CURRICULUM

FOR THE TRADE OF

INSULATOR MAKER/ MACHINE OPERATOR (CERAMIC)

UNDER

APPRENTICESHIP TRAINING SCHEME

सत्यमेव जयते
Government of India

GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT& ENTREPRENURESHIP
DIRECTORATE GENERAL OF TRAINING

CONTENTS

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1. Atlas Industries
2. AntrixSanitarywares
3. The P. P. W. Co. Ltd., Morbi
4. YogideepCera& Co.

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Co-ordinator for the course: Sh. NirmalyaNath., ADT

Sl. No.	Name & Designation Sh./Mr./Ms.	Organization	Expert Group Designation
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2.	Patel Jaswantbhai P.	Atlas Industries	Expert
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4.	P. B. Jadeja	The P. P. W. Co. Ltd., Morbi	Expert
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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**; trade apprentice, 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 in **Insulator Maker Machine Operator (Ceramic)**trade]

1) Tends preset automatic, semiautomatic, and manually operated machines to drill, mill, grind, saw, top, head, cut, thread, turn, or groove green technical ceramic pieces for electronic, mechanical, industrial, and other uses: Places pieces on feeder of machines that are preset and automatic.

2) Places pieces in jig or chuck and starts semiautomatic machine.

3) Positions pieces in front of bit or tap, moves piece around for boring, drilling, or tapping operations, and removes piece when machining manually.

4) Inspects piece for defects, such as cracks and chips.

5) Gauges piece on snap gauge or go-not-go gauge and discards defective pieces.

6) Cleans pieces, using airhose and rotating brush.

7) Stacks pieces on tray or handtruck and trucks lot to storage shelves.

8) Records number of machined pieces for production purposes.

4. JOB ROLES: REFERENCE NCO

Brief description of Job roles:

Insulator maker machine operator;operates mixing machine (blunger) in which different kinds of clay is mixed into their semi-liquid form (slip) for making ceramic products. Regulates flow of materials into mixer; starts mixer and allows it to run for specified time, pumps slip over magnets to remove any iron or steel particles and through filter process to remove excess water, regulating flow by means of a valve; cleans filters and magnets with water as required ; washes screens and magnets to remove foreign particles and sludge using hose. May mix clays according to formula.May undertake minor repairs to machine.May operate Ball Mill to make slurry.

Insulator maker operates ball mill for finally grinding clay,rock, clinker etc. into slurry (thin paste or semi -fluid mixture), powder and cement; checks that pebbles or balls, are filled incylinder; feeds cylinder with requisite amount of material and water through opening or regulates feed and flow of waterby manipulating valves of mill; adjusts air drift when grinding rock of clinker into powder or cement to avoid jamming orchoking; closes opening, starts machine and runs it for specified time ensuring grinding of material to required fineness; stops machine and tilts cylinder to remove ground material or watches delivery of slurry through delivery-end while machine is in operation. May be designated according to material ground or industry in which worked such as SLURRY MILLER (CERAMICS or CEMENT MILLER). May tend one or more grinding mills.

Plan and organize assigned work and detect & resolve issues during execution. Demonstrate possible solutions and agree tasks within the team. Communicate with required clarity and understand technical English. Sensitive to environment, self-learning and productivity.

Perform TPM (Total Production Management), TQM (Total Quality Management) and record keeping system.

Reference NCO:

i) **NCO-2004:** 8139.60
ii) **NCO-2004:** 8139.30

5. GENERAL INFORMATION

1. **Name of the Trade** **: INSULATOR MAKER MACHINE OPERATOR (CERAMIC)**

2. **N.C.O. Code No.** : **NCO-2004:**8139.60, 8139.30

3. **Duration of Apprenticeship Training (Basic Training + Practical Training):**2years

4. **Duration of Basic Training**: -

a) Block –I : 3 months

b) Block – II : 3 months

Total duration of Basic Training: 6 months

5. **Duration of Practical Training (On -job Training): -**

a) Block–I: 9 months

b) Block–II : 9 months

Total duration of Practical Training: 18 months

6. **Entry Qualification** : Passed in 10th Class Examination under 10+2 system of education with Science or equivalent.

7. **Selection of Apprentices:** The apprentices will be selected as per Apprenticeship Act amended time to time.

8. **Rebate for ITI passed trainees** : i) **One year** in the trade of **Refractory Technician**

Note: Industry may impart training as per above time schedule for different block, 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 aspects is compromised.

6. COURSE STRUCTURE

Training duration details: -

Time (in months)	1-3	4-12	13-15	16-24
Basic Training	**Block– I**	**-----**	**Block – II**	**------**
Practical Training (On - job training)	**----**	**Block – I**	**------**	**Block – II**

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
Basic Training Block - I																								
Practical Training Block - I																								
Basic Training Block - II																								
Practical Training Block - II																								

7. SYLLABUS

7.1 BASIC TRAINING
(BLOCK – I &II)
DURATION: 06 MONTHS

GENERAL INFORMATION

1) **Name of the Trade** :**INSULATOR MAKER MACHINE OPERATOR (CERAMIC)**
2) **Hours of Instruction** : 1000 Hrs. (500 hrs. in each block)
3) **Batch size** : 20
4) **Power Norms** : 13.6 KW for Workshop
5) **Space Norms** : 130 Sq. m.
6) **Examination** : The internal assessment will beheld on completion of each Block.
7) **Instructor Qualification** :

i) Degree/Diploma in Mechanical/Ceramic/MetallurgyEngg. from recognized university/Board with one/two year post qualification experience respectively in the relevantfield.

OR

ii) NTC/NAC in the trade of **Insulator Maker Machine Operator (Ceramic)**with three year post qualificationexperience in the relevant field.

Preference will be given to a candidate with Craft Instructor Certificate (CIC)

8) **Tools, Equipments & Machinery required**: - As per Annexure – I

7.1.1 DETAILSYLLABUS OF CORE SKILL

A. Block– I
Basic Training

Topic No.	a) Engineering Drawing	Duration (in hours)	b) Workshop Science & Calculation	Duration (in hours)
1.	Engineering Drawing: Introduction and its importance Different types of standards used in engineering drawing. Drawing Instruments: their uses Drawing board, T-Square, Drafter (Drafting M/c), Set Squares, Protractor, Drawing Instrument Box (Compass, Dividers, Scale, Diagonal Scales etc.), Pencils of different Grades, Drawing pins / Clips.	**30**	**Units & Measurements-** FPS, CGS, MKS/SI unit, unit of length, Mass and time. Fundamentals and derived units Conversion of units and applied problems.	**20**
2.	Lines : types and applications in Drawing as per BIS SP:46-2003 Drawing geometrical object using all types of lines. **Drawing of Geometrical Figures:** Angle, Triangle, Square, Rectangle and Circle. **Letters: -** Lettering styles, Single stroke letters and numbers as per IS standard. Lettering practice		**Material Science** : properties - Physical & Mechanical, Types - Ferrous & Non-Ferrous, difference between Ferrous and Non-Ferrous metals	
3.	**Dimensioning-** Types of dimension, elements of dimensions, Methods of indicating Values, Arrangement, Alignment and indication of dimensions. **Scales**:-Types use and construction. Representative factor of scale.		**Mass .Weight and Density** : Mass, Unit of Mass, Weight, difference between mass and weight, Density, unit of density,	
4.	Method of presentation of Engineering Drawing - Pictorial View - Orthogonal View - Isometric view		**Speed and Velocity:** Rest and motion, speed, velocity, difference between speed and velocity, acceleration, retardation. Average Velocity, Acceleration & Retardation. Related problems. Circular Motion: Relation between circular motion and Linear motion, Centrifugal	

			force, Centripetal force	
5.	**Constructions: -** Draw proportionate free hand sketches of plane figures. Sketch horizontal, vertical and inclined line by free hand, Draw circles by free hand using square and radial line method, Draw arcs and ellipse by free hand		**Ratio & Proportion** : Simple calculation on related problems. **Percentage:** Introduction, Simple calculation.	
6.	Projections: Concept of axes plane and quadrant. Orthographic projections Method of first angle and third angle projections (definition and difference) Symbol of 1^{st} angle and 3^{rd} angle projection as per IS specification. Free hand Drawing of Orthographic projection from isometric/3D view of geometrical blocks		**Work, Power and Energy:** work, unit of work, power, unit of power, Horse power of engines, mechanical efficiency, energy, use of energy, potential and kinetic energy, examples of potential energy and kinetic energy. Meaning of H.P., I.H.P., B.H.P., and F.H.P. and CC and Torque.	

B. Block- II
Basic Training

Topic No.	a) Engineering Drawing	Duration (in hours)	b) Workshop Science & Calculation	Duration (in hours)
1.	**Screw :-** Its Types and Sizes, Screw thread, their standard forms as per BIS, external and internal thread.	**30**	**Algebra:** Addition, Subtraction, Multiplication, Division, Algebraic formula, Linear equations (with two variables).	**20**
2.	**Rivets and Joints:-** Prepare a drawing sheet on rivets nomenclature and Joints.		**Heat & Temperature:** Heat and temperature, their units, difference between heat and temperature, boiling point, melting point, scale of temperature, relation between different scale of temperature, Thermometer, pyrometer, transmission of heat, conduction, convection, radiation.	
3.	Free hand Sketches for simple pipe line with general fittings.		**Mensuration:** Area and perimeter of square, rectangle, parallelogram, triangle, circle, semi circle, Volume of solids - cube, cuboid, cylinder and Sphere. Surface area of solids -cube, cuboid, cylinder and Sphere. Volume of cut-out solids: hollow cylinders, frustum of cone, block section. Volume of simple solid blocks.	
4.	Reading of drawing. Simple exercises related to missing lines, dimensions. How to make queries.		**Basic Electricity:** Introduction, use of electricity, how electricity is produced, Types of current_ AC, DC, their comparison, voltage, resistance, their units. Conductor, insulator, Types of connections - series, parallel, electric power, Horse power, energy, unit of electrical energy. Concept of earthling.	
5.	Simple exercises related to trade related symbols. Basic electrical and electronic symbols		**Simple machines** **Transmission of power: -** Transmission of power by belt, pulleys & gear drive. **Heat treatment process: -** Heat treatment and advantages. Annealing, Normalizing,	

			Hardening, Tempering.	
6.	Free hand sketch of trade related components / parts /cutting tool indicating angles.		**Trigonometry:** Trigonometrical ratios, measurement of angles. Trigonometric tables. Finding the value of unknown sides and angles of a triangle by Trigonometrical method. Finding height and distance by trigonometry. Application of trigonometry in shop problems. (viz. taper angle calculation). Calculate the area of triangle by using trigonometry and application of Pythagoras theorem.	
7.			**Concept of pressure** - **Definition**:-Force, Pressure, and their units, atmospheric pressure, gauges used for measuring pressure, problems. Introduction to pneumatics & hydraulics systems.	
8.	**Simple exercises related to trade related Test Papers. Solution of NCVT test papers.**			

7.1.2DETAIL SYLLABUS OF PROFESSIONAL SKILLS & PROFESSIONAL KNOWLEDGE

A. Block –I

Basic Training

Week No.	Professional Skills	Professional Knowledge
1.	Safety: - its importance, classification, personal, general, workshop and job safety. Occupational health and safety. Basic injury prevention, Basic first aid, Hazard identification and avoidance, safety signs for Danger, Warning, caution & personal safety message. Preventive measures for electrical accidents & steps to be taken in such accidents. Importance of housekeeping & good shop floor practices. Disposal procedure of waste materials like cotton waste, metal chips/burrs etc. Fire& safety: Use of Fire extinguishers.	Importance of safety and general precautions observed in the in the industry/shop floor. All necessary guidance to be provided to the new comers to become familiar with the working of Institute system including stores procedures. Introduction of First aid. Safety attitude development of the trainee by educating him to use Personal Protective Equipment (PPE). Response to emergencies eg; power failure, fire, and system failure. Accidents- Definition types and causes. First-Aid, nature and causes of injury and utilization of first-aid. Introduction to 5S concept & its application. Fire: - Types, causes and prevention methods. Fire Extinguisher, its types. Global warming its causes and remedies. Industrial Waste its types, sources and waste Management.
2.	Identification of common ceramic raw materials. Familiarisation with the common tools and equipment Familiarisation with the common ceramic machineries	Different types of raw materials used in ceramic industries China Clays, fire clays, ball clays, and plastic clays, feldspar, quartz, limestone, Sillimanite, Kyanite chemical coloured oxides etc. visual identification selection of the raw materials
3-4.	Practice on the fundamental manufacturing process of ceramic articles Marking out from drawing using scales divisers scribers etc Maintenance of tools cleaning, sharpening, protecting etc.	Classification of ceramic bodies, common clays (terracota) stoneware, earthenware, faiences, semi – porecelain, vitreous china, hotel china, Bone china etc. Heavy clay ware HT porcelains – sanitary ware, tiles etc.

5-6.	Fitting of studs and removal of broken ones fitting and replacement of Dowels Making of vee , flat and endless belts. Jointing of belts.	Basic knowledge about functioning of impotant machineries like jaw cursher wedge runner mill / Disinteqroutorballmill, blunger, fitter pump, and press, De-airing pugmill, jigger and jolly vibratory screen, toggle press, extrusion press semi-automatic and automatic machines.
7.	Identification of different pumps &basic maintenance practice of pump.	Introduction of simple operation of pumps&processes.
8.	Simple pipe fitting. Fitting of guards and safety devices	Pottery and refractory driers – different types of driers and their mechanism of drying.
9-10.	Carryout preventive maintenance of different plants & machineries related to the trade.	Introduction to preventive maintenance.
11-12.	Quartz Calculation Grinding and crushing of feldspar, quartz etc Charging of blunger.	
13.	**Revision &Internal Assessment**	

B. Block –II
Basic Training

Week No.	Professional Skills	Professional Knowledge
1-2.	Wet grinding of raw materials in ball mill Magnetic separation of iron particles	Pottery Glaze and decoration – under glaze, in-glaze and on glaze decoration and methods of application hand drawing , lithographic throwing, turning, casting, jiggering, pressing etc.
3-4	Preparation of clay for casting and pressing A) Throwing of clay B) Shaping of clay body by hand Operation of jigger and jolly	Ceramic fabrication processes like extrusion, throwing, turning casting jiggering, pressing etc.
5.	Simple casting, joining and finishing Dry Pressing Drying and glazing	Different klin furniture's like saggers, setters, stilts, crank thimbles & deck slabs cantilevers their uses.
6-7.	Preparation of sagger mixture – pressing of saggers. Hand making of saggers Drying of saggers Placing of wares in sagger Placing of saggers in the kiln	Furnaces – types of kilns and classification or furnaces
8.	Application of colours and different decoration and art	Intermittent and continuous kilns like down draft kiln, chamber kiln, tunnel kiln fired by solid.
9.	Making of Moulds	Liquid gaseous fuels and electricity, kiln and furnace instrumentation (reading of instruments)
10.	Shaping by hand Mouldingsaggers Operation of presses	Knowledge of the fuel used in rectangular and tunnel kilns
11.	Operation of insulator making machine	Study of different standards like IS, IEC, DIN etc
12.	Operation of kilns, down draft, chamber, tunnel, Decorating etc	Introduction to Steam curing. Hot Water curing and Air curing
13.	**Revision & Internal Assessment**	

7.1.3 EMPLOYABILITY SKILLS

GENERAL INFORMATION

1)	**Name of the subject**	**:**	**EMPLOYABILITY SKILLS**
2)	**Applicability**	**:**	ATS- Mandatory for fresher only
3)	**Hours of Instruction**	**:**	**110 Hrs. (55 hrs. in each block)**
4)	**Examination**	**:**	The examination will be held at the end of two years Training by NCVT.
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 12th /diploma level

OR

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

7.1.3.1 SYLLABUS OF EMPLOYABILITY SKILLS

A. Block – I
Basic Training

Topic No.	Topic	Duration (in hours)
	English Literacy	**15**
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	**15**
1	**Basics of Computer** Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.	
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	**25**
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. Case study/Exercise	
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.	
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. Case study/Exercise	
4	**Facing Interviews** Manners, Etiquettes, Dress code for an interview Do's & Don'ts for an interview	
5	**Behavioral Skills** **Organizational Behavior** Problem Solving Confidence Building Attitude Decision making Case study/Exercise	

B. Block– II
Basic Training

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 of entrepreneurs 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	**10**
1	**Productivity** Definition, Necessity, Meaning of GDP.	
2	**Affecting Factors** Skills, Working Aids, Automation, Environment, Motivation How improves or slows down.	
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, Vibro-acoustic 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 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	**5**
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	

7.2 PRACTICAL TRAINING (ON-JOB TRAINING)
(BLOCK – I&II)
DURATION: 18 MONTHS (9 months in each block)

GENERAL INFORMATION

1) **Name of the Trade** :**INSULATOR MAKER MACHINE OPERATOR (CERAMIC)**

2) **Batch size** :a) Apprentice selection as per Apprenticeship guidelines.
b) Maximum 20 candidates in a group.

3) **Examination** : i) The internal assessment will be held on completion of each block
ii) NCVT exam will be conducted at the end of 2nd year.

4) **Instructor Qualification** :

i) Degree/Diploma in Mechanical/Ceramic/MetallurgyEngg. from recognized university/Board with one/two year post qualification experience in the relevant field.

OR

ii) NTC/NAC in the trade of Insulator **Maker Machine Operator (Ceramic)**with three year post qualificationexperience in the relevant field.

Preference will be given to a candidate with Craft Instructor Certificate (CIC)

5) **Infrastructure for On-Job Training** : - As per Annexure – II

7.2.1 BROAD SKILL COMPONENT TO BE COVERED DURING ON-JOB TRAINING

A. BLOCK – I (09 months)

1. Safety and best practices/Basic Industrial Culture (5S, KAIZEN, etc.).
2. Prepare different types of documentation as per industrial need by different methods of recording information**.**
3. Identification of raw material such as Quartz Feldspar and Clays
4. Methods of elementary sampling and quality control test.
5. Weightment of raw materials for a given composition.
6. Charging and discharging of Ball mills
7. Operation of Magnetic separator and vibratory screen.
8. Measurement of specific gravity, viscosity etc
9. Lining of Ball Mill – charging and discharging
10. Scrap blunginh – maintaining ratio of returns to fresh
11. Charging of pugmill and checking of vacuum
12. Filter pressing – operation of filter pump
13. Releasing filter press cakes of different hardness, use of hardness gauge and
    a) Shocking of cakes
14. Precautionary steps in using pugmill and blanks
15. Checking the hardness of cakes and blanks
16. Checking vacuum by silicing method
17. Throwing jiggering and jollying
18. Releasing from moulds use of rings and blanks
19. Fixing dies and lubrication techniques.
20. Checking the hardness for finishing and finishing as per drawing
21. Measuring dimensions, fixing of templates and use of tools
22. Mounting of templates on potters lathes and operation on lathes
23. Measurement of Humidity, temperature and other control parameters in Drying chamber.
24. Dry finishing to Drawing
25. Inspection, Determination of Moisture content before glaze

B. BLOCK – II (09 months)

1. Determination of glaze characteristics and preparation of glaze and glazing by dipping.
2. Spray glazing and sanding
3. Examining various types of ceramic kilns namely round ad rectangular down draught kilns and tunnel kilns
4. Examination of different type of ceramic kiln through fuel system, Dempor system, loading and unloading Saggers Movement of Trolley, pushing system gas and oil fired Tunnel kilns operations
5. Oil and gas Burner control
6. Control of fixing by test picec. Seger cone Buller ring etc
7. Measurement of temperature and the use of Recording Instruments operation of Pyrometer and Theromo couple, recording temperature from Recording and indicator.
8. Making segger, studying of drawing of Down Draught Chamber and Tunnel Kilns for repairs.
9. Writing the log book during firing – temp. , atmosphere, pressure etc.
10. Loading methods and technique, use of saggers and setters.
11. Unloading, inspection, sampling methods for routine tests.
12. Analysis of defects and their rectification
13. Cutting and grinding – use of proper cutting tolls, measurement of finish and dimension.
14. Electrical, Thermal, Porosity & Mechanical test (Simple Test)
15. Use of Jigs and fixtures for Assembly (Cementing and Assembly)& testing.
16. Steam curing. Hot Water curing and Air curing
17. Packing – use of tensioners, palletizing etc
18. Perform TPM (Total Production Management), TQM (Total Quality Management) and record keeping system.

8. ASSESSMENT STANDARD

8.1 Assessment Guideline:

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking assessment. Due consideration to be given while assessing for team work, avoidance/reduction of scrape/wastage and disposal of scarp/wastage as per procedure, behavioral attitude and regularity in training.

The following marking pattern to be adopted while assessing:

a)Weightage in the range of 60-75% to be allotted during assessment under following performance level:

For this grade, the candidate with occasional guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of an acceptable standard of craftsmanship.

In this work there is evidence of:

- good skill levels in the use of hand tools, machine tools and workshop equipment
- many tolerances while undertaking different work are in line with those demanded by the component/job.
- a fairly good level of neatness and consistency in the finish
- occasional support in completing the project/job.

b)Weightage in the range of above75%- 90% to be allotted during assessment under following performance level:

For this grade, the candidate, with little guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of a reasonable standard of craftsmanship.

In this work there is evidence of:

- good skill levels in the use of hand tools, machine tools and workshop equipment
- the majority of tolerances while undertaking different work are in line with those demanded by the component/job.
- a good level of neatness and consistency in the finish
- little support in completing the project/job

c)Weightage in the range of above 90% to be allotted during assessment under following performance level:

For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.

In this work there is evidence of:

- high skill levels in the use of hand tools, machine tools and workshop equipment
- tolerances while undertaking different work being substantially in line with those demanded by the component/job.
- a high level of neatness and consistency in the finish.
- minimal or no support in completing the project

8.2 FINAL ASSESSMENT- ALL INDIA TRADE TEST FOR APPRENTICE

SUBJECTS	Marks	Sessional Marks	Full Marks	Pass Marks	Duration of Exam.
Practical	300	100	400	240	08 hrs.
Trade Theory	100	20	120	48	3 hrs.
Workshop Cal. & Sc.	50	10	60	24	3 hrs.
Engineering Drawing	50	20	70	28	4 hrs.
Employability Skill	50	-	50	17	2 hrs.
Grand Total	**550**	**150**	**700**	**-**	

Note: - The candidate pass in each subject conducted under all India trade test.

9. FURTHER LEARNING PATHWAYS

Employment opportunities:

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

- Ceramic & related ancillary industries

ANNEXURE – I

TOOLS & EQUIPMENT FOR BASIC TRAINING

INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

TRADE:INSULATOR MAKER MACHINE OPERATOR (CERAMIC)

LIST OF TOOLS & EQUIPMENTS FOR 20APPRENTICES

A : TRAINEES TOOL KIT:-

Sl. No.	Description	Qty.
1	Safety goggles (armoured heat proof)	1 No.
2	Protective apron (jute or Asbestos)	1 No.
3	Rule steel 300 M.M. /12”	1 No.
4	Tool Tray	1 No.
5	Hand brush 25 mm	1 No.
6	Steel rule 6” /150 mm	1 No.
7	Foot wear / Asbestor over- shoes	1 No.
8	Try square 250 mm/10”(for wood work)	1 No.
9	Marking Gauge (wood work)	1 No.
10	Diagonal Scale	1 No.
11	Divider	1 No.
12	Iron Moulds	3 Nos.
13	Wooden Moulds	3 Nos.
14	Crucible (30 c.c. capacity)	1 No.
15	Tongs (Nickel plated)	1 No.
16	Specific gravity bottle	1 No.

B: Tools, Instruments and General Shop Out fits and General Machineries.

Sl. No.	Description	Quantity
1.	Standard chemicals required forAcidimetry and Alkalimetry	As per required
2.	Torson Viscometer	1
3.	Small Filter Press	1
4.	Small Vacumpugmill (motorised)	1

5.	Moulds of rupture apparatus	1
6.	Platinum Crucible (30 c.c. Capacity)	2
7.	Nickel Crucible	8
8.	Electric Furnace 1000 c capacity	1
9.	Electric Furnace 1450 c capacity	1
10.	Gas Fired Muffle furnace 1200c capacity	1
11.	Vacuum pump	1
12.	Vacuum Descricator	2
13.	Porcelain Mortar & Pestle	6
14.	Iron Mortar & pestle	3
15.	Horse shoe magnet	4
16.	Stop Watch	2
17.	Chemical Balance	2
18.	Student Petrological Microscope	1
19.	Tongs assorted	4
20.	Asbestos Hand Gloves	4 Pair
21.	Pint Mug Enamel	6
22.	Rule, contraction 600 mm	1
23.	Drill, Ratchet Brace 10”/2500 mm	1
24.	Auger 6,9,12, 125 mm assorted	1 Each
25.	Blow lamp, Kerosene	2
26.	Shovel hand	2
27.	Wheel Barrows	1
28.	Funnel Enamel 75 mm	4
29.	Funnel Enamel 150 mm	4
30.	Double ended bench Grinder(150 mm wheel dia)	1
31.	Drying oven	1
32.	Liquid limit device	1
33.	Magnifying Lense	3
34.	Physical Balance (upto 250 gm	3
35.	Travelling Microscope	1
36.	Jaw crusher*	1
37.	Roller Mill*	1

38.	Edge Runner*	1
39.	Hammer mill*	1
40.	Ball Mill*	1
41.	Pot Mill (3 to a set)	3 Set
42.	Weight Scale 10 kg. capacity	1
43.	Weight Scale 50 kg. capacity	1
44.	Burettle Pipette measuring Cylinder etcAs required in a Chemical laboratory	As required
45.	Standard service (I.S. Std.)	1 Set
46.	Chisel cold flat 12 mm	4
47.	Chisel cold flat 20 mm	4
48.	Hammer ball pein 1 kg.	4
49.	Hammer ball pein 2 kg	4
50.	Half round file 150 mm	4
51.	Renner flat	4
52.	Wrench adjustable 75 mm	2
53.	Wire Brush	4
54.	Screw Driver 250 mm	3
55.	Screw Driver 150 mm	4
56.	Engineering try square 150 mm	2
57.	Scriber 200 mm	4
58.	Pliers 200 mm	4
59.	Caliper outside 150 mm	4
60.	Caliper inside 150 mm	4
61.	Face shicld s (clear)	8
62.	Head Wear	8
63.	Fire extinguisher foam chemical(According to factory regulation)	2
64.	First aid box including burn treatment	2
65.	Fire Buckets with stand	4 Sets
66.	Work bench 2MX1.5MX750MM	2 Nos
67.	Vice, Bench 125 mm jaw	4
68.	Lockers Steel with 8 Drawers each	2
69.	Hack saw frame adjustable 225 mm to 300 mm	4
70.	Hack saw blades 300 mm	AS required

71.	Mallet Hide	4
72.	Different tools appliances for colouring	8 Sets
73.	Taper trowel	4
74.	Temp – Recorder	4 Sets
75.	Bunesen Burner	8 Sets
76.	Refractory Fire Bricks	As required
77.	Oil / Gas burner	4 Set each
78.	Pyrometer / Thermocouples	4 Set each
79.	Indicators (Tem)	4 Set each
80.	Glass Room with necessary furniture &Equipment for teacher and apprentices	1 for each
81.	Steel Almirah for Teacher	1 for each

NOTE: - AnMoU may be signed with nearby industries/ organizations (within range of 25 km) for the items marked (*) and practical training under basic training component may be carried out in the premises of that industry/ organization. However, the same organization/ industry must ensure the availability of such infrastructure during examination.

INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND ENGINEERING DRAWING

TRADE: INSULATOR MAKER MACHINE OPERATOR (CERAMIC)

LIST OF TOOLS& EQUIPMENTS FOR 20APPRENTICES

1) **Space Norms** : 45 Sq.m.(For Engineering Drawing)

2) Infrastructure:

A : TRAINEES TOOL KIT:-

Sl. No.	Name of the items	Quantity (indicative)
1.	Draughtsman drawing instrument box	20 Nos.
2.	Set square celluloid 45^0 (250 X 1.5 mm)	20 Nos.
3.	Set square celluloid 30^0-60^0 (250 X 1.5 mm)	20 Nos.
4.	Mini drafter	20 Nos.
5.	Drawing board (700mm x500 mm) IS: 1444	20 Nos.

B : FURNITURE REQUIRED

Sl. No.	Name of the items	Quantity (indicative)
1	Drawing Board	20 Nos.
2	Models : Solid & cut section	as required
3	Drawing Table for trainees	as required
4	Stool for trainees	as required
5	Cupboard (big)	01
6	White Board (size: 8ft. x 4ft.)	01
7	Trainer's Table	01
8	Trainer's Chair	01

ANNEXURE – II

INFRASTRUCTURE FOR ON-JOB TRAINING

TRADE: INSULATOR MAKER MACHINE OPERATOR (CERAMIC)

For Batch of 20APPRENTICES

Actual training will depend on the existing facilities available in the establishments. However, the industry should ensure that the broad skills defined against On-Job Training part (i.e. 9 months + 9 months) are imparted. In case of any short fall the concern industry may impart the training in cluster mode/ any other industry/ at ITI.

ANNEXURE-III

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.