

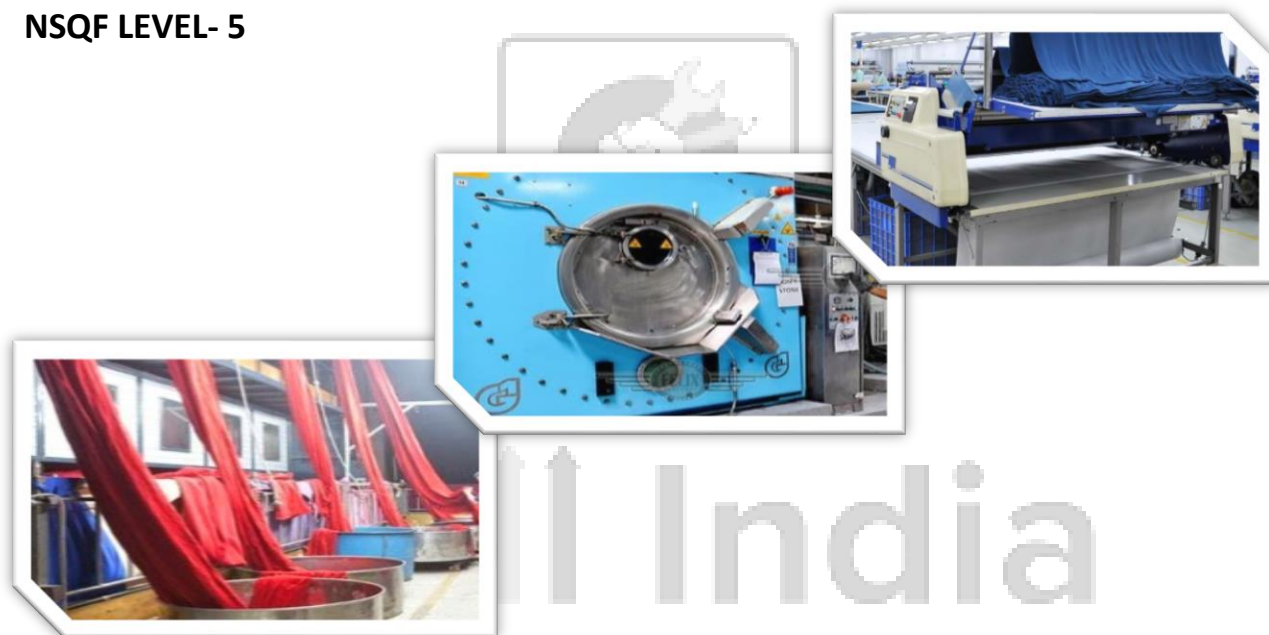
TEXTILE WET PROCESSING TECHNICIAN

COMPETENCY BASED CURRICULUM

(Duration: 2 Yrs.)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL- 5



India

कौशल भारत - कुशल भारत
SECTOR – TEXTILE AND HANDLOOM



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

TEXTILE WET PROCESSING TECHNICIAN

(Designed in 2020)

APPRENTICESHIP TRAINING SCHEME (ATS)



Skill India
कौशल भारत - कशल भारत

Developed By

Ministry of Skill Development and Entrepreneurship
Directorate General of Training
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Textile Wet Processing Technician

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1. BACKGROUND

1.1 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 DGT 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 DGT 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.

1.2 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.

1.3 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.



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2. TRAINING SYSTEM

2.1 GENERAL

Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under aegis of National Council of Vocational Education & Training (NCVET). Craftsman Training Scheme (CTS) and Apprenticeship Training Scheme (ATS) are two pioneer programmes of DGT for propagating vocational training.

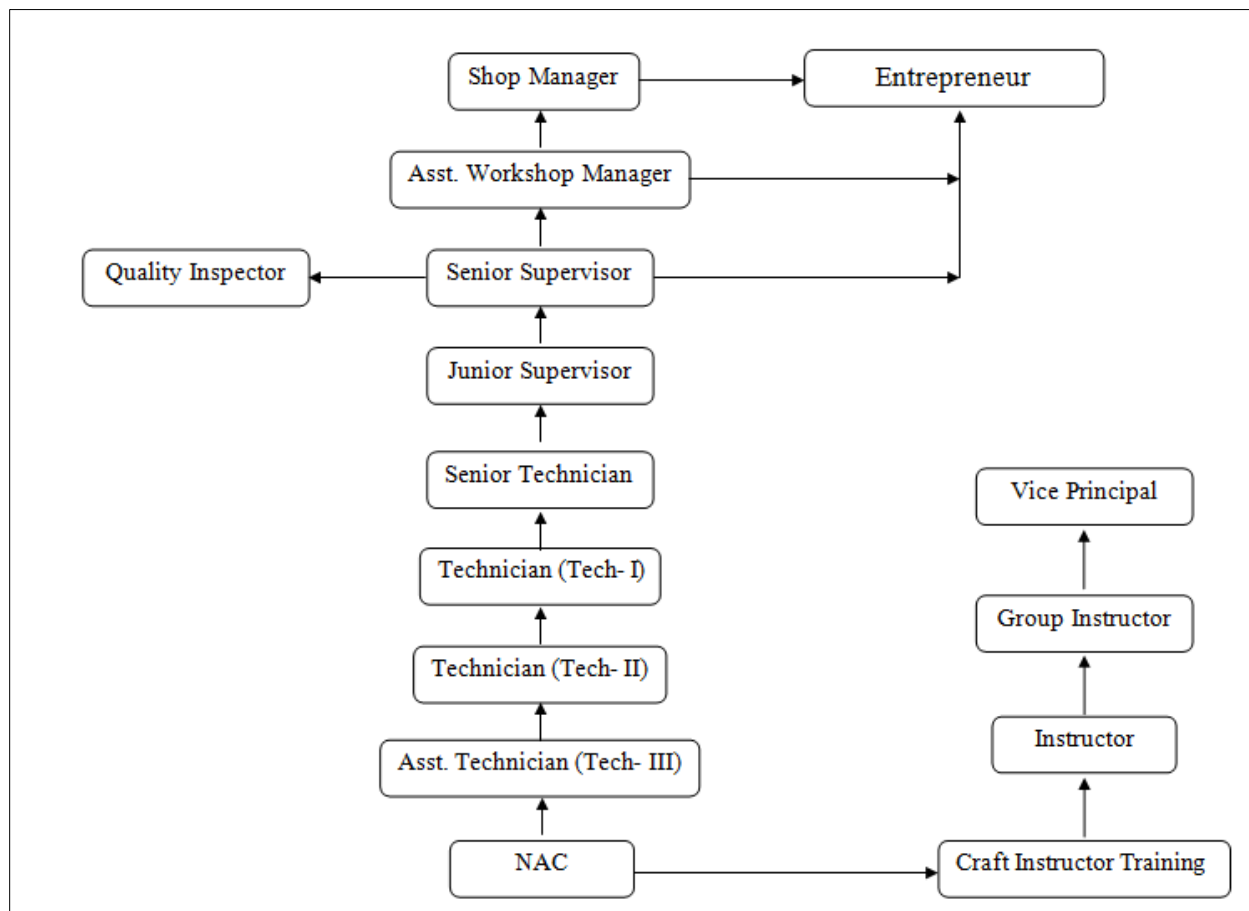
Textile Wet Processing Technician trade under ATS will be delivered nationwide through different industries. The course is of two years (02 Blocks) duration. It mainly consists of Domain area and Core area. In the Domain area Trade Theory & Practical impart professional - skills and knowledge, while Core area - Workshop Calculation and science, Engineering Drawing and Employability Skills imparts requisite core skills & knowledge and life skills. After passing out the training programme, the trainee is being awarded National Apprenticeship Certificate (NAC) by DGT having worldwide recognition.

Broadly candidates need to demonstrate that they are able to:

- Read & interpret technical parameters/document, plan and organize work processes, identify necessary materials and tools;
- Perform task with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge, core skills & employability skills while performing jobs and solve problem during execution.
- Check the job/assembly as per drawing for functioning, identify and rectify errors in job/assembly.
- Document the technical parameters related to the task undertaken.

2.2 CAREER PROGRESSION PATHWAYS:

- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming instructor in ITIs.
- Indicative pathways for vertical mobility.



2.3 COURSE STRUCTURE:

Table below depicts the distribution of training hours across various course elements during a period of two years (*Basic Training and On-Job Training*): -

Total 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

A. Basic Training

For 02 yrs. course (Engg.) :-(**Total 06 months:** 03 months in 1styr. + 03 months in 2nd yr.)

For 01 yr. course (Engg.) :-(**Total 03 months:** 03 months in 1styr.)

SL. No.	Course Element	Total Notional Training Hours	
		For 02 Yrs. course	For 01 Yr. course
1.	Professional Skill (Trade Practical)	550	275
2.	Professional Knowledge (Trade Theory)	240	120
3.	Workshop Calculation & Science	40	20
4.	Engineering Drawing	60	30
5.	Employability Skills	110	55
	Total (Including internal assessment)	1000	500

B. On-Job Training:-

For 02 yrs. Course (Engg.) :-(**Total 18 months:** 09 months in 1styr. + 09 months in 2nd yr.)

Notional Training Hours for On-Job Training: 3120 Hrs.

For 01 yr. course (Engg.) :-(**Total 12 months**)

Notional Training Hours for On-Job Training: 2080 Hrs.

C. Total training hours:-

Duration	Basic Training	On-Job Training	Total
For 02 yrs. course (Engg.)	1000 hrs.	3120 hrs.	4120 hrs.
For 01 yr. course (Engg.)	500 hrs.	2080 hrs.	2580 hrs.

2.4 ASSESSMENT & CERTIFICATION:

The trainee will be tested for his skill, knowledge and attitude during the period of course and at the end of the training programme as notified by Govt of India from time to time. The Employability skills will be tested in first two semesters only.

a) The **Internal assessment** during the period of training will be done by **Formative assessment method** by testing for assessment criteria listed against learning outcomes. The training institute have to maintain individual *trainee portfolio* as detailed in assessment guideline. The marks of internal assessment will be as per the template (Annexure – II).

b) The final assessment will be in the form of summative assessment method. The All India Trade Test for awarding NAC will be conducted by DGT on completion of course as per guideline of Govt of India. The pattern and marking structure is being notified by govt of India from time to time. **The learning outcome and assessment criteria will be basis for setting question papers for final assessment. The examiner during final examination will also check** individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

The minimum pass percent for Practical is 60% & minimum pass percent for Theory subjects 40%. The candidate pass in each subject conducted under all India trade test.

2.4.2 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 should be given while assessing for team work, avoidance/reduction of scrap/wastage and disposal of scarp/wastage as per procedure, behavioral attitude, sensitivity to environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work

Evidences of internal assessments are to be preserved until forthcoming semester examination for audit and verification by examination body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60 -75% to be allotted during assessment	
For performance in 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.	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipment • Below 70% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • 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	
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.	• Good skill levels in the use of hand tools, machine tools and workshop equipment • 70-80% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • 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	
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.	• High skill levels in the use of hand tools, machine tools and workshop equipment • Above 80% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • A high level of neatness and consistency in the finish. • Minimal or no support in completing the project.

3. JOB ROLE

Brief description of job roles:

Singeing Machine Man/Singeing Machine Operator; tends singeing machine to burn fluff and rough protruding fibres on cloth to get better finish. Adjusts cloth roll at feed-end of machine. Runs loose end of cloth through guides and feeds it through rollers. Lights burners in machine and regulates flow of gas to obtain desired flame. Starts machine and observes cloth as it runs over burner flames. Avoids scorching of cloth, ensuring burning of fluff and unwanted threads and better finish to it. Adjust machine where necessary for creaseless flow and proper singeing of cloth. Cleans and oils machine.

Stentering Machine Man/Stentering Operator; Tenter Machine Man; Tentering Machine Man (Textile) tends stentering machine or frame which dries and restores original width of cloth after dyeing, washing or finishing. Adjusts stenter frames according to width of cloth. Starts machine. Ensures that cloth passes through machine without damage from stenter clips and is properly stretched. May be known as ASSISTANT STENTERING MACHINE MAN or BACK STENTERING MACHINE MAN if working at delivery end of machine. Cleans and oils machine.

Jigger Man (Cotton Textile)/Jigger Machine Operator; dyes cloth by operating jigger machine. Fits undyed cloth rolls on machine and passes one end of rolled cloth carefully through vat on to other roller for making rolls of dyed cloth. Prepares dyeing solution of required shade, pours it into jigger vat and ensures that cloth passing through vat is completely dipped in dyeing solution. Starts machine. Allows undyed cloth to unroll from roller, pass through colouring solution in jigger vat to get dyed and then get rolled on other roller. Takes proper care to maintain temperature and level of dye liquor and ensures proper dyeing of cloth without spots and creases. Gets sample of dyed cloth approved. Cleans and oils jigger machine. May operate automatic or ordinary jigger machine.

Padding Machine Man/Padding Mangle Operator; tends padding machine for treating cloth with light preliminary coat of dye or chemicals preparatory to further processing. Mounts cloth roll on machine and passes loose end of cloth through guide-rollers and trough to roller at opposite side. Pours dye or chemical solution into trough of machine and ensures that cloth is completely dipped in it. Opens steam valve to heat dye or chemical solution to required temperature. Starts machine. Adjusts pressure on rollers and ensures smooth flow of cloth through solution on to roller at opposite side. Cleans and oils machine. May rinse dyed material and pass it on to Drier for further processing.

Kierman (Textile)/Package Dyeing Machine Operator; tends kier (vat for boiling yarn or cloth) for bleaching and dyeing. Puts chemicals in tanks and lets in water and opens steam to boil chemical

solution. Puts cloth or yarn into kier with help of Piler ensuring that cloth or yarn is properly piled. Closes and secures mouth of kier and pumps chemical solution from tank into kier. Checks level and circulation of solution, controls temperatures and pressure in kier and ensures that yarn or cloth is properly boiled.

Printing Master (Textile);organize, direct and supervise printing of cloth in various designs ensuring quality, output and smooth running of printing department. Arrange for supply of necessary chemicals and dyes. Check mixing of colours in required proportions for printing purpose. Examine printed sample to check its quality and carries out chemical tests to ensure its fastness. Ensure regular supply or required quantity of cloth for printing in their department. Get printing rollers with required engraving of pattern fitted in printing machines. Supervises work of Printers, Textile to ensure quality output. Maintains record of job orders completed, and batches of colours used. May check operations of printing machines to ensure optimum output and may make arrangements for repair of defects in machines or replacements of parts.

Reference NCO-2015:

- (i) 8154.2700 – Singeing Machine Man/Singeing Machine Operator
- (ii) 8154.2100 – Stentering Machine Man/Stentering Operator
- (iii) 8154.1000 – Jigger Man (Cotton Textile)/Jigger Machine Operator
- (iv) 8154.2300 – Padding Machine Man/Padding Mangle Operator
- (v) 8154.0200 – Kierman (Textile)/Package Dyeing Machine Operator
- (vi) 2141.1700 – Printing Master (Textile)

4. NSQF LEVEL COMPLIANCE

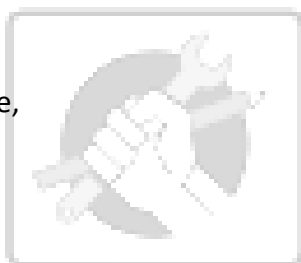
NSQF level for Textile Wet Processing Technician trade under ATS: **Level 5**

As per notification issued by Govt. of India dated- 27.12.2013 on National Skill Qualification Framework total 10 (Ten) Levels are defined.

Each level of the NSQF is associated with a set of descriptors made up of five outcome statements, which describe in general terms, the minimum knowledge, skills and attributes that a learner needs to acquire in order to be certified for that level.

Each level of the NSQF is described by a statement of learning outcomes in five domains, known as level descriptors. These five domains are:

- a. Process
- b. Professional knowledge,
- c. Professional skill,
- d. Core skill and
- e. Responsibility.



The Broad Learning outcome of Textile Wet Processing Technician trade under ATS mostly matches with the Level descriptor at Level- 5.

The NSQF level-5 descriptor is given below:

Level	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
Level 5	Job that requires well developed skill, with clear choice of procedures in familiar context.	knowledge of facts, principles, processes and general concepts, in a field of work or study	A range of cognitive and practical skills required to accomplish tasks and solve problem by selecting and applying basic methods, tools, materials and information.	Desired mathematical skill, understanding of social, political and some skill of collecting and organizing information, communication.	Responsibility for own work and Learning and some responsibility for other's works and learning.

5. GENERAL INFORMATION

Name of the Trade	Textile Wet Processing Technician
NCO - 2015	8154.2700, 8154.2100, 8154.1000, 8154.2300, 8154.0200, 2141.1700
NSQF Level	Level – 5
Duration of Apprenticeship Training (Basic Training + On-Job Training)	Two years (02 Blocks each of one year duration).
Duration of Basic Training	a) Block – I : 3 months b) Block – II : 3 months Total duration of Basic Training: 6 months
Duration of On-Job Training	a) Block–I: 9 months b) Block–II : 9 months Total duration of Practical Training: 18 months
Entry Qualification	Passed 10 th Class with Science and Mathematics under 10+2 system of Education or its equivalent
Selection of Apprenticeship	The apprentices will be selected as per Apprenticeship Act amended time to time.
Instructors Qualification for Basic Training	As per ITI instructors qualifications as amended time to time for the specific trade.
Infrastructure of Basic Training	As per related trades of ITI
Examination	The internal examination/ assessment will be held on completion of each block. Final examination for all subjects will be held at the end of course and same will be conducted by DGT.
Rebate to Ex-ITI Trainees	01 year
CTS trades eligible for Textile Wet Processing Technician Apprenticeship	1. Textile Wet Processing 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.
- For imparting Basic Training the industry to tie-up with ITIs having such specific trade and affiliated to DGT.

6. LEARNING OUTCOME

6.1 GENERIC LEARNING OUTCOME

The following are minimum broad Common Occupational Skills/ Generic Learning Outcome after completion of the Textile Wet Processing Technician course of 02 years duration under ATS.

Block I &II:-

1. Recognize & comply safe working practices, environment regulation and housekeeping.
2. Work in a team, understand and practice soft skills, technical English to communicate with required clarity.
3. Explain the concepts and principles of basic arithmetic, algebraic, trigonometric and apply knowledge of specific areas to perform practical operations which requires well developed skills
4. Understand and explain basic electrical and material sciences and apply the knowledge.
5. Read and apply engineering drawing for different application in the field of work.
6. Understand and explain the concept in productivity, quality tools, labour & welfare legislation and apply such in day to day work to improve productivity and quality.
7. Explain the general concept and process of energy conservation, global warming and pollution and contributes in day to day work by optimally using available resources.
8. Explain personnel finance management, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.
9. Apply the general concept of basic computer, basic operating system and uses of internet services to take benefit of IT developments in the industry.

6.2 SPECIFIC LEARNING OUTCOME

Block – I

1. Understand & explain basic concept of wet processing, its applications & safety.
2. Recognize different raw materials, properties and machinery equipment used in the trade.
3. Develop analytical skills related to the testing of water quality and efficiency of wetting agent.
4. Identify various types of fibres and apply physical and chemical methods in practice.
5. Develop skill on various chemical preparatory processes carried out for yarn and grey cloth. Washing and drying of different textiles and machineries used for washing and drying. Recognize damages after preparatory process using various methods of detection and prevention.

6. Develop skill on starching of fabric, chemical softening biochemical/enzyme assisted processes carried over for textile fabrics and Identify machineries used to finishing work of various functional processes.
7. Identify defects in blow room laps, causes and remedial measures. Identify various lubricants used for different parts of the machineries and maintenance of these machineries.

Block-II

8. Perform running a model effluent treatment plant with chemical dosing and filtration and aerations with situation of clear choice and calculations of steam & energy.
9. Plan and execute the operation of boiler.
10. Identify and select the dyeing process and troubleshoot various machineries involved.
11. Select and organize the dyeing process of wool, silk, flax and jute with suitable dyes using appropriate machines.
12. Plan and execute the working method of screen printing machines, troubleshoot and test the machinery.
13. Troubleshoot and maintain the electronic controller used in dyeing and printing machine using appropriate rules & tools.
14. Familiarization to QA System.

NOTE:

- *Learning outcomes are reflection of total competencies of a trainee and assessment will be carried out as per assessment criteria.*

7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

GENERIC LEARNING OUTCOME	
Learning Outcomes	Assessment Criteria
1. Recognize & comply safe working practices, environment regulation and housekeeping.	1.1 Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements and according to site policy.
	1.2 Recognize and report all unsafe situations according to site policy.
	1.3 Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures
	1.4 Identify, handle and store / dispose off dangerous goods and substances according to site policy and procedures following safety regulations and requirements.
	1.5 Identify and observe site policies and procedures in regard to illness or accident.
	1.6 Identify safety alarms accurately.
	1.7 Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	1.8 Identify and observe site evacuation procedures according to site policy.
	1.9 Identify Personal Productive Equipment (PPE) and use the same as per related working environment.
	1.10 Identify basic first aid and use them under different circumstances.
	1.11 Identify different fire extinguisher and use the same as per requirement.
	1.12 Identify environmental pollution & contribute to the avoidance of instances of environmental pollution.
	1.13 Deploy environmental protection legislation & regulations
	1.14 Take opportunities to use energy and materials in an environmentally friendly manner
	1.15 Avoid waste and dispose waste as per procedure
	1.16 Recognize different components of 5S and apply the same in the working environment.
2. Work in a team, understand	2.1 Obtain sources of information and recognize

and practice soft skills, technical English to communicate with required clarity		information.
	2.2	Use and draw up technical drawings and documents.
	2.3	Use documents and technical regulations and occupationally related provisions.
	2.4	Conduct appropriate and target oriented discussions with higher authority and within the team.
	2.5	Present facts and circumstances, possible solutions & use 14 English special terminology.
	2.6	Resolve disputes within the team
	2.7	Conduct written communication.
3. Explain the concepts and principles of basic arithmetic, algebraic, trigonometric and apply knowledge of specific areas to perform practical operations which requires well developed skills	3.1	Terminal examination to test basic skills on arithmetic, algebra, trigonometry and statistics.
	3.2	Their applications will also be assessed during execution of assessable outcome and also tested during theory and practical examination.
4. Understand and explain basic electrical and material sciences and apply the knowledge.	4.1	Terminal examination to test basic skills on science in the field of study including basic electrical and hydraulics & pneumatics.
	4.2	Their applications will also be assessed during execution of assessable outcome and also tested during theory and practical examination.
5. Read and apply engineering drawing for different application in the field of work.	5.1	Terminal examination to test basic skills on engineering drawing.
	5.2	Their applications will also be assessed during execution of assessable outcome and also tested during theory and practical examination.
6. Understand and explain the concept in productivity, quality tools, labour & welfare legislation and apply such in day to day work to improve productivity and quality.	6.1	Terminal examination to test the concept in productivity, quality tools and labour welfare legislation.
	6.2	Their applications will also be assessed during execution of assessable outcome.

7. Explain the general concept and process of energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	7.1 Terminal examination to test knowledge on energy conservation, global warming and pollution. 7.2 Their applications will also be assessed during execution of assessable outcome.
8. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	8.1 Terminal examination to test knowledge on personnel finance, entrepreneurship. 8.2 Their applications will also be assessed during execution of assessable outcome.
9. Apply the general concept of basic computer, basic operating system and uses of internet services to take benefit of IT developments in the industry.	9.1 Terminal examination to test knowledge on basic computer working, basic operating system and uses internet services. 9.2 Their applications will also be assessed during execution of assessable outcome.
SPECIFIC OUTCOME	
<u>Block-I & II</u>	
<i>Assessment Criteria i.e. the standard of performance, for each specific learning outcome mentioned under block – I & block – II(section: 10) must ensure that the trainee achieves well developed skill with clear choice of procedure in familiar context. Assessment criteria should broadly cover the aspect of Planning (Identify, ascertain, estimate etc.); Execution (perform, illustration, demonstration etc. by applying 1) a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information 2) Knowledge of facts, principles, processes, and general concepts, in a field of work or study 3)Desired Mathematical Skills and some skill of collecting and organizing information, communication) and Checking/ Testing to ensure functionality during the assessment of each outcome. The assessments parameters must also ascertain that the candidate is responsible for own work and learning and some responsibility for other's work and learning.</i>	

BASIC TRAINING (Block – I)**Duration: (03) Three Months**

Week No.	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
01	Implementation of various safety measures in the shop floor. Visit to different sections of the Institute. Demonstration of elementary first aid. Artificial Respiration. Practice on use of fire extinguishers. Occupational Safety & Health. Importance of housekeeping & good shop floor practices. Health, Safety and Environment guidelines, legislations & regulations as applicable. Disposal procedure of waste materials like cotton waste, metal chips/burrs etc. Basic safety introduction, Personal protective Equipment (PPE):- 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. Use of Fire extinguishers.	Occupational Safety & Health Basic safety introduction, Personal protection:- Basic injury prevention, Basic first aid, Hazard identification and avoidance, safety signs for Danger, Warning, caution & personal safety message. Use of Fire extinguishers. Visit & observation of sections. Various safety measures involved in the Industry. Elementary first Aid. Concept of Standard Introduction of First aid. Operation of electrical mains. Introduction of PPEs. Introduction to 5S concept & its application. Response to emergencies eg; power failure, fire, and system failure.
02	Visit to spinning, Weaving and Chemical Processing units.	Overview of Textile Industry History, Scope & Future Prospects. Strengths & Weakness of the industry.
03	Identify & familiar with different raw materials.	Orientation programme for recognizing different fibres.
04	Test of hardness and PH of water and to find out efficiency of given wetting agent.	Studies on General utilities. Definition of inorganic chemicals, organic chemicals, acids, alkalies, salts
05	Identification of different fibres.	Classification of Textile Fibres, description &

		properties of fibres.
06	Preparatory Chemical Processing.	Inspection of grey fabric and repairing/mending, stitching and marking, cropping.
07-08	Bleaching of yarn & grey cloth in practice. Desizing of cotton.	Study of shearing, Singeing, Desizing,
09	Chemical Softening of textile fabrics, Wash - n - wear finishing.	Damping, Calendaring, Drying and Preshrinking of cotton.
10-11	Water repellent and water proofing finish.	Calendaring & roller coating / grinding & inspection.
12-13	Lubrication of various parts and machine.	Lubrication of various parts of machinery, High density oil, Light oil, Heat resistant oil, and grease etc.
Assessment/Examination 03days		

NOTE: -

- *More emphasis to be given on video/real-life pictures during theoretical classes. Some real-life pictures/videos of related industry operations may be shown to the trainees to give a feel of Industry and their future assignment.*

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BASIC TRAINING (Block – II)**Duration: (03) Three Months**

Week No.	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
01	Calculations of energy consumption.	Energy saving in Textile Chemical Processing. Awareness about eco friendliness (eco-mark scheme) of textile products.
02	Calculation for Steam requirement.	Ecopara meters and their permissible limits for textiles. Ban of certain azo dyes.
03-04	Demonstration of running of boilers.	Boilers and its efficiency. Efficient, use of steam.
05-06	Dyeing with Direct, Basic Sulphur, vat, solubilised vat, azoic.	Brief study of Theory of colour. Definitions of Chromophore
07	reactive dyes on cotton, jute and viscose rayon.	Brief study of Theory of Auxochrome, affinity, substantively, exhaustion, Expression,
08-09	Dyeing of Polyester, nylon and acrylics with suitable dyes and dyeing machines.	Percentage of Shade, Leveling. Classification of dyes & Pigments.
10-11	Dyeing of wool, silk, flax, jute with suitable dyes, using suitable machines.	Study of tests for colour fastness for dyed textiles against washing, rubbing, hot ironing, UV-light or sunlight exposure and perspiration etc.
12	Printing of white/coloured fabrics with different dyes/ colorant.	Definition of Textile Printing. Difference between Printing and Dyeing.
13	Electronic maintenance of programmer & temperature controller in dyeing machines	Maintenance of pneumatic controls in Padding mangle Routine maintenance of various processing machines used in dyeing sections.
	Assessment/Examination 03days	

NOTE: -

- *More emphasis to be given on video/real-life pictures during theoretical classes. Some real-life pictures/videos of related industry operations may be shown to the trainees to give a feel of Industry and their future assignment.*

9. SYLLABUS - CORE SKILLS

9.1 WORKSHOP CALCULATION SCIENCE & ENGINEERING DRAWING

Block – I		
Sl. No.	Workshop Calculation and Science (Duration: - 20 hrs.)	Engineering Drawing (Duration : - 30 hrs.)
1.	Unit: Systems of unit- FPS, CGS, MKS/SI unit, unit of length, Mass and time, Conversion of units.	Engineering Drawing: Introduction and its importance - Viewing of engineering drawing sheets. Method of Folding of printed Drawing Sheet as per BIS SP:46- 2003 Drawing Instruments : their Standard and 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.
2.	Fractions & Simplification: Fractions, Decimal fraction, Multiplication and Division of Fractions and Decimals, conversion of Fraction to Decimal and vice versa. Simple problems Simplification using BODMAS.	Lines : - Definition, types and applications in Drawing as per BIS SP:46-2003 - Classification of lines (Hidden, centre, construction, Extension, Dimension, Section) - Drawing lines of given length (Straight, curved) - Drawing of parallel lines, perpendicular line - Methods of Division of line segment
3.	Square Root : Square and Square Root, method of finding out square roots, Simple problem using calculator	Drawing of Geometrical Figures: Definition, nomenclature and practice of - - Angle: Measurement and its types, method of bisecting. - Triangle -different types - Rectangle, Square, Rhombus, Parallelogram. - Circle and its elements.
4.	Ratio &Proportion: Simple calculation on related problems.	Lettering and Numbering as per BIS SP46-2003: - Single Stroke, Double Stroke, inclined, Upper case and Lower case.
5.	Percentage: Introduction, Simple calculation. Changing percentage to decimal and fraction and viceversa.	Free Hand sketch: Hand tools and measuring instruments used in electronics mechanics trades
6.	Material Science : properties - Physical & Mechanical, Types – Ferrous & Non-Ferrous, difference between Ferrous	Free hand drawing : - Lines, polygons, ellipse, etc. - geometrical figures and blocks with dimension . - Transferring measurement from

	and Non-Ferrous metals, introduction of Iron, Cast Iron, Wrought Iron, Steel, difference between Iron and Steel, Alloy steel, carbon steel, stainless steel, Non-Ferrous metals, Non-Ferrous Alloys.	the given object to the free hand sketches.
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Block – II		
Sl. No.	Workshop Calculation and Science (Duration: - 20 hrs.)	Engineering Drawing (Duration : - 30 hrs.)
1.	Mass ,Weight and Density : Mass, Unit of Mass, Weight, difference between mass and weight, Density, unit of density, specific gravity of metals	Symbolic Representation (as per BIS SP:46-2003) of : - Fastener (Rivets, Bolts and Nuts) - Bars and profile sections - Weld, brazed and soldered joints. - Electrical and electronics element - Piping joints and fittings
2.	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	Construction of Scales and diagonal scale
3.	Algebra: Addition, Subtraction, Multiplication, Division, Algebraic formula, Linear equations (with two variables).	Heald wire ,pulley,Drop Pin , Shuttle , Loom Drive ,Auxillary shaft
4.	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.	Temple , Temple cutter , Slay Board , Return Spring Box , Harness Comber Board ,Tappet
5.	Trigonometry: Trigonometrical ratios, measurement of angles. Trigonometric tables. Finding height and distance by trigonometry.	Rapier , Weft Winder , Cutter , Beam , Tension Disc , Ballon Brake Disc, Reed

9.2 EMPLOYABILITY SKILLS**(DURATION: - 110 HRS.)**

Block – I (Duration – 55 hrs.)	
1. English Literacy Duration : 20 Hrs. Marks : 09	
Pronunciation	Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)
Functional Grammar	Transformation of sentences, Voice change, Change of tense, Spellings.
Reading	Reading and understanding simple sentences about self, work and environment
Writing	Construction of simple sentences Writing simple English
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.
2. I.T. Literacy Duration : 20 Hrs. Marks : 09	
Basics of Computer	Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.
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.
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.
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.
3. Communication Skills	
Duration : 15 Hrs. Marks : 07	
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.
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.
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.
Facing Interviews	Manners, Etiquettes, Dress code for an interview Do's & Don'ts for an interview.
Behavioral Skills	Problem Solving Confidence Building Attitude
Block – II	
Duration – 55 hrs.	
4. Entrepreneurship Skills	
Duration : 15 Hrs. Marks : 06	
Concept of Entrepreneurship	Entrepreneur - 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.
Project Preparation & Marketing analysis	Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of PLC, Sales & distribution Management. Different Between Small Scale & Large Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix.
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.
Investment Procurement	Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes.
5. Productivity Duration : 10 Hrs. Marks : 05	
Benefits	Personal / Workman - Incentive, Production linked Bonus, Improvement in living standard.
Affecting Factors	Skills, Working Aids, Automation, Environment, Motivation - How improves or slows down.
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.
Personal Finance Management	Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.
6. Occupational Safety, Health and Environment Education Duration : 15 Hrs. Marks : 06	
Safety & Health	Introduction to Occupational Safety and Health importance of safety and health at workplace.
Occupational Hazards	Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.
Accident & safety	Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety measures.
First Aid	Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person.
Basic Provisions	Idea of basic provision legislation of India.

	safety, health, welfare under legislative of India.
Ecosystem	Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance.
Pollution	Pollution and pollutants including liquid, gaseous, solid and hazardous waste.
Energy Conservation	Conservation of Energy, re-use and recycle.
Global warming	Global warming, climate change and Ozone layer depletion.
Ground Water	Hydrological cycle, ground and surface water, Conservation and Harvesting of water.
Environment	Right attitude towards environment, Maintenance of in -house environment.
7. Labour Welfare Legislation	
Duration : 05 Hrs. Marks : 03	
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.
8. Quality Tools	
Duration : 10 Hrs. Marks : 05	
Quality Consciousness	Meaning of quality, Quality characteristic.
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.
Quality Management System	Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.
House Keeping	Purpose of House-keeping, Practice of good Housekeeping.
Quality Tools	Basic quality tools with a few examples.

10. DETAILS OF COMPETENCIES (ON-JOB TRAINING)

BROAD LEARNING TO BE COVERED IN INDUSTRY FOR TEXTILE WET PROCESSING TECHNICIAN
TRADE:

1. Safety and best practices /Basic Industrial Culture (5S, KAIZEN, etc.)
2. Record keeping and documentation
3. Making components observing different metal removing procedure and perform different fitting job.
4. Assembling of different components as per requirement and check functionality.
5. Carryout maintenance of different machines including hydraulics & pneumatics system.

Note: Actual training will depend on the existing facilities available in the establishments.

The **competencies/ specific outcomes** on completion of On-Job Training are detailed below: -

Block – I

1. Understand & explain basic concept of wet processing, its applications & safety.
2. Recognize different raw materials, properties and machinery equipment used in the trade.
3. Develop analytical skills related to the testing of water quality and efficiency of wetting agent.
4. Identify various types of fibres and apply physical and chemical methods in practice.
5. Develop skill on various chemical preparatory processes carried out for yarn and grey cloth. Washing and drying of different textiles and machineries used for washing and drying. Recognize damages after preparatory process using various methods of detection and prevention.
6. Develop skill on starching of fabric, chemical softening biochemical/enzyme assisted processes carried over for textile fabrics and Identify machineries used to finishing work of various functional processes.
7. Identify defects in blow room laps, causes and remedial measures. Identify various lubricants used for different parts of the machineries and maintenance of these machineries.

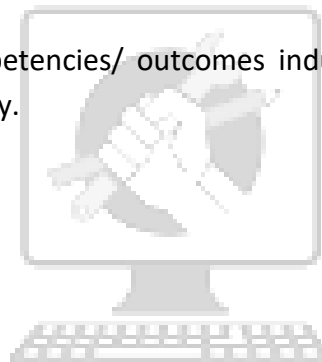
Block-II

8. Perform running a model effluent treatment plant with chemical dosing and filtration and aerations with situation of clear choice and calculations of steam & energy.
9. Plan and execute the operation of boiler.
10. Identify and select the dyeing process and troubleshoot various machineries involved.

11. Select and organize the dyeing process of wool, silk, flax and jute with suitable dyes using appropriate machines.
12. Plan and execute the working method of screen printing machines, troubleshoot and test the machinery.
13. Troubleshoot and maintain the electronic controller used in dyeing and printing machine using appropriate rules & tools.
14. Familiarization to QA System.

Note:

1. Industry must ensure that above mentioned competencies are achieved by the trainees during their on job training.
2. In addition to above competencies/ outcomes industry may impart additional training relevant to the specific industry.



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INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

TEXTILE WET PROCESSING TECHNICIAN			
LIST OF TOOLS AND EQUIPMENT for Basic Training (For 20 Apprentices)			
A. TRAINEES TOOL KIT (For each additional unit trainees tool kit Sl. 1-18 is required additionally)			
Sl. no.	Name of the Tool & Equipments	Specification	Quantity
1	Asbestos sheets	250x100mm or 200x200mm	42 NOS
2	Glass beakers capacity	100,250,400,500 ml. (Thick glass quality) Corning / Borosil	21 NOS
3	Glass rods	200mm long, with ends rounded, thick quality 10mm dia	21 NOS
4	Water bath	for 6 dye pots with electrical heating and temperature control	21 NOS
5	Stainless steel dye pots of	500 ml each	42 NOS
6	Kit boxes with locks for keeping cloth /dyes etc.		21 NOS
7	Prepared Screens for Printing for single colour with rubber squeeze		21 NOS
8	Buckets (enamelled and plastics)	10 litres	21 NOS
9	Wire gauges	150x150mm or 250x250mm	21 NOS
10	Plastic bottle with nozzles (spray bottles)	500ml capacity	21 NOS
11	Plastic Spatulas (flat type)	150 mm long	42 NOS
12	Test tube holders		42 NOS
13	Pair of tongs (copper or stainless steels)		42 NOS
14	Brushes for cleaning apparatus		42 NOS
15	Watch glasses	(75mm dia.)	42 NOS
16	Funnels 75mm dia. (glass)		42 NOS
17	Test tubes (thick class)	150mm (glass) 144 Nos	105 NOS
18	Bowls with rods for mixing dyes (Stainless steel)	500 ml	21 NOS

Textile Wet Processing Technician

19.	Measuring pipette	(Graduated) Capacity 0ml, 25 ml, 50 ml SET	21 SET
B : INSTRUMENTS & GENERAL SHOP OUTFIT			
20.	Cement or iron tanks for storing water	1200x1200x1200mm	02 NOS
21.	Thermometer ranging	0-110°C and 0-300QC	03 NOS EACH
22.	Wooden vats	2100x750x600mm height	04 NOS
23.	Electric water/heater GiserJ	45 litres	01 NO
24.	Water bath for	6 dye pots with electrical heating and temperature control	08 NOS
25.	Yam reeling arrangement (one big and one small)		02 NOS
26.	Electronic Weighing balance with capacity	1 gm to 200gm and 5gm to 1kg.	02 NOS EACH
27.	Prepared Screens for Printing for single colour with rubber squeeze		08 NOS
28.	Small Capacity Electrode boiler (lab model)		01 NO
29.	Basins (enamelled and plastics)		05 NOS
30.	Wooden Almirah for dyes and chemicals		02 NOS
31.	Scissors, Measuring Tape, Transparency Sheet		03 NOS EACH
32.	Inclined Table	1.5m length x 1.5 breadth 0.75 m depth) for screen and spray printing covered with PVC sheet and padded cloth	02 NOS
33.	Instructor's table and chair		01 SET
34.	Scientific microscope	10 to 200 magnification	02 NOS
35.	Crock meter		01 NO
36.	First Aid box		01 NO
37.	Fire extinguisher, (Acid type or as required)		05 KG
38.	Tables with glass top	440-Watt tube light for exposure of Printing screen	01 NO
39.	Measuring cylinders capacity	1000, 500, 250, 100, 25, 10 ml	10 SET
40.	Mono pan Lab-model Electronics balance having	200 gm Capacity, With Accuracy of minimum: 0.1 gm	02 NOS
41.	Stainless steel vessels	capacity 2 lits., 3 lits., 5 lits. With cover	02 NOS EACH
42.	Kerosene stoves (industrial types)	4 in each lab. Or Gas cylinder and	03 NOS

Textile Wet Processing Technician

		Gas Burners	
43.	Stainless steel rods	12 mm thickness with wooden handle 300mm length	04 NOS
44.	Measuring flasks with glass cork capacity	250ml, 500ml, 1000ml (for preparing standard solutions)	10 NOS
45.	Funnels	150mm dia. (glass)	10 NOS
46.	Watch glasses	150mm dia. (glass) for weighing dyes etc.	10 NOS
47.	Grey scale (staining & loss of depth), and Blue wool standard cloth		AS REQUIRED
48.	Locker	10 drawers (standard size)	02 NOS
49.	Steel almirah / cupboard		01 NO
C : GENERAL MACHINERY INSTALLATIONS			
50.	Electric oven/ air circulating drying woven		01 NO
51.	Twaddle -	Hydrometers No. 1 to IV (full set)	01 SET
52.	Precision electronic weighing balance Accuracy minimum	0.01 gm	01 NO
53.	Steaming Chest (Cottage type) Lab model	500 X 500 X 500 mm, or Lab model steamer	01 NO
54.	Pressure cooker (domestic type)	5 & 10 lit. Capacity with stainless steel container	01 EACH

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**INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND ENGINEERING
DRAWING**

**TRADE: TEXTILE WET PROCESSING TECHNICIAN
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	Specification	Quantity
1.	Draughtsman drawing instrument box		20+1 set
2.	Set square celluloid 45° (250 X 1.5 mm)		20+1 set
3.	Set square celluloid 30°-60° (250 X 1.5 mm)		20+1 set
4.	Mini drafter		20+1 set
5.	Drawing board (700mm x500 mm) IS: 1444		20+1 set
B : Furniture Required			
Sl. No.	Name of the items	Specification	Quantity
1	Drawing Board		20
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	8ft. x 4ft	01
7	Trainer's Table		01
8	Trainer's Chair		01

TOOLS & EQUIPMENTS FOR EMPLOYABILITY SKILLS		
Sl. No.	Name of the Equipment	Quantity
1.	Computer (PC) with latest configurations and Internet connection with standard operating system and standard word processor and worksheet software	10 Nos.
2.	UPS - 500VA	10 Nos.
3.	Scanner cum Printer	1 No.
4.	Computer Tables	10 Nos.
5.	Computer Chairs	20 Nos.
6.	LCD Projector	1 No.
7.	White Board 1200mm x 900mm	1 No.
<i>Note: - Above Tools & Equipments not required, if Computer LAB is available in the institute.</i>		

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FORMAT FOR INTERNAL ASSESSMENT

Name & Address of the Assessor :						Year of Enrollment :								
Name & Address of ITI (Govt./Pvt.) :						Date of Assessment :								
Name & Address of the Industry :						Assessment location: Industry / ITI								
Trade Name :			Semester:			Duration of the Trade/course:								
Learning Outcome:														
Sl. No	Maximum Marks (Total 100 Marks)		15	5	10	5	10	10	5	10	15	15	Total internal assessment Marks	Result (Y/N)
	Candidate Name	Father's/Mother's Name	Safety consciousness	Workplace hygiene	Attendance/ Punctuality	Ability to follow Manuals/ Written instructions	Application of Knowledge	Skills to handle tools & equipment	Economical use of materials	Speed in doing work	Quality in workmanship	VIVA		
1														
2														