NSQF QUALIFICATION FILE

Version 6: Draft of 08 March 2016

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Name and address of submitting body:

Ministry of Micro, Small and Medium Enterprises
Udyog Bhawan,
Rafi Marg,
New Delhi - 110011

Name and contact details of individual dealing with the submission

Name	**:** Mr. Pramod Joshi
Position in the Organization	**:** General Manager
Address if different from above	: **MSME Tool Room, Indore** **(**Indo German Tool Room, Indore) Plot No. 291/B-302/A, Sector-E, Industrial Area, Sanwer Road, Indore (Madhya Pradesh)-452015
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List of documents submitted in support of the Qualifications File

1. Outcome based curriculum
2. Industrial validation
3. Summery Sheet 1 (Vetting)
4. Summery Sheet 2 (Course detail)

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SUMMARY

Qualification Title	**ADVANCE CERTIFICATE COURSE IN WELDING TECHNOLOGY**
Qualification Code	MSME / ACCWT/ 18
Nature and purpose of the qualification	**Nature:** Welding Technology, **Purpose:** Learners who attain this qualification are competent for welding like TIG, MIG, GAS, Electric ARC & other various type of welding or become an entrepreneur. • Qualified learner get skill to work in Fabrication field. • Qualified learner are capable to do all type of welding their inspection & able to identified defect & their remedies.
Body/bodies which will award the qualification	**MSME Technology Centre, Ministry of Micro, Small and Medium Enterprises, New Delhi**
Body which will accredit providers to offer courses leading to the qualification	**MSME Technology Centre, Ministry of Micro, Small and Medium Enterprises, New Delhi**
Body/bodies which will carry out assessment of learners	**MSME Technology Centre, Ministry of Micro, Small and Medium Enterprises, New Delhi**
Occupation(s) to which the qualification gives access	Welding Technician
Licensing requirements	Not Applicable
Level of the qualification in the NSQF	5
Anticipated volume of training/learning required to complete the qualification	1560 notational hours
Entry requirements and/or recommendations	Preferably ITI Pass & Complete 18 year of age
Progression from the qualification	**Job Progression:** After completion of course and after 2 years of field experience the trainee can work as a senior welding technician and after that 3 years of experience trainee can work as a supervisor **Education progression:** Candidate can took admission in D.Voc. (Welding) or B.Voc. (Welding)
Planned arrangements for the Recognition of Prior learning (RPL)	Yes, If candidate appeared in our Assessment & qualify it then certificate can be awarded to him.
International comparability where known	We checked south African qualification authority & they approved similar qualification by qualification ID – 21113. In the name of certificate welding & the level is 4.

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Date of planned review of the qualification.	01/2018

Formal structure of the qualification

Certificate Course in Welding Technology	**Mandatory/ Optional**	**Estimated size (learning hours)**	**Level**
Personality Development & Computer Literacy	Mandatory	60 hrs	3
Engineering Calculation & Science	Mandatory	80 hrs	5
Mechanical Drawing	Mandatory	120 hrs	5
Welding Technology (Theory)	Mandatory	240 hrs	5
Welding Technology (Practice)	Mandatory	1000 hrs	5
Admission and Assessment	Mandatory	60 hrs	-
Total		**1560 Hrs**	

SECTION 1

ASSESSMENT

Body/Bodies which will carry out assessment:

Assessment for the Certificate Course in Welding Technology is conducted by Examination Cell of MSME TC's

Will the assessment body be responsible for RPL assessment?

YES.

Learners who have met the requirements of any Unit Standard that forms part of this qualification may apply for recognition of prior learning to the relevant Education body. The applicant must be assessed against the specific outcomes and with the assessment criteria for the relevant Unit Standards.

Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF:

1. ASSESSMENT GUIDELINE:

- Criteria for assessment based on each learning outcomes, will be assigned marks proportional to its importance.
- The assessment for the theory & practical part is based on knowledge bank of questions created by trainers and approved by Examination cell (MSME TC's)
- For each Individual batch, Examination cell will create unique question papers for theory part as well as practical for each candidate at each examination.

- Assessment comprises the following components:

>Job carried out in workshop

>Record book/ daily diary

>Answer sheet of assessment

> Viva-voice

>Progress chart

>Attendance and punctuality

2. ASSESSORS:

MSME TC's faculty teaching the Certificate Course in Welding Technology, also assesses the students as per guidelines set by Examination cell of MSME Technology Centre. Faculties are been trained from time to time to upgrade their skills on various aspects such as conduction of assessments, teaching methodology etc. These training are usually conducted at ITI's of various states, and other tool rooms in the country.

3. ELIGIBILITY TO APPEAR IN THE EXAM:

Minimum 80% attendance is compulsory for the students to appear for the assessments.

4. MARKING SCHEME:

Please refer Annexure-1 for marking/evaluation scheme.

5. PASSING MARKS:

Passing criteria is based on marks obtain in

Internal assessment (attendance record, term works , assignments),

Practical (practical's performance and viva) and

Theory exam.

Minimum Marks to pass practical exam – 60%

Minimum Marks to pass theory exam – 40%

Minimum Marks to pass internal assessment – 60%

Allotment of division as per marks secured by candidate will be as follow as –

a. Distinction (Equals to or more than 70 %)

b. First class (Equals to or more than 60 % and less than 70%)

c. Second class (Equals to or more than 50 % and less than 60%)

d. Third class (Equals to or more than 40 % and less than 50%)

6. RESULTS AND CERTIFICATION:

The assessment results are backed by evidences collected by assessors. Successful trainees are awarded the certificates by MSME Technology Centre.

ASSESSMENT EVIDENCE

Assessment evidence comprises the following components document in the form of records:

1) Job carried out in workshop
2) Record book/ daily diary
3) Answer sheet of assessment
4) Viva –voice
5) Progress chart
6) Attendance and punctuality

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Title:

CERTIFICATE COURSE IN WELDING TECHNOLOGY

Sr. No.	Outcomes to be assessed	Assessment criteria for the outcome
1.	Know about English Literacy	**The candidate should be able to :** 1.1 Use proper pronunciation, 1.2 Use proper functional grammar 1.3 Read, write & spoke English, Hindi & Regional language
2	Understand IT Literacy	**The candidate should be able to :** 2.1 Know about basic of computer 2.2 Know computer operating system 2.3 Work on word processing & worksheet 2.4 Use computer networking & Internet
3	Get Communication Skill	**The candidate should be able to :** 3.1 Know about importance of communication 3.2 Use listening & behavior skill 3.3 Apply motivation & its effect 3.4 Know about how to face interview
4	Know Entrepreneurship Skill	**The candidate should be able to :** 4.1 Apply the concept of Entrepreneurship 4.2 Know project preparation & marketing analysis 4.3 Know the importance of institution & investment for entrepreneurship
5	Knowledge about Productivity	**The candidate should be able to :** 5.1 Its benefits & affecting factor 5.2 Knowledge about comparative productivity in developed countries & living standards 5.3 Use of banking process, Handling ATM, KYC registration & Insurance.
6	Knowledge about Occupational safety, health & environment education	**The candidate should be able to :** 6.1 Know about the importance of safety & health at workplace 6.2 Adhere the occupational hazards like mechanical, chemical, electrical, thermal, occupational diseases/disorder & its prevention 6.3 Apply the accident prevention techniques (control of accidents & safety measures) 6.4 Know first aid procedures for sick person. 6.5 Know basic safety, welfare rules. 6.6 Know about ecosystem & factor causing imbalance. 6.7 Know about various type of pollution 6.8 Adhere global worming & its effects 6.9 Know about energy & water conservation
7	Understand Labour welfare legislation	**The candidate should be able to :** 7.1 Know about various welfare acts

8	Know about Quality Tools	**The candidate should be able to :** 8.1 Use & apply the need of quality & relation with housekeeping 8.2 Know basic quality tools & quality circle
9.	Understand Units	**The candidate should be able to :** 9.1 Use various system of units 9.2 Know units of various systems 9.3 Capable to convert units from one system to another
10	Capable to General Mathematics	**The candidate should be able to :** 10.1 Use BODMAS for doing simple calculation 10.2 Use scientific calculator for simple calculations 10.3 Differentiate between fraction & decimal 10.4 Convert fraction to decimal & vice-versa
11	Impart application of Ratio Proportion & Percentage	**The candidate should be able to :** 11.1 Do calculation on basis of ratio proportion & percentage
12	Know Basic Algebra	**The candidate should be able to :** 12.1 Do addition, subtraction, multiplication for algebraic terms.
13	Understand Mensuration	**The candidate should be able to :** 13.1 Solve linear equation of two variables 13.2 Calculate area & parameter of square rectangle, parallelogram, triangle, circle & semi-circle 13.3 Calculate volume of various solids 13.4 Calculate surface area of various solids
14	Understand Material Science	**The candidate should be able to :** 14.1 Use of properties & application of various metals, non-metals, alloy & insulators 14.2 Know the different between ferrous & non-ferrous metals.
15	Knowledge about mass, weight & density	**The candidate should be able to :** 15.1 Get difference between mass & weight 15.2 Use & apply concept of density & its relation with mass & weight 15.3 Solve problem related mass, weight & density
16	Elasticity	**The candidate should be able to :** 16.1 Differentiate between elastic & plastic material 16.2 Differentiate between stress & strain 16.3 Differentiate between ultimate & breaking stress.
17	Heat & Temperature	**The candidate should be able to :** 17.1 Differentiate heat & temperature 17.2 Differentiate boiling & melting point 17.3 Know about various scale of temperature measurement 17.4 Use various method for temperature measurement 17.5 Know about various method for transmission of heat

18	Know about basic electricity	**The candidate should be able to :** 18.1 Know use of electricity 18.2 Know current voltage resistance, power energy & their unit 18.3 Differentiate between AC & DC 18.4 Differentiate between insulator & conductor with their use
19	Demonstrate Engineering drawing instrument & their requirement	**The candidate should be able to :** 19.1 Know about importance of engineering drawing 19.2 Use various drawing Instruments
20	Understand Line Free hand drawing lettering & numbering	**The candidate should be able to :** 20.1 Use various type of line according to drawing 20.2 Use free hand drawing for making applied components 20.3 apply lettering & numbering in drawing
21	Dimensioning	**The candidate should be able to :** 21.1 Make dimension in a drawing as per requirement
22	Geometrical figure	**The candidate should be able to :** 22.2 Prepare various type of geometric figure, by using measuring instruments or free hand
23	Size of layout drawing sheet	**The candidate should be able to :** 23.1 Adhere & capable to use various size of drawing sheets. 23.2 Draw layout
24	Symbolic representation & its method	**The candidate should be able to :** 24.1 Use various method of presentation 24.2 Know about various symbol use in Engineering drawing
25	Drawing of figures	**The candidate should be able to :** 25.1 To make drawing of solid figures by instrument or free hand 25.2 To make free hand sketch of hand tool & measuring tools
26	Projection	**The candidate should be able to :** 26.1 Use first & third angle of projections 26.2 Draw orthographic projection of required block
27	Reading of in fabrication drawing	**The candidate should be able to :** 27.1 To read & interpreting of fabricated engineering drawings
28	Basic introduction	**The candidate should be able to :** 28.1 Know about General rules of Institute 28.2 Elementary first aid, 28.3 Know importance of welding & various precaution of welding
29	Introduction to welding	**The candidate should be able to :** 29.1 Know the definition of welding 29.2 Know Arc & Gas welding equipments 29.3 Use various process & their application 29.4 Know Arc & Gas welding terms & its definition 29.5 Know the application & importance of simulator

30	Metal Joining	**The candidate should be able to :** 30.1 Know about various joining metal like bolting, riveting & soldering etc. 30.2 Know about various welding joints & capable to prepare it for different thickness 30.3 Do surface welding before cleaning
31	Shielded metal Arc welding	**The candidate should be able to :** 31.1 Know use of electricity & various electric terms 31.2 Know application & importance of heat & temperature in welding 31.3 Adhere about principle of arc welding 31.4 Deal various instrument use in arc welding 31.5 Differentiate AC & DC welding machines 31.6 Differentiate arc length & its effects 31.7 Know polarity, its type & application 31.8 Know about electrode, fluxes, coating, size & its coding 31.9 Know about prevention & storage of electrode
32	Oxy-acetylene gas welding & cutting	**The candidate should be able to :** 32.1 Know about gases use in welding & cutting & their properties 32.2 Equipment use in gas welding & cutting 32.3 Use the properties of calcium carbide, acetylene gas its purifier & related terms. 32.4 Use properties of oxygen its charging process & equipment use in with oxygen gas. 32.5 Know the working of oxy-acetylene low presser & high presser in welding system 32.6 Know & apply right & left ward welding technique 32.7 Distortion, defects, cause, remedies & controlling during Arc welding 32.8 Know about filler rod, specification & size 32.9 Know about fluxes, types & its functions 32.10 Know gas brazing, shouldering & its application
33	Welding Joints	**The candidate should be able to :** 33.1 Acknowledge welding positions as per standards 33.2 Know about welds slop & rotation 33.3 Identify welding symbols
34	Pipe welding	**The candidate should be able to :** 34.1 Know about difference between pipe welding & plate welding 34.2 Know about various type of pipe joints positions & procedure 34.3 Know about manifold system
35	Materials & properties	**The candidate should be able to :** 35.1 Use about various steel & its classification 35.2 Know about effect of alloying elements of steel 35.3 Differentiate various non-ferrous metal, their properties & welding methods 35.4 Know about cast iron & stainless steel with their welding

		35.5 Know weldability & importance of pre heating & post heating
36	Gas metal/gas tungsten Arc welding	**The candidate should be able to :** 36.1 Apply safety in gas metal Arc welding & gas tungsten arc welding 36.2 Can used equipment in GMAW/GTAW 36.3 Know the difference between GMAW over SMAW 36.4 Know the process variable for GMAW 36.5 Know about wire feed system its type & maintenance 36.6 Know about various wire used in GMAW as per standard 36.7 Know about shielded gas, gas mixture & its advantage 36.8 Know Edge preparation for various metals 36.9 Know Heat input & controlling 36.10 Do pre heating & post weld treatment 36.11 Know about sub merged Arc welding process its principle, equipment, advantage & limitation. 36.12 Know about electro slag & electro gas welding process 36.13 Know about thermit welding process 36.14 Know about GTAW process 36.15 Know about tungsten electrode type & use 36.16 Get Knowledge about filler rod & its selection 36.17 Know the various parameter of welding in GTAW 36.18 Know pulsed TIG welding 36.19 How to use of argon/helium gas & its properties 36.20 Know defect cause & remedies in GTAW 36.21 Know fraction welding process 36.22 Know laser beam welding, electron beam welding & plasma arc welding 36.23 Know Various resistance welding & its parameter 36.24 Can set the parameter in simulator 36.25 Can study the difference between various process & parameters 36.26 Can perform welding simulation on simulator
37	Welding Inspection & Testing	**The candidate should be able to :** 37.1 Know about welding codes & standard 37.2 Identify the requirement of hard facing & surface necessity 37.3 Use weld quality inspection, NDT methods 37.4 Know welding economics & cost estimation
38	Shielded metal Arc Welding/Oxy-Acetylene gas welding/ Oxy-acetylene gas cutting	**The candidate should be able to do;** 38.1 Hack sawing, filing square to dimensions 38.2 Marking out on plate & punching 38.3 Setting Arc welding machines & related accessories 38.4 Setting of oxy-acetylene welding equipments 38.5 fusion run without & with filler rod on M.S. sheet 38.6 Edge joint on MS sheet 38.7 Marking and straight line cutting 38.8 Straight line & weaved bead

		38.9 Square butt & fillet T joint 38.10 Beveling of M.S. plate & open corner joint 38.11 Fillet lap joint on MS sheet 38.12 Single "V" butt joint, Square butt joint on MS sheet 38.13 Fillet "T" Joint, Fillet Lap Joint on M.S. sheet 38.14 Fusion run with filler rod in vertical position on M.S. sheet 38.15 Square butt joint, Single "V" butt joint 38.16 Structural pipe welding butt joint on MS pipe dia 50 & wall thickness 38.17 Pipe welding "T" joint on M.S. Plate dia 50 mm & 3 mm WT 38.18 Pipe welding 45^0 angle joint on MS pipe 38.19 Pipe flange joint on MS plate with MS pipe dia 50 mm X 3mm WT 38.20 Pipe welding butt welding joint on MS pipe dia 50 and 5 mm WT in IG position 38.21 Single "V" butt join on MS plate in over head position 38.22 Pipe butt joint on MS pipe 38.23 Square butt joint on SS sheet, square butt joint on brass sheet 38.24 Square butt & lap joint in MS sheet by brazing 38.25 Arc going on MS plate 10 mm thick. 38.26 Square butt joint on 3 mm aluminium sheet
39	GMAW/GTAW	**The candidate should be able to do:** 39.1 Depositing straight line beads on M.S. plate 39.2 Fillet weld – lap, "T", corner, square butt, single "V" in flat, vertical, Over head & horizontal position by dip transfer 39.3 "T" joint on MS pipe in flat position 39.4 Welding on SS sheet 39.5 Depositing bead, square butt joint on aluminium sheet 39.6 Fillet weld "T" joint & outside corner joint on aluminium sheet 39.7 Fillet weld & left joint of stainless steel 39.8 Resistance spot welding on MS sheet 39.9 Welding of ferrous metal with non-ferrous metal 39.10 Brazing of ferrous metal with non-ferrous metal 39.11Hard surfacing practice 39.12 Testing trough visual inspection & weld gauge 39.13Testing though NDT

Means of assessment 1 and 2

Skill performance is assess by conducting

i) Assignment for each module
ii) Written test for each module
iii) Final exam after completion of all module
iv) Practical exam for each module
v) Final practical exam after completion of all module
vi) Viva / Oral Exam

Internal Assessment

Pass/Fail

Passing criteria is based on marks obtain in attendance record, term works, assignments, practical's performance, viva or oral exam, module test, practical exam and final exam

Minimum Marks to pass practical exam – 60%
Minimum Marks to pass theory exam – 40%
Minimum Marks to pass internal assessment – 60%

SECTION 2
EVIDENCE OF LEVEL

Option A

Title/Name of qualification/component: CERTIFICATE COURSE IN WELDING TECHNOLOGY			
NSQF Domain	**Outcomes of the Qualification/Component**	**How the Job Roll Relates to the NSQF Level Descriptors**	**NSQF Level**
Process	• Selection of Correct welding process • Preparing for welding operation • Performs all types of Joining process	Job holder is expected to understand and performs all types of joining like MIG, MAG & TIG etc welding, and carrying out with clear choice of procedures in familiar context. Job holder known as skilled worker so he should work in familiar or similar type of jobs & should be capable to select correct welding process among the available resources. As per above his work with clear choice of procedures in familiar context, therefore this job role is pegged at level 5.	**5**
Professional knowledge	• Knowledge about various welding materials and welding machines which are available in the workshop • Knowledge about welding symbols and theoretical procedures for testing and inspection of welds	Job holder known as skilled worker is responsible to do the work as per knowledge of facts and principles. He should have knowledge about various permanent & temporary joining process and clear concepts in his fields. He should have knowledge about welding materials and welding machines for installation & their safely use. Further he should able to read & know about welding symbols with theoretical procedures for testing and inspection of welds. Job holder will have knowledge about different welding methods and procedures for welding techniques. As per above candidate have knowledge about various facts, principles processes and concept of the filed therefore this job role is pegged at level 5.	**5**
Professional skill	• Read/Understand about welding drawing, symbols and welding positions	Job holder able to understand the given drawing & capable to work as per customer requirement. He can work as per standard reference procedures.	**5**

	• Carrying out welding operations • Testing for quality	They are learning the skills through different exercises and improve their practices day by day and carrying out wide range of exercises during training period. They have been continuously learning/practicing different welding methods within time frame and getting quality welding. He can perform the available testing procedures as per previous practice As per above candidate have cognitive and practical skills for doing work by selecting and applying basic method tool material and information therefore this job role is pegged at level 5.	
Core skill	• Good communication skills in speech and writing • Openness to learn new techniques for all welding methods • Apply arithmetic and algebraic mathematical calculations to solve the problems • Interpretation of welding drawing and do welding accordingly in the shop	Job holder able to communicate his ideas/skills knowledge process to his sub ordinates, colleagues and the head of the department/management. Job holder able to learn new techniques by using his previous skills and knowledge and apply their job to produce quality welds. Job holder able to interpret welding drawings and do the welding accordingly to meet the customer satisfaction/requirements. The job holder able to use desired arithmetic skills & understand social and political influence on work. He can also collect data for organization. As per above the candidate is able to communicate in proper language with others & capable to use desired mathematical skill and understand social and political influence therefore this job role is pegged at level 5.	**5**
Responsibility	• Select right material, machine and welding process • Quality of the work done by him • Follow safety rules for himself/machines/ team members/ environment	Job holder known as skilled worker has the responsibility of quality of weld is to be produced by him, and little-bit for his team .He can follow safety welding procedures for machines, himself and for his subordinates and he has to work within team & individuals which ever situation is required. Job holder able to understand that pollution/environmental awareness during welding process and follow the eco-free procedures while doing welding. As per above the candidate is responsible for own work and some responsibilities for his team and colleague therefore this job role is pegged at level 5.	**5**

ECTION 3
EVIDENCE OF NEED

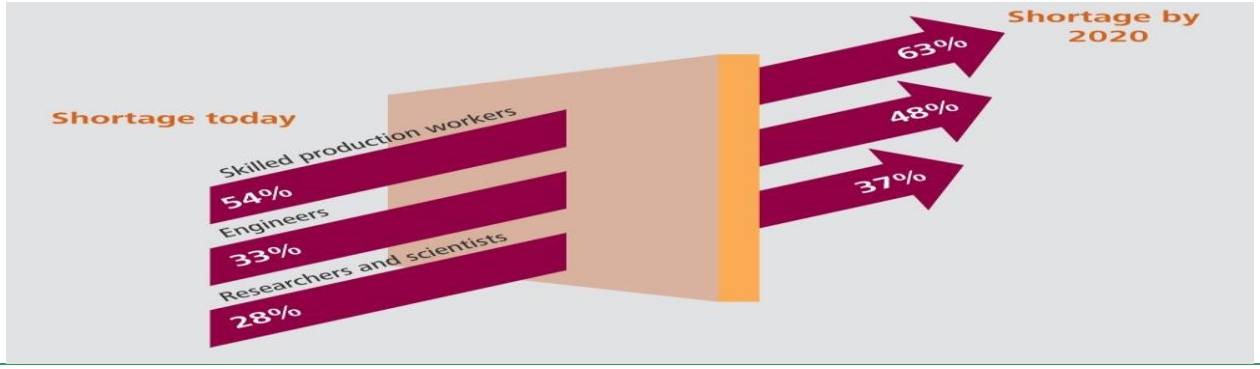
What evidence is there that the qualification is needed?

During Industrial visit to our candidates & at the time of campus placement various organization ask for welder. So we start the 1 year Certificate course in Welding Technology.

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

Welding Industry is basically based on skill. There is lack of trained man power in this sector. How ever the ITI's & other technical institute are unable to fill-up the gap. The requirement of good welder are available in capital good, fabrication & automotive sector also. There is a huge demand in near by & through out the country.

The total employment shortage is given for various level & we understand that there is maximum gap is in the field of skill worker.



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

The qualification is originally designed by curriculum committee comprising the training head, industrial expert, academic professional experts.

The work group under the guidance of curriculum development committee already conducted desk search as well as refers the qualification packs for as a supporting document for the mapping of curriculum.

As per the search it is found that, the certificate course is not available for the skill development of the candidates in any Sector Skill Council (capital good, automotive & fabrication).

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?

The curriculum committee meeting for review will be in the month of Jan 2018 which comprising industrial expert, university professors with subject specialization.

The data used for revision or update will be impact analysis (student, trainers, experts and industries) and new subject area opportunities, multiple entry and exits incorporated or RPL strategy implementations.

The curriculum review and updates, in consultation with industries and expert of respective domain, NOS approved by NSDA will also be referred to from time to time.

SECTION 4
EVIDENCE OF RECOGNITION AND PROGRESSION

What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?

Qualifying trainee will obtain an MSME TC's Certificate in 'Welding Technology'. After 2 year of experience give the opportunities to the trainees to work as Senior Welding Technician as a career progression with this position and experience of 3 years he becomes welding supervisor. The below mention diagrams represent the vertical mobility for the job holder as a job progression in related Sector.

As a educational progression the trainee will be able to apply for ITI's in Welding Trade, D.Voc. or B.Voc

Career progression, trainee appoint as a Welding Technician