iron machine parts by selecting appropriate welding process. [Appropriate welding process- OAW, SMAW]</li> </ul>	<p>based on their understanding of welding processes, principles and standards. Learning outcomes like “Set the GTAW machine and perform welding by GTAW in different types of joints on different metals in different position and check correctness of the weld”, “Perform Aluminium &amp; MS pipe joint by GTAW in flat position” etc. reveal the same.</p> <p>Hence NSQF Level is 4 for this descriptor.</p>	



## NSQF QUALIFICATION FILE

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

26	<p><b>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?</b></p> <table border="1" data-bbox="339 562 1390 1711"> <thead> <tr> <th data-bbox="339 562 627 707"><b>Basis</b></th> <th data-bbox="627 562 1390 707"><b>In case of other Awarding Bodies (Institutes under Central Ministries and states departments)</b></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 and Manufacturing Sector has a significant presence of organized as well as unorganized skilled manpower requirement. This sector is poised to grow exponentially in the years to come and is highly labour intensive and there are many emerging trends in this sector. Hence the qualification has been designed keeping in view to cater to the ever-increasing demand of skilled manpower in consultation with stakeholders.</td> </tr> <tr> <td data-bbox="339 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 102207.</td> </tr> </tbody> </table>	<b>Basis</b>	<b>In case of other Awarding Bodies (Institutes under Central Ministries and states departments)</b>	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 102207.
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Usage of the qualification	The Proposed qualification will create skilled Technician for various establishments in different Sectors.										
Estimated uptake	The present seating capacity is 102207.										
27	<p><b>Recommendation from the concerned Line Ministry of the Government/Regulatory Body. To be supported by documentary evidences.</b></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

Approved in 24<sup>th</sup> NSQC Dated 27<sup>th</sup> Feb, 2020

	Ministry of Skill Development and Entrepreneurship, Govt. of India.
28	<p><b>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</b></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><b>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</b></p> <ul style="list-style-type: none"> <li>• The research wing of CSTARI &amp; DGT reviews and updates the qualification, in consultation with industries and other stakeholders, on a regular basis by conducting trade committee meetings.</li> <li>• DGT will monitor any duplicity by comparing existing qualifications with upcoming ones in the National Qualifications Register (NQR) and relevant sectors.</li> </ul>

**SECTION 4****EVIDENCE OF PROGRESSION**

30	<p><b>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</b></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] --&gt; B[Senior Technician]     B --&gt; C[Supervisor]     C --&gt; D[Manager]     A --&gt; E[Entrepreneur]     B --&gt; E     C --&gt; E     D --&gt; E </pre>
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