CURRICULUM

FOR THE TRADE OF

Construction Welder

UNDER

APPRENTICESHIP TRAINING SCHEME

GOVERNMENT OF INDIA

MINISTRY OF SKILL DEVELOPMENT AND ENTREPRENEURSHIP

DIRECTORATE GENERAL OF TRAINING

1. Category of trade **:** Non-Engineering

2. Name of the Trade **:**Construction Welding

3. Duration of Apprenticeship Training **:** **24 Months**

Break up of the Apprenticeship Training

(i) Duration of Basic Training **:** 6 (3+3) months / 1200Hrs

(ii) Duration of Practical Training/
On-the-job Training: 18 (9+9) Months

4. Entry Qualification **:** 5th Pass

(A) <u>Basic training components</u>

(i) Employability Skills – 110 Hrs

(ii) Basic numeracy - 50 Hrs

(iii) Trade theory - 120+120Hrs

(iv) Trade practical - 400+400Hrs

(B**Practical Training/On-the job training** **:** 18 Months

CONTENTS

1. ACKNOWLEDGEMENT

L&T Construction Corporate Centre, HQ, sincerely acknowledges with thanks the contribution and cooperation extended by the Construction Skills Training Institutes and project sites of L&T projects, Trade Experts, Subject Matter Experts and all others to bring out this curriculum for the trade of **Construction Welding (under MEP Services & Maintenance)** under Apprenticeship Training Scheme.

Special acknowledgement to the following departments in L&T Construction who have contributed valuable inputs in bringing out this curricula through their expert members:

1. Competency Development Centre
2. Skills training institutes Facilities & Management Team
3. Principals and Master Trainers
4. Subject Matter Experts from respective department
5. VACUM (Vocational Curriculum) Development team of L&T Construction Skills Training Department

2. BACKGROUND

2. 1. Apprenticeship Training Scheme under Apprentice Act 1961

The Apprentices Act, 1961 was enacted with the objective of regulating the programme of training of apprentices in the industry by utilizing the facilities available therein for imparting on-the-job training. The Act makes it obligatory for employers in specified industries to engage apprentices in designated trades to impart Apprenticeship Training on the job in industry to school leavers and person having National Trade Certificate(ITI pass-outs) issued by National Council for Vocational Training (NCVT) to develop skilled manpower for the industry**.** There are four categories of apprentices namely**; tradeapprentice, graduate, technician and technician (vocational) apprentices.**

Qualifications and period of apprenticeship training of **trade apprentices** vary from trade to trade. The apprenticeship training for trade apprentices consists of basic training followed by practical training. At the end of the training, the apprentices are required to appear in a trade test conducted by NCVT and those successful in the trade tests are awarded the National Apprenticeship Certificate.

The period of apprenticeship training for graduate (engineers), technician (diploma holders and technician (vocational) apprentices is one year. Certificates are awarded on completion of training by the Department of Education, Ministry of Human Resource Development.

2. 2. Changes in Industrial Scenario

Recently we have seen huge changes in the Indian industry. The Indian Industry registered an impressive growth during the last decade and half. The number of industries in India have increased manifold in the last fifteen years especially in services and manufacturing sectors. It has been realized that India would become a prosperous and a modern state by raising skill levels, including by engaging a larger proportion of apprentices, will be critical to success; as will stronger collaboration between industry and the trainees to ensure the supply of skilled workforce and drive development through employment. Various initiatives to build up an adequate infrastructure for rapid industrialization and improve the industrial scenario in India have been taken.

2. 3. Reformation

The Apprentices Act, 1961 has been amended and brought into effect from 22nd December, 2014 to make it more responsive to industry and youth. Key amendments are as given below:

- Prescription of number of apprentices to be engaged at establishment level instead of trade-wise.
- Establishment can also engage apprentices in optional trades which are not designated, with the discretion of entry level qualification and syllabus.
- Scope has been extended also to non-engineering occupations.
- Establishments have been permitted to outsource basic training in an institute of their choice.
- The burden of compliance on industry has been reduced significantly.

3. RATIONALE

[Need for Apprenticeship asConstructionworks]

In a construction industry, the identification and selection of most important construction trades, which covers almost 80% of the construction work activities. These trades cover Bar bending, Masonry, Formwork, Plumbing, Finishing-Tiling, Lab Technician, Surveyor, Electrician, Welding, CCTV, Optical Fibre Cable (OFC) and all sectorial activities. It will covers the Construction, Installation & Surveillance and Infrastructure industries.

The greater degree of relevance of the training with latest advancements of the industry will enhance the employability opportunities.

1. Uses the welding equipments and accessories properly and safely.
2. Select cables, Electrode — holders and earth damps of the right capacity and makes proper connection.
3. Makes the fit up with proper root gap and proper distortion allowance.
4. welds in specified parameter and position.
5. In different position uses different parameters to Control the molten metal and slag.
6. Inspects and ensures the welds are of specified size and free from defects
7. Reduction in Consumable wastages and optimum usage of consumables
8. Techniques to avoid occurrence of welding defects and elimination of welding defects.
9. Analytical skills to find misalignment in fit-up stage to avoid weld repairs.
10. Basic operative techniques of simple NDT methods such as DPT

4. JOB ROLE

Brief description of Job role:

Construction Welding Tradeis one of the basic trade in Construction Industry which is common to all type of Constructions and has variance with respect to specificrequirements of the Project.

Brief Job Description of Construction Welder: Welders fabricate and assemble metal structures and equipment through the use of welders, cutters, shapers and measuring tools. Welders produce metal products according to customer or employer specifications. They use multiple welding machines to repair and maintain metal equipment and structures of various sizes. Welders read and interpret diagrams, sketches and blueprints to determine operations, required materials and timeframes for projects.

Welders set up, operate and maintain welding equipment. They understand and implement personal and company safety measures by wearing specialized goggles, helmets and gloves. Communication skills are essential to work with team members and converse with customers and clients.

5. LEARNING OUTCOMES

A. GENERIC OUTCOME

- Recognize & comply safe working practices, environment regulation and housekeeping.
- Work in a team, understand and practice soft skills, technical English to communicate with required clarity.
- Understand and explain the concept in quality tools and labour welfare legislation and apply such in day to day work to improve productivity & quality.
- Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.
- Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.
- Understand and apply basic computer working, basic operating system and uses internet services to get accustomed & take benefit of IT developments in the industry.

B. SPECIFIC OUTCOME

The Trainees will be able to

- Takes the job allocation from site supervisor.
- Checks the welding Equipments for proper connection and polarity.
- Collects the required consumables, tools and tackles for the work..
- Performs the welding as per specification.
- Welding as per qualified position and given fit-up.
- Welds defect free weld joint and negligible weld repair.
- Able to identify the different material specifications and fusion electrodes
- Understands how to repair the weld joints
- Understands pre — heat and post heat requirements.
- Works at heights uses ladders and scaffolds.

- Works responsibly and safely without endangering others.
- Understands electrode baking and holding procedures.
- Avoids Consumable Wastages.
- Able to understand repair tracings and remove weld defects
- Uses the welding equipments and accessories properly and safely.
- Select cables, Electrode — holders and earth damps of the right capacity and makes proper connection.
- Makes the fit up with proper root gap and proper distortion allowance.
- Welds in specified parameter and position.
- In different position uses different parameters to Control the molten metal and slag.
- Inspects and ensures the welds are of specified size and free from defects
- Reduction in Consumable wastages and optimum usage of consumables
- Techniques to avoid occurrence of welding defects and elimination of welding defects.
- Analytical skills to find misalignment in fit-up stage to avoid weld repairs.
- Basic operative techniques of simple NDT methods such as DPT

6. GENERAL INFORMATION

1.	Name of the Trade	:	Construction Welding
2.	Duration of Apprenticeship Training	:	24 Months
	Basic Training	:	6 Months
	Practical Training	:	18 Months
3.	Duration of Basic Training	:	
	a. Block –I	:	3 months
	b. Block - II	:	3 months
4.	Total duration of Basic Training	:	6 Months
5.	Duration of Practical Training (On -job Training)	:	18 Months
6.	Entry Qualification	:	5th Pass
7.	Selection of Apprentices	:	The apprentices will be selected asper Apprenticeship Act amended time to time.
8.	Rebate for ITI passed trainees	:	NA

Note: *Industry may impart training as per above time schedule, however this is not fixed. The industry may adjust the duration of training considering the fact that all the components under the syllabus must be covered. However the flexibility should be given keeping in view that no safety aspect is compromised and duration of industry training to be remains as 1 year.*

7. COURSE STRUCTURE

Training duration details:-

Time (in months)	**1-3**	**4-12**	**13-15**	**16-24**
Controlled Condition training	Part A	-------	Part B	------
On-job training	-----	Part A	------	Part B

Components of training	Duration of training in Months																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Controlled Condition Training Part A																								
On Job Training, Part A																								
Controlled Condition Training Part B (@ site)																								
On Job Training, Part B																								

8. SYLLABUS

8.1 BASIC TRAINING

(Part A & B)

DURATION: 06 MONTHS

GENERAL INFORMATION

1)	Name of the Trade	:	Construction Welding
2)	Hours of Instruction	:	800 Hrs.
3)	Batch size	:	20
4)	Power Norms	:	NA
5)	Space Norms	:	NA
6)	Examination	:	The internal assessment will be held on completion of each Block.
7)	Instructor Qualification	:	

a) Degree/Diploma in Engineering or Masters from recognized university/Board with one/two year post qualification experience respectively in the relevant field.

8)Tools, Equipment's & Machinery required: - As per Annexure – I

8.1.1 Details of Syllabus of Core Skill

COURSE CONTENTS:-

Introduction to Basic Competencies
• Introduction to Trade and duties of "Welder" • Occupational health hazards, Personal Protective Equipments(PPE) usage and working at heights • Introduction, Handling, Storing and Maintenance of Tools, Materials, Consumables and Small Equipments • Understanding tolerance limits, Measuring in MKS system, field testing of Materials and Consumables

Controlled Condition Training (Part A and Part B)

Duration: 6 Months (3 Month in each part)

Controlled Condition Training, Part A: 3 Months

PracticalCompetencies	UnderpinningKnowledge(Theory)
a. Grooveweldpositions b. Filletweldpositions	
• Typesofweldingelectrodesandfillerwires	• Typesofcarbonsteelelectrodes&fillerwires • Typesofalloysteelelectrodes&fillerwires • Typesofstainlesssteelelectrodes&fillerwires
Level–I(SMAW–1G,2G,3G,4G) • Weldingin1Gposition–plate	• Weldingstartandfinishpoint • Inter-passcleaning • Rootgap • Defectsanalysisandremedies
RepeatweldingwithnewpieceineachpositiontillDesiredresultsareachieved	• Inspection
Weldingin2G,3G,4Gposition–plate	• Weldingstartandfinishpoint • Inter-passcleaning • Rootgap • Defectsanalysisandremedies
RepeatweldingwithnewpieceineachpositiontillDesiredresultsareachieved	• Inspection

Level–II(SMAW–1G&2Gpipe)	• Weldingstartandfinishpoint • Inter-passcleaning • Rootgap • Defectsanalysisandremedies
Repeatweldingwithnewpieceineachpositio ntillDesiredresultsareachieved	• Inspection

Controlled Condition Training, Part B: 3 Months

Level–III(SMAW–5G&6G) Rootweldpipesin5G&6Gposition	• Weldingstartandfinishpoint • Inter-passcleaning • Rootgap • Distortioncontrol • Defectsanalysisandremedies
Repeatweldingwithnewpiece ineachpositiontill Desiredresultsareachieved	
Weldfurtherpassesandcompletethewelding	• Inspection
Weldersqualificationtestin6Gposition	
Level–IV(GTAW) IntroductionTIGweldingprocess	
1. Rootweldthepipein1Gposition	• Weldingstartandfinishpoint • Inter-passcleaning • Rootgap • Distortioncontrol • Defectsanalysisandremedies
Repeatweldingwithnewpieceineachpositiontill Desiredresultsareachieved	• Inspection

Rootweldthepipein5Gposition	
Rootweldthepipein6Gposition	
CompletefurtherpasseswithSMAW/GMAWprocesses	

8.1.2 EMPLOYABILITY SKILLS

GENERAL INFORMATION

1) **Name of the subject** : **EMPLOYABILITY SKILLS**

2) **Applicability** : ATS- Mandatory for fresher only

3) **Hours of Instruction** : 110 Hrs.

4) **Examination** : The examination will be held at the end of two years Training by CSDCI.

5) **Instructor Qualification** :

i) MBA/BBA with two years experience or graduate in sociology/social welfare/Economics with two years experience and trained in Employability skill from DGET Institute.

And

Must have studied in English/Communication Skill and Basic Computer at 12^{th} /diploma level

OR

ii) Existing Social Study Instructor duly trained in Employability Skill from DGET Institute.

8.1.3 SYLLABUS OF EMPLOYABILITY SKILLS

Part A

Basic Training

Topic No.	Topic	Duration (in hours)
	English Literacy	**20**
1	**Pronunciation :** Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)	
2	**Functional Grammar** Transformation of sentences, Voice change, Change of tense, Spellings.	
3	**Reading** Reading and understanding simple sentences about self, work and environment	
4	**Writing** Construction of simple sentences Writing simple English	
5	**Speaking / Spoken English** Speaking with preparation on self, on family, on friends/ classmates, on know, picture reading gain confidence through role-playing and discussions on current happening job description, asking about someone's job habitual actions. Cardinal (fundamental) numbers ordinal numbers. Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication.	

	I.T. Literacy	
1	**Basics of Computer** Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.	**20**
2	**Computer Operating System** Basics of Operating System, WINDOWS, The user interface of Windows OS, Create, Copy, Move and delete Files and Folders, Use of External memory like pen drive, CD, DVD etc, Use of Common applications.	
3	**Word processing and Worksheet** Basic operating of Word Processing, Creating, opening and closing Documents, use of shortcuts, Creating and Editing of Text, Formatting the Text, Insertion & creation of Tables. Printing document. Basics of Excel worksheet, understanding basic commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets	
4	**Computer Networking and INTERNET** Basic of computer Networks (using real life examples), Definitions of Local Area Network (LAN), Wide Area Network (WAN), Internet, Concept of Internet (Network of Networks), Meaning of World Wide Web (WWW), Web Browser, Web Site, Web page and Search Engines. Accessing the Internet using Web Browser, Downloading and Printing Web Pages, Opening an email account and use of email. Social media sites and its implication. Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT - ACT, types of cyber crimes.	

	Communication Skill	
1	**Introduction to Communication Skills** Communication and its importance Principles of Effective communication Types of communication - verbal, non verbal, written, email, talking on phone. Non verbal communication -characteristics, components-Para-language Body - language Barriers to communication and dealing with barriers. Handling nervousness/ discomfort.	
2	**Listening Skills** Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening. Triple- A Listening - Attitude, Attention & Adjustment. Active Listening Skills.	**15**
3	**Motivational Training** Characteristics Essential to Achieving Success The Power of Positive Attitude Self awareness Importance of Commitment Ethics and Values Ways to Motivate Oneself Personal Goal setting and Employability Planning.	
4	**Facing Interviews** Manners, Etiquettes, Dress code for an interview Do's & Don'ts for an interview	
5	**Behavioral Skills** Problem Solving Confidence Building Attitude	

Topic No.	Topic	Duration (in hours)
	Entrepreneurship skill	**15**
1	**Concept of Entrepreneurship** **Entrepreneurship** - Entrepreneurship - Enterprises:- Conceptual issue Entrepreneurship vs. Management, Entrepreneurial motivation. Performance & Record, Role & Function ofentrepreneurs in relation to the enterprise & relation to the economy, Source of business ideas, Entrepreneurial opportunities, The process of setting up a business.	
2	**Project Preparation & Marketing analysis** Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of Product Life Cycle (PLC), Sales & distribution Management. Different Between Small Scale & Large Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix.	
3	**Institutions Support** Preparation of Project. Role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes & procedure & the available scheme.	
4	**Investment Procurement** Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes.	
	Productivity	
1	**Productivity** Definition, Necessity, Meaning of GDP.	

2	**Affecting Factors** Skills, Working Aids, Automation, Environment, Motivation How improves or slows down.	**10**
3	**Comparison with developed countries** Comparative productivity in developed countries (viz. Germany, Japan and Australia) in selected industries e.g. Manufacturing, Steel, Mining, Construction etc. Living standards of those countries, wages.	
4	**Personal Finance Management** Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.	
	Occupational Safety, Health & Environment Education	**15**
1	**Safety & Health** Introduction to Occupational Safety and Health importance of safety and health at workplace.	
2	**Occupational Hazards** Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.	
3	**Accident & safety** Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety measures.	
4	**First Aid** Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person	
5	**Basic Provisions** Idea of basic provision legislation of India. of safety, health, welfare under legislation of India.	
6	**Ecosystem** Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance.	

7	**Pollution** Pollution and pollutants including liquid, gaseous, solid and hazardous waste.	
8	**Energy Conservation** Conservation of Energy, re-use and recycle.	
9	**Global warming** Global warming, climate change and Ozone layer depletion.	
10	**Ground Water** Hydrological cycle, ground and surface water, Conservation and Harvesting of water	
11	**Environment** Right attitude towards environment, Maintenance of in -house environment	
	Labour Welfare Legislation	**05**
1	**Welfare Acts** Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment Wages Act, Employees Provident Fund Act, The Workmen's compensation Act.	
	Quality Tools	**10**
1	**Quality Consciousness :** Meaning of quality, Quality Characteristic	
2	**Quality Circles :** Definition, Advantage of small group activity, objectives of quality Circle, Roles and function of Quality Circles in Organization, Operation of Quality circle. Approaches to starting Quality Circles, Steps for continuation Quality Circles.	
3	**Quality Management System :** Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.	
4	**House Keeping :** Purpose of Housekeeping, Practice of good Housekeeping.	
5	**Quality Tools** Basic quality tools with a few examples	

8.2BASIC NUMERACY

GENERAL INFORMATION

6) **Name of the subject** : **BASIC NUMERACY**

7) **Applicability** : ATS- Mandatory for fresher only

8) **Hours of Instruction** : 50 Hrs.

9) **Examination** : The examination will be held at the end of two years Training by CSDCI.

10) **Instructor Qualification** :

iii) MBA/BBA with two years experience or graduate in Science and Mathematics with two years experience and trained in Basic Numeracy from DGET Institute.

And

Must have studied in Mathematics at 12^{th} /diploma level

8.2.1 SYLLABUS OF BASIC NUMERACY

Basic Training

Topic No.	Topic	Duration (in hours)
	English Literacy	**50 Hrs**
1	Number System/Fractions	
2	Square Root/Cube Root	
3	Average/Percentage	
4	Area Calculation- Triangles, Quadrilaterals	
5	Concept of geometry- Square, Rectangle, Circle, Triangle	
6	Basic Trigonometry	

8.3 PRACTICAL TRAINING (ON-JOB TRAINING)

(Part A & B)

DURATION: 18 MONTHS

Broad Skill Components to be covered during On-Job Training

On Job Training, Part A: 9 Months

1) Types of welding electrodes and filler wires
2) Level – I (SMAW – 1G, 2G, 3G, 4G)
    a. Welding in 1G position – plate
    b. Welding in 2G, 3G, 4G position – plate
3) Level – II (SMAW – 1G & 2G pipe)

On Job Training, Part B: 9 Months

1) Level – III (SMAW – 5G & 6G)
    1. Root weld pipes in 5G & 6G position
    2. Welders qualification test in 6G position
2) Level – IV (GTAW)
3) Introduction TIG welding process
    1. Root weld the pipe in 1G position
    2. Root weld the pipe in 5G position
    3. Root weld the pipe in 6G position
4) Complete further passes with SMAW/GMAW processes

4.**Instructors Qualification:**

i) Degree/Diploma in MechanicalEngg. from recognized university/Board With one/two year post qualification experience in the relevant field.

OR

ii) ITI in relevant trade with three year experience / 8 years' experience in the relevant field with 10^{th} Qualification.

5. Infrastructure for On-Job Training: Ongoing Project sites

9. ASSESSMENT STANDARD

Assessment Guideline

Successful achievement of the partical assesment is the professional judgement of the instructor/assessor. Failure to demonstrate the appropriate practical skills and practices to the satisfatction of the Assessor will result in a failure of the course. The following area will be consoidered.
Selection of materials, Understanding of drawing, Quality of work (Functional aspects, Dimensional features, Surface finish), Personal safety, time taken to complete the job.
If the delegate fail a couse the Training Provider must make a recommendation outline a time period required for the delegate to gain sufficient industry experinece prior to repete the course.

10. FURTHER LEARNING PATHWAYS

- On successful completion of the course trainees can opt for any charge hand/ foreman / supervisory course under CSDCI.

Employment opportunities:

On successful completion of this course, the candidates may be gainfully employed in the following industries:

1. Construction Sector – Structural activities.

ANNEXURE – I

TOOLS & EQUIPMENT FOR BASIC TRAINING

INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONALKNOWLEDGE

TRADE: Storage and Inventory Executive (warehouse/Manufacturing plant)

LIST OF TOOLS & EQUIPMENTS FOR 20 APPRENTICES

A : TRAINEES TOOL KIT:-

Sl. No	Name of Equipment and Tools as per prescribed Norms	UoM	Quantity Required
1	Arc Welding power source CC type 400 AMPS	nos	10
2	Arc Welding power source CC type 250 AMPS	nos	1
3	MIG welding power source - CV type 600 Amps	nos	2
4	Baking oven - 250-300 deg C	nos	1
5	Holding oven - (Electrical drying oven) (80-150 deg. C)	nos	1
6	Arc welding holder	nos	10
7	MIG torch - 350 Amps	nos	2
8	Fume extractor - Centralised	nos	2
9	TIG welding torch	nos	5
10	Portable holding oven	nos	9
11	Argon - Flowmeter cum gauge	nos	8
12	Oxygen regulator (0-315 bar)	nos	2
13	Gas cutting torch	nos	5
14	Acteylene regulator (0-40 bar)	nos	2

16	AG 7 Grinding machine	nos	8
17	AG 5 Grinding machine	nos	4
18	Metal clad deconnector plug (Single phase)	nos	7
19	Metal clad deconnector plug (Single phase)	nos	1
20	Welding helmet	nos	25
22	Bench vice	nos	6
23	Weld inspection kit	set	1
24	Gas cutting nozzle PNME - 3/64"	nos	10
25	Double stage regulator (acetylene)	nos	1
26	Carbon dioxide regulator cum flowmeter	nos	2
27	TIG torch backup	nos	25
28	Wire brush	packets	2
29	White glass (welding)	nos	150
30	Goggles	packets	1
31	Pug cutting machine	nos	1
32	Hack saw frame	nos	8
33	Tongs	nos	25
34	Double stage regulator (Oxygen)	nos	2
35	Ceramic nozzle - 24/3	nos	20
36	TIG filler rod - er 70s2 (2.40mm)	packets	4
37	TIG filler rod - er 70s2 (1.6 mm)	packets	2
38	AG 5 cutting wheel	packets	1
39	AG 7 cutting wheel	nos	10
40	AG 7 grinding wheel	nos	64
41	ER 7018 electrodes	packets	6

42	TIG gloves	nos	10
43	Arc welding gloves	nos	50
44	Welding apron	nos	10
45	Leg guard	nos	30
46	Arm guard	nos	40
47	C-clamp -6"	nos	1
48	Spindle key	nos	5
49	Ceramic nozzle -2411	nos	30
50	Cutting plier	nos	2
51	Heating torch	nos	1
52	Verniercaliper	nos	1
53	MIG welding torch cup	nos	4
54	Grinding machine carbon brush	nos	30
55	Antispatter spray	nos	1
56	Earth clamp	nos	9
57	Trisquare	nos	16
58	Welding cable terminal	box	1
59	Chipping hammer	nos	4
60	Center punch	nos	4
61	Scriber	nos	1
62	Welding glass DIN 11	nos	10
63	Ball pin hammer	nos	7
64	Round file	nos	2
65	Number punch	set	1
66	Screw driver (long)	nos	2

67	Star screw driver	nos	2
68	Teflon PTFE tape	nos	8
69	Tap set (16,12,14,8,10,6,4,5,3)	sets	16
70	Gas cutting scriber	nos	13
71	Flat file	nos	3
72	Ring spanner	nos	20
73	Double end spanner	nos	13
74	Triangular file	nos	1
75	Grinding machine key	nos	4
76	Chisel	nos	10
77	Steel ruler -300mm	nos	3
78	Ear plug	nos	25
79	White googles	nos	18
80	Gas cutting nozzle ANME - 3/64"	nos	4
81	Alen key	set	1
82	Nozzle cleaner	nos	3
83	Hose clamp for gas cutting	nos	17
84	Spark lighter	box	7
85	Flash back arrestor - Oxygen	nos	8
86	Flash back arrestor - Acetylene	nos	3
87	Pipe wrench	nos	1
88	Tungsten rod dia. 2.4mm -Thoriated	box	3
89	Ceramic nozzle -2411	nos	42
90	Ceramic nozzle - 8 (12.5mm dia)	nos	16
91	Welding machine amp controller	nos	5

92	Hack saw blade -10 teeth	nos	1
93	Hack saw blade -24 teeth	nos	7

Note: In case of basic training setup by the industry the tools, equipment and machinery available in the industry may also be used for imparting basic training.

INFRASTRUCTURE FOR ON-JOB TRAINING

Actual training will be conducted at ongoing construction project sites

ANNEXURE-II

GUIDELINES FOR INSTRUCTORS AND PAPER SETTERS

1. Due care to be taken for proper & inclusive delivery among the batch. Some of the following some method of delivery may be adopted:

A) LECTURE

B) LESSON

C) DEMONSTRATION

D) PRACTICE

E) GROUP DISCUSSION

F) DISCUSSION WITH PEER GROUP

G) PROJECT WORK

H) INDUSTRIAL VISIT

2. Maximum utilization of latest form of training viz., audio visual aids, integration of IT, etc. may be adopted.

3. The total hours to be devoted against each topic may be decided with due Diligence to safety & with prioritizing transfer of required skills.