CURRICULUM

FOR THE TRADE OF

OPERATOR

SINTER PLANT EQUIPMENTS

UNDER

APPRENTICESHIP TRAINING SCHEME

2017

सत्यमेव जयते
Government of India

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

CONTENTS

1. ACKNOWLEDGEMENT

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1. TATA Steel, Jamshedpur

Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

Co-ordinator for the course: Sh. Nirmalya Nath., ADT

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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 **Operator Sinter Plant Equipments** trade)

1. Tends sintering machine and auxiliary equipment, for example conveyors, pug mill, and suction fan, etc.
2. produce sinter cake from finely ground iron ore, lead, coke, and flue dust
3. Turns gas valve of sintering machine and ignites burner with torch.
4. Moves controls on panel board to start equipment.
5. Signals SINTER FEEDER (mill industry) to feed pug mill conveyor specified amounts of sinter material.
6. Feels mixture processed by pug mill to determine moisture content.
7. Moves controls to regulate water supply to pug mill to attain specified moisture in mixture.
8. Examines sinter cake produced by sintering machine and moves controls of machine to produce cake to specifications.
9. Chips sinter material from chutes and spouts of machine, using bar and hammer.
10. Records weight and type of materials used.

4. JOB ROLES: REFERENCE NCO

Brief description of Job roles:

Operate and maintain the respective sinter making equipment based on the job specification efficiently and safely & also up keep the health of the related equipment.

The important jobs are as follows:

1. Raw materials handling & preparation
2. Bedding & blending
3. Nodulizing and green mix preparation.
4. Sintering operation
5. Cooling and screening.

5. GENERAL INFORMATION

1. **Name of the Trade** **: OPERATOR SINTER PLANT EQUIPMENTS**

2. **N.C.O. Code No.** : **8121.90**

3. **Duration of Apprenticeship Training (Basic Training + Practical Training):** 15 Months

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

a) Block –I : 3 months

Total duration of Basic Training: 3 months

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

a) Block–I: 12 months

Total duration of Practical Training: 12 months

6. **Entry Qualification** : Passed 10th Class Examination

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

8. **Rebate for ITI passed trainees** : NIL

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	4-15
Basic Training	Block– I	-----
Practical Training (On - job training)	----	Block – I

Components of Training ↓	Duration of Training in Months →														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Basic Training Block - I															
Practical Training Block - I															

7. SYLLABUS

7.1 BASIC TRAINING

(BLOCK – I)

DURATION: 03 MONTHS

GENERAL INFORMATION

1) **Name of the Trade** : **OPERATOR SINTER PLANT EQUIPMENTS**
2) **Hours of Instruction** : 500 Hrs.
3) **Batch size** : 20
4) **Power Norms** : 3 KW for Workshop
5) **Space Norms** : 70 Sq. m.
6) **Examination** : The internal assessment will be held on completion of each Block.
7) **Instructor Qualification** :

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

OR

ii) NTC/NAC in the trade of **Operator Sinter Plant Equipments** with three year post qualification experience 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 DETAIL SYLLABUS OF CORE SKILL

A. Block– I
Basic Training

Topic No.	a) Engineering Drawing	Duration (in hours)	b) Workshop Science & Calculation	Duration (in hours)
		30		**20**
1.	Introduction to Engineering drawing, its importance and uses in engineering fields. Simple definitions of Points, Lines, Parallel straight lines.		Applied workshop problems involving simple addition, subtraction, multiplication, division and common fractions.	
2.	Geometrical construction of Square, Rectangle, Triangle, Circle, Polygons, etc.		Science- Definition, Nomenclature, various branches, significance and definitions of important terms.	
3.	Drawing different types of lines.		Rounding of decimal values, use of approximation.	
4.	Free hand sketch of Hand tools used in the trade.		Units – Definition, fundamental & derived units, system of units- FPS, CGS, MKS and SI units of some important parameters- Length , mass, time, density, current, voltage, pressure etc. Unit conversion.	
5.	Screw Threads – Forms of Various Screw threads used in general in the industry – Nomenclature, convention		Workshop problems related to average.	
6.	Fastening Devices – Temporary and Permanent. Meaning and difference. Temporary Device – Hexagonal Bolt, Nut, Check Nut, Washer.		Workshop problems related to percentage.	
7.	Different Methods of Preventions of rotation of Bolts - Check nut, Square headed bolt, Square headed bolt with square neck, cup headed bolt, Eye bolt, counter sunk headed bolt, rag bolt, etc.		Workshop problems related to ratio and proportion.	
8.	Different Methods of locking of nuts :- a) Lock nuts, b) Split pin, c) Slotted nut , d) Symmonds nut, e) Castle nut**, f**) Wings nut, etc.		Workshop problems related on time & work.	
9.	Permanent Fastening Devices- Rivets – different parts and their types Different types of rivet heads.		Profit & Loss and problems concerning to workshop practices.	

10.	Rivets Joints – Lap joint and Butt or Strap joint. Lap Joint – a) Single Riveted, b) Double riveted, i) Chain, ii) zig – zag Butt Joint – a) Single plate or strap, b) Double plate or strap		Properties of Matter- Different types of Properties of Matter e.g. Mechanical, Electrical, Chemical, Magnetic.	
11.	Keys and Cotter Joints, Difference between Keys and Cotters, Different types of Keys.		Properties of Matter (Mechanical) - Tenacity, Toughness, Malleability, Ductility, Elasticity, Plasticity, Brittleness, Hardness (concept & definition)	
12.	---		Properties and uses of copper, zinc, lead, tin, aluminum, brass, bronze, solder, bearing metals, timber, and rubber.	
13.	---		Engineering Material- Introduction, classification, Metallic- Non metallic material, physical and mechanical properties,	
14.	---		Heat & temperature- Definition and its importance. Scales of Temperature, e.g. Fahrenheit, Centigrade, Kelvin- relationship between them.	
15.	---		Transmission of heat- Conduction, Convection and Radiation. Examples from Industries (concept & definition)	
16.	---		Transmission of Power and motion of Belt and Pulleys:- Driver and Follower – Open and Cross belt system of belt drives. Velocity ratio. Power Transmission by belt – Problems	

7.1.2 DETAIL 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. Safety regarding working with different types of steam and its First-Aid.	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 e.g.; 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. Define environment, environment Pollution, Pollutants, type of Pollution (Air pollution, water pollution, soil pollution noise pollution, thermal pollution, radiation. Global warming its causes and remedies. Industrial Waste its types, sources and waste Management. **Induction & Safety Training** Company Profile, Significance of Steel Business Plant familiarization, Layout, Product Mix, Objectives. Safety, Health & Environment Awareness Basic skill development training on Use of Tools, Basic Measuring Instruments, Coupling & Alignment, Welding, Gas Cutting.
2.	**Video demo of the Sinter Plant processes**	**Introduction to Sinter Plant** 1. Introduction to sintering, equipment details, flow process, organization structure, working of sinter plant, 2. Safety instruction for Sinter plant 3. Hazards of sinter plant 4. Material handling equipment safety 5. System of permits and shutdown **Sinter plant equipments** 1. Introduction to various material handling equipments at sinter plant

		2. Layout and capacity, 3. Operational parameters of equipments 4. Maintenance schedule and identification of trouble 5. Safety devices on equipments and their functions 6. Lubrication system 7. Identification of troubles and proper reporting.
3.	**Video demo of the Material receiving and proportioning processes** Practice on sinter plant.(Involving different role of material, layout, operational parameters and other operations.)	**Material receiving and proportioning** 1. Introduction to various material received at sinter plant 2. Functions and role of material receiving 3. Layout and capacity & interlocks. 4. Operational parameters of equipments 5. Identification of trouble 6. Safety devices on equipments and its functions 7. Calculation of material received and sinter production based on yield and blend mix consumption
4.	**Video demo of the balling and drum operating processes**	**Balling and Nodulising Drum Operation** 1. Introduction to Nodulising drum and its functions 2. Layout and details & interlocks. 3. Operational parameters of Nodulising Drum 4. Maintenance schedule and trouble shooting 5. Safety devices on equipments and its functions 6. Air blaster
5.	**Video demo of the compressor operating processes** Practice on Compressor Operation.(Involving different tyes of operations.)	**Compressor Operation** 1. Introduction to Compressor and its functions 2. Pre and Post Start Checks 3. Layout details & interlocks. 4. Operational parameters of equipments 5. Maintenance schedule and trouble shooting 6. Safety devices on equipments and its functions 7. Screw compressor 8. Air filters and driers 9. Air tanks and piping networks 10. Nitrogen change over 11. Handling Emergency situations.
6.	**Video demo of the pump house operating processes**	**Pump House Operation** 1. Introduction to pumps like cold circulating , drinking water, make up water pumps, booster pumps 2. Layout and capacity & interlocks. 3. Operational parameters of pumps and pump house

		4. Identification of troubles 5. Safety devices on equipments and its functions 6. Pipe line network details 7. Types of valves manual and motorized 8. Level sensors and calibration 9. Interlock arrangements
7.	Practice on Exhauster operation.(Involving different profile)	**Exhauster Operation** 1. Introduction to exhauster operation 2. Layout and capacity & interlocks. 3. Operational parameters of exhauster 4. Identification of troubles 5. Safety devices on equipments and its functions 6. Lubrication pump and pipe line details 7. Damper control 8. Interlock scheme 9. Precautions during start up and shut down
8.	**Video demo of the gas mixing and boosting station processes**	**Gas Mixing and Boosting Station** 1. Introduction to gas booster and gas lines 2. Layout and capacity & interlocks. 3. Operational parameters of gas booster 4. Identification of troubles 5. Safety devices on equipments and its functions 6. Gas valves and functions 7. Interlock scheme 8. Precautions during start up and shut down 9. Steps for shutdown
9.	**Video demo of the sinter machine operating processes** Practice on sinter machine operation.(Involving different types of sinter operations)	**Sinter machine operation** 1. Introduction to sintering. 2. Quality parameters. 3. Details of equipments, capacity and design features. 4. Sinter cooling and normalizing. **Sinter Dispatch operation** Introduction sinter disposal route Layout and capacity Operational parameters of conveyors of disposal route Identification of troubles Safety devices on equipments and its functions Control desk operation Interlock system Precautions during start up and shut down Liners for chutes Flap gate
10.	**Video demo of the Pollution control equipment operating processes**	**Pollution Control Equipments Operation** 1. Working of ESP, Multicellar, heat recovery, cyclones 2. Design layout and Capacity.

		3. Operational parameters 4. Maintenance schedule and trouble shooting 5. Safety devices on equipments and its functions 6. Dust disposal scheme 7. Air conditioning system 8. Water cooling network and booster pump
11.	**Video demo of the sinter screening system processes.**	**Technical Cell** Working of technical cell **Sinter Screening System** 1. Introduction sinter screens 2. Capacity and layout 3. Operational parameters of screens 4. Identification of troubles 5. Safety devices on equipments and its functions 6. Auto and manual operation 7. Interlock scheme 8. Precautions during start up and shut down 9. Liners for chutes 10. Changeover chutes
12.	**Video demo of the lime dosing system processes**	**Lime Dosing System** 1. Introduction lime dozing system. 2. Layout and capacity 3. Operational parameters of lime dozing system. 4. Identification of troubles 5. Safety devices on equipments and its functions 6. Interlock scheme 7. Precautions during start up and shut down
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	
	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)
DURATION: 12 MONTHS

GENERAL INFORMATION

1) **Name of the Trade** : **OPERATOR SINTER PLANT EQUIPMENTS**

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** Engg. from recognized university/Board with one/two year post qualification experience in the relevant field.

OR

ii) NTC/NAC in the trade of **Operator Sinter Plant Equipments** with three year post qualification experience 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
DURATION: 12 MONTHS

1. **Introduction to Sinter Plant:**

- Use of protective devices like helmet, gloves, safety belts
- Use of gas safety devices
- Use of fire fighting equipments
- Layout of sintering plant, assembly point, emergency exits
- Visit to Hazardous areas of sintering plant

2. **Sinter plant equipments:**

- Operation of various material handling equipments with monitoring and logging of operational parameters
- Schedule and critical check up before start up
- Inspection during running of equipments
- Housekeeping activities of equipment
- Operation during conditions of overload, jam, drive failure
- Actions during emergency conditions
- Logging of parameters
- Procedure for shut down
- Inspection of side skirts, return idlers, back plate rubber, chute liners, CCD etc.
- Identification of troubles

3. **Material receiving and proportioning:**

- Operation of weigh feeders/ receiving conveyors
- Operational aspects for material receiving like sequence of bunker filling, level of filling , withdrawal sequence etc.
- Calibration of weigh feeders
- Online cleaning during shutdown
- Inspection of equipments and log book recording
- Inspection of running equipments
- Housekeeping activities of equipment and grill at bunker top including boulder removal and disposal
- Operation during conditions of overload, jam, drive failure

- Actions during emergency conditions
- Logging of parameters
- Procedure for shut down of equipment

4. **Balling and Nodulising Drum Operation:**

- Operation in local and auto mode
- Online inspection of Drum Lubrication and greasing of tyres
- Inspection of water spray nozzles
- Discharge chute and inlet chute inspection and cleaning activity
- Housekeeping activities of equipment
- Operation during conditions of overload, jam, drive failure
- Actions during emergency conditions
- Procedure for shut down of equipment
- Air blaster operation
- Operation of jack hammer
- Flushing of lines water and air

5. **Compressor Operation:**

- Operation of Compressor both in local and auto mode
- Online inspection of Compressor Lubrication
- Check up procedure before start up
- Cleaning of filters
- Housekeeping activities of equipment
- Operation during conditions of overload, jam, drive failure
- Actions during emergency conditions
- Procedure for shut down of equipment
- Operation of air drier
- Air tank operation
- Different valves, coolers, gauges, instruments operation
- Starting and stopping of compressor

6. **Pump House Operation:**

- Operation of Pumps both in local and auto mode
- Online inspection of pump and glands
- Check up procedure before start up
- Gland packing

- Housekeeping activities of equipment
- Operation during conditions of overload, jam, drive failure
- Actions during emergency conditions
- Procedure for shut down of equipment
- Diesel pump operation
- Fire fighting pump operation
- Different valves gauges, instruments operation
- Operation in Auto and manual mode

7. **Exhauster Operation:**

- Operation of exhauster in local mode
- Online inspection of exhauster
- Check up procedure before start up
- Housekeeping activities of equipment
- Actions during emergency conditions
- Procedure for shut down of exhauster
- Operation in Auto and manual mode r
- Oil pump change over
- Temperature and pressure gauges, scanners reading and reporting
- Oil cooler and water circuit operation

8. **Gas Mixing and Boosting Station:**

- Operation of gas boosters in local mode and Auto mode
- Check up procedure before start up
- Housekeeping activities of equipment
- Actions during emergency conditions
- Procedure for shut down of gas booster
- Running checkups for booster
- Oil pump change over
- Water seal operation, bleeder operation
- Operation of Nitrogen purging
- Gas sample and analysis
- Booster balancing
- Inverter operation for booster
- Interlock arrangement

9. **Sinter machine operation:**

- Upkeep of segregation plate & Deflector plate.
- Raw mix bin level control
- Control of moisture, temperature, machine speed
- Loading of sinter machine.
- Bed height adjustment
- Start and stop of machine
- Operation of equipment through Digital display & control system.
- Operation of various equipment through PLC terminals.
- Understanding of various groups of equipments.
- Interlock arrangement.
- Recording of data.
- Grate bar changing.
- Emergency situation handling

10. **Sinter Dispatch operation:**

- Operation of disposal route
- Check up procedure before start up
- Housekeeping activities of equipment
- Actions during emergency conditions
- Cleaning of chutes
- Running checkups for conveyors
- Surge bin operation
- Vibro feeder interlocks
- Operation of Nut coke addition system
- Interlock schemes
- Control desk operation
- Coordination with high lines

11. **Pollution Control Equipments Operation:**

- Operation of Electro Static Precipitator (ESP), flight conveyors, sluice feeders, DDGV (Double Dust Gate Valve), Flap gates
- Check up procedure before start up
- Housekeeping activities of equipment
- Actions during emergency conditions

- Cleaning of chutes
- Running checkups for ESP
- Monitoring of current and voltage of ESP
- Interlock arrangement
- Steps for Shut down
- Operation of air conditioning system
- Pipe line network, valve operation and booster pump operation and inspection of ESP ducts.

12. **Technical Cell:**

- Data entry in Computers.
- Operation of Management information system
- Record keeping & back up taking
- Preparation of daily, monthly and yearly report
- Data exchange with concerned departments

13. **Sinter Screening System:**

- Operation of screens in auto and local mode.
- Oil cellar operation.
- Checking and upkeep of mats.
- Cleaning of screen chutes.
- Housekeeping activities of equipment
- Actions during emergency conditions

14. **Lime Dosing System:**

- Operation of lime dozing equipments from control panel.
- Lime tanker operation.
- Operation of compressed air tanks.
- Operation of safety devices installed in lime tankers.

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:

- demonstration of good operational skills while executing the assigned job.
- different accuracy achieved while undertaking different skills demanded by the job.
- a fairly good level of neatness and consistency in handling controls.
- 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 operation while executing the assigned job.
- the majority of the accuracy achieved while undertaking different skills demanded by the job.
- a good level of neatness and consistency in handling controls.
- little support in completing the 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 operation while executing the assigned job.
- accuracy while undertaking different work being substantially in line with those demanded by the 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.

8. FURTHER LEARNING PATHWAYS

Employment opportunities:

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

1. Manufacturing & Process industries like steel plant and other related industries etc.

ANNEXURE – I

TOOLS & EQUIPMENT FOR BASIC TRAINING

INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

TRADE: OPERATOR SINTER PLANT EQUIPMENTS

LIST OF TOOLS & EQUIPMENTS FOR 20 APPRENTICES

As per training need the tools & equipment may be procured.

INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND ENGINEERING DRAWING

TRADE: OPERATOR SINTER PLANT EQUIPMENTS

LIST OF TOOLS & EQUIPMENTS FOR 20 APPRENTICES

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: OPERATOR SINTER PLANT EQUIPMENTS

For Batch of 20 APPRENTICES

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. 12 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.