

GUIDANCE NOTE ON COST MANAGEMENT IN TEXTILE INDUSTRY



The Institute of Cost Accountants of India
(Statutory body under an Act of Parliament)

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FOREWORD

India's textiles sector is one of the oldest industries in Indian economy dating back several centuries. The Indian textiles industry is extremely varied, with the hand-spun and hand-woven textiles sectors at one end of the spectrum, while the capital intensive sophisticated mills sector at the other end of the spectrum. The decentralized power looms/ hosiery and knitting sector form the largest component of the textiles sector. The Indian textile industry has the capacity to produce a wide variety of products suitable to different market segments, both within India and across the world.

I am happy to note that the Professional Development Committee is coming out with the Guidance Note on Cost Management in Textile Industry. The guidance note aims at providing general framework for the Cost Audit as well as Industry specific framework, so that the users may adopt tools and techniques which are best suited for the company. I hope that this publication will be extremely useful to our members and other stakeholders.

I congratulate CMA Biswarup Basu, Chairman and other members of Professional Development Committee and the PD Directorate of the Institute for their efforts and contribution in developing the Guidance Note. I hope that PD Committee of the Institute will continue to bring out such valuable documents for the capacity building of its members in all professional areas.

With Warm Regards,

CMA Vijender Sharma

14th July, 2023

CMA Biswarup Basu

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PREFACE

India's textiles industry contributed seven per cent of the industry output (in value terms). It contributed two per cent to the GDP of India and employs more than 45 million people. The textiles sector has witnessed a spurt in investment during the last five years. The Indian government has come up with a number of export promotion policies for the textiles sector.

The purpose of this Guidance Note (GN) is to provide guidelines to all the policy implementers of Textiles, the manufacturers of textile products, trade associations, CMA professionals employed in textile companies, etc. to get an insight into an effective cost management system in Textile Mills.

I acknowledge the sincere efforts of CMA S. Srinivasan, who has developed this Guidance Note on Cost Management in the Textile Sector. I also acknowledge the contribution of CMA Prakash P with regard to the review of the Guidance Note.

I sincerely thank CMA Vijender Sharma, President of the Institute for providing guidance and able leadership connected with the Professional Development. I acknowledge the contribution of PD Committee of the Institute in bringing out this Guidance Note in present form. I also compliment CMA Nisha Dewan, Additional Director and her team at PD Directorate of the Institute for extending technical and administrative support in the development of this Guidance Note.

I am sure that this Guidance Note will help the members in imparting their professional responsibilities successfully. I urge the members to give their suggestions on the Guidance Note so that it can be further improved in the time to come.

CMA Biswarup Basu

Chairman, Professional Development Committee

14th July, 2023

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OVERVIEW of Textile Sector in India

Introduction

The textiles and apparel industry in India has strengths across the entire value chain from fibre, yarn, fabric to apparel. The Indian textile and apparel industry is highly diversified with a wide range of segments ranging from products of traditional handloom, handicrafts, wool, and silk products to the organized textile industry in India. The organized textile industry in India is characterized by the use of capital-intensive technology for the mass production of textile products and includes spinning, weaving, processing, and apparel manufacturing. The Indian textile and apparel industry is expected to grow at 10% CAGR from 2019-20 to reach US\$ 190 billion by 2025-26. India has a 4% share of the global trade in textiles and apparel.

The Indian textile sector is the second largest employer after agriculture providing direct employment to 45 million people and 100 million people in allied industries. The Ministry of Textiles has advocated innovations in:

- a) Product,
- b) Processes,
- c) Machinery,
- d) Marketing,
- e) Business Model and
- f) Organisation.

More specifically,

- a) to improve working conditions of workers,
- b) Develop products with improved functional properties,
- c) Increase efficiency and hence productivity of workers,
- d) Develop cost effective processes,
- e) Replace conventional machines with the advanced ones,
- f) Reduce discharge of effluents,
- g) Capacity building schemes for textile sector and
- h) Increase visibility of Indian Textile Industry in the global market.

The Companies (Cost Records & Audit) Rules 2014 that take effect from 30th June 2014, list of the records that are to be maintained. It is mainly for textile



sector processing products falling under CTA codes 5004-5007 (Silk), 5106-5113 (Wool), 5205- 5212 (Cotton), 5306-5311 (Veg yarn/fabric like flax, jute, etc.), 5401-5408 (Man Made filament yarn & fabric), 5504-5516 (Man Made Staple fibres). The full details of the CTA codes mentioned above are given in the Annexure-3.

This GN takes references for Spinning, Weaving, Processing and Service departments for utilities but is applicable by and large to other departments and the products made from other textile fibres/filaments.

The Textiles (Development and Regulation) Order 2001 [TDRO2001] also requires maintenance of records listed in Para-II, item (3) relating to Production, Processing, Import, Export, Supply, Distribution, Sales, Consumption etc. In addition, requires maintenance of records for machinery on installation, relocation, sale, transfer, disposal of installed machines and modernisation programmes. The order, in Part-III, item-8, specifies the records on Production.

A textile unit may maintain common records that meet the requirements of both TDRO2001 and CCRAR2014.

Of the two broad sectors of the industry viz. Textiles and Clothing (T&C), the GN is confined to the textile sector only. Both the organised and unorganised-sectors of the industry, contribute significantly to the economy. Over the last two decades, the industry has shifted from sellers' market to the buyers' market. Therefore, there is a dire need for **proper Cost Management in the units. Adequate cost records are required for proper pricing of the products and for cost control.**

India fares well in the export market in finer yarns, but does poor in the high value products of T&C especially in competing with Chinese products. The break -up of India's current exports are as follows¹:

i) Fibre & Filament: 9%, (ii) Yarn: 10%, (iii) Fabric: 15%, (iv) Apparel: 45%, (v) Home textiles: 15% and (vi) Others: 6%. **Concentration to value added product is gaining importance now.**

The age-old industry is rife with traditional labour practices, possesses fewer modern machines and adopts **vintage product costing techniques.**

The Textile sector has three major Divisions –viz: Spinning, Weaving and Processing. The production capacity of the units in Spinning sector varies from medium to large size, relatively modernised (thanks to ATUFS² initiative from the Ministry of Textiles) and it forms only a small part of the unorganised sector. The Knitting, Weaving (Handloom & Power loom) and

¹ (*) Source: Directorate General of Commercial Intelligence and Statistics (DGCIS)



Processing (Bleaching, Dyeing and Printing) Sectors are fragmented, less modernised. With a view to position the country as a global leader in Technical Textiles, National Technical Textiles Mission has been approved for creation at a total outlay of Rs.1480 Crore.

The plant utilisation level (2019-20) of Spinning was 86%, Knitting & Weaving was 70%. The Post Spinning Sector needs attention and boost to perform better in the global market. The main reason for the fragmented post spinning sector is **high labour cost in the organised sector** and resistance for productivity linked wage increase, forcing the investors to opt for unorganised sector where the wage is often on piece rate basis.

Table 1

India's Top 20 Exported Textile & Apparel Categories (US\$ Million)

S. No.	CTA	Commodity	2019-20
1	5205	Cotton Yarn Containing 85% or More By weight of cotton	2700.0
2	6204	Women or Girls Suits, Ensembles, Jackets, Blazers, Dresses, Skirts, Divided Skirts, Trousers, Bib and Brace	2534.4
3	6109	T-Shirts, and other vests, Knitted/Crotched	2481.9
4	6304	Other Furnishing Articles, excluding those of heading 9404	1784.6
5	6302	Bed Linen, Table Linen, Toilet Linen and Kitchen Linen	1545.7
6	5407	Woven Fabrics of Synthetic filament yarn including woven fabrics obtained from 5404	1190.1
7	6211	Track Suits, Ski Suits and Swimwear, other garments	1113.7
8	5402	High Tenacity Yarn of Nylon or Other Polyamides, Whether or Not Textured	1107.2
9	5208	Woven Fabrics of cotton Containing >=85% By weight of cotton Weighing not More than 200 G/M2	1093.4
10	6206	Women or Girls Blouses, Shirts and Shirt-Blouses	1089.1
11	6203	Men's or Boys Suit s, Ensembles, Jackets Blazers, Trousers, Bib and Brace Overalls Breeches and Shorts	1068.0
12	6205	Men's or Boys Shirts	1019.9
13	5201	Cotton, Not Carded or Combed	994.9

14	6111	Babies Garments and Clothing Accessories, Knitted or crocheted	909.5
15	6305	Sacks and Bags, of A Kind Used for The Packing of Goods	876.9
16	6105	Men's/Boys Shirts, Knitted/Crocheted	700.5
17	6108	Women's or Girls Slips, Petticoats, Briefs, Panties, Night dresses, pyjamas	629.0
18	6104	Women's or Girls Suits, Ensembles, Jackets, Blazers, Dresses, Skirts, Divided Skirts, Trousers, Bib and Brace	568.6
19	5702	Carpets and Other Textile floor coverings	550.2
20	6107	Men's/Boys Underpants, Briefs, Nightshirts, Pyjamas, Bathrobes etc, Knitted/crocheted	541.3
TOTAL			24498.9

Issues and Challenges faced by the Indian Textiles Sector

The problems faced by the Indian textile sector are

- a) Raw Material:** Wild fluctuation in price and frequent shortage of Cotton. Ironically, India has 26% of the world acreage on cotton cultivation, but has only 9% of the output indicating poor yield per acre. The cotton yield is below the world average. The cotton is predominantly of short staple and the trash content is high. Limited availability of Polyester and viscose staple fibres of International –quality at a higher price.
- b) Machinery:** In India 60% spindles are >25 years old and only 18% of the looms are automatic against the world average of 62%. Non-availability of indigenous post spinning textile machinery-of quality, at reasonable price - especially the shuttle-less machines. India has only 2% share in global shuttle-less looms installed capacity. Obsolete machinery leads to low output and poor quality of goods as a result of which Indian textile goods are not able to face competition in the international market.
- c) Labour:** Unlike in developed countries, textile factories in India are not fully automated and remain labour intensive. In-adequate labour skill – arising

¹ Amended Technology Fund Upgradation Scheme (ATUFS) was notified in January 2016 with an outlay of Rs 17822 crore to mobilize new investments of about Rs 95,000 crore and to create new employment for about 35 lakh persons by the 2022. As on 25.03.2021 a total of 11107 UIDs have been issued under ATUFS with estimated project cost of Rs.46860.70 crore.



from inadequate education and labour training-especially of principal machine operators like spinning-tenters, weavers, dyers, printers, stenter operators, mechanics, instrumentation technicians etc. The lacuna in the labour skill has profound effect on productivity and the quality of the end products. The work load of Indian Textile operators is less compared to that in many developed countries. For instance, the wage rate is less than that of China, the production rate is less resulting ultimately in higher labour cost per good-unit produced. In realising this requirement, the Government has approved the new scheme titled “Scheme for Capacity Building in Textile Sector (SCBTS)” for the entire value chain of textiles except Spinning and Weaving in the organized sector, for a period of three years from 2017-18 to 2019-20 with an outlay of Rs. 1300 crore. The Scheme would target to train 10.00 lakh persons (9 lakhs in organised & 1 lakh in traditional sector) over a period of 3 years (2017-20). The Textiles Committee will be the Resource Support Agency (RSA) which shall identify and finalize the skill development needs in consultation with the Sector Skill Councils (SSCs) and industry and standardize the course content and to develop the content and so on.

d) Export: Inability to meet export market deadlines and it is reported that the default is about 25%-arising due to various reasons like labour strike, power cut, high level of absenteeism during festival/wedding seasons, delays in ports, delays in inspection etc.

e) Indirect Costs: High input indirect cost especially of power, fuel and interest rates.

The textile industry of the country is thus facing both short-term and long-term problems. Former includes problems of high prices, shortage of raw materials, liquidity problems due to poor sales and accumulation of huge stocks due to poor demand in the market. The long-term problems of the industry include the slow pace of modernisation, outdated technology resulting in low productivity, the high cost of production, low profitability and increasing sickness of mills.

Direct hand on cost especially the OH cost is needed through maintenance of proper records and adoption of appropriate absorption techniques to make “Make in India” initiative a reality.

COST MANAGEMENT IN TEXTILE UNITS

A. Management Accounting Policy & ABC costing

1. Traditionally, Textile organisations have been satisfied with the “average” costs and efficiency, instead of “product-wise, process-wise accuracy and finer level performance evaluation” that are needed for operational control. The textile business trend has been, varieties of products, product introduction in a short time, short product life cycles, a rapid shift from sellers to buyers’ market, more sales support and high investments in machinery...all of which require **revamping of the Cost Management** in the industry.

2. The detailed records on input direct materials, labour, utilities, stores, and details of wastes, overheads, specifications of end products, Joint products and bi-products, captive consumption, the process sequence and the cost centres involved -are the basic requirements for proper cost management.

3. The CCRAR 2014 requires, the Cost-auditor’s comments on “Other relevant management accounting policy adopted by the Company”. In traditional distribution, the common overhead costs are distributed to Production and Service cost centres (Primary Distribution) and the overhead cost of service cost centres are redistributed to Production cost centres (Secondary distribution) and absorbed to cost objects using the departmental absorption rates like **machine-hour rate or labour-hour rate** etc. The CARR 1977 furnishes in detail, the procedures to be followed for Textile Product Costing but not repeated here. (Vide the Chapter on “Product Cost Calculation” for details).

4. A cost object is the one for which cost is computed. It may be a product, a cost centre, a class of customer, a sale-area etc. The ultimate cost object is the one that gives revenue to the company. An indirect cost is the common cost for multiple cost objects. Tracing common costs to cost object is difficult.



5. A **good costing system makes** as much **indirect costs as variable**, by which one can understand why a cost of a cost-object varies. **All the common costs do not move in line with machine hour (or labour hour etc.) but with some other activities** taken by the cost object. Some examples of such costs and cost drivers are: Stores Cost (Driver- No: of issues), Inspection cost (Driver-No: of inspections), Set up cost (Driver-No: of set ups and time taken for the setup), Preventive-Maintenance cost (Driver-No. of incidences and time taken)-, etc. In **Activity Based Costing (ABC)**, instead of departmental absorption rates, **multiple activity absorption rates are taken**. The concept of ABC is taken in absorbing direct cost also where the m/c allocation differs [refer point(a) that follows]. ABC system facilitates better cost control. Some of the **cases of absorption based on multiple activity rate**, instead of machine hr rate, **in textile activities** are given below:

a. In Spinning Units,

- The wage & salary of R/F (or O.E) operators are to be segregated and absorbed on various counts based on the **number of “R/F -sides” assigned**. For instance, the spindle assignment for different yarn counts (for R/F of about 500 spindles per side) may be:

Up to 14Ne= two sides (i.e. one m/c), (16Ne-24Ne) =four sides (i.e. two m/cs), (26Ne-36Ne) =five sides (2.5 m/cs) and so on.

Let a spinning mill of 10,000 spindles have 10-R/Fs (20 sides)-each of the same no: of spindles. Let 14Ne be made on one R/F, 20Ne on four R/Fs and 30Ne on five R/Fs. Then the number of operators for 14, 20 & 30Ne will be = 1+2+2=5.

Let the average (annual) production per **m/c shift** be for: 14Ne=Y₁₄, 20Ne=Y₂₀ and 30Ne=Y₃₀. If the m/c shift details for each count are not available, the nearest m/c shift fig can be arrived at from the total annual production of each count and the gms/spl. shift of each count (the information of which are usually available).

Let “P” is the total R/F operator salary per m/c shift (of all the operators).

$$= \frac{\text{Total annual salary of all the R/F operators}}{\text{Total R/F- mc. shift for the year}}$$

In the absence of actual salary information for each of the R/F operators, knowing that their salary differs based on the side-allocation, in the ratio1:



1.1: 1.2 for 14Ne, 20Ne and 30 Ne respectively, the total salary (“P”) of all the R/F operators per shift is distributed to different counts as follows.

The facts to be considered for the allocation and the no. of operators for each count are:

Total weightage = [1X1 (for 14Ne)] + [1.1X2 (for 20Ne)] + [1.2X2(for30Ne)] =1+2.2+2.4=5.6. Then, for:

14Ne, the one operator salary/mc. shift=1 P/5.6=X₁₄,

20Ne, its two operators salary/mc. shift=2.2P/5.6=X₂₀,

30Ne, its two operators salary/mc. shift=2.4P/5.6=X₃₀,

then the operator cost per Kg for:

14Ne= X₁₄/(1 x Y₁₄), 20Ne= X₂₀/(2 x Y₂₀) and 30Ne= X₃₀/(2 x Y₃₀).

(Similarly for winders based on drum allocation, weavers on loom allocation-considering in addition the no: of fabric width woven on a loom in parallel)

- W&S of Preventive Maintenance Gang should be taken out from the total W&S of indirect labour and the cost should be absorbed to the cost object based on the preventive maintenance schedule of the machine used by the cost object. This is because the frequency of preventive maintenance schedule may vary for coarse and fine counts. Also, for export yarn, the schedule may be frequent and so on. (Similarly in Loom shed and Processing)
 - The W&S of doffers may be separated from total indirect labour W&S and based on No: of doff involved for each count, the doffer cost may be absorbed to different yarn counts. (It is to be noted that the doff will be more for coarse counts and for smaller ring dia/short lift of spindles). Also, their W&S should not be taken for the production from auto-doff ring frames.
- b. Similarly, in loom shed, the cloth doffer cost should be linked to the No: of doffs (as the size of cloth roll to be doffed vary for each sort and type of loom. [Usually for the same or similar type of fabric, the No: of doffs are more for conventional type looms while for shuttle less looms, the No: of offs are less].
- c. The W&S of sizers should be segregated into size mixer, back sizer and m/c operator. The size mixer cost may be absorbed based on the No: of different types of size prepared and the corresponding time taken and the respective cost object involved. The back sizer cost should be absorbed -based on no. of creel changes and time involved for different No: of beams and linking to the respective sorts.



- d. Usually where both export and local products are made, the quality checks on export varieties are more and based on the time spent for each, the OH cost of QC activities should be absorbed. For instance, if it is estimated that of all the QC activities - if 25% time is spent on Export sorts, then 75% of the QC-OH should be absorbed by non-export sorts and 25% by export sorts.
- e. Sizing materials cost-The cost of sizing materials varies with yarn of different specification. For instance, the sizing mix changes for 100% cotton, Blends, 100% Polyester and within these for various warp densities and the type of loom to be used - like Shuttle-less and high-speed auto and other looms. In line with ABC system, the respective sizing material cost should be taken. (Similarly in Process House for various recipes of bleaching, dyeing, finishing etc.)
- f. The cost of Computer Colour Matching (CCM) lab should be applied to the new shades. The life cycle of the new shades should be estimated and documented for cost records. The cost should be treated as deferred revenue expenditure and absorbed on the corresponding sorts using the shades.
- g. Like in CCM, in Printing also, the same principle should be applied for all the new designs. Further, based on the number of new screens and stripped screens used while printing fabric of a particular sort the respective screen cost should be absorbed (if possible, also the entire cost of paper design, tracing, engraving and stripping should be absorbed).
6. The ABC system is complex and more expensive, as more records are to be maintained to collect details of a) expenses incurred by the activities (cost pool) and the information of the cost drivers. For multiple heterogeneous cost objects that consume different level of resources in their activities, - **as is the case in Textiles, ABC system is most suitable to arrive at the true cost.** It also helps in proper decision making in Capital Investments. But, the **cost of the ABC system should justify the benefit derived.** The traditional system offers less accurate cost, but is simple and less expensive to implement. Therefore, for textile mills producing, a few similar varieties, and/or less expensive sorts, the ABC system may NOT be required.

B. COST MODELS.

Following cost models are adopted in Textile industry-depending on the purpose.



1. Variable Cost Approach (for product mix selection, make or buy decision, accept an order or not, relevant cost approach for investment decisions etc.)
2. Total Cost Approach (for price fixation by Govt. authorities based on conventional Overhead distribution, new projects, profit forecasting, etc.)
3. Activity Based Cost Approach (for estimation of finer cost).

C. COST POOLS

Textile activities are broadly classified into the following groups and hence cost pools are also classified in the same manner: Under each group, there are many cost centres.

1. Production Departments (Expenses incurred for resource utilisation)
2. Sales Departments (Income generating dept.).
3. Production - Service Departments (for utilities and Processing m/c maintenance)
4. Other Service depts. (Admin, I.T, Secretarial, Finance etc.),
 - a) Break down the revenue streams from different sources: (Refer Chapter on Revenue Streams for details)
 - b) Break down the costs to different cost centres & identify and quantify cost drivers, map costs to activities
 - c) Decide on suitable allocation keys and apportion costs to cost objects.
 - d) Match the revenues with costs using the activity links
 - e) Remove non cost items like discretionary costs, sunk costs
 - f) Remove non-operating revenues like interest received, miscellaneous income
 - g) Add risk premium to cover inherent risks in the project
 - h) Match cost pools with suitable cost drivers
 - i) Compare cost of each service group with revenues generated and arrive at Profitability.

Under the chapter on “**Product Cost Statement**”, more details are given.

D. TARGET COSTING

Representative Cost Sheet for different Yarn counts of a Spinning Unit

Cost Element	As % on Sales Turn Over		
	Yarn#:40s Ne	Yarn#:50s Ne	Yarn#:80s Ne
Raw Material	64.4	65.2	48.8
Power	14.0	10.8	16.2

Wages & Salary	5.9	6.6	12.0
Stores & packing	4.1	4.6	4.4
Prodn, Admin & Marketing O.H	1.4	1.6	2.2
Interest & Depreciation	8.0	7.3	9.0
Total Cost	97.8	96	92.6
Profit Margin%	2.2	4.0	7.4

Source: SITRA e-Techletter 2020

The above table indicates slender margin with which Spinning units operate in India and the dire need to control various costs especially of **Raw Material, Energy, Labour and to improve Machine utilisation and productivity.**

For a Spg Mill, RM cost forms nearly 55-65% of the total sales value (more for coarser counts and less for finer counts) and therefore, **elaborate and fairly accurate records are required for controlling RM cost.**

Being in the midst of severe local and international competition, Textile Mills are forced to adopt **Target costing** and look inwards for cost reduction in overheads, productivity linked wage increase, product substitution, value engineering and so on.

E. PROCESS COSTING

In Textile Mills the output of one section becomes the input for one or more section. To arrive at the average cost per unit of the cost object, the total expenses of a cost object for a period and total output of the cost object for the same period are taken. The outputs during the period for a given product are assumed to be homogeneous and no distinction is made in the product produced during the period-even if differences actually exist. For production of this nature, **“Process Costing”** system is followed. Sometimes for special orders (like fabrics requiring special dyes or special printing design etc.) job costing is adopted only for the specific process(es) involved.

F. PROCESS FLOW & FUNCTIONS of each SECTION

1. The details of the sequence of (normal) operations and their functions are given in Annex-4 under title “Process Flow Details”. The operations shown are mainly for Cotton Carded yarn. The points to be noted are: a)the point at which the direct material is added ,which is relevant in determining the correct WIP rate for the stock at a particular stage, b)the form of the input and output materials, c) the amount of waste generated at each stage shown in the flow chart, d)whether the waste is saleable or useable and e) the main

function of the process (to evaluate measures to determine whether the function has been done without consuming additional resources like excess wastage, under load-allocation to operator etc.)

Details of the process in terms of amount of waste, production, m/c speed, labour allocation, power consumption etc. are given under “Details of each cost centres” and “Performance Appraisal “for comparing the actuals with the industry norm.

Annexure-Part A- Cost Accounting Policy-CCRAR2014 is given below in verbatim.

(1) Briefly describe the cost accounting policy adopted by the company and its adequacy or otherwise to determine correctly the cost of production/operation, cost of sales, sales realisation and margin of the product(s)/service(s) under reference separately for each product(s)/service(s). The policy should cover, inter alia, the following areas:

- a) identification of cost centres/cost objects and cost drivers.
- b) Accounting for material cost including packing materials, stores and spares, employee cost, utilities and other relevant cost components.
- c) Accounting, allocation and absorption of overheads
- d) Accounting for Depreciation/Amortisation
- e) Accounting for by-products/joint-products or services, scraps, wastage etc.
- f) Basis for Inventory Valuation
- g) Methodology for valuation of Inter-Unit/Company and Related party transactions.

G. COMPARISON with INDUSTRY NORMS:

1. In considering wastages of raw material, labour allocation and production level at various stages, the industry Norms of the Research Associations (R.A) - like SITRA, BTRA, ATIRA etc. -can be re-coursed to, taking care to compare the proper norm.
- I. For instance, i) in a Spinning Unit, from B/R to R/F, the norm for wastage for cotton – is 5% for usable waste (where all the usable wastes are reused), 13% for saleable waste (Carded counts) with a break up for Indian cotton with about 4.5-5%trash content, as:
For B/R-4.8%, Invisible loss-0.25%,Gutter loss-0.75%,Card waste-7%,hard waste-0.2%..total=13%.

With permitted 12% comber noil (–if the noil is sold out), the total saleable waste $(13+12=)25\%$ for combed counts.

The norms and the conditions applicable for various wastes of raw material and direct materials like Colours and chemicals, and weight loss in Scouring are given in detail in the chapter “Performance Appraisal”.

- II. Further, in non-pre-shrunk cotton fabrics, there is elongation of about 2-3% between grey length and final length, more the number of passages more is the elongation. For preshrink fabrics, the contraction may be, about 2% (depending upon the shrinkage imparted).
- III. For heat-set polyester fabric there will be about 2% shrinkage depending up on the over feed during heat setting.

These examples indicate that the associated facts are to be taken into account in comparing the actual with the Industry Norms.

2. It is improper to take weighted average RPM of looms and apply it to all the fabric qualities (sorts) to arrive at the production. The RPM of a loom differ with its width, attachments like dobby/jacquard, pick insertion method, colour selection mechanism (or drop box), warp and weft specifications like cotton, polyester, fine count, strength, high twist, etc. and also for different mechanical condition/age. Weaving units fix different standard RPM considering these parameters and it is necessary to apply these standards to arrive at the standard production.

3. The m/c spares having more than one-year useful life is to be taken as deferred revenue expenditure and again Research Association norms on the life of the spares can be taken. For instance, the norm for life of an apron of R/F for cotton yarn is 1.5 year (and therefore can be taken as deferred revenue expenditure) and it is up to one year for 100% polyester yarn for a blended yarn, the average based on the wt. of the individual component may be taken. Out of total apron consumption, this fact is to be applied to arrive at deferred rev-expenditure of aprons and similarly for other items.

H. SELF CONSUMED ITEMS;

Like usable waste in Spinning, all the self-consumed items should be recognised, quantified and accounted. Such items which are sometimes omitted are:

1. Twine for packing, grey cloth for packing, cloth used as lead cloth, grey back cloth in printing and for cleaning are to be accounted properly.
2. Condensate recovery in boilers,

3. Heat recovery from economisers of boilers, DG Sets, Steam Hoods and, blow downs from boiler, process m/cs etc.
4. Rain water harvested (untreated/treated before usage),
5. Waste water used in toilets
6. Recovered treated waste water recycled & reused
7. Credit for sale of coal ash.

I. RECORDS with inadequate details /break-ups

Attention should be paid to maintain records with complete details. In the following records sometimes, inadequacy is noticed.

1. The steam and thermic boilers use different types of fuel-that have varying calorific value and price--- like, Heavy furnace oil, Light Furnace oil, Diesel, Gas, Coal, Lignite, Pet coke, Husk (Rice), wheat bran, Cashew skins, briquettes of various items like cotton waste, agricultural waste, etc. Consumption of these fuels should be accounted separately.
2. Thermic Oil Boiler: It is to be treated as a separate cost centre of utility. Records on this Boiler are sometimes missing but required. A record similar to steam boiler is to be maintained for thermic boilers. (Energy from Thermic oil are consumed in processing m/cs like, Stenters and with modified radiators in Printing m/c driers, Polymeriser, Loop steamer etc.).
3. In addition to details on purchased power and D.G. set generated power, separate records for Power for Wind & Solar power are to be maintained.
4. The penalty for low PF should be treated as abnormal cost.
5. Treatment on distribution of mix yarn (windings from bottoms), FRC needs attention of an Auditor. The abnormality should be seen with respect to total wdg (Kg) and total pkg.
6. If the steam boilers of different capacities are connected only to specific cost centres, then the individual boilers are treated as separate service cost centre of steam. But, if there is an arrangement to get steam-supply from any boiler to any steam using cost centre, all the steam boilers are together taken as one service cost centre for steam. (A similar treatment for Thermic boilers).

J. Work-In-Progress in SPINNING

CARR1977: WORK IN PROGRESS AND FINISHED STOCK:

The method followed for determining the cost of work in progress and finished stock of the textile products shall be indicated in the cost records so as to

reveal the cost element that have been taken into account in such computation. The appropriate share of conversion cost up to the stage of completion shall be taken into account while computing the cost of work-in-progress. The method adopted for determining the cost of work-in-progress and finished goods shall be followed consistently.

1. Often, the WIP is arrived at from book figures. But a physical stock verification is necessary. First a fair estimate on the quantity of the stock at EACH stage should be established. Then the appropriate rate should be applied on the quantity. For these details of the product of different specification going through the process and the process flow of each product should be taken into account. Often, the **Physical stock on comparison** with the **book figures throws some surprises** to the Management.

2. Basic guideline to arrive at a fair quantity estimate of WIP stock in Spinning.

Before taking the stock, the following information should be collected to save time. The physical stock (especially at the R/F stage) is tedious and a well-prepared audit will save time. An assistant at the level of Production clerk or a Foreman should accompany the auditor to identify the various stocks.

- a) Collect information on machines – type, running, idle and types (auto can change, auto doff, no. of deliveries/no. of spindles/no. of drums and make (like Zinzer, Reiter, LR, etc.).
- b) Get the “hank” of the output in preparatory (of slivers and rovings)
- c) Get wt. of empties- lap rod, cans of different sizes and types like metal/plastic etc., S/F bobbins of different sizes, R/F bobbins of different sizes and type, plastic and paper cones, etc.
- d) Get wt. of full laps, cans, S/F and R/F bobbins, cones etc. or the full doff length(mtr) for auto doffs in Cards and D/Fs are to be collected.
- e) The stocks are collected as per the material level present in containers (lap-rods, cans, bobbins, cones, etc.) and are classified into Nil, 1/8, 1/4, 1/2, 3/4, Full level and corresponding wt. is arrived at.
- f) The places where the stocks (RM, intermediate, FG) are stored.
- g) The stock at job work place is to be established going through the agreement on the ownership of the waste collected and how it is adjusted in input-output reconciliation.

3. COVERAGE of WIP stock Taking:

The 100% of the WIP stock should be taken for: Raw Material, wastes in go downs and depts., F. G, stock in B/R to Draw Frame (incl. comber if any). In S/Fs, at least 50% of the stocks in the feed- cans of **all** the S/Fs (extrapolated

for 100%) and 100% of stock on working spindles, 100% of S/F bobbin stocks on trolleys /bins/floor.

In Ring Frame, on the **Creel alone** usually about 30% of the total stock of Spinning dept. is present and this stock is to be arrived at on a **broad base covering each R/F**. For this purpose, half the no: of spindles of one side of each frame is to be selected. The size (as said earlier –nil, 1/8 etc.) of each of the bobbin on the creel (incl. spare creel) should be noted down. Imaginary figures are given below for clarification.

- a) No. of spindles observed (=half of spindles on one side) =250 spindles.
- b) No. of spare creels among 500 spindles=125
- c) No. of bobbins observed=375 (idle creel holders are taken as bobbin of nil content)
- d) # Of Nil bobbins=10, 1/8 bobbin=75, 1/4=100, 1/2=125, 3/4=25, Full=40, Total=375
- e) Full S/F bobbin wt=1.2Kg
- f) Weight on creel of 250 spindles observed=300 kg
- g) By extrapolation the total wt. of stock on creel of the entire R/F of 1000spindles= {(Tot. spdls on the mc/spindles observed for stocks) x Stock kg of spindles observed} = [(1000/250) x 300] =1200Kg.

[The situation in 25% parts of the m/c is applicable to the entire m/c].
When all the m/cs are covered the estimate will be a fair estimate.

In a similar manner, the wt. of the stock of bobbins on the running spindles is arrived at and extrapolated for the entire machine. The 100% of stock of yarn on floor, bins etc. are also to be arrived at.

In winding, the stock is to be collected at: feed end (working spindle or magazine), on the drums, waiting on m/cs for doffing, in the bins where ejected R/F-bobbins are collected and on floor.

From, R/F the stock should be collected for yarn of different specifications. In Preparatory, the stock should be for different a) hanks and b) raw material content.

K. Application of appropriate rate for WIP stock.

1. The RM content of the stock and the “hank” of the stock should be considered to apply the proper rate. Thus, carded counts, combed counts, blends of different proportions, 100% MM staple of polyester, 100% MM staple of viscose/polynosic will get different rates. Within this, the different “hank “of the material will get different rates.

2. The concept of joint cost up to card is considered for combed counts and combined cost where merger takes place... as in D/F (or B/R) for blends.

It is to be noted that for 100% cotton yarn, the combed slivers are processed separate without any merger till the yarn is spun.

L. WIP in Weaving:

1. Conversion from Metre to Kg and Vice versa.

The UoM in Spinning and Winding is Kg but sometimes the length of yarn wound on cones (where cono meters are installed) is considered in winding, to arrive at the Kg on the cones. The count of the yarn on the cone, the length and the corresponding Kg are interconnected. Where conversions from length to kg or vice versa are done taking the yarn count into account, **the actual count (instead of Nominal count) should be used** for which, the periodic Q.C. Reports on Actual Vs Nominal count spun can be taken as the reference. This requirement is **more important in determining the grey fabric weight** per unit length for a given fabric specification. Also, in arriving at Warper's **and weavers' beams (yarn) weight** for a given no. of ends and the beam length. In **input-output reconciliation** also, this requirement is emphasised.

2. As in Spinning, the basic details of various yarns in progress, tare weight, wt. of cones and beams of various sizes considering their specifications, process flow, number of m/cs, the make, type etc are to be collected.

3. Direct Warping (for each m/c)

- a) On creel: No. of various sizes of cones on creel, the actual yarn count, will give the wt. on creel.
- b) On working Beam (at head stock): From the length –counter at the head stock, the Length already wound on the beam at the time of stock taking and the no. of ends wound on the beam and actual yarn count, the beam wt. on working beam can be arrived at.
- c) Warpers' Beams on floor: The label stuck on the beam gives details of # of ends, yarn details (count, blend, K or C etc.) and the length. From these details the wt. on each beam can be found. On random basis, some beams can be actually weighed and from the tare wt. details the yarn wt. on the beam can be arrived at and the wt. can be compared with the calculated wt. It is to be noted that all the beams will not be full. Some partial beams will also be on floor.

4. Sectional Warping:

- a) On creel: Same as in Direct Warping.
- b) On machine in sections: The information required are:



- i. The yarn details
- ii. The No: of ends (i.e., yarn) per section
- iii. The full length of a section

I. The length already wound for the section in progress to be taken from the length counter.

Using these details, the wt. of the section in progress can be found. For the sections already completed, knowing the length already wound, and the no of sections already wound, the total wt. of these sections can be arrived at. Usually, the no. of ends in each section will be same but sometimes, for the last sections it may vary.

c) On the beams during run off: Some yarn weight will be on weavers' beam and some on the sections. Using the information on full weaver's beam wt. for the sort in progress on the m/c, the wt. of the sections can be arrived at as follows:

Yarn on sections = Yarn wt. of full beam - Yarn wt. on partial beam in run off condition.

The wt. of partial beam can be arrived at, exactly as in the case of Working beam of Direct Warping.

d) Weaver's Beam on floor: As in Direct warping, from the details of no. of ends, length on the beam and the yarn actual count, the wt. of weavers' beam can be found out.

5. SIZING:

a) At the Creel:

The wt. of each warper's beam can be arrived at as follows:

- i. No. of warper's beam in the creel
- ii. Beam details as obtained from the labels on the beam.
- iii. Length remaining on the warper's beam.

This can be arrived at as follows:

The length of the warper's beam in the beginning after creeling- (total length of all the full weavers beam wound already) - (The length already wound of the weavers beam now running on the head stock) *

(* There is stretch in the yarn between the creel and the head stock to the extent of about 1.5-2.5%). Taking the stretch applicable for the lot being sized, (say at 2%), the length already wound is brought to the un-stretched stage as in the creel as follows.

The equivalent un stretched yarn already wound= [(total length of all the full weavers beam wound already) + (The length already wound of the weavers beam now running on the head)]/ (1+ stretch level%) = All the lengths already wound/1.02

b) Wt. of weavers Beam being wound on head stock=

From the Total ends in the weaver's beam, length already wound (equivalent to unstretched level) and the yarn count at the un-stretched level i.e., at the warper's beam stage the wt. on the weavers can be arrived at.

c) Weaver's Beam on Floor (in sizing section, drawing-in, in loom shed)

From the details of No. of ends, the yarn count (after stretch), length of beam (after stretch), the wt. of each beam can be found out. The calculated wt. will correspond to the yarn wt.

The actual Gross weaver's beam wt.= Yarn wt. as calculated + wt. of size added on the yarn + tare wt. In fact, the size add-on as a % is arrived at using this formula.

6. Stock at Loom Shed:

The stocks are:

a) Weavers beam at the back of each loom (On shuttle-less wider width looms, there may be two or three beams behind). The length still left out on the weavers' beam = Total length of the full beam-length lost at the time of beam gaiting- [length of cloth already doffed+ length now on the cloth roll (i.e., undoffed)] x adjustment factor.

b) The adjustment factor is to bring the cloth length to the corresponding warp length. Usually, a particular piece length is selected, in multiples of which, the cloth is doffed. Also corresponding to the Piece length, a length called "**Tape Length**" is marked on the warp (at the sizing stage) considering the warp shrinkage when cloth is formed (called warp crimp).

Tape Length = Cloth length x (1+wp.crimp%). Therefore, the adjustment factor= (1+wp.crimp%).

From the length left out on weavers' beams, the total no. of ends and warp count (after size stretch), the beam wt. can be calculated.

c) Cloth on cloth roll: There may be more than one cloth roll on the cloth roll, if multiple widths are woven simultaneously on loom. The pick counter reading should be marked at the time of last cloth doffing. From, the total picks inserted from the last doff till the time of the stock taking, the PPI of the fabric, the length on the cloth roll can be arrived at. From the actual (yarn)

wt. per mtr of grey fabric, the wt. of cloth on roll can be arrived. (The actual wt. of grey fabric per mtr= (Actual Weight of grey cloth of a doff-Size wt. on warp)/length of cloth doffed in mtr.

d) The size wt.is arrived at from the calculation of warp yarn wt. from the fabric construction details and applying actual (or standard) size add on % on it. For example, if the doff length is 360 mtrs, and the warp yarn wt. is 50 gms per mtr, then total warp yarn weight calculated is= $360 \times 0.050 = 18.00$ kg and size add on is 10%, the size wt. on 360 mtrs. of fabric= (10% of 18 Kg) = 1.8 Kg.

e) Weft Yarn on Loom and Floor and Pirn wdg.

f) Cloth on floor, at Inspection in metres.

g) Cloth in Grey Ware House (mtr).

M. WIP in Processing:

The information is collected in Kg for the fabric stock at the feed end and delivery end considering the no. of ends processed in parallel. Except in case on Kier (where a large stock stays inside the Kier), the stock on the m/c is ignored-being small. A large amount of stock is on floor- i.e., on trolleys/plastic-boxes, on batch roll frames-waiting for processing.

It is a good practice to number all the trolleys and batch roll stands and a provision to keep a card where the details of the sort number, fabric-mtr on the rolls/trolley, processes completed are recorded. In some mills lot no. and sub lot numbers are also given in the card. Also, a specific space should be ear marked for the stock waiting for the next process near to the m/c where the process will take place and the space can also be numbered. When a stock is taken, **the space No., the trolley/batch-roll Frames numbers are shown in the records.** This helps in identification of the place of the stock and also to ensure no stock on floor is left out or duplicated.

Sometimes, when there is shortage of Batch-roller Frames, on the same roller, a shorter width of a fabric is wound on a larger width fabric. Then, the information of both the sorts should be recorded in the card. If the two or more fabrics are wound and they are of the same width, a tag separating the fabrics should be put. Often, the lengths of the individual fabrics are written on the fabric itself or on a tag hanging out from the fabric so that the detail is readable easily. (It is a wrong practice to wind shorter width fabric on wider rolls especially when there is shortage of such rolls-and thus blocking the rollers for wider fabrics).



It is better to **identify slow moving, non-moving WIP stock in Processing**, as often, some stocks lye un-attended for months due to “No sales programme”. The corresponding rates are to be applied to arrive at the value of the stock.

N. WIP in Inspection & Packing

The information is required for unpacked and packed sorts. For unpacked, the details required are: sort no., process (Bld, Dyed, Ptd etc.), Grade (Good, SL, TP, Seconds, FRC etc.), and in case of packed, same details as the unpacked, package no. and details on type of packing (bale, roller, card board etc). Like in Processing, the slow moving, non-moving stocks are to be identified.

Product Cost Calculations

A. Back Ground

The Cost Statement of CCRAR2014, is for all the **operational-products** sold by a Textile unit which may be **Yarn** or **Grey Fabric** or **Processed Fabric** etc. The CCRAR2014 statements are to be prepared as per CTA code of the products sold. The Product Cost Statements show the “Full cost”- including Finance cost, and the required “relevant” basic cost and revenue information are taken from financial figures. It does NOT require Bonus and Gratuity to be shown separately nor the information on “Controlled” and “Non-Controlled yarn” costs, as the latter information is no longer mandatory. A few CCRAR tables (for Yarn, Grey Fabrics and Processed Fabrics) are reproduced below along with the relevant back up tables of CARR1977. The entire link in the cost statements as per CCRAR2014 is not shown but only the important links are discussed below.

Cost Statements-as per CCRAR2014 (Amended in 2019)

- a) Cost statements (monthly, quarterly and annually) showing quantitative information in respect of each good or service under reference shall be prepared showing details of available capacity, actual production, production as per GST records, capacity utilisation (in-house), stock purchased for trading, stock and other adjustments, quantity available for sale, wastage and actual sale, total quantity of outward supplies as per cost records and total outward supplies as per GST records during current financial year and previous year.
- b) Such statements shall also include details in respect of all major items of costs constituting cost of production of goods and services, cost of sales of goods or services and margin in total as well as per unit of the goods and services. The goods or services emerging from a process, which forms raw material or an input material or service for a subsequent process, shall be valued at the cost of production or cost of service up to the previous stage.
- c) Cost statements (monthly, quarterly and annually) in respect of reconciliation of indirect taxes showing details of total clearances of goods or services, assessable value, duties or taxes paid, CENVAT or

VAT or Service Tax or GST credit utilised, duties or taxes recovered and interest or penalty paid.

- d) If the company is operating more than one plant, factory or service centre, separate cost statements as specified above shall be prepared in respect of each plant, factory or service centre.
- e) Any other statement or information considered necessary for suitable presentation of costs and profitability of goods or services produced by the company shall also be prepared.

For CCRAR2014, some statements are to be prepared as a backup for which CARR1977 serves as a good guide.

CARR1977: COST STATEMENTS:

- (1) The cost statement showing details of installed capacity, production, wastage, issues and sales of the current financial year and previous year shall be prepared for each process adopted in manufacture or production of textiles products in Proformas A,B,C,D-1,D-2, D-3 and E.
- (2) The product emerging from a process, which forms raw material for a subsequent process, shall be valued at the cost of production up to the previous stage.
- (3) If the company is operating more than one plant or factory, separate cost statements as specified above shall be prepared in respect of each plant or factory.
- (4) The cost statements shall be prepared count-wise or denier-wise or sort-wise for items whose production is substantial and which constitute eighty five percent or more of the total value of production and for the remaining items whose production is relatively negligible and where all such items put together constitute nearly fifteen percent of the total value of production, combined cost statements shall be prepared for groups of counts or deniers or sorts.

B. CCRAR and CARR statements for some Cost Elements

1. Raw Material:

In all the cost statements of CCRAR, the raw material cost to be shown, is the cost of the RM-used for the particular CTA code-product at the initial stage of the production (E.g.: Cotton mixing cost). The format of CCRAR for RM consumption is given below with some illustrative figs.



2A. Details of Materials Consumed as per CCRAR2014

Name of Product: 30 Ne- K

CTA Heading: 520512

Qty and Rs in (000s)

Description of Material	Category	UoM	Current Year			Previous Year		
			Qty	Rate	Rs	Qty	Rate	Rs
J-34	Ind	Kg	300	90	27000			
S-4	Ind	Kg	350	100	35000			
MCU-5	Ind	Kg	300	95	28500			
Own same mix waste*	Ind	Kg	15	60	900			
Total			965		91400			

*As per the guidelines, the Re-usable waste is to be rated at "Cost" but in practice mills take only a nominal value of about 20% which is nearly the resale value of Usable waste and the same is shown here

Category: Indigenous/ imported/Self Manufactured

The CARR format for RM is for **all the RMs used**. The format with illustrative figs is given below for comparison.

ANNEXURE-IV of CARR 1977: The Statement showing the quantity and value of total cotton /Man-made Fibre issued for the manufacture of carded or combed or blended yarn.

S.No	Particulars	Mixing A			Mixing B			Total		
		Kg	Rate	Rs	Kg	Rate	Rs	Kg	Rate	Rs
1.1	Fibres in Mixing									
	a) Cotton:									
	J-34	3000	90					3000		
	S-4	3500	100		2130	105		5630		
	MCU-5	3000	95		2110	98		5110		
	b) Polyester 44mm				6760	150		6760		
1.2	Pur. cot. waste									



1.3	Own -same mix waste	150	60					150		
1.4	Own higher mix waste									
1.5	Total	9650			11000			20650		
2.	Issued for									
	a) Carded Yarn	9650						9650		
	b) Combed Yarn									
	c) Blend 50 PC (67:33)				11000			11000		
	Total	9650						20650		
3.	Yarn produced (Ne)									
	a)30s K Wp	8400						8400		
	b) 34s C Wp.									
	c)Blend 50s PC (67:33)				9800			9800		
	Tot. Wp	8400			9800			18200		
	a)30s K Wft									
	b)30s C Wft									
	Tot. Wft									
	Total Wp & Wft	8400			9800			18200		

Notes: - (1) In case own waste is used without routing the same through the waste go down it should be shown separately.

2) The rates adopted for own waste should be reasonable and basis shall be consistent.

3) The name of mixings given are illustrative only.

4) Nomenclature of variety of cotton used should be adopted as per the office of Textiles Commissioner.

5) In case the company is having its own ginning units, the cost of ginning and pressing with the respective sale realisation on cotton seeds shall be separately kept with full details.

6) Where yarn produced is measured in hanks, the quantity both in hanks and kg. shall be indicated in the proforma. If the same is measured in Kg quantity in hanks need not be given.

Conversion costs:

Each of the element of conversion costs (like W&S, Power, utilities, Depreciation etc.) to be shown in the CCRAR statement, is the **sum of the conversion cost from the initial stage (E.g.: B/R stage) to the point of sale** (E.g.: for grey sale till grey inspection and packing). In the summation only the relevant cost centres are considered.

For example, for a Grey Fabric sale, with 30s Ne combed Cotton Warp and 20s Ne carded cotton Weft, each element of the conversion cost of Spinning (B/R to Ring Frame) corresponding to the Combed line for warp and carded line for weft fabric are to be considered.. to be added to the same element of conversion Cost of the weaving section.

Example: Grey Fabric sold: 1000 mtrs. Total fabric (yarn) weight=110kg. Its warp wt.= 50Kg & Weft wt.= 60Kg. After considering HW, the warp output from Spg = 51Kg. Weft output from Spg after taking HW=61.

Upto Spinning: For warp:30s Ne combed: W&S is Rs 5/Kg

Upto Spinning: For weft:20s Ne Carded: W&S is Rs 4/Kg

In Weaving (Wdg to Sizing): For warp W&S is Rs 5.5/Kg.

In Weaving (Pirn winding): For weft Re 0.5/Kg

In Weaving (Loom shed & Inspection): For Grey fabric: W&S is Rs 2/m.

Then, the total W&S to be shown in the CCRAR 2014 cost statement for Grey Fabric is = $(51 \times 5) + (61 \times 4) + (50 \times 5.5) + (60 \times 0.5) + (2 \times 1000)$
= $255 + 244 + 275 + 30 + 2000 = \text{Rs. } 2,804.$

C. Waste Multipliers

1. Waste multipliers in spinning process is required to arrive at the material realisation at every stage after wastage removal.

2. Waste Multiplier for Raw Material

The WM indicates the quantity of cotton mixing required at the input stage of each cost centre for one Kg of yarn output. The stages considered are from B/R to CW.



Mixing: Various Virgin Cotton=950Kg Usable waste=50Kg Total=1000Kg

Cost centre	Input (kg)	Saleable Waste % (#)	Output (kg)	WM (\$)
Mixing	950+50		1000	
B/R	1000	3%	970	1.205
Carding	970	9%	880	1.093
D/F1	880	1%	870	1.081
D/F2	870	0.5%	865	1.075
Simplex	865	0.5%	860	1.068
R/F	860	5%	810	1.006
CW	810	0.5%	805	1.000
Total		19.5%		

The calculations for W.M for Spinning Cost centres are shown above with illustrative figs.

(#) – Waste % is given on the total input at the mixing stage.

The yarn output of 805Kg is realised from 950Kg of cotton-mixing (i.e., 84.74% of yarn realisation).

(\$) – Waste multiplier is calculated by: (output at each stage/final output).

Ex. For B/R: = (970/805=1.205) and so on for each stage.

The use of WM in CARR1977 is shown in the format shown below.

CARR 1977		ANNEXURE VII					
<u>Name of the Company.....</u>							
<u>Name and address of the Mill</u>							
<u>Statement showing waste multipliers for each cost centre Mixing wise for the year ending.....</u>							
<u>In Spinning Department Refer to Annexure IX)</u>							
Sl.	Department	Mixing 'A'			Mixing 'B' etc.		
		% loss	Kg.	W.M	% loss	Kg.	W.M
1	2	3	4	5	6	7	8



1. Blow room
2. Carding
3. Combing
4. Draw frames
5. Inters
6. Roving
7. Ring frames
8. Cone winding

W.M=Waste Multiplier

NOTES.-I. In case in any mixing a portion goes through combing and both Inter or Roving or through only one such operation waste multiplier shall be worked out separate for the same.

2. % on loss shall be on the basis of quantity of waste formed (collected & lost) in each Cost Centre. Waste percentages for that Cost Centre are on the net input of each Cost Centre shall be calculated and shown in the respective columns. From these waste figs the waste multiplier for each mix shall be calculated and shown in Annexure VII.

3. Cost centres given above are illustrative only.

4. In the case of companies considering waste on any other basis than actuals adjustment for overall usage variance shall be shown separately and considered while calculating the waste multiplier of each cost centre for each mixing.

3. Waste Multiplier for Conversion Cost calculation

W.M is calculated to determine the conversion cost of each cost centre for one unit of output (R/F Yarn). The procedure for calculation of W.M for the Spinning cost centre is as follows:

Mixing: 50s Cotton Carded (up to output of C/W)

1	2	3	4	5	6	7	8=6X7
Cost centre	Input	Tot. Waste		Output	W.M	Conv. cost In Rs/ Out put Kg (\$)	Conv. cost In Rs/ Kg Yarn (&)
	Kg	Kg	% (*)	Kg	For Conv. cost		
Cotton	1000						



Mixing							
B/R	1000	30	3.0	970	1.205	2	2.41
Card	970	90	9.0	880	1.093	7	7.65
D/F-1	880	10	1.0	870	1.081	1.5	1.62
D/F-2	870	5	0.5	865	1.075	1	1.07
S/F	865	5	0.5	860	1.068	5	5.34
R/F	860	50	5.0	810	1.006	48	48.30
C/W	810	5	0.5	805	1.000	7	7.00
Over all		195		805		71.5	73.40

N.B: 1 The input of cotton Mix contains virgin cotton and cotton (usable) waste

N.B: 2 The total waste contains, Saleable and usable waste.

(*) The % is w.r.t, the input to the cost centre at initial stage. E.g.: for Card: $90/1000=9\%$.

(\$) The output is that of the respective cost centre

(&) The kg yarn is the output of Cone winding

W.M=Waste Multiplier for conversion cost= (output of the cost centre/ final output of Yarn of C/W) Eg: WM for S/F= $860/805=1.068$

The conversion cost of a cost centre is calculated per Kg of its output of a **particular mixing** because the waste generated varies with the mixing. If say for D/F1, the conv. cost/ (kg of output of D/F1) for a mixing is 1.5, then, the conv. cost of D/F1 for one kg of yarn of the mixing= Conv. cost of the cost centre for the mixing x WM = $1.5 \times 1.081=1.62$. Similarly, for other cost centres.

D. Calculations for cost of Production, Cost of Sales and Margin on Cost of goods sold- Yarn

1. The following table is prepared to arrive at the cost/machine-shift of each cost centre in Spinning Dept.

2.

Proforma-A of CARR1077. Calculation of Conversion cost for different cost centres in Spinning.

Sl#	Particulars	Mixg & BR	Card	Super Lap	Comber
1	2	3	4	5	6

3.



Drawing	S/F	Ring Frame	Total
7	8	9	10

- A. 1. M/c shifts/Spl. Shifts
 i) Available
 ii) Worked
 2. Production Kg
 3. Avg. Production Kg/mc shift or spl. Shift

B. EXPENSES:

1. Direct W&S
 - a) Time Rate Wages
 - b) Salaries
2. Utilities
 - a) Water
 - b) Steam
 - c) Power
 - d) Others
3. Consumable Stores
4. R&M
5. Other Exp
6. Factory OH
7. Depreciation
8. Admin OH
9. R&D
10. Adj. of conv. cost for stocks
11. Adj. for cost variances
12. Total
13. Cost per mc shift/Spl. shift

Notes. - (1) While computing Machine shift/Spindle shift cost in each cost centre, piece rate wages, wherever paid shall be excluded. Piece rates on the basis of actuals shall be taken into account while working out the conversion cost.

(2) Cost centres given are illustrative only.

(3) Item No. 11 is applicable to companies maintaining cost records on standard costing.



2. In the above statement, Q.C Expenses, Technical Know-how fee, Royalty is merged with in factory OH. But a break up is required in the Cost Statement as per CCRAR2014. The Technical know-how fee or royalty, if it is for the specific product for which the Cost Statement is made, then it is taken as Direct Expenses otherwise it is shown under Technical Know-How/Royalty.

4. Cost of Production of Yarn:

The format for calculations of cost of Production of each product is shown below.

CARR-1977 PROFORMA 'B'

Name of the company _____

Name and address of the Mill _____

The Cost of production of yarn count-wise for the year ending.....

S. No	Mixing	#Hk/Ne	Count	K/C	Net cost/kg of mixing	WM	Cost/kg of mixing	Conv. cost/Kg
1	2	3	4	5	6	7	8=6X7	9
Tot. cost of Prodn/kg yarn spun					Kg yarn Spun		Total cost of yarn spun	
10 = (8+9)					11		12=(10X11)	

- A. Warp Yarn
 - 1.
 - 2.
 - 3.
 - 4.
- B. Warp Yarn blended
 - 1.
 - 2.
 - 3.
 - 4.
- C. Yarn from Man-made fibre
 - 1.
 - 2.
 - 3.
 - 4.



D. Weft Yarn

- 1.
- 2.
- 3.
- 4.

Note. If the yarn produced is measured in Kg. data in column 3 need not be given.

Up to end of Ring Frame, the Production Cost/ Kg. of yarn of a particular count = [(Cost/ Kg) of the mixing used corresponding to the yarn less the realisation from waste] + (Conversion cost per Kg).

The total cost of a particular yarn sold = Cost of opening stock + production during the year-yarn issued for further processing - closing stock = Cost of yarn issued for sales. The cost of a) reeling/winding, b) packing, c) share of Admin. OH, d) S&D OH, e) bonus, interest, gratuity, etc. are added to get the cost of sales.

Margin on the sale of the yarn = “Sales realization”- “cost of sales”.

The transfer to the next process is taken at the cost.

The details in the above format will be useful in filling up the Cost Statement as per CCRAR2014 for the yarn of a particular CTA code.

The conversion cost break-up is to be shown for each CTA product. The Bonus, Gratuity need not be shown separate and therefore added to W&S. The interest cost is shown under Finance Cost.

ABRIDGED COST STATEMENT (for each product with CTA Heading separately):

Name of Product:

CTA Heading

Unit of Measurement (UoM)

	Production	FG purchased	FG stock adjustment	Captive Consumption	Other adjustment	Qty. Sold
Cur. Yr.						
Prev. Yr.						



S. No.	Particulars	Current Year		Prev. Year	
1	Materials Consumed (details as per 2A)				
2	Process Materials/Chemicals.				
3	Utilities (specify details as per 2B)				
4	Direct Employees Cost				
5	Direct Expenses				
6	Consumable Stores and Spares				
7	Repairs and Maintenance				
8	Quality Control Expenses				
9	R & D Expenses				
10	Technical know-how Fee/Royalty				
11	Depreciation/Amortisation				
12	Other Production Overheads				
13	Industry Specific Op. Exp. (details as per 2C)				
14	Total (1-13)				
15	Increase/Decrease in W.I.P				
16	Less: Credits for Recoveries, if any				
17	Primary Packing Cost				
18	Cost of Production/Operation [14 + (15to17)]				
19	Cost of Finished Goods Purchased				
20	Total Cost of Production & Purchases (18+19)				
21	Inc./Dec. in Stock of F.G.				
22	Less: Self/Captive Consumption (incl. Samples)				
23	Other Adjustments (if any)				
24	Cost of Production of Product Sold [20+(21to23)]				
25	Administrative Overheads				
26	Secondary Packing Cost				



27	Selling & Distribution Overheads				
28	Cost of Sales bef. Interest (24to27)				
29	Finance Cost				
30	Cost of Sales (28 + 29)				
31	Net Sales Realisation (Net of Taxes & Duties)				
32	Profit/(Loss)as per Cost Accounts (31-30)				

Notes:

1. Separate cost statement shall be provided for each CTA heading representing the product.
2. If the same product has different unit of measures, separate cost statement is to be provided for diff UoMs.
3. The items of cost shown in the Proforma are indicative-to be modified to meet the requirement of the industry.
4. In case the company follows a pre-determined or standard costing system, the above cost statement shall reflect figures at actuals after adjustment of variances, if any.

In filling up the above table, all the link Tables of CARR are NOT shown-but the important links are given.

E. Calculations for cost of Production, Cost of Sales and Margin on Cost of goods sold- Grey Fabric.

1. Conversion Cost: The format for calculation details of conversion cost of various cost centre (Winding-Weaving) are given below.

CARR1977--Proforma-D Cost Center wise Conversion cost from Winding to Weaving for the year.....

Sl.#	Particulars	Winding		Reeling	Doubling	Warping	
		Ord.	H. S			Dir	Sec
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>		



<u>Sizing</u>		<u>Drawing</u>	<u>Wp Tying</u>	Looms				Total
<u>Conv.</u>	<u>H. S</u>			<u>Ord.</u>	<u>Auto</u>	<u>Terry</u>	<u>S. L.</u>	

S.L. = Shuttle-Less

A. 1. Loom Shift/M/c shifts

- i. Available
- ii. ii) Worked
2. Production Kg
3. Avg Production Kg/mc shift or spl. shift

B. EXPENSES:

1. Direct W&S
 - a) Time Rate Wages
 - b) Salaries
2. Utilities
 - a) Water
 - b) Steam
 - c) Power
 - d) Others
3. Consumable Stores
4. Sizing Material
5. R&M
6. Other Direct Exp.
7. Factory OH
8. Depreciation
9. Admin OH.
10. R&D
11. Adj. of conv. cost for stocks
12. Adj. for cost variances
13. Total
14. Cost per loom shift/mc shift
15. Cost/Kg or metre
16. Total piece Rate wages paid in the year.

Notes: - (1) In the case of Drawing-in cost centre the unit of production shall be the number of ends drawn (in 000s).

(2) Adequate records shall be maintained, showing the sizing material consumed for each type of sizing, absorbed by the warp yarns and loss



in material, Rate per Kg. of sizing materials absorbed, the percentage of sizing material in Warp yarn for each type of sizing so that cost of sizing materials per Kg. of Warp Yarn sized can be worked out. While arriving at the conversion cost per Machine shift of the sizing department the cost of sizing materials shall be excluded. While working out the cost of Grey cloth in Proforma 'E' this element shall be treated separately.

(3) More departmentalisation, shall be made in respect of various groups of looms, if possible, according to width, utility etc., to have further refinement in working out the cost.

(4) The names of the Costs centres given are illustrative only

(5) Item No. 12 is applicable to companies maintaining cost records on standard costing,

(6) Piece rate wages shall be shown separately.

Cost of Production:

The statement on Cost of Production for each sort is prepared as shown below.

CARR1977: PROFORMA-E. Sort-wise Cost of Production in the Year

.....

1.Sort#..... 2.Description..... 3.Qty Produced: a:Mtr..... b:Kg..... C:#of Pcs each of mtr..... 4.Width(inch/cm)..... 5.Wp Ne..... 6.Weft Ne..... 7.Reed & Reed Space (inch/cm)..... 8.PPI..... 9.Selvedge..... 10.T.L(yds/m)..... 11.T.L allowance%..... 12.EPI..... 13.Loom Type & RPM..... 14.Loom Width(n)..... 15.Loom Shed Eff%..... 16.Prodn/LM shift.....

17.Loom Shift taken for Prod'n:..... 18.Cont.cloth/Non cont cloth/Export.....

19.Piece Rate for Wvg:..... 20.# End drawn.....

N.B: TL=Tape Length, PPI=Picks/inch, EPI=End/inch, Eff=Efficiency

Sl.#	Particulars	UOM	Qty	Rate	Val Rs.	Cost/pce or mtr
1	2	3	4	5	6	7



1. Cost of yarn
 - (a) Warp
 - (b) Weft
 - (c) Selvedge
2. Winding Cost
 - (a) Warp
 - (b) Weft
3. Warping cost
4. Sizing cost
 - (a) Material
 - (b) Other expenses
5. Drawing in cost
6. Loom shed cost
7. Piece rate wages
8. Adj. For opening and closing W I P, if any.
9. Total cost
10. Less credit for waste realisation in pre-weaving and weaving Departments
11. Net total cost.

NOTES. - (1) If synthetic filament is used in weft the quantity and cost of such filament shall be shown separately, similarly dyed yarn or any other processed yarn if used as warp or as weft, the details shall be shown in this Proforma.

(2) Winding charges shall be shown for that particular type of winding like cone, cheese, Roto or Pirn winding as applicable.

(3) If the cloth is subjected to calendaring or any other finishing the conversion cost for such operation/operations shall be added to the cost.

(4) While calculating yarn requirement adjustments for hard waste in pre-weaving and weaving departments shall be made.

For each sort the fol. statement is prepared (Prof-E1)

Sort#.....

Production (Prof. B)		FRC		Good Prod'n (^)		Op. bal	
mtr	Rs	Kg	Rs	Mtr	Rs	Mtr	Rs.



1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

To: Processing		To: Sales		To: Consignment		Cl. Stock		Con. Return	
mtr	Rs	mtr	Rs	Mtr	Rs	mtr	Rs	mtr	Rs
9	10	11	12	13	14	15	16	17	18

(^) Includes all grades sold in mtr form- like Good, cuts, SL, Seconds etc.

Some observations on the above format:

1. The FRC in Kg of Grey cloth, should be converted into mtr – to reconcile with the quantity received. For this purpose, for the grey fabric (with size on the warp), the size added on warp is to be considered.

Example: FRC of a sort weighs 1.050 Kg (=1050gms). The corresponding length is calculated as follows.

FRC of Grey cloth (of wt.1050gms) contains starch added on the warp in Sizing dept. The sizing wt. should be removed to find, only the yarn wt. Then the yarn wt. per mtr of grey fabric is taken to find the length of grey fabric equivalent to 1.050Kg of FRC.

The yarn weight of warp/mtr= 50 gm. The yarn wt. of weft/mtr= 50 gm. (i.e., total yarn wt. of fabric = 100 gm/mtr)

The size add on is 10% (on warp). Then, size on warp= 50X10%= 5 gm. Thus, the total yarn wt. of grey fabric in the FRC= 1045 gms

The length of FRC= Tot. yarn wt. of FRC/tot. yarn wt. per mtr of fabric
 =1045/100=10.45m

A similar but modified treatment is given for FRC of “Processed- fabric”. The input to processing is before wt.loss of cellulosic component and (say) elongation of fabric. For input –output reconciliation, between the Grey and Processed (final) cloth output, the wt. of grey fabric should be adjusted or brought to the status of the processed fabric considering wt.loss and elongation. For instance for 100% cotton fabric, after 2% elongation, the grey fabric of yarn wt of 100gm/mtr will weigh 100gm for 1.02 mtr. But, during the process there is wt.loss of 7% (in scouring).Then, 100-7=93 gm will be the wt .of 1.02 mtr .Or 93/1.02=91.2gm will be the wt.per mtr of processed fabric. Thus, if say 9.120 kg (or)9120gms of FRC is generated the equivalent length of grey fabric=9120/91.2=100mtr.

For other categories (like Fresh, Two parts ,Short length, Seconds etc , which are measured in mtr for processed (final) fabric, if say, for 10200 mtr of the final fabric , the equivalent grey fabric=10200/1.02=10,000mtr.



2. The details of “Reed” to be given along with reed space is not necessary and is ornamental when the details of EPI are given later in the table. Similarly, the information on TL (tape length) is the (total) TL corresponding the total production. When the TL allowance % is given, actual TL is not required and it is only ornamental.

CARR: Prof-F

1	2	3	4	5	6	7	8
Sl#	Sort#	Cont/Non-Cont.	To: Sales (m)	Cloth sent to sales- cost of Production	Admin. OH	Bonus Grat.	Int.

9	10	11	12	13	14	15	16
Pkg	Tot. cost of sales (^)	Tot. cost of sales (Act-mtr)	Cost of sale/mtr	Sales Realisation		Margin	
				Tot	Per mtr	Tot	Per mtr

(^) Issued for Sales Pkg= Packing that includes grey inspection cost.

Notes:

1. Adjustment for variances in the selling and distribution and other expenses included in this proforma shall be made and such adjustment shown separately in respect of companies maintaining cost records on standard costing.
2. In case commission is paid for sales, the same shall be shown separately under selling and distribution expenses.
3. Cloth sent on consignment account which bear expenses connected with sales during the particular year, as shown in this proforma, if returned, shall not bear similar charges of subsequent year when such stock is sent again for sales.

After preparing the above tables, the following table required in Part-D of CCRAR2014 can be prepared for sale of Grey Cloth.

CCRAR2014 Part-D (for audited Products) PRODUCT PROFITABILITY STATEMENT

1	2	3	4	5	6	7	8
Sl.#	Particulars	Current Year			Previous Year		
		Sales Rs	Cost of sales Rs	Margin Rs	Sales Rs	Cost of sales Rs	Margin Rs

Product-1
Product-2
Etc....

Total

F. Calculations for cost of Production, Cost of Sales and Margin on Cost of goods sold-Processed Fabric.

1. Processing Process Flow:

For different end-products required, the sequence of Processing operations differ. Some of them are listed below:

White, Dyed, White Ground (WG) printed, Dyed-Printed, Digital printed, etc. The fabric of these combinations may get “Mercerised” before the “Bleaching” process and get “Finished” at the end. The finishing may be of various types as explained in the Process flow details in Annexure-4.

2. Computation of the cost of production finished cloth usually involves the following steps:

- Calculation of the cost centre-wise conversion cost in the Mercerising, Bleaching and finishing sections.
- Cost of Chemicals used in: de-sizing, scouring, mercerizing, bleaching and finishing. Credit for chemical recovered in mercerising-recovery process.
- Cost of utilities like water, steam/ thermic oil –if used, power, gas (in singeing).
- Mill-Overheads of the cost centres involved for Shearing & Cropping, De-sizing & Singeing, Scouring & Bleaching, Drying, Finishing (on Stenters) & Calendar-if any.
- Conversion cost should be calculated per Kg/Metre of the final fabric processed and/or Machine Shift/Hour.

3. The common processes for all the fabrics undergoing processing are:

- Shearing & Cropping, De-sizing, Scouring, (either half/full) Bleaching, Drying and Finishing (on Stenters). The optional processes are: Singeing, Mercerising, Dyeing, Printing, Calendaring and special Finishing.
- The optional processes taken differ for White (Full-Bleached) fabrics, Dyed fabrics and Printed fabrics.



- The processes for White (un-mercerised-Cotton) fabrics are:
- Shearing & Cropping, De-sizing and singeing, Scouring, Full Bleaching, Drying and Finishing (on Stenters). If to be mercerised, it is usually done before Bleaching after drying the scoured fabric.

CARR1977 Proforma-G Statement or Cost Centre wise Conversion Cost in Bleaching Section for the Year.....

Sl.#	Particulars	J-Box			Op. width			Kier		
		kg	mtr	Mc sft	Kg	mtr	Mc sft	kg	mtr	Mc sft
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>

<u>Mercerising</u>			<u>Others</u>			<u>Total</u>	
Kg	mtr	Mc sft	kg	mtr	Mc sft	Kg	Mtr
<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>

A. 1. Cloth Processed in metres

2. Cloth processed in kgs.
3. No. of machine shifts/hours available
4. No of machine shifts /hours worked (in terms of 8 hours)

B. Expenses (Rupees)

1. Process chemicals
 - (a) De-sizing
 - (b) Souring
 - (c) Scouring
 - (d) Bleaching
 - (e) Wetting agents, etc.
 - (f) Others (to be specified)
 - (g) Chemicals for Mercerising.
- Total
2. Direct Wages & Salaries
3. Utilities (water/steam/power)
 - (a) Singeing
 - (b) Chemical Mixing
 - (c) Rope Washing
 - (d) Lye cooling plant
 - (e) Caustic recovery plant

(f) Others (to be specified)

Total

4. Consumable stores

5. Repairs & Maintenance

6. Other direct expenses if any.

7. Mill/Process house overheads

8. Effluent treatment plant cost

9. Depreciation

10. Share of Administrative Overheads

11. Research & Development

12. Adjustment for cost variances

13. Adjustment for conversion cost including opening and closing W.I.P

14. Total

C. 1. Cost per Kg/Metre/Machine shift/hour

2. Cost per Kg/Metre/Machine shift/hour (Previous year)

Notes:

1. Expenses chargeable according to weight of the cloth and length of the cloth and time taken for the process in each cost centre shall be filled in columns 3,4,5, 6 etc respectively and the rate for respective unit of production worked out. The rates separately worked out per Kg/per metre, per Machine shift/hour shall be applied while working out the cost of processed cloth in Proforma L.

2. The names of Cost centres and type of bleaching given in the Proforma are illustrative only.

3. In case separate department is doing yarn bleaching, adequate records shall be kept to work out bleaching cost of such yarn .

4. For special type of bleaching, adequate records shall be kept for the quantity and the cost of special chemicals used.

5. Item No.12 is applicable to companies maintaining cost records on standard costing.

Explanation:

(Refer to details on Gross and net mtr/kg processed in Annexure-1

1. Under total col. the Kg and mtr refers to the output of the Bleaching Section. As a foot note the Kg and mtr of re-bleaching, re-mercerising may be given.

2. The other m/cs may be drying range etc.

3. Under "Utilities": the Gas used for singeing is to be shown as "singeing". In item2-2a for steam and 2b for Thermic oil, note that Caustic Recovery Plant is taken under utilities. One more utility viz. Compressed air may also be included wherever applicable.



4. For the dyed fabrics:

For cotton fabric of dark shades, normally half bleaching is done. The required processes for dyeing are: Shearing & Cropping, De-sizing and singeing, Scouring, mercerising, Bleaching, Drying, Dyeing, Soaping, Drying and Finishing.

In case of PC Blended fabric, the fabric is Heat Set on stenter (for setting the polyester component in the fabric) and then dyed with Disperse dyes and later the Cellulosic component is dyed with Reactive/Vat/Azo/Sulphur etc. To dye the polyester component, High Temperature High Pressure (HTHP) or Jet Dyeing machine is used. To dye the Cellulosic component “Jet” or “Jigger” or “Padding” m/cs are used. For 100% Polyester fabrics, only Disperse dyes are used. The dyed fabric is after-treated on Soaper (also called washing Machine) for removing dyes that are mechanically adhering to the fabric and to improve the colour fastness. The fabric is then sent to Stenter for finishing.

5. The direct and indirect costs involved for the conversion processes are:

Cost of Colours & Chemicals used in various cost centres like desizing, scouring, bleaching, (Mercerising if any net of recovery), Dyeing, Soaping and finishing processes.

Cost of utilities like water, steam, thermic, power, compressed air etc.

Mill-Overheads of the cost centres involved.

Thus, depending on the machines used, the corresponding conversion cost of the cost centre is taken for cost calculations. The conversion cost should be calculated per Kg/Metre of the final fabric processed and/or Machine Shift/Hour.

The Calculation of the cost centre-wise conversion cost is done as shown below:

Sl.#	Particulars	Yarn dyeing				<-----Cloth Dyeing-		
		Beam Dyg		Cheese Dyg		Jigger		
		Kg	Mc sft	Kg	Mc sft	Kg	mtr	Mc sft

<-----Cloth Dyeing----->			<u>Others</u>			<u>Total</u>
<u>Beam Dyeing (HTHP)</u>			<u>Eg: Jet Dyg</u>			
Kg	mtr	Mc sft	Kg	mtr	Mc sft	<u>mtr</u>

- A. 1. Cloth Processed (dyed) in Metres
2. Cloth processed (dyed) in Kgs.
3. Yarn dyed in Kgs



4. No. of machine shifts/hours Available
 5. No. of Machine Shifts/Hrs worked (in terms of 8 hrs)
-

B. Other Expenses (Rs)

1. Process Materials
 2. Direct wages & salaries
 3. Utilities
 - a) Water
 - b) Steam
 - c) Power
 - d) Pigment Padding
 - e) Developing
 - f) Fast Colouring
 - g) Soaping
 - h) Mangling
 - i) Drying ranges etc.
 - Total Rs
 4. Consumable Stores
 5. Repairs & Maintenance
 6. Other direct expenses (if any)
 7. Mill/Process House overheads
 8. Effluent treatment plant cost
 9. Depreciation
 10. Share of Administrative Overheads
 11. Research & Development
 12. Adjustment for cost variances
 13. Adjustment for conversion cost included opening and closing W.I.P
 14. Total
- C.1 Cost per Kg /Metre/Machine shift/hour
2. Cost per Kg/Metre/Machine shift/hour (Previous year)

Notes

1. Expenses chargeable according to the weight of the cloth/ length of the cloth and time taken for the process in each centre shall be filled in columns 3,4,5,6, 7,8,9 etc respectively and the rate for respective unit of production worked out. The rates separately worked out per Kg, per Metre, per machine shift/hour shall be applied while working out the cost of processed cloth in Proforma L and processed yarn in Proforma B.
2. The names of Cost centres and type of dyeing given in the Proforma are illustrative only.
3. In case dyeing of yarn is done in separate department by spinning mills, similar Proforma shall be prepared for such section/types of dyeing.

4. Cost of Dyes & special chemicals used shall be treated as separate element of cost in the cost of processed cloth.
5. Item No. 12 is applicable to companies maintaining cost records on standard costing.

G. For Printing, the procedure is similar and the brief process and cost details are given below.

Calculation of the cost centre-wise conversion cost in the Mercerising, Bleaching, Printing and Finishing sections.

For cotton fabric to be printed with dark back-ground, half bleach may be done.

a) The cost calculations for WG Printed Fabric:

The process required in addition to what is said for Merc-Blg-Fng fabric are the printing and soaping process. In case of polyester-fabric, printing is done with Disperse dyes and for cotton fabric, printing is done with Reactive/Vat dyes etc., For rotary printing machine and for auto flat- bed m/cs, the printed fabric is dried on the printing m/c itself. For roller and ord. flat-bed/table printing m/c, the fabric is dried on a drying range or on Stenter. To fix/cure and develop the printed colours, the printed fabric is passed through Stenter (for Disp. cols), or through Steam ager (loop steamer/star ager etc.,) for Reactive colours and through Polymeriser for Direct Colours (used both for polyester and cotton fabrics). The fabric is then after-treated on Soaper (also called washing Machine) for removing printing colours that are mechanically adhering to the fabric and to improve the colour fastness. Thus, depending on the machines used, the corresponding conversion cost of the cost centre is taken for cost calculations.

Cost of Col & Chemicals used in: Printing and soaping processes.

Cost of utilities like water, steam/thermic-oil, power, compressed air etc.

Mill-Overheads of the cost centres involved.

The conversion cost should be calculated per Sq. Metre/ Linear Metre of the final fabric processed and/or Machine Shift/Hour.

H. The cost calculations for Dyed- Printed Fabric (i.e., Print on coloured back ground fabric):

To get the coloured back ground, all the processes involved in Mercerising, Bleaching, Dyeing and finishing sections mentioned above are to be considered. Sometimes, instead of the normal dyeing process mentioned above, if blended fabrics with predominantly polyester component are processed, to get the coloured back ground, the cotton/cellulosic component is dyed on Stenter by “pad-batch” process, steamed on a “float drier” which is

in tandem with the stenter and dried on the same stenter and then taken to Printing machine to print polyester component with disperse colours.

For rotary printing machine and for auto flat-bed m/cs, the printed fabric is dried on the printing m/c itself. For roller and ordinary flat-bed/table printing m/c, the fabric is dried on a drying range or on Stenter. To fix/cure and develop the disperse colours, the printed fabric is passed through Stenter.

Normal dyeing (i.e., not pad-batch) is done for cotton fabric to get the coloured back ground. Then the reactive colours printed is passed through Steam ager (loop steamer/star ager like) for Reactive colours or through Polymeriser for Direct Colours (used both for polyester and cotton fabrics). The fabric is then after-treated on Soaper (also called washing Machine) for removing printing colours that are mechanically adhering to the fabric and to improve the colour fastness. Thus, depending on the machines used, the corresponding conversion cost of the cost centre is taken for cost calculations.

Cost of Col & Chemicals used in: Printing and soaping processes.

Cost of utilities like water, steam/thermic-oil, power, compressed air etc.

Mill Overheads of the cost centres involved.

The conversion cost should be calculated per Sq. Metre/ Linear Metre of the final fabric processed and/or Machine Shift/Hour.

In a similar manner the cost of finishing is calculated. Finishing is done on stenters, where after applying finishing chemicals in bath trough, the fabric passes through a series of hot chambers for drying where they are simultaneously stretched to the required width and delivered out of the m/c. The other optional processes like calendaring, preshrinking, raising etc. are done post finishing and the cost calculation are similar.

The fabric is then taken for inspection where they are segregated into Good (or Sound or Fresh) cuts, SL, Sec, FRC and for each sort, the total non-Good mtr and the cost centres responsible for the defect are recorded for corrective action.

The fabrics are then packed either in lump or bale or roller, card boards form. For Packing material, recipies' are prepared for various types of packing including that for export, then the actual consumption of the material is compared with the recipe to take corrective steps for excess consumption. The following table shows the cost of sales and sales realisation and margin.



I. COST OF SALES of PROCESSED FABRIC

CARR1077: Proforma -M Statement for Cost of Sales of Processed Cloth & Sales Realised in the Year

Sl.#	Cont/ Non-cont	Sort#	Qty issued for sales (*)		Admin OH	S&D OH	Bonus	Gratuity
			mtr	Rs				
1	2	3	4	5	6	7	8	9

Int	Tot cost of Sales	Act Qty Sold	Cost of sales of qty actually sold	Cost of sales/mtr	Sales Realisation		Margin	
					Tot	Per mtr	Tot	Per mtr
10	11	12	13	14	15	16	17	18

(*)Packed cloth

Notes:

(1) Adjustment for variances in the selling and distribution and other expenses included in this Proforma, shall be made and such adjustment shown separately in respect of companies maintaining cost records on standard costing.

(2) In case sales commission is paid, the same shall be shown separately under selling and distribution expenses.

(3) Cloth sent on consignment account which bear expenses connected with sales during the particular year, as shown in this Proforma if returned, shall not bear similar charges of subsequent year, when such stock is sent again for sales.

(4) If the company is having more than one Mill producing and selling processed cloth, and having common selling Department this Proforma may be prepared for all Mills together. But adequate records shall be maintained to show the details of cloth sold on account of each mill both in quantity and value.

4

Cost calculations of Textile Industry

Production calculation of a spinning mill:

I) Production/card/8 hours in kgs:

$$= 0.2835 * (\text{Delivery speed in mpm} * \text{Machine efficiency}) / (\text{sliver hank} * 100)$$

Where, 0.2835 is a constant which is arrived by = $(1.0936 * 60 * 8) / 840 / 2.205$

II) Production/comber/8 hours in kgs:

$$= (\text{Comber speed in npm} * 60 * 8 * \text{Feed/nip (mm)} * \text{Lap weight (g/m)} * \text{Machine efficiency} * (100 - \text{Noil\%}) * \text{No of heads}) / (\text{lap tension draft}(1.1) * 1000 * 1000 * 100 * 100)$$

III) Production/Draw frame/8 hours in kgs: (For single delivery)

$$= 0.2835 * (\text{Delivery speed in mpm} * \text{Machine efficiency}) / (\text{sliver hank} * 100)$$

IV) Production/Simplex spindle/8 hours in kgs:

$$= (\text{Spindle speed in rpm} * 60 * 8 * \text{Machine efficiency}) / (\text{TPI} * 36 * 840 * \text{roving hank} * 2.205 * 100)$$

V) Production/Ring Frame spindle/8 hours in kgs:

$$= (\text{Spindle speed in rpm} * 60 * 8 * \text{Machine efficiency}) / (\text{TPI} * 36 * 840 * \text{count} * 2.205 * 100)$$

BASIS OF COST ALLOCATION PER KG OF YARN (SITRA METHOD):

S.No	Items	Basis of allocation
i)	Raw material cost	$(100 * (c - p)) / g$
		where,
		c = fibre cost/kg
		p = waste sales realisation per kg of fibre
		g = yarn realisation (%)



- ii) Wages cost Operatives requirement on the basis of spin plan and work assignments. Ancillary operatives allocation on the basis of respective machine shifts. Non-production operatives – spindle shift basis.
- iii) Salaries cost Spindle shifts
- iv) Power cost Spin-plan and machine-wise power consumption Humidification, lighting, etc. on the basis of spindle shifts.
- v) Stores cost Spindle shifts
- vi) Packing material cost Cost per kg of yarn
- vii) Overheads:
 - Selling expenses Cost per kg of yarn
 - Others Spindle shifts
- viii) Depreciation Spindle shifts
- ix) Interest cost:
 - Working capital Sales turnover
 - Term loans Spindle shifts

MODEL COST SHEET FOR YARN: (to be given in Rs/kg)

- Count :
- Mixing :
- Single/Folded :
- Clean cotton cost :
- Wages
 - Upto spinning :
 - Post spinning :
- Power
 - Upto spinning :
 - Post spinning :
- Consumable stores :
- Packing materials :
- Staff salaries :
- Repairs & Maintenance cost :
- Administration expenses :



- Working capital interest :
- Term loan interest :
- Selling expenses :
- Depreciation :
- Total cost (A) :**
- Yarn selling price (B) :**
- Margin (A-B) :**

Impact of operational parameters on profit:

Machine and labour productivity in ring spinning are the most important factors that influences the conversion cost of fibre to yarn. This is because not only a high spindle utilisation leads to a reduction per unit production in every item of conversion costs – overheads, depreciation, interest, stores, power and wages – but also increases profits consequent to the higher volume of production and sales turnover.

Production calculation of a weaving mill:

Inputs required to calculate woven fabric production/day-

- i) Loom speed in rpm ii) PPI iii) Loom efficiency & Utilisation %

To calculate cloth production/day in mtrs;

$$= \frac{(\text{Loom speed in rpm} \times 24 \times 60 \times \text{Eff}\%) \times \text{Uti}\%}{39.36 \times \text{PPI} \times 100 \times 100}$$

Inputs required to calculate woven fabric costing-

- i) EPI ii) PPI iii) Yarn count (warp & weft) iv) warp & weft yarn price v) Fabric width vi) Yarn crimp & waste percentage

To calculate warp weight in grams;

$$= \frac{(\text{EPI} \times \text{fabric width in inches} \times 0.59) \times (100 + \text{warp crimp}\%) \times (100 + \text{warp waste}\%)}{\text{Warp count (Ne)} \times 100 \times 100}$$

$$\text{Warp count (Ne)} \times 100 \times 100$$

To calculate weft weight in grams;

$$= \frac{(\text{PPI} \times \text{fabric width in inches} \times 0.59) \times (100 + \text{weft crimp}\%) \times (100 + \text{weft waste}\%)}{\text{Weft count (Ne)} \times 100 \times 100}$$

$$\text{Weft count (Ne)} \times 100 \times 100$$

Where, 0.59 = (453.6*1.0936)/840



It is customary to use "Reed Space" to find the weft weight, where "Reed Space in inches"=(fabric width in inches)X(100+weft crimp %).

The waste% is for all sections in Weaving.

MODEL COST SHEET FOR FABRIC: (to be given in Rs/mtr)

-Raw material cost	
- warp cost	:
- weft cost	:
-Sizing cost	:
-Weaving conversion cost (Wages, power, Repairs)	:
-Fixed cost (Salary, Dep., Admin)	:
-Packing material cost	:
-Interest cost	:
-Selling expenses	:
-Total cost (A)	:
-Fabric selling price (B)	:
-Margin (A-B)	:

5

Revenue Streams in Textile Units

The normal source of revenue in a composite Textile Mills are from the sale of the following products:

1. Finished fabric
2. Grey fabric
3. Yarn (cones, sized beam)
4. Sliver (carded, combed)
5. Usable waste
6. Saleable waste
7. Stained Chindies
8. Scrapes: Plastic scrapes like broken cans, roving-bobbin, R/F bobbins, pirns, winding cones, empty containers/drums of colours and chemicals, Machine scrapes, Spares scrapes, Metal Scrapes like can springs, discarded lap rods, Warpens or weavers' beams, roofing sheets and Paper Scraps, Defective type writers, computers, electrical items like fans, regulators, capacitor banks, mains, switches, tube-lights/bulbs, broken furniture, discarded vehicles, tyres etc.
9. Rental income
10. Interest on investments made.

The finished fabrics are sold as "Fresh" and other non-standard forms like, SL, Seconds and FRC. The FRC is sold in Kg form. Even fabric is sold in grey form from looms without any finishing. The finished fabrics can be sold in the form: Grey, Grey-Mercerised, Mercerised-Bleached, Bleached, Mercerised-Dyed, Dyed, Printed and all these with finishes like, soft, stiff, water repellent, water proofing, soil release, flame retardant etc.

The Yarns are sold in the form-Grey, Fancy, Compact, core-spun, filament (POY), filament(texturised), Mercerised, Sized in Beam form, Dyed etc.

In rare cases, Slivers or rovings are also sold. (In the mixing of Weft Yarn of Blankets, slivers are used).

Soft and Hard Wastes are usually segregated into different categories like:

Saleable waste from Spinning: Stained cotton and card droppings, Flat stripes, Sweepings, Wastes cleared from Humidification cages etc.

Usable waste from Spinning: Some mills sell usable wastes also and use only virgin cottons in the mixing-to enhance the yarn quality. The wastes of Comber Noil, lap bits, sliver, Roving, Bonda (roller clearers), pneumafilis are usually segregated mix-wise.

Hard Waste: These wastes are classified as per lengths, unsized/sized, Grey/coloured etc.



The rental and interest income are treated as non-operational income and will not be adjusted in the cost to get net cost.

Records on Sales Return and Customer complaints: Any serious management will look into the records on Sales return and the reasons for it and the log book of customer complaints.

6

Performance Appraisal in Textile Industry

A. GENERAL:

The appraisal should be focussed on “controllable” in the hands of management and hence “internal” factors are to be critically looked into. It is important to know how some factors of production- like machine speed, labour allocation, basic raw material quality, process parameters, machinery condition, ambient conditions and others like small lot size, lay out, etc. affect output. The performance is to be compared with the industry’s Norms established by the Research Associations like, ATIRA, BTRA, SITRA etc. (For the textile units that exceed the Superior Norm of the industry, the International Norm-like that of “Uster” are to be taken for comparison). Selecting the proper “Norm” for comparison is IMPORTANT.

The performance appraisal of a textile unit is analysed for a) Utilisation of (i) Plant, (ii) Raw Material, (iii) Direct Materials like Colours & Chemicals, (iv) Labour and (v) Power, and b) for Energy conservation. Assessment of the financial performance through various Ratio Analysis etc. are well known to the accountants and hence discussed below in brief. Fluctuations in Net Profit may arise from marketing conditions in trading activities (especially when there is excess trading on cotton stock). The level of resource utilisation has a significant effect on Cost of production.

B. PLANT UTILISATION

In Textile units, different products give different outputs from the same Plant. To report, the capacity utilisation as per the CCRAR2014 guidelines (vide Annexure-16 for details), the concept of equivalent production is adopted. Thus:

1. In Spinning, the entire Ring Frame (and O.E and other Spinning m/cs) production is converted into production of 40s Ne.
2. In Weaving, the entire production of looms is converted into total linear mtr of all the “picks” inserted (say – in thousand mtrs). The inclusion of linear mtr takes the effect of reed space utilisation.
3. In Processing, all the production is taken in terms of actual time taken (m/c hrs) or conversely, like for 40s conversion in Spinning, the equivalent Common Sort production can be taken (for instance –if Cotton Shirting is the

major production, all the production equivalent to Cotton Shirting of the process can be taken).

4. In applying conversion to 40s Ne, precaution should be taken. If the actual production is much finer than 40s Ne (like 60s Ne or 80s Ne or above), then the no. of preparatory m/cs required to make 40s Ne may be inadequate - a case of bottleneck - and the spindle allocations to the operator may also differ. This means the resources used for the finer count may NOT be the same for the equivalent 40s Ne, thus calling for appropriate corrections when the resource levels are considered. *[If the Preparatory Machines are balanced for a particular average count, then for the finer (average) counts spun, the Preparatory machines will be in excess. Then, some Spinning Units may run these preparatory machines at a much lower speeds than the Norms (quoting better quality of output as the reason). It is preferable to run these m/cs at normal speeds and shut down the m/cs in week-ends or in third shifts-to save power, Over Time or labour cost. (This may require more “empties” and space for storage). A Cost Benefit analysis is required to evaluate such situations.]*

5. Textile Units, for convenience, segregate the capacity utilisation into: Plant utilisation and Plant productivity.

a) In Spinning, if a ring frame has worked in a shift, it is said to be utilised in the shift. Some of the spindles in a ring frame would not have worked (idle spindles). Spindle hrs lost due to doffing, idle spindles, m/c stoppage due to electrical & mechanical faults during the shift, down time due to unscheduled oiling & cleaning during the shift are **not** taken as machine hrs lost in Utilisation calculations. These losses are taken as efficiency loss in productivity calculations.

b) Records on the **reason wise loss** in utilisation are IMPORTANT.

c) For this purpose, it is necessary to understand, the definition adopted by the Textile Unit. For instance, a Spinning unit may take idle “spindles” as utilisation loss while others may take it as efficiency loss. Then, the former will not consider “idle spindles” as working spindles in Productivity calculations. The industry Norm suggested by “SITRA” takes “idle spindles” as efficiency loss.

d) The reasons for loss in utilisation are to be classified into, Losses due to:

“Natural Calamities”, “Uncontrollable/Unplanned” (in short run by the Management) like Permanent idle m/cs, Power Cut, Labour Strike, Material shortage and/or No sales order arising due to statutory ban etc., Machinery Modifications or Conversions or Expansion etc. and “Controllable” (Labour Absent, No Sales order, No Raw Material, No back material, No Empties, Machinery Break down, Rain water dropping etc.,). The management should find steps to mitigate these losses- with a special emphasis on “Controllable”.

C. UTILISATION of RAW MATERIAL:

1. The RM cost is affected by three components - the mix of RM components, wastage and the price paid (considered in mix, yield and price variances respectively).

2. For accuracy of the information on RM consumption,

a) Apply lot-wise average wt. of the bales for all the bales delivered from the lot, b) Regular calibration of weighing scales to eliminate the scale errors and periodically establishing the correct tare weight of various empties/containers.

3. The RM Wastages are classified into three groups --(a) Saleable, (b) (Re)Usable and (c) Unaccountable/Invisible Loss

a) Invisible Loss (Norm:0.5%): Invisible loss in a spinning mill occurs due to a number of factors such as short fibres (fluff) escaping from the departments, improper accounting of wastes produced, **weighing** errors in cotton purchased and wastes sold, excess give away of yarn and inaccuracies in the estimates of stock held in process.

b) Saleable Waste: It is the waste extracted and sold. The actual % of waste removed with respect to the Norm is to be seen. Records on waste extracted at various stages in Blow room and the lint content in those wastes are to be maintained. The actual quantity of waste to be extracted depends on the Impurities (called "Trash") in the Raw Material (RM). For a given level of trash (and hence the level of cleaning required), the actual % of waste extracted at each cleaning points in "Blow Room" should be compared with the Norm. The waste contains both trash and lint. For a given trash level, the extra waste removed indicates more loss of good RM (called lint). The Norm is: to remove 1% trash in RM, 1.4% (max) of waste should be extracted in Blow Room.

4. Comber Waste (In Comber short fibres in Cotton are removed).

According to SITRA, "Under good working, for every 1% increase in comber waste, yarn strength will increase by 1% and evenness is expected to improve by 0.15 U%". Conversely, if a mill requires, (say due to customer demand) 10% higher yarn strength than what can be obtained without extracting Comber Waste, it should extract 10% Noil and not more. A Spinning Unit should check whether the Noil extraction is higher than the SITRA's recommendations.

5. Usable Waste. (SITRA Norm: Total 4.5 to 5.0%)

Usually, the above wastes are reused up to say 5%. Higher Usable waste results in reprocessing cost. (Some mills sell all the usable waste)

Norm: Pneumafil & Roller waste:2.5% (conditions apply).

6. Hard Waste: It varies with the R/F bobbin content, Cone size, type of winding, beam size (warper's, weaver's), smaller doffs/weft bobbin/cones esp. in colour patterns, variations in length of yarn on cones/beams, excess ends in warp, Excess wastage during "beam change" in loom shed.

Norm is from 2.5-3% of Yarn input

7. Wastages in processing: The loss occurs due to reprocessing i.e. re-bleaching, re-dyeing, re-finishing and in rare cases re-mercerising add to the costs. (Refer Annexure-9 on "Cost control in Processing" for more details). There is also loss of col. & chemicals in washing (especially while washing Printing Screens).

D. UTILITY LOSSES:

Wastage of water, leakage of steam, wastage of power due to idle running of m/cs etc. are common in Processing. (Refer Annexure-12 on "Energy conservation" for more details).

E. MIX WISE YARN REALISATION:

A Textile Unit should check the yarn realisation-mix wise to see whether there is abnormal high or low realisation and ask for reasons. Usually there is a tendency to use richer mixing-meant for finer counts in coarser counts. This analysis will also highlight, if there is **unaccounted booking of yarn output**-due to which the yarn in question will show low yarn realisation. The low realisation is usually explained as – "due to higher wastes" at different stages (especially in Combing) and comparison of the waste figs of each stage with the Norms will indicate the abnormality. [The moisture is added to Yarn as per the need of the customer and it should be accounted in determining yarn realisation].

1. The input- output reconciliation should be on actual and not standard. This should be looked into in input-output reconciliation for Yarn count, fabric construction, conversion factors used for Kg/mtr and vice-versa.

Where the end products are sold on fixed length per piece basis, like in towel, Dhoti, Saree, blanket, bedsheet, shawls etc., the variation in the actual length w.r.t the standard is to be seen and accounted properly. For instance, if the variation is 2% (plus or minus) correction should be applied for such variations on the standard –if standard figures are taken in reconciliation.



F. MACHINE PRODUCTIVITY

1. For the principal machine listed earlier the “Actual Output” is actually weighed/measured physically in some textile units. In some units, the output is a derived figure from part actual and part formulae (E.g.: Ring Frame hank meter reading X a Constant). In the latter case, the actual wt. (in case of yarn) or mtr (in case of cloth) at the packing stage is taken as the output.
2. The actual count may be coarser or finer than the nominal count and if nominal count is used in the fabric weight and production calculations then there will be deviation from the actual.
3. For a given cotton, if the actual spindle rpm and yarn twist is different than the standard rpm and TPI, then there will be a loss (or gain) in gm/spindle shift.

SITRA Norms on R/F productivity (for some cotton carded counts)

Count (Ne)	Spl. RPM	TPI	Eff%	Gms/spl.sft *
30	15,500	24.10	91.0	140.5
40	15,600	27.20	92.0	95.0
60	16,500	31.76	93.0	58.0
80	16,500	35.78	93.0	38.6

*- Production per spindle per 8 hours = $\frac{7.2 \times \text{spindle speed} \times \text{efficiency}}{\text{TPI} \times \text{count} \times 100}$

G. LABOUR (vide Annexure 8)

H. MARKETING/SALES:

- a) Control of bad debts, embezzlement
- b) Sales tour expenses Vs results.
- c) Effect of advt.
- d) In intercompany transactions, the transfer pricing adopted by the SBUs is to be looked into considering the various factors for the buying unit like availability of the same or equivalent product from an outsider, the purchase price, maximum quantity available, whether the outsider buys any item from the group company to supply the same product after conversion to the buying unit, the price elasticity of the price w.r.t quantity purchased, the conversion cost involved in the item bought and the corresponding selling price of the product. For the selling units, the selling price and the maximum quantity

that can be sold, idle capacity, transport & marketing cost when sold to the third party.

- e) Price elasticity of product
- f) Control on free samples.
- g) Like selection of product based on better contribution, the customers should also be selected. Some customers offer higher price, accept the Company's quality and thus return less product purchased from the Company, pay in time, offer bulk lot etc.
- h) Marketing philosophy (Local, export, small customers).

I. FINANCIAL PERFORMANCES:

- a) Comparative three years' figs (juxtapose)
- b) Common Size Statement
- c) Financial Ratios
- d) Income from Trading Activity
- e) Investment Income
- f) Foreign Exchange Fluctuation Income
- g) Abnormal income/expenditure

J. MANAGEMENT ACCOUNTING

- a) Marginal Costing, ABC, LP techniques for Product selection
- b) What is taken as Variable Cost, Semi Variable Cost (& proportion)
- c) Contribution/Key factor
- d) Costing to effectively utilise the excess capacity
- e) Make/buy products
- f) Accepting an order

K. SUBSTITUTION/VALUE ENGINEERING:

Search for alternative cheaper R.M is required to save cost. This will be a part of Value Engineering approach where similar search is made to reduce cost without affecting the basic functional properties of the product sold. Selection of best production methods that lead to cost reduction activities.

L. INDEX ON MACHINE CONDITION/PARAMETERS USED:

1. For a given cotton and the yarn count, using SITRA norms, the expected yarn-strength can be arrived at. The ratio of [(Actual Strength X 100)/Expected Strength] indicates process efficiency. The Norm for the ratio is: Good=100, Average=95 and Poor=90. Lower figs for the ratio indicates poor m/c conditions and/or improper process parameters.
2. As a corollary, for a given yarn strength and yarn count, find the required cotton quality index (=Ls/f) and if the index of the actual cotton used



is more, it shows that the mill uses richer mixings (due to poor mechanical condition of m/cs or improper process parameters). The difference in cost of the two mixings high lights the loss due to improper process conditions.

M. RECORDS ON NO. OF PRODUCT CHANGES:

In a Spinning unit, a frequent product changes indicate too many Yarn Counts in the production line. Frequent changes reduce machine utilisation. A simple index may be the number of products made at a time and the total number of products made in the reporting period. For a spinning mill, SITRA suggests that for a 30,000-spindle unit, only five Yarn counts at any time and a maximum of eight yarn counts in year. There will be more down time at Ring Frame due to creel change, if the change is in terms of change of raw material and back material hank/count and in case of Man-Made Fibre (MMF), if the lot size of the MMF is small. Frequent count changes indicate vulnerability of the company's product in the market.

N. PRODUCT DIVERSIFICATION/VARIETIES IN FINAL PRODUCTS:

A planned introduction of products of higher value addition is welcome and the number of new products introduced in a year indicates better performance towards sustenance of the unit.

Thorough **Production Planning** and introduction of **m/c loading** schedule cost is saved by reducing m/c idle time.

The concerned Managers should be given an opportunity to offer their views and only then, the performance of a Textile Mills should be reported.

Research and Development (R&D) Cost

The Quality Control Activity involving the routine process control of the process in use and the activities for maintaining the product specifications (including the quality) of the existing products, fall outside the scope of R&D activities. The R&D activity should be towards **improvement** of the existing process/product or development of a **new** process/ product/plant facility and included **market research** for the existing and new products.

CARR 1977: RESEARCH AND DEVELOPMENT EXPENSES:

(1) The proper records showing the details of expenses, if any, incurred by the company for the research and development work on the product covered under these rules according to the nature of development of products, existing and new product and processes, development of process of manufacture, existing and new, design and development of new plant facilities and market research for the existing and new products, shall be maintained separately.

(2) The method of charging these expenses to the cost of textile products and all other products shall be indicated in the cost records. Where the utility of such research and development work extends over more than one financial year, such expenses shall be treated as deferred expenses and charged to the cost of production of the textile products and all other products if any, on an equitable and reasonable basis and applied consistently.

(3) The expenses incurred by the Research and Development Department for providing technical know-how to outsiders shall be recorded separately and excluded from the cost of textiles products. The amount recovered for providing technical know-how to outsiders shall also be indicated separately and excluded from the income arising from the sale of textiles products.

Life Cycle costing is to be considered for the intended product taken under R&D investment. Usually the proportion of R&D cost to the total life cycle cost for a product is not high and therefore, gets less attention of the top Management. But it is important to note that the R&D cost is a sunk cost and **it sets the stage for the future larger expenses** of the product for Manufacturing, Labour, Training, Marketing, Customer service etc. Assessing the skill requirement of labour is important and if it is not readily available locally, it may have to be imported or for local labour some training cost will be involved-which will have a pronounced effect on cost.



Inadequate R&D expenses may lead to finalisation of a poor product design, which cannot be changed or rectified at a later stage or may result in high customer service cost or even rejection of the product in the market. Therefore, it is necessary to estimate what is the amount and proportion of the (budgeted) R&D cost to the total life cycle cost of the product and whether the Company can bear the R&D cost in case the product has not taken off. It is also necessary to estimate at what stage in the life cycle of the product, the R&D cost is recovered. A good management gives more attention to the R&D activities.

According to the “Theory of Constraints”, any investment (including that in R&D) should improve “Throughput Contribution”.

The R&D cost is to be amortised for the useful life of the Product Developed and the cost of the abandoned R&D activity should be written off. If benefit of the outcome of the R&D activities is shared by more than one unit, the cost of the R&D should be apportioned based on the amount of benefits received by the beneficiaries.

CONCLUSION:

Cost advantage is the buzz word in global competitiveness and even for sustainability of an organisation. Optimum utilisation of resources is the key issue in effective Cost Management. This requirement is more applicable for Textile Mills as its margins are slim. With the availability of electronic equipment at cheaper price, elaborate ERP systems and online information are nowadays available for immediate control of the activities in Textile Mills. Thus, the late post mortem analysis of the performance is a thing of the past. Information is becoming more and more powerful than ever before.

What cannot be measured, cannot be controlled. Many textile units do not measure all the input resources and thus are unaware of the wastage they incur in some areas. Installation of individual KWhr meters for each section (or at least for main cost centres like R/F, Loom Shed, Dyg and Printing m/cs, stenters) are necessary with the ever-increasing power cost. Similarly, installation of Steam meters to record steam consumption for the important cost centre in Processing.

By and large, Indian Textile mills have succeeded in taming the machines, material and of late even the money (cheaper interest rates and easy availability) but not the “men”. The following slogan has relevance in the context of Productivity linked wage rise which eludes many textile mills.

**All employers want “more work and less pay”,
All employees want “more pay and less work”,
Ultimately, we end up in “less work and less pay”,
But I want “more work and more pay”**

-----Arvind Buch,

(Union Leader TLA-Ahmedabad-in a Conference at ATIRA)

Annexure-1

COMMON TEXTILE TERMS

The Textiles (Development & Regulation) Order 2001 [TDRO2001], under Part-1, item (2) defines “Textiles” as any Textile Product and includes any Fibre, Tops, Yarn, Cloth, Made-ups and Garments.

The terms often used in Textile Industry (producing Yarn & cloth) are listed below:

A. Raw Material.

- Vegetable Fibre: Cotton, Kapok, Jute, Sisal, Ramie and Flax.
- Animal Fibre: Silk, Wool, Alpaca and camel hair
- Man Made Staple Fibre/Filament:
 - a) Synthetic: Polyester, Nylon, Acrylic, Polypropylene etc.
 - b) Artificial: Viscose/Rayon, etc.

Synthetics are basically chemicals while Artificial are basically non-chemicals i.e., from natural source (E.g.: Viscose from wood pulp)

The continuous filaments are cut into different lengths like 38mm, 44mm, 60mm etc. and are given certain crimp to form staple fibres. The synthetic or artificial staple fibres can be processed alone or in blend with cotton or with another artificial staple fibre on a Cotton Spinning System with minor modification.

Cotton, Polyester and Viscose are the most popular Raw Material used in Textiles. Some important quality details of these fibres are given in Annexure-6 on Quality. (Viscose, Cuprammonium, Polynosic are other forms of Rayon)

B. Yarn

- The specifications of a yarn: Its raw material content (like cotton, polyester, viscose etc.) and in case of blends, the proportion of each raw material in the blend (like PC 67:33 blend = 67% polyester and 33% cotton), count (Ne), carded or combed, twist and special process if any-like high twist, fancy, core, compact, singed, dyed, mercerised etc. The quality specifications of a yarn, are given in Annexure-6.

Yarn Count: Ne (i.e., Number English) is an index of yarn count. A yarn count indicates thickness of a yarn but **the measure of thickness is made as a relation between weight and length**. Higher the (Ne) number, lesser the thickness (i.e., finer the yarn). Example: 20s Ne is twice as thick as 40s Ne.

The English count is defined as “Number of hanks per pound of yarn where one hank= 840 yds”.

(Other types of yarn measurement like Tex, Denier, Nm, Deci-Tex are also used but in India Ne is widely used. In HS and CTA codes Deci-tex or Nm is

used. Conversion factors from one type of measurement to the other are available- Vide Annexure-2 for more details).

Example: If a single yarn measures 20 hanks and weighs one pound (lb), the count is 20s Ne. If a single yarn measures 30 hanks and weighs 2 lbs, the count is $30/2 = 15s$ Ne.

Sizing:

The sizing process consists of application of a mixture of sizing material on the warp yarn, so that the warp can withstand the rigours (tension and abrasion).

Raw (Grey) Fabric Details/Specifications:

Warp: The lengthwise yarn (running parallel to the selvedge) in a fabric.

Weft: The yarn across the width of a fabric (running from one selvedge to the other). It is also called “Filling”. Usually (but not always), the twist in weft is less than in warp and the count is same or coarser than of warp of the same fabric.

The warp and weft -being yarn-take the specifications of a yarn.

Yarn density in a fabric

Warp density: It refers to the no. of warp yarn per inch of a fabric. Traditionally the density on loom stage (at Reed) is specified, but in recent times, the density on table - in a relaxed condition of the fabric is specified. This is popularly called as “Ends per Inch” (EPI).

Weft Density: It refers to the no. of weft yarn per inch of a fabric as measured on table - in a relaxed condition of the fabric. This is also called “Picks per Inch” (PPI).

(For both the densities, instead of inch, deci-meter is also used)

Length Measurement:

Length of a fabric is measured on table in a relaxed condition, along the selvedge of the fabric and the width across the selvedge. Width is measured in Inches (or in mtrs) and the length in yards or metre.

On a loom, where several fabrics (of same or different widths) are made side by side, then, several terms like linear metre, solid metre, sq. metre are used when referring to the production from such loom. These terms have different meaning as explained below (for a simple case).

Example: Let a loom, make three fabrics side by side across its width, of the same specification. **It is a must that the weft and PPI should be same for all these fabrics.** (The width of each fabric can vary). Obviously, the length made on the loom, for each of these fabrics, will be same. Let the fabrics be removed from the loom, without separation of the three fabrics. Let the length

measured on a table, along the selvedge of any of the fabrics be 100 mtrs. Then, the solid length of the (three) fabrics is 100 mtrs.

Let the three fabrics be separated. Then, the total linear length of the three fabrics will be $100 \times 3 = 300$ mtrs.

Let the grey width on table of one fabric be 1.1 mtr, the second fabric be 1.2 mtr and the third fabric be 1.25 mtr. Then, the total sq. mtr of all the three fabrics will be $(100 \times 1.1) + (100 \times 1.2) + (100 \times 1.25) = 110+120+125 = 355$ sq. mtr.

Width: For a raw/grey fabric, this refers to “Grey width” and is measured on table. Some textile units use the term “**Reed Space**” which refers to the **width - (all) the warp yarn of a fabric, take on the reed**. The “Reed Space” will correspond to (but not equal to) the fabric-grey width on table. Reed Space will always be more than the grey width.

Selvage (Selvedge): For shuttle Looms-Traditional or leno, and for shuttle-less looms- Tucked-in or Fringe or Leno or Fused selvages are used.

Colour Yarn Pattern:

If, one or more colours of warp yarn are used with grey weft yarn to form a pattern, it is called vertical stripe pattern. If different coloured yarn is used in weft it is referred to as horizontal stripe pattern and if they are used both in warp and weft, it is known as “check” pattern. Usually in Weft up to 4 colours are used. But in Shuttle-less looms, there is a provision to run up to 8 colours.

Weave: The way the warp and weft interlace (going up or down the other perpendicular yarn) is called the weave. The simple weaves are: plain, twill and Sateen. There are other weaves that use a “Dobby” or “Jacquard”.

[Dobby and Jacquard are the “shedding” attachments on a loom and “Shedding” is a mechanism of a loom that decides the weave]

Processing Terms:

Final Width required: This is the width of a fabric at the final stage. **This is an important specification of a fabric.** This width is normally less than the grey width on the table.

Required Processes:

Singed, Mercerised, Half Bleached or Full Bleached, Dyed, printed with White Back Ground, Printed with dyed back ground, Different types of finishes like Preshrink, Soft, Stiff, Water proof, Flame retardant, Soil Release etc. In addition, for dyed fabrics, the types of dyes to be used are also specified (as different dyes have different fastness properties). For example, for Cotton- Reactive, Vat, Azoic, Direct etc., For Polyester- Disperse, Direct etc., Also the depth of shade required is also specified (usually as per sample or) in general as “very light”, “light”, “medium”, “dark”, special colours like florescent etc.

For printed fabric, the type of printing dye, design (indicating no. of colours, coverage) and the depth of shade required are also specified. In addition, the printing process like discharge, over dyed etc. are also specified.

Length Specifications: In case of some fabrics, like Dhoti, Saree, Towel, Blanket etc. along with the width, the final length required for each piece is also specified. The usual widths of fabrics are: 36”,44”,45”,48”,54”,58”,60”. In a very few cases, like bed-sheets, very wide widths like 90”,108”,120” etc. are specified.

Example: Saree (width 45” or 48”): 6 yds or 8 yds, Dhoti: 4yds or 8yds, Towel: 48”,54”,60”, Blanket: 108” etc, in case of Towels, Terry loop pattern (one side, both sides, as per pattern) and the final weight or terry loop size are also specified.

Packing and/or Folding Specifications:

Single Fold, Double Fold, Card Board Fold, Lump Packing, Bale Packing etc.

Length, Width, Weight Measurements:

In India, traditional (British) type Measurements are used. Example: Inch, Yard, Hank, (One hank=840 yds), Pound, Ne etc.

The unit used to indicate the thickness (length and wt. relation) of pre-yarn materials like roving, sliver and lap is “Hank” which is similar to the unit “Count” used for yarn. This measure should not be confused with the length measurement where the term “Hank” (One Hank=840 yds) is used. Depending on the context, the term Hank is taken as a measure of thickness or a measure of length.

The weight measurement is lbs or Kgs.

The length measurement of Yarn is Yards or hank and in Metric system- metre or Km.

The length measurement of Fabric (Grey or Processed) is Yards or Metres. (The length of a towel in inches). The weight measurement is usually Kgs.

The width measurement of Fabric (Processed) is usually in Inches (sometimes in metres).

The weight measurement

It is to be noted that the Unit of Measurement (UoM), changes at different stages.

	Bales	for
RM, (one bale of cotton=170 kg and one bale of Polyester Fibre=200 Kg and so on),	Yarn in Kg,	Grey-Fabric in Mtrs,
finished Fabric (Fresh, Two Part, Sub-Std, Seconds) in mtrs and FRC in Kg–calling for conversion factors between length and weight measurements. These conversion factors (from Kg to Linear mtr and vice versa) changes for Raw Fabric and Processed fabric due to elongation or contraction and/or weight loss the fabric undergoes in between the “Grey” and finished fabric stage.		



Gross and net Production on Processing M/cs:

Sometimes, fabric of length say 1000m may pass through the same machine like Drying Range or stenter more than once.

For instance, on a drying range, a Merc-Bld-Dyed-Finished fabric may have first pass on it after scouring, (then taken to Mercerising and then bleached) and have a second pass on D/R for drying and after dyeing and soaping have a third pass for drying on D/R (and then taken to stenter for finishing and delivered to Folding/Packing section).

Example: When only one D/R is available, the net production is the mtr finally delivered =1000m

The gross production of D/R=net production x No. of passages in the D/R=1000x3=3000m.

All the conversion costs of the D/R like W&S, utilities, power, repairs, depreciation etc. are absorbed by the gross production of 3000m and the cost per mtr is arrived at.

This cost is taken on 1000m and shown as the conversion cost of D/R.

Alternatively, as the first two passes fall in the Bleaching process, only the Gross mtr for the two passes (i.e., 2000m) may be considered and included in the Bleaching activity and one pass may be taken in the Dyeing activity.

Similarly, several passes take place on stenters also. The fabric mtrs of Re-processing, Re-Blg, Re-Merc, Re-Dyg, Re-Fng, Re-soaping etc. is to be included in gross production but excluded in net production.

When more than one similar m/c is available and if any one of the m/cs. is used for each passage, then, all the m/cs are grouped as one cost centre, and the average cost per m/c (of W&S, power, utilities, stores, depreciation etc.) is taken and the treatment for one mc said above is applied.

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From Spinning to Sizing—Kg, Raw (or Grey) Fabrics: Linear Mtr/Sq.mtr.



Annexure-2

Yarn Count Definitions and Conversion table

Code	Name	Definition	Formula
Ne	Number English	No. of hanks per pound(lbs) of yarn (1 hank=840 yds)	$Ne = Yds / [840 \times (lbs)]$
d.Text	Deci Tex	Wt. in gms per 10,000m of yarn	$d.Text = (gms \times 10000) / mtr$
Tex	Tex	Wt. in gms per 1,000m of yarn	$Tex = (gms \times 1000) / mtr$
Den.	Denier	Wt. in gms per 9,000m of yarn	$Den = (gms \times 9000) / mtr$
Nm	Number Metric	No. of 1,000m (1 Km) per Kg of Yarn	$Nm = Metre / [1000 \times Kg]$

Conversion table

	Ne	Nm	Tex	Den	d.Text
Ne	1xNe	0.5905xNm	590.5/Tex	5315/Den	5906/d.tex
Nm	1.693xNe	1xNm	1000/Tex	9000/Den	10000/d.tex
Tex	590.5/Ne	1000/Nm	1xTex	0.1111xDen	0.1xdtex
Den	5315/Ne	9000/Nm	9xTex	1xDen	0.9xdtex
d.Text	5906/Ne	10000/Nm	10xTex	1.111xDen	1xdtex



Annexure -3

CTA code details

Note:	The details of the CTA codes covered in CCRAR2014 are given below. For few codes, details are given for more than four digits.
The 5th and 6th digits of the code (11-15) for uncombed of yarn in the count (Nm) range of [≤ 14), (>14 to ≤ 43), (>43 to ≤ 52), (52 to ≤ 80), (>80 to <94)]	
AND (21-27) for combed yarn in the count (Nm) range of [≤ 14), (>14 to ≤ 43), (>43 to ≤ 52), (52 to ≤ 80), (>80 to <94), (>94 to ≤ 120) and >120]	
AND (31-35) for multiple folded yarn of single yarn uncombed of count range [≤ 14), (>14 to ≤ 43), (>43 to ≤ 52), (52 to ≤ 80), (>80 to <94)] AND (41-48) same as (31-35) but Cabled	
The 7th and 8th digits of the code 10 is for GREY, 20 is for Bleached, 30 is for Dyed and 90 is for Others.	
Gsm = Grams per square metre	

Nm	D.tex
14	714.3
43	232.6
52	192.3
80	125.0
94	106.4

Sl. No:	CTA code	Brief Name	Description
	4-digit code		
1	5004-5007	Silk	
2	5106-5113	Wool	
3	5205	Cotton & its Blends	Cotton yarn (other than sewing thread) containing $\geq 85\%$ of cotton by



			wt., not put up for retail sale, single yarn, uncombed.
4	5206	Cotton & its Blends	Same as 5205, but has < 85% by wt. of cotton
5	5207	Cotton & its Blends	same as 5205 but put up for retail sale
6	5208	Cotton & its Blends	Woven Fabric of cotton containing >=85% cotton by wt. weighing not more than 200 GSM
7	5209	Cotton & its Blends	Same as 5208, but wt.>200GSM
8	5210	Cotton & its Blends	Woven fabric of cotton containing <85% cotton by wt., mix with man-made fibre, not more than 200GSM
9	5211	Cotton & its Blends	Same as 5210, but >200GSM
10	5212	Cotton & its Blends	Other woven fabrics of cotton.
11	5301-5311	Jute and other vegetable textile items	
12	5401-5408	Man Made Filament items	
	5205	Uncombed	Cotton yarn (other than sewing thread), containing 85% or more by weight of cotton, not put up for retail sale. Single yarn, of uncombed fibres.
	5205.11		Measuring 714.3 decitex or more (not exceeding 14 metric number)
		5205.11.10	Grey
		5205.11.20	Bleached



	5205.11.30	Dyed
	5205.11.90	Other
5205.12		-- Measuring less than 714.3 decitex but not less than 232.6 decitex (exceeding 14 metric number but not exceeding 43 metric number)
	5205.12.10	Grey
	5205.12.20	Bleached
	5205.12.30	Dyed
	5205.12.90	Other
5205.13		-- Measuring less than 232.6 decitex but not less than 192.3 decitex (exceeding 43 metric number but not exceeding 52 metric number)
	5205.13.10	Grey
	5205.13.20	Bleached
	5205.13.30	Dyed
	5205.13.90	Other
5205.14		-- Measuring less than 192.3 decitex but not less than 125 decitex (Exceeding 52 metric number but not exceeding 80 metric number)
	5205.14.10	Grey
	5205.14.20	Bleached
	5205.14.30	Dyed
	5205.14.90	Other
5205.15		-- Measuring less than 125 decitex (exceeding 80 metric number)
	5205.15.10	Grey
	5205.15.20	Bleached



	5205.15.30	Dyed
	5205.15.90	Other
		Cotton yarn (other than sewing thread), containing 85% or more by weight of cotton, not put up for retail sale. Single Yarn, Combed fibres
5205.21	Combed	Measuring 714.3 decitex or more (not exceeding 14 metric number)
	5205.21.10	Grey
	5205.21.20	Bleached
	5205.21.30	Dyed
	5205.21.90	Other
5205.22		-- Measuring less than 714.3 decitex but not less than 232.6 decitex (Exceeding 14 metric number but not exceeding 43 metric number)
	5205.22.10	Grey
	5205.22.20	Bleached
	5205.22.90	Other
5205.23		--Measuring less than 232.6 decitex but not less than 192.3 decitex (Exceeding 43 metric number but not exceeding 52 metric number)
	5205.23.10	Grey
	5205.23.20	Bleached
	5205.23.90	Other
5205.24		-- Measuring less than 192.3 decitex but not less than 125 decitex
		(Exceeding 52 metric number but not exceeding 80 metric number)
	5205.24.10	Grey



	5205.24.20	Bleached
	5205.24.90	Other
5205.26		-- Measuring less than 125 decitex but not less than 106.4 decitex (Exceeding 80 metric number but not exceeding 94 metric number)
	5205.26.10	Grey
	5205.26.20	Bleached
	5205.26.90	Other
5205.27		-- Measuring less than 106.4 decitex but not less than 83.3 decitex (Exceeding 94 metric number but not exceeding 120 metric number)
	5205.27.10	Grey
	5205.27.20	Bleached
	5205.27.90	Other
5205.28		-- Measuring less than 83.3 decitex (exceeding 120 metric number)
	5205.28.10	Grey
	5205.28.20	Bleached
	5205.28.90	Other
5205.31	Multi folded Uncombed	Multiple (folded) or cabled yarn, of uncombed fibres
		-- Measuring per single yarn 714.3 decitex or more (not exceeding 14 metric number per single yarn)
	5205.31.10	Grey
	5205.31.20	Bleached
	5205.31.30	Dyed
	5205.31.90	Other



5205.32		--Measuring per single yarn less than 714.3 decitex but not less than 232.6 decitex (exceeding 14 metric number but not exceeding 43 metric number per single yarn)
	5205.32.10	Grey
	5205.32.20	Bleached
	5205.32.90	Other
5205.33		--Measuring per single yarn less than 232.6 decitex but not less than 192.3 decitex (exceeding 43 metric number but not exceeding 52 metric number per single yarn)
	5205.33.10	Grey
	5205.33.20	Bleached
	5205.33.30	Dyed
	5205.33.90	Other
5205.34		-- Measuring per single yarn less than 192.3 decitex but not less than 125 decitex (exceeding 52 metric number but not exceeding 80 metric number per single yarn)
	5205.34.10	Grey
	5205.34.20	Bleached
	5205.34.30	Dyed
	5205.34.90	Other
5205.35		-- Measuring per single yarn less than 125 decitex (exceeding 80 metric number per single yarn)
	5205.35.10	Grey
	5205.35.90	Other



5205.41	Cabled Yarn	Multiple (folded) or cabled yarn, uncombed fibres
		-- Measuring per single yarn 714.3 decitex or more (not exceeding 14 metric number per single yarn)
	5205.41.10	Grey
	5205.41.20	Bleached
	5205.41.30	Dyed
	5205.41.90	Other
5205.42		--Measuring per single yarn less than 714.3 decitex but not less than 232.6 decitex (exceeding 14 metric number but not exceeding 43 metric number per single yarn)
	5205.42.10	Grey
	5205.42.20	Bleached
	5205.42.90	Other
5205.43		-- Measuring per single yarn less than 232.6 decitex but not less than 192.3 decitex (exceeding 43 metric number but not exceeding 52 metric number per single yarn)
	5205.43.10	Grey
	5205.43.20	Bleached
	5205.43.90	Other
5205.44		-- Measuring per single yarn less than 192.3 decitex but not less than 125 decitex (exceeding 52 metric number but not exceeding 80 metric number per single yarn)
	5205.44.10	Grey
	5205.44.20	Bleached



		5205.44.90	Other
	5205.46		-- Measuring per single yarn less than 125 decitex but not less than 106.4 decitex (exceeding 80 metric number but not exceeding 94 metric number per single yarn)
		5205.46.10	Grey
		5205.46.20	Bleached
		5205.46.30	Dyed
		5205.46.90	Other
	5205.47		-- Measuring per single yarn less than 106.4 decitex but not less than 83.3 decitex (exceeding 94 metric number but not exceeding 120 metric number per single yarn)
		5205.47.10	Grey
		5205.47.20	Bleached
		5205.47.30	Dyed
		5205.47.90	Other
	5205.48		-- Measuring per single yarn less than 83.3 decitex (exceeding 120 metric number per single yarn)
		5205.48.10	Grey
		5205.48.20	Bleached
		5205.48.30	Dyed
		5205.48.90	Other
	5206	Single yarn of uncombed fibres	Cotton yarn (other than sewing thread) containing less than 85% by weight of cotton, not put up for retail sale.



	5206.41		Measuring per single yarn 714.3 decitex or more (not exceeding 14 metric number per single yarn) and so on
	5207	Put up for Retail Sale	Cotton yarn (other than sewing thread) put up for retail sale.
	5207.10		Containing 85% or more by weight of cotton.....and so on
	5208	Woven Fabrics	Woven fabrics of cotton, containing 85% or more by weight of cotton, weighing not more than 200 g/m ² . (GSM)
	5208.11		Unbleached -- Plain weave, weighing not more than 100 g/m ²
		5208.11.10	Dhoti
		5208.11.20	Saree
		5208.11.30	Shirting fabrics
		5208.11.40	Casement
		5208.11.90	Others
	5208.12		-- Plain weave, weighing more than 100 g/m ²
		5208.12.10	Dhoti
		5208.12.20	Saree
		5208.12.30	Shirting fabrics
		5208.12.40	Casement
		5208.12.50	Sheeting (takia, leopard fabrics, other than furnishing fabrics)
		5208.12.60	Voils



	5208.12.90	Other
5208.13		-- 3-thread or 4-thread twill, including cross twill
	5208.13.10	Shirting fabrics
	5208.13.20	Dobby fabrics
	5208.13.90	Other
5208.19	Other fabrics	
	5208.19.10	Dedsuti, dosuti fabrics
	5208.19.90	Others
5208.21		-- Plain weave, weighing not more than 100 g/m ²
	5208.21.10	Dhoti
	5208.21.20	Saree
	5208.21.30	Casement
	5208.21.40	Shirting fabrics
	5208.21.50	Cambrics (including madapollam and jaconet)
	5208.21.60	Mulls (including limbric and willaya)
	5208.21.70	Muslin (including lawn, mullmull and organdi)
	5208.21.80	Voils (excluding leno fabrics)
	5208.21.90	Other
5208.22		-- Plain weave, weighing more than 100 g/m ²
	5208.22.10	Dhoti
	5208.22.20	Saree
	5208.22.30	Shirting fabrics



	5208.22.40	Casement
	5208.22.50	Cambrics (including madapollam and jaconet)
	5208.22.60	Longcloth (including calico)
	5208.22.70	Sheeting (takia and the like)
	5208.22.80	Voils (excluding leno fabrics)
	5208.22.90	Other
5208.23		-- 3-thread or 4-thread twill, including cross twill
	5208.23.10	Shirting fabrics
	5208.23.20	Parmatta fabrics (including ilesia, pocketing, Italian twill)
	5208.23.30	Shirting fabrics
	5208.23.90	Other
5208.29		Other fabrics
	5208.29.10	Dhoti and saree, Zari bordered
	5208.29.20	Dedsuti, Dosuti fabrics, ceretonnas and Osamburge
	5208.29.90	Other
5208.31		Plain weave, weighing not more than 100 g/m ²
	5208.31.10	Lungi
	5208.31.20	Sarees
	5208.31.21	-- Of Handloom
	5208.31.29	-- Other
	5208.31.30	Shirting fabrics
	5208.31.40	Casement



	5208.31.50	Cambrics (including madapollam and jaconet)
	5208.31.60	Mull (including limbric and willaya)
	5208.31.70	Muslin (including lawn mulmul and organdy) of carded or combed yarn
	5208.31.80	Voils (excluding leno fabrics)
	5208.31.90	Other
5208.32		Plain weave, weighing more than 100 g/m ²
	5208.32.10	Lungi
	5208.32.20	Saree
	5208.32.30	Shirting fabrics
	5208.32.40	Casement
	5208.32.50	Bed ticking, domestic
	5208.32.60	Cambrics (including madapollam and jaconet), Longcloth (including calico) and voils (excluding leno fabrics)
	5208.32.70	Coating (including suiting)
	5208.32.80	Furnishing fabrics other than pile and chenille fabrics
	5208.32.90	Other
5208.33		3-thread or 4-thread twill, including cross twill
	5208.33.10	Shirting fabrics
	5208.33.20	Coating (including suiting)
	5208.33.30	Shirting (including mazri)
	5208.33.90	Other
5208.39		Other fabrics



		5208.39.10	Zari bordered sarees
		5208.39.90	Others
	5208.41	Fabrics with Yarns of different colours	-- Plain weave, weighing not more than 100 g/m
	5303	Jute & Others	Jute & Other textile Bast Fibres (excl. Flax. true Hemp and Ramie) raw/processed but not spun, tow & waste of these fibres
	5310	Woven Fabrics of Jute etc.	Woven fabrics of Jute or other bast fibres of heading 5303
	5401		Sewing Thread of Man-Made Filaments whether or not put up for Retail Sale.
	5401.10	MM Filament-Sewing Thread	Of Synthetic Filaments (like Polyester, Nylon)
	5401.20		Of Artificial Filaments (like Rayon, Acetate)
	5402		Synthetic Filament Yarn (other than sewing thread) not put up for Retail Sale, including synthetic monofilament of <67 decitex
	5402.11		Of Aramide
	5402.19		Others



	5402.31		Of Nylon or other Polyamides, Single Yarn not more than 50 tex
	5402.32		Of Nylon or other Polyamides, Single Yarn more than 50 tex
	5402.33		Of Polyester
	5402.34		Of Polypropylene
	5402.39		Others (Polypropylene, Acrylic)
			Other single yarn, with a twist not exceeding 50 turns per metre
	5402.44		Elastomeric
	5402.45		Nylon or other polyamides
	5402.46		Polyester Yarn Partially Oriented
	5402.47		Other Polyester Yarn
	5402.48		Other Polypropylene Yarn
	5402.49		Other Yarns
			Other single yarn, with a twist exceeding 50 turns per metre
	5402.51		Nylon or other polyamides
	5402.52		Of Polyester
	5402.53		Of Polypropylene
	5403	Artificial Filament Yarn	Artificial filament yarn (other than sewing thread), not put up for retail sale, including artificial monofilament of less than 67 decitex.
	5403.10		High tenacity yarn of viscose rayon
		5403.10.10	Viscose rayon tyre yarn - 1,233 decitex



		5403.10.20	Viscose rayon tyre yarn - 1,833 decitex
		5403.10.90	Others-single
	5403.31	5403.31.00	Of viscose rayon, untwisted or with a twist not exceeding 120 TPM
	5403.32	5403.32.00	Of viscose rayon, with a twist exceeding 120 turns per metre
	5403.33	5403.33.00	of cellulose acetate
	5403.39		Other
		5403.39.10	Cuprammonium rayon
		5403.39.90	Others Single
	5403.41	Multiple folded	Multiple Folded/Cabled of viscose rayon
		5403.41.10	Upto 67 decitex
		5403.41.20	Of 83 decitex
		5403.41.30	Of 111 decitex, bright
		5403.41.40	Of 111 decitex, dull
		5403.41.50	Of 133 decitex, bright
		5403.41.60	Of 133 decitex, dull
		5403.41.70	Of 167 decitex, bright
		5403.41.80	Of 167 decitex, dull
		5403.41.90	Other
	5404		same as 5403 but >67 d.tex but dia=<1mm
	5405		same as 5403 but >67 d.tex but dia >1mm



	5406		MM filament yarn (not sewing thread) for retail sale
	5407	Woven fabrics	Woven fabrics of Syn. Fil. Yarn
	5408	Woven fabrics	Woven fabrics of Art. fil. Yarn
	5504	Artificial Staple Fibre	Artificial Staple Fibre not processed for Spinning
	5505	Waste	Waste incl. Noil, Yarn waste of MM staple
	5506	Synthetic Staple Fibre	Synthetic Staple Fibre processed for Spinning
	5507	Artificial Staple Fibre	Artificial Staple Fibre processed for Spinning
	5508	Sewing Thread	Sewing Thread of MM Staple Fibre
	5509		Yarn (not Sewing Thread), of synthetic staple not for retail sale
	5510		Same as 5509 but artificial staple



			fibres
	5511		Yarn (not Sewing Thread), of MM Staple fibres for retail sale
	5512	Woven fabrics	Woven Fabrics of Syn. Staple Fibres with =>85% of syn staple fibres
	5513	Woven fabrics	Woven Fabric of <85% syn staple fibres mixed with cotton of wt, =<170 GSM
	5514	Woven fabrics	Woven Fabric of <85% syn staple fibres mixed with cotton of wt, >170 GSM
	5515	Woven fabrics	Other woven fabrics of Syn. Staple Fibres of Polyester
	5516	Woven Fabrics	Woven Fabrics of Art. Staple Fibres



Annexure-4

Process Flow Details

SPINNING:

Cotton Carded Counts

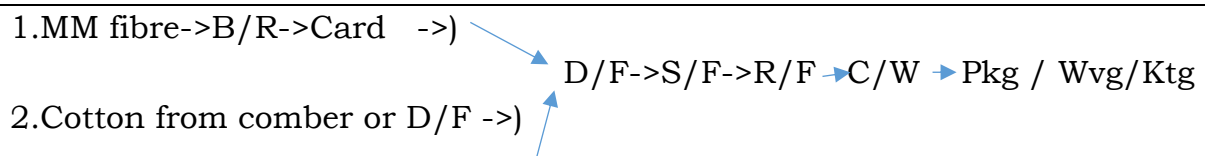
Cotton-->Blow Room-> Card ->Draw Frame -> Draw Frame-> Speed Frame-> Ring Frame-> Winding-> Packing/to Weaving or Knitting

Speed Frame is also called Fly Frame or Simplex. In olden dates Slubbing, Inter, Roving was used in its place.

For combed counts,

Cotton-->Blow Room-> Card-> Sliver Lap-> Ribbon Lap-> Comber-> Draw Frame-> Speed Frame-> Ring Frame-> Winding-> Packing/to Weaving or Knitting

For Blends: The MM fibre is processed separate in B/R and Card and then blended with combed cotton in D/F stage. The process flow is:



->Ring Frame->Winding->Packing/to Weaving or Knitting

If MM fibre and cotton are mixed in B/R. the combed sliver is brought to B/R and processed with MM fibre from B/R.

WEAVING

For Warp: Winding (*)-> Warping-> Sizing-> Drawing-in->

For Weft: Pirn/weft Winding->

(Both Warp and Weft)->Looms->

Raw Fabric Inspection->to Processing

(*) In some units, Winding is part of weaving

PROCESSING:

Stitching (joining fabrics)-> Shearing & Cropping-> De-sizing & Singeing-> Scouring-> Bleaching->

For White Fabric: Second Bleaching-> Drying-> Finishing-> to fabric inspection

For Dyed Fabric: Dyeing & Post dyeing treatment-> Drying-> Finishing->To fabric inspection

For (WG)Printed Fabric: Stretching-> Printing-> Polymerising or Steaming-> Washing/Soaping->Finishing-> to fabric inspection

WG=White Ground



Fabric Inspection:

Grading into “Fresh”, SST, SL, Seconds, Fents, Rages, Chindies (where the later categories are shorter than “Fresh”)

Recording Reasons for creation of non-fresh fabrics:

Reason wise: Defects due to: Fibre, Yarn, Raw Fabric, Processing (various processing dept. faults), Handling, Oil stains, etc.

Summary of the above Department wise,

Packing:

Single Fold, Double Fold, Card Board, roll (Stick), Lump etc.

External Packing

BRIEF FUNCTIONS OF EACH SECTION

SPINNING (100% cotton carded process is shown as an example)

Input: Cotton

Output: Yarn

Cotton from the Ginning Factories is brought to Spinning Mills in (compressed) bale form. The cotton has impurities like stalk, leaf bits, sand, seed coat, packing material like PP or jute bits etc. The impurities are called “trash” (about 2.5 to 6%). The Cotton is also in a small lump form with fibre entangled.

BLOW ROOM:

Input: Raw Material (say Cotton/MMF) Output: Lap/partly cleaned loose fibre to the chute of cards.

Here, different types of cotton (usually about three to five in numbers) are fed, to be thoroughly opened up, and mixed and trash in the material fed is removed, taken out finally in a sheet form ((of say 1cm thick and about 1m width) rolled on an iron rod. This sheet is called as “LAP” and it is taken to the next section called “Card”.

In modern B/R the “LAP” is not formed but the cotton- after all the processes -is sent to “Card” via pneumatic ducts. (Chute feed system). At the end, the cotton is cleaned by about 60%. In the process of removing the trash, inevitably good cotton (called lint) is also removed. It is important to note that Waste contains both “**trash**” and “**lint**”. In the process **Saleable waste called Blow Room-droppings are collected.**

Card:

Input: Lap/loose fibre in chute feed. Output: Almost fully cleaned sliver.

It individualises the cotton fibre, cleans the cotton further and brings out the cotton in rope form called” SLIVER”. Slivers are collected in large cans. The combined cleaning of B/R and Card is 90-95%. From the quality angle, Card

also removes NEPS in cotton fibre. **Saleable wastes in the form of licker-in and cylinder droppings, flat strips and some useable waste in the form of sliver/card web are generated in the process.**

Draw Frame(D/F):

Input: Card Sliver

Output: /F-I passage Sliver

I Passage (Two delivery system)

Eight card slivers are fed, drawn 8 times and made into one sliver of the same size as of the single input sliver. Some wastes in the form of sliver and roller lappings that are usable are generated in the process.

II Passage (Single Delivery system)

Input: D/F-I passage Sliver. Output: D/F-II passage Sliver

Again 8 slivers from output of I Passage are fed, drawn 8 times and made into one sliver of the same size as the single input sliver. Combining and drawing of slivers are done twice, to even out the variations in the density of card slivers as well as to make the fibres parallel to one another. The slivers are collected in (relatively) smaller cans. Some sliver (usable)waste is generated in the process.

Speed Frame(S/F): Say: of 120 spindles.

Input: D/F-II passage Sliver.

Output: Roving

Each sliver is drawn further –say about 10 times to make it thinner like a wick (of an oil lamp). The output is called “Roving”. The strand coming out of the front rollers of a S/F is given a light twist to avoid breaking. The twisted strand is called “Roving”. The rovings are wound on bobbins. It may be noted that as the fibre strand becomes thinner, twist is required to get adhesion among the fibres of the strand. The adhesion prevents its breakages. Some sliver and roving wastes (both-usable) are generated in the process.

Ring Frame (R/F)

Input: Roving

Output: Yarn

Each roving is drawn/drafted further–say about 25 times to get untwisted strand of “Yarn”. The untwisted strand is given a twist to form a yarn. The twist given, mechanically binds the strands and thus imparts strength which helps in the yarn not breaking. The yarn is wound on (R/F) cops.

Waste in the form of yarn is called as “Hard Waste”, while the waste in the form of roving, roller lappings, pneumafil waste are called as usable “Soft Wastes”.

Winding:

Input: Yarn on R/F cops Output: Nearly cleared Yarn on cones.

R/F cop holds very small quantity (about 40 gms) of yarn. So, yarn from several R/F cops (about 38-40) are wound on to a cone of say 1.5 kgs. In this



process, about 85% of abnormal (Classimat) type of yarn faults are also removed to get a cleared yarn. Hard waste is generated in Winding section.

The cones – if sold - are sent for packing.

In Weaving units, the cones – if they are for Warp, are sent to Warping Section and if they are for Weft - sent to Shuttle-less looms or to Pirn winding section.

END OF SPINNING DIVISION.

Weaving:

Direct Warping:

Input: Cones

Output: Warper's Beam

Yarn from cones is wound on about six to twelve (warper's) beams - each with equal no. of warp yarn (approximately about 400-500 ends). The process is called direct warping. The length of warp yarn wound on the beam depends on the flange size of the warper's beam. The Warper's beams are sent next to sizing section.

Sectional warping:

Input: Cones

Output: Sec-Warper's Beam

The total number of warp yarn required in a fabric is first wound from cones on to a drum of a Sectional warping m/c in sections (about 12-24) each with 400-500 warp yarn. The process is called Sectional Warping. Once all the sections are formed, the yarn from all the section are together re-wound (running-off) on to sectional warper's beam. The beams are then sent to sizing section.

Sizing:

Input: Warper's beam/Sectional warper's beam

Output: Weaver's beam.

If direct warper's beams are used, about 8 to 14 beams are used at the back of sizing machine and all the warp yarns from the beams are combined to form total warp yarn required in the fabric, [in case of Sectional Warped beams, all the yarn in the (single) weavers beam] and they are, dipped in a size box where sizing material (one of the direct materials used in textiles) is applied on the yarn. The materials starch/Poly Vinyl Alcohol (PVA)/Carboxyl Methyl Cellulose are the main adhesives that forms a coating on the warp yarn. For predominantly polyester content in the warp yarn, larger proportion of PVA is used. In the same machine, the sized yarn then gets dried and wound on weaver's beam to be taken to Drawing-in section or to Loom-shed for Warp-tying. Two types of wastes (unsized and sized) are generated. The wastes are again segregated based on their length- as short and long.



Drawing-in:

Input: (usually) Sized Beam

Output: Drawn Weavers' Beam

The warp yarn is drawn (as per the weaving pattern required) into set of Heald-Frames and Reed (that were detached from the loom for this purpose). This is done manually by a pair of persons (or) on semi-auto-drawing-in by one person. Some hard waste is obtained in the process.

Warp-Tying:

If the exhausted beam and the incoming beam have the same fabric specification (including weave pattern) as far as warp is concerned the new weaver's beam can be tied to the Warp-ends of the exhausted beam using a warp-tying machine. Warp-tying is done on the loom itself. Some hard waste is obtained in the process.

Loom Shed:

This is the most important cost centre in Weaving Division.

The drawn beam with healds and reed are fitted on the loom, and the required weft is inserted one by one, in the long sheet of warp, as per the weave pattern and the (grey)cloth formed is wound automatically on a beam which when full is removed (doffed) for inspection. The fabric at this stage is called "Grey-Cloth"— where "Grey" means Raw.

Some amount of warp yarn of the new beam ahead of the new cloth formed from the new beam, and some warp yarn at the tail end of the beam that got exhausted, and some amount of extra warp yarn form hard waste at the loom stage.

When leno or fringe selvedge is used, some amount of warp & weft yarn become waste.

Grey cloth inspection.

The grey-cloth is inspected for its specs and fabric defects like yarn mix-up, width, missing warp/weft yarn, yarn entanglements, gaps, wrong weaving pattern, stains etc.

END OF WEAVING DIVISION

Processing:

Several pieces of fabric of the same construction are joined (sewn) to form a long length, weighing approximately from 300-1000 kg and sent to Shearing & cropping machine.

(Fabrics of different constructions requiring the same process can also be joined but a clearly demarcation at the beginning and end of fabric of each

construction is needed to avoid mix up of fabric at each stage). **Shearing & Cropping:** Loose threads on the body and emanating from selvages of the grey fabric are clipped/sheared and the wastes are brushed off mechanically and thus a fabric with a clean surface is processed further.

De-sizing cum Singeing:

Singeing operation removes the protruding hair-fibres that are on the surface of the fabric. For this, either side of the fabric is alternatively passed rapidly over a flame –the speed is just enough to burn the protruding fibres only. There is no chemical application in singeing. In the same machine, the singed fabric is quenched in de-sizing chemicals. De-sizing is the process that removes the starch that was applied on warp in Sizing section through application of de-sizing chemicals-usually enzymes. The removal is necessary for better penetration of the various chemicals applied in processing. The de-sized fabric stays overnight (i.e., for about 12 hours) and then taken to next process.

Scouring:

This operation is done in Kiers (batch process), J-Boxes (continuous process) and open width jiggers (batch process).

Scouring process chemically removes the wax and impurities (basically from warp and weft yarn) of the fabric to make the fabric more absorbent. For bleaching process – if any, the same machine is used further.

Bleaching process whitens the fabric. For dark dyed shades and for printed fabrics of dyed back ground or of larger printing coverage, half bleaching is done.

For scouring/bleaching, in big size jiggers (called Jumbo jiggers) about 1000 kg of fabric is passed several times through scouring/bleaching liquor and given a wash using hot/cold water. The washing is done before, in between & after the scouring & bleaching operation.

Scouring and bleaching reduces the weight of cellulosic component of the fabric by about 6-8% (depending on the severity of scouring & bleaching). Of this, the wt. reduction is more at the scouring stage than at the bleaching stage.

Mercerising:

In this process the fabric is passed through a Caustic soda solution of about 20% concentration and washed off. Mercerising process improves the dye absorption and enhances the shining of the fabric due to swelling of yarn.

Caustic Recovery:

The caustic soda is recovered from the caustic solution used in the mercerising process through evaporation process. After recovery, usually about 7% of caustic side is consumed by weight of the fabric mercerised.

The mercerised fabric is sent for bleaching. (Some units take up Mercerising after Bleaching)

Drying:

The bleached fabrics-if sent for dyeing, they are dried on a machine with multiple drying cylinder-called drying-range and then taken for dyeing.

If sent for printing, the wet fabric is stretched to the width required for Printing and simultaneously dried, on a hot-air-drier called “Stenter”.

Dyeing:

Dyeing is the process where the fabric is passed through a dye bath having water, dye and chemicals to get the required shade, and washed with chemicals in the same machine to enhance the colour fastness. The dyeing is done usually on an open vessel like Jigger (for cellulosic part) or in Jet Dyeing m/c (for cellulosic or polyester part) or in HTHP m/cs (for polyester part).

Printing:

Printing is essentially a localised dyeing done on one side of a fabric- the dyeing done on the fabric, only in the portion required as per the design.

There are four types of Printing: a) Roller. b) Table c) Rotary and d) Digital. Of the four, Rotary printing is the most popular printing machine in which nickel screens in the form of rollers are used for printing. The number of screens used equals the number of colours in the printing design. The screens are engraved for the required printing design. The back processes to engraving are: Tracing and paper design making. The printed fabric is dried in a hot chamber in the printing m/c. The fabric is latter sent for post printing treatment. Digital printing is a new technology in fabric printing. It is described as any ink-jet based method of printing colorants onto fabric.

Post Printing treatment:

Fixation:

For direct colours, polymeriser is used where dry heat is applied to fix the printed design on the fabric.

For reactive colours, steaming is done for which steamers (like loop agers) are used.

For disperse colours (used for polyester components), stenters where high temperatures (about 180-220 deg C) are used to set the printed design on the fabric.

Washing:

The printed fabric after fixation process passes through a bath with soap solution and later hot & cold washed on a Soaper/Washing machine - where the colours mechanically adhering to the fabric are removed.

Drying:

The washed fabric is dried on drying range and sent for finishing.



Finishing:

This is done on Stenters. The finishing may be soft, normal or harsh or some special effect like soil release, waster proofing, water repellent, fire retardant etc. The finished fabric is sometimes calendared and/or pre-shrunk as per the customer requirements.

Heat Setting:

The polyester component of a fabric is heat set on stenter before dyeing for dimensional stability. The fabric shrinks about 2% during heat setting depending upon the amount of over feed at the stenter. Heat setting require a temperature $>180\text{DegC}$ and often the thermic boiler is used to heat the stenter-radiators.

Annexure-5

List of Cost Centres

(The details given below may look a duplication of process flow details. But there are some differences.)

Conventional, H.S, Modern technology, different No. of deliveries, with or No attachments like auto piecer, auto doff/changer, etc. are to be taken as different cost centres for proper cost determination.

Spinning: (separate cost centres for cotton, blends and MMF processes) as often the m/c speed differs for these mixings;

Blow Room, Card, Draw Frame (Br), D/F(Fr), S/F, R/F (for combed counts: Super Lap, Comber).

Weaving: Winding, Pirn Winding, Sec-warping, Direct Warping, Size Preparation, Sizing, Drawing-in, Warp Tying, Looms (Ord loom of different width (in small range groups), attachments, technology)

Processing: Stitching, Shearing & Cropping, Singeing, Scouring & Bleaching: Kier, Box, Open width small Jigger, Open width Jumbo Jigger, Drying Range (two cylinder), D/R(multi-cylinder), Merceriser, Caustic Preparation, Caustic Recovery, Pad Batch dyeing, Jigger Dyeing, Jet Dyeing, Fibre Dyeing, Yarn Dyeing, HTHP dyeing (vessels of widely different capacity is taken as separate cost centre), Soaper.

Printing: Roller, Rotary, Flat Bed, digital, Auto Flat Bed, Steamer (Loop Ager, Star Ager), Polymeriser, Stenter (different cost centres for: a) widely different (maximum) width, b) Steam Heated, c) Thermic oil Heated) Calendar, Preshrunk, Raising etc.

Packing: Lump, Bale packing, Single fold, Double fold, Roller Fold, etc.

Service Cost Centres:

Utilities:

Water line, Treatment line, Hydrant line,

Steam Boiler: separate for different capacity, coal, oil, Fur. oil, diesel, Gas fired, firewood

Thermic Boiler:(similar to steam boiler)

Power: Purchased power set up (Bus Bar, Mains, Changeover switches, DBs, etc)

Generated: DG set (Diesel & Gas separate), Solar, Wind etc.

Compressed Air: (Screw type, Piston type separately) including water coolers, reservoirs.



Humidification: Separate for each plant in Spinning and Weaving Stores (RM, Spares, Grey cloth, FG), Work Shop, ETP, Security, Canteen, Production Office, Q.C. Dept (Spg, Wvg, Procg), Computer Col matching Lab, Printing Design Studio, R&D, Product Development, Personnel/Admin, I.T., Finance, Marketing or Sales, Export dept, H.O. Inspection: Grey, Processed fabric.

Annexure-6

Quality Records

Quality is the one which differentiates a product from that of the other. Quality is a commitment which is not compulsory. But quality committed should be honoured.

A systematic cost benefit analysis should be taken up between the cost of Preventive and Appraisal quality system and the cost incurred to identify and correct the Internal Failure and that of the External Failure. An elaborate Preventive and Appraisal quality system may NOT be necessary for the units which intends to sell only non-high priced/export products.

Quality Reports of Raw material and Direct Materials used, intermediate products, products sold, process parameters etc. are to be maintained for better management control. The list of such reports is given below in detail.

CARR 1977: QUALITY CONTROL:

The adequate records shall be maintained to indicate the expenses incurred in respect of quality control department or cost centre for product under reference. Where these services are also utilised for other products of the company, the basis of apportionment to textiles products and to other products shall be equitable and reasonable and clearly indicated in the records and applied consistently.

Raw Material Test Results Records:

Cotton:

Test reports showing Length, Strength, Fineness, Maturity Ratio, Uniformity Ratio, Trash, Honey Dew and Moisture content.

Polyester/Viscose:

- Staple Fibre: Denier, Length, Tenacity, Crimp
- Filament Yarn: Denier and #of filaments, Tenacity

Cotton/Blended Yarn or 100% Polyester Spun or Viscose Spun Yarn:

Actual average Count Vs Nominal Count, Count C.V, Strength, Strength C.V, Uniformity measure [Uster(U%)], Blend % and its variations, Imperfections (Thin, Thick, Naps), Classmate Faults etc.

Filament Yarn: Denier, No. of filaments, POY/PTY, Tenacity, U%, Brightness (dull/semi dull/bright, Cat-ionic) etc.

Grey Fabric:

Width, Weight, Tensile and Tear Strength, Correctness of Yarn used, missing ends, Weave and the design pattern when diff. types of warps and weft are used, defects.

Finished Fabric:

Dimensions, Weight, Width variation, defects, Colour-fastness, Finish, abrasion resistance, design matching, etc.

Records on Process Control Quality Reports: machine details for rpm, fan speeds, settings, process parameters like draft, tpm etc. and end breaks in all cost centres of Spg and wvg, and m/c- audit for load, eccentricity, rubber roll harness, mechanical expression of rubber rolls for water removal, air infiltration in stenter door chambers etc. are checked by Q.C depts, but not listed below.

Spinning:

B/R: Waste droppings in beating points, Trash in Lap, Lap to Lap C.V or mtr to mtr variations in Lap, Usable Waste-Lap bit

Card: Usable Waste-Lap bits and sliver, Waste collection at different points, Sliver U%, 5m sliver wrapping C.V.

D/F (Br. & Finisher): Usable waste-sliver, Roller lappings, Sliver U%(Finisher), 5m sliver wrapping C.V.(Finisher)

S/F: Usable waste-sliver, rovings, Roller lappings, Roving U%, 1m roving wrapping C.V.

R/F: Usable waste-rovings, Roller lappings (bonda), pneumafil waste, Hard Waste, Yarn quality details as mentioned above.

Weaving:

Winding: Hard waste, Package defect & uniformity in density of package especially for dyed packages.

Sizing: Hard waste, Size pick-up %, Stretch in Sizing.

Loom Shed: Hard Waste, Sizing Lappers/1000ends/1000m

Avg. Yarn count of Warper's Beams.

Grey Fabric Inspection from initial doff for fabric conformity to the specs

Grey Fabric wt. (without size)/sq. mtr or lin. mtr

Processing:

Fabric tests as for grey fabrics and mc audit for energy conservation and in addition, water hardness test, Iodine Test for desizing, Water absorbency Test for scouring, Whiteness Test Bleaching, Ph. of dye bath, Colour fastness (light, washing, rubbing) for dyed and printed fabrics, pilling test, and special tests for water proofing. Soil release, flame retardancy, Water absorbency test for Terry towels etc.

Utilities:

Water: Hardness, PH, TDS, bacterial



Boiler: (Steam /Thermic): GCV (Gross Calorific Value) of fuel used, Ph. of boiler water, Temp at stake(furnace), temperature before and after economiser (if economiser is fitted) or Flue Gas Temperature, Co₂, Regular statutory boiler inspection.

Power: PF, Oil leak at transformer (for reporting to EB). (See Electrical Energy conservation for more details)

Compressor: Air leakage, Safety valve condition, Regular statutory compressor inspection.

ETP: PH before and after neutralisation, TDS, Colour of the discharge.

Hygienic conditions in & around the canteen, toilets and the factory.

Noise Pollution: Noise pollution in loom shed, Generators and decibel levels in those sections.

Annexure-7

Details of direct material consumed. (Ref: Part 2A of CCR&AR 2014)

From the details given below, the various types of Direct Material used and the stage at which they are used in the process should be noted.

In Spinning:

Raw Material: In direct material, RM forms the major part. The most common RMs used in a textile unit are: Cotton, Polyester Staple Fibre, and Viscose Staple Fibre etc.

In a cotton mixing, usually about 3 to 4 qualities of cotton are used-meant for yarn of carded count of a narrow range. For instance, for coarser count of yarn (say, up to say 16s Ne), one mixing is used, another for medium count range (say 20s Ne-26s Ne), another for still higher range (say 30s Ne-36s Ne). **Normally**, carded yarns are spun up to 36s Ne count only. For higher finer counts, either the same mixing meant for 30-36 Ne counts or some other mixing is Combed and then spun. The staple fibres of Polyester and Viscose, if they are the only blend in the yarn, (E.g.: P.V. blend), they are processed together right from B/R. If Polyester or Viscose (or both) staple fibres are to be mixed with cotton, they are blended at D/F stage (E.g.: PC, VC and PVC blends), - after processing the manmade staple fibres (polyester or viscose) in B/R and card separately. Alternatively, the Polyester or viscose staple fibres can be blended with cotton-sliver at B/R stage.

Along with cotton, less than 5% by wt. of usable wastes are mixed at the B/R (input) stage. The usable waste may be from the same cotton mixing or higher-count mixing. Blended usable wastes are NOT usually re used.

Other Direct Material: Tinting colours (used in mixings), Sizing Materials, Colours and Chemicals used in Processing are the direct materials that are commonly used in textile production.

Different Tinting colours are applied for different types of blends to distinguish one from the other, before the mixings are fed to the blow room machines.

The **raw materials for a Weaving (or a Knitting) unit** are in the form of yarn and taken into the weaving process at the beginning stage of the process. The yarn may be a **spun yarn** from a spinning unit or a **filament yarn** (of Polyester or Viscose) from a Man-Made Filament (MMF) manufacturing unit. For fish net, industrial fabrics like tyre cord etc., Nylon filament yarn is used. For agro sacks, Cement bags, polypropylene yarn is used and for wool-substitutes, acrylic yarn is used-E.g.: Blankets and shawls)



The specifications of commonly used fibres, yarn and filaments are given in the Annexure-1 on “Textile Common Terms”.

Sizing material: The sizing material is taken at the intermediary stage of Weaving process i.e., at the sizing stage and it consists of a mixture of starch/Poly Vinyl Alcohol (PVA)/Carboxy Methyl Cellulose (CMC) and other chemicals like, wetting agents, softener, anti-mildew agents etc.

Colours and Chemicals used in Processing (for cotton and polyester blended fabrics) are given below [Refer to Annexure-4 on Process Flow for complementary details].

Colours are the dyes used in Dyeing or Printing operation.

Bleaching Section:

Desizing: Enzymes, Scouring & Bleaching: Caustic soda, Sodium bi sulphate, Hydrogen Peroxide, wetting agents, whitening agents like tinopal etc.

Dyeing Section:

Various dyes: For cotton: Reactive, Vat, Azo, Direct, Sulphur etc. and for Polyester: Disperse and Direct

Chemicals: Acetic acid, Catalyst

Printing Section:

Dyes: Reactive and Direct for Cotton, Disperse for Polyester

Chemical for Pigment Ptg: Emulsion Thickener, Binder, Di-ammonium phosphate, Urea etc.

Chemical for Reactive: Urea, Resist Salt, Sodium bi- carbonate etc.,

Finishing: Softener, Resins, wetting agents etc.

.....
..

Packing Material: Hessian cloth, Card board Box, Craft paper, Card board, Wooden/Plastic (roll) sticks, Iron Straps, Clips etc.



Annexure-8

Labour Employment in Textile Mills

The quality of labour in terms of speed of his operation, dexterity of his hand in attending to “end- breaks”, systematic working, minimum absence away from m/cs, good attendance etc. will have effect on productivity and quality of the output. The basic attitude, education, skills required for the job are tested on the applicant and right choice is made at the time of entry itself. Adequate training is given to the special skills required and the culture of the organisation is imparted to make it an unconscious practice on the job.

The special category of employees like Spinning Tenter, Doffer, Mechanics, Electrician, Weaver, Processing M/c operator, Colour Mixer etc. are given training to get the best output. Importance is to be given to present the machines in good condition- not only to avoid break downs, produce quality output but also to reduce end-breaks. This means the skill of Machine-Operators (called Tenters), Mechanics & Electricians play a vital role in getting higher outputs and thus has salutary effect on Cost.

The standard Ring Frame operator and doffer allocations for Ring Frame is given by SITRA. The actual may be compared, and corrective action taken for the large variations.

SITRA Norm (2010): Work Assignment for 12 HOK (40s Conv)

(HOK=Operative Hours to produce 100 Kg yarn)

Category	Work Assignment		Remarks
Mixing Man	9 bales of 170kg/man/8hrs		
B/R Operator	To feed 4,000 kg of mixing/man/8hrs.		
Card Operator	Up to 20 chute feed cards or max 4,500 kg sliver/8hrs		With AL, ACC, AWES
D/F-I Pass	4 mcs/optr with AL, ACC,		2 del m/c
D/F-II Pass	6 mcs/optr with AL, ACC,		1 del m/c
S/F Optr	Upto 1.00 HK=3 mcs. Others 4 mcs.		120 spdl/mc
S/F Doffer	1,200 spdl. doffs/doffer/8hrs		
R/F Optr	Ne (Cotton)	Spdl/optr	Addl. 15% of total optrs as relievers
	Upto 10s	1,008	
	11-20s	1,512	
	21-36s	2,016	



	37-59s 60s & above	2,520 3,024	
R/F Doffer		6000 spindle doff/man/8hrs	
Ancillary Optr Excl comber	50 /day/30,000 spdls, (The break-up of ancillary operatives is given below).		
	AL = Auto Leveller, ACC=Auto Can Change, AWES= Auto waste evacuation system		

Ancillary Operatives for 30,000 spindles (40s Ne) (excl. comber)

Category	No. of operatives per Day
B/R to S/F	
Fitter/Fitter Helper	5
Cleaner	6
Waste Collector cum Sweeper	3
Bobbin Carrier	3
Ring Frame	
Jobber	3
Fitter/Fitter Helper	5
Cleaner	12
Roller Coverer	2
Shift Fitter	3
Doff Carrier	3
Draft Zone Cleaner	5
TOTAL	<u>50</u>

The Winding Drum allocation for Electronic Yarn Clearing & auto knotting



Ne	Drums/tenter
Up to 16s	12
18-20s	15
24-36s	20
40-44s	24
60-70s	30
80-120	40

Records on Labour allocation

Due to an over enthusiasm to reduce labour cost, some spinning mills give higher spindle allocation without considering the load on “tenters”. The factors to be considered are: the type of actual work to be done, actual end breaks level, skill levels (trainee, experience on higher spindle speed etc.), Lay out etc. For instance, draft zone cleaning and bringing roving bobbins and even assistance during doffing, creel change may be part of the spg tenter work load in some mills. If excess allocation is given, there may be problems of excess roller lapping, more pneumafil loss, bending of front rollers due to lapping etc.

These factors are to be considered for other categories of operatives also (like, R/F -Doffer, Winders).

Textile Mills face a regular problem of seasonal absenteeism. Allowance for absenteeism should be taken for each category of workers and arrangement should be made for stand-by workers at least for the important categories. The Norm for absenteeism in Spinning is given by SITRA.

SITRA Norm for absenteeism (Excl. EL, ML & CL) *

Absenteeism%	Rating
<=7	Excellent
>7 to <=11	Good
>11 to <=15	Average
>15	Below Average

Incentives for 100% attendance, and suitable recognition of such employees are practised in mills.



Labour T.O: The turnover of skilled hands is of concern to many textile units that needs to be controlled. Incentives for long service, objective appraisal practices for promotion, increments etc. are needed to reduce the problem.

For 24x7 working, 1/6 of additional hands with staggered weekly offs and staggering of lunch time with a few additional helpers to run the machines round the clock are common practice in many mills.

- * EL- Earned leave; ML – Maternity leave; CL – Casual leave

Annexure-9

Cost Control including Energy Saving in Processing Unit:

Colours & Chemicals form the single largest variable cost in a textile Process house and the systematic record of its cost, analysis, control and costing are necessary for proper pricing. One aspect of the control, is monitoring of the **purchase price** of the Colours & Chemicals considering its quality in terms of, a) less quantity of the item consumed, b) lesser energy and water required and (c) better fastness etc.

The other aspect is to control the consumption through **reduction of wastage** (and re-dyeing) and looking for cheaper substitutions.

The price fixed for a fabric for Disperse, Vat, Azo, Reactive, Direct etc. are usually different. A broad distinction within the same type of dyes for different shades like pale, medium, dark, very dark, special colours etc., are made. For each colour shade used in Dyeing, a standard recipe with further details like temp., dyeing time and expected re-dyeing% (based on difficulty in dyeing or matching the shades) etc. are to be prepared. Periodically, say once a month, each dye –should be reconciled for the standard and the actual consumption. A similar exercise can be done for expensive chemicals(only) leaving other chemicals –as chemical cost is usually less. Such an exercise, will highlight a large variation in consumption due to (a)**more re-dyeing**, (b)actual quantity of colours used vary from standard or Computer Colour matching-recipe, (c)difference in strength of colour between standard and the actual, (d)the dye used has lost its strength on storage etc.

Controlling the various parameters that affect the dyeing quality like (a)correct quantity of the colour/dye as per the standard recipe, (b) proper colour strength, (c) PH of dye bath, (d)rising rate, holding time, cooling rate of temperature and for this the required steam temperature, (e)substrate quality in terms of adequacy in mercerising, scouring, de-sizing etc. and (f)the post dyeing treatments etc. are to be looked at. All these means measuring all the factors affecting dyeing periodically and monitoring them.

Mercerising, Scouring, Bleaching

The Borne/Twaddle, Concentration and temperature for Caustic soda used, the speed of mercerising machine, the nip pressures, effectiveness of washing etc. are to be looked at, to avoid/reduce re-mercerising.

With changing fuel price, the economics of Caustic Recovery should be re-evaluated. As said in Quality measurements, suitable process control

(iodine test, absorbency, whiteness etc) is required to check effectiveness of scouring and bleaching to avoid reprocessing.

Labour Allocation:

In some units, the operators do material handling also. It is better to keep unskilled labour for material handling than using skilled labour (operators) to do the same as their additional job.

Planning:

Advance planning on m/c loading will reduce waiting for goods, trolleys etc. Numbering the trolleys/container boxes and ear marking the areas for input and output of each m/c -will help in machine loading and keep the machine engaged with a little down time. The instruction sheet showing the sequencing of loading may be given to the Supervisor indicating the trolley or batch roll numbers to avoid mistakes. Planning the proper processing time (with a smaller allowance for exigencies) for each machine and **running the suitable capacity boiler to suit the load and shutting down a boiler -when not required is a sure way to save energy.**

Minor Modification of machines:

In case dryers are in tandem with merceriser, soaper or any other m/c, it is advisable to make arrangements to use the dryers separately -when required. This arrangement will help when driers are the bottle neck.

Display on Machine used time:

Install LED that display in **bold** the hrs the m/c has run in the shift. With this, any Supervisor or Manager can immediately find the long idle m/cs at a glance when taking rounds in the dept. and take corrective steps.

Use full capacity of Containers:

It is better to use storage batch rolls or the trolley boxes to the **full** to reduce the no. of trolleys required. This will also reduce the number of trips to be made and the storage space required. The flooring should be even to facilitate smooth movement of trolleys. In case, boxes are filled partially for the left-over material, exhaust the partially filled boxes **first** to release the boxes soon. Do not batch shorter width fabric on wider batch rolls especially when only a few wider batch rolls are in stock. If such a thing is not avoidable, plan the activity in a way to use the upper fabric as soon as possible.

Processing lot wise:

Lot-wise processing, will eliminate remnant fabrics lying for a long time - often without any processing instructions. When the sales-demand for the fabric processed is quite less than the production capacity, processing



instructions are changed often by the Sales dept. to accommodate urgent orders and the lot is broken. Agreement between Sales and Production depts. on the lot size and strictly adhering to it will reduce some material lying in the Process house for a long time remaining unnoticed. Tracking the lot number (or at least the fabric quality number) that has entered and left the Processing dept. will indicate accumulation of fabric of particular quality. A finer exercise to locate the section involved is to track the input and output of each section for each lot (or fabric quality number).

It is better to go from lighter shades to darker shades without m/c cleaning instead of processing random shades and clean the m/c frequently.

Input-output reconciliation from grey fabric to packing is a must for each quality taking into account elongation/contraction and weight loss. Even after considering the size removal, at scouring, there is a loss of about 6 to 8% in cellulose content of fabric. This loss is often not accounted properly. At packing(output), some qualities like Fents, Rags and Chindies are measured in Kg and so proper conversion factor is required to convert to equivalent input metres. The conversion factor should clearly specify at what stage of the fabric (grey or fully processed) the factor is applicable. i.e., after or before considering elongation/contraction and wt. loss. Many processing units fail to do proper reconciliation.

Practice cutting at the defects to remove the defective piece. Cutting at the fold (i.e., at every mtr or yard fold) will increase “Value Loss”.

Where goods are sold in pieces (towel, dhoti, saree, blankets) check the actual length every day on random basis. The loss in this area often goes unnoticed.

At packing, if a bundle contains certain number of pcs, weigh the bundles and record the wt. At random re-weigh the packed bundle and compare with the std. wt. This will highlight if any extra pieces are added in the bundle while packing - for wrong motives.

In a competitive environment even, a small saving is needed to improve the profit. Systematic working, going into details that affect cost, measuring, assessing and taking immediate corrective steps will give an upper edge to an organisation compared to their competitors not taking such steps.

Annexure-10

MODERNISATION & CAPITAL INVESTMENT

Capital investment has a profound effect on Cost of a product and being a sunk cost, the investment should be made after careful analysis. What is best for one organisation need not be the best for another organisation- as the cost structure, marketing skill and good-will levels may differ. For better returns from high investment, the asset should be used –to the extent possible-for high-priced products.

Textiles mills discard the conventional technology under the impression that the technology requires “**too much to do**” by the existing work force and so modern technologies are opted where less human interference is needed. But **an organisation should set right its home first before embarking on modern technology, to reap the best from the huge investments.**

To establish higher priced products in the market, the prerequisites of an organisation are, a) its good will in delivering quality products consistently and b) higher skills of the machine operators and the maintenance staff.

The steps normally followed before going for modern technology are to:

1. Taking up a thorough market study to decide about the **products to be sold. The selection of the products, restricts the selection of the technology most suited for the product.**
2. Assessing **the present and future potentials** of the organisation in **producing and selling** the products shortlisted in point-1. The potential should be assessed in terms of a) the skill of various **personnel** needed, b) the availability of such skills internally, c) the level of training –if required, d) the turnover of trained personnel, e) quality level of the product expected in the market etc. In a similar manner the input **material** requirement should be looked into. The other infra structure required like, lay out, Repair shop, Q.C. Labs etc. should also be evaluated.
3. The next step is to select the “**Make**”. For instance, for the same technology like air jet, the weaving machine from India, Germany, Swiss, Belgium, Italy, Japan, China, are available. Each of different width, speed, limitation in yarn material and count, fabric construction and selvage type. Multi width weaving will require certain minimum lot size and single width weaving will require lesser lot size-thus the latter, increases the flexibility in making a variety of sorts at a time.
4. Every technical specification of the machine should be considered in the calculations of return and where the features cannot be converted to financial terms, they should be mentioned as a foot note. The usual order of modernising the various sections of a Textile unit is given below. But the

priority will vary from one unit to the other, depending on the place of bottleneck.

Conventional order of Modernisation in a Textile Mills

The order for the different divisions is: First Spinning, then Weaving and Processing in parallel. Based on the bottleneck or the nature of complaints received on the product sold to customers, the priority may be changed.

The order in Spinning is: D/F, Card, R/F, S/F, B/R, Humidification

Weaving: Winding, Looms, Sizing, Warping, Pirn Winding, Humidification

Processing: Bleaching, Dyeing, Mercerising, Finishing, Printing

Utilities: Steam Boilers, Thermic Boilers, Unconventional energy, DG Sets.

Choice of technology for important cost centres:

Spinning:

For Yarn of coarser counts (<20Ne): O.E (of normal yarn strength), R/F (if higher yarn strength is needed)

For Yarn of non-coarser counts (>20Ne): R/F with compact arrangement.

Winding:

For yarn requiring better yarn clearing only: H.S. Conventional Winding with electronic clearers.

For better clearing, better quality of the output package, auto splicing/knotting (that has effect on drum allocation to winder); Modern H.S winding m/cs like Auto coner, CA11 etc.

Weaving:

For 100% polyester fabric (medium wt. i.e., 100-200 gsm): Water Jet Looms

For medium weight fabrics (Shirting and Dress Material): Air Jet, Rapier

For Medium to Heavy Fabrics (250-300 gsm Suiting etc.): Rapier

For Heavy Fabric (Denims etc. >350 gsm): Projectiles.

Dyeing: For cotton: Jet Dyeing, For Polyester: HTHP or Jet Dyeing

Printing: Cross Border, long repeat design: Flat Bed

Design of limited design repeat (about 28"): Rotary

For sharp and to print large designs: Digital

Steam or Thermic Boiler: Gas fired –if gas in pipe line is available, or diesel or fur. Oil fired boilers. (To use Thermic boiler wherever possible-like in Stenter, Printing drying chamber instead of steam).

Annexure-11

Budgetary Control & MIS in Textile Mills

The CARAR2014 requires observations of the cost Auditor regarding adequacy or otherwise of the Budgetary **Control System**, if any, followed by the company.

In commenting about Budgetary Control, the following points should be looked into:

- i) Whether the Budget is in line with objectives of the organisation,
- ii) Existence of clear, organisational structure, authorities and responsibilities,
- iii) Full commitment of the top management for the budget.
- iv) Whether the Budgets are prepared in consultation with the departmental and functional heads to get commitment from them.

The Budgetary Control system and Standard Costing system are the base for the MIS. The Company standards are chosen-based on its past performance and the industry Norms.

The starting point of the budget is the “Sales Budget” in which, the products to be sold for a period are decided. Various constraints such as, availability of the required, a) type of machinery and its number, b) raw material, c) marketing skills and so on are to be considered. In particular, in Textiles, the number, size(width) and attachments on looms are considered. For instance, if a fabric requires a reed space on loom of 54” but if the maximum width available on loom is only 52”, then the fabric cannot be produced. Similarly, if a fabric requires a weave that can be made only on “Dobby” or “Jacquard” and if those attachments are not available on looms, fabrics of such weaves cannot be produced. Similarly, Stenters have the limitation of processing fabrics of certain widths or less. A Rotary printing machine cannot process cross border prints or of repeat more than say 28”.

In addition to the production constraints, the marketing constraints like limitation on the number and skill of sales-men, restrictions on zones etc. are also considered. After considering plant capacity, Financials constraints etc., a final list of products to be SOLD is prepared for each month of the budgeted year.

The requirement of each product to be sold is adjusted for FG stock, WIP and RM and the production to be made is arrived at. Based on the production programme a bill of material is prepared. The production programme is essentially made for looms and it is popularly called in Textile parlance as” LOOM PROGRAMME”.

Based on the loom programme, the production programme is prepared, for the main back process like Spinning and forward process like “Bleaching, Dyeing, Printing” etc. Adjustments are made, a) in the back process programmes for the product sold in between (E.g.: Yarn and size beam sale), WIP and b) in the forward processes programmes for the Products purchased (E.g.: spun and fil. yarn and grey cloth purchase) and WIP.

Like the Management Information System (MIS) in any other industry, the system for MIS in Textile Mills, decides the supplier of data, user of the information, the format and the frequency of reporting, the filtration of the report for different echelons of the organisation and extensive use of on-line data collection real time processing and reporting.

MIS reports the actual performance for a period and compares the performance with the Company’s standard. The reports of Confidential and sensitive information, Ad-hoc and special MIS reports-like that on a new project involving huge Capital Investment, financial results, steps taken to solve some serious problems, CSR activities etc. are usually presented to the top management. The Financial Reports include report on various expenses as % of Production value, Ratio analysis, Cash flow analysis, non-moving, slow-moving inventory (especially of FG) etc. To the top management, no elaborate reports but only exceptional reports are furnished.

$ROI = (\text{Opr. profit}/\text{investment}) = [(\text{Opr. profit}/\text{Sales}) \times (\text{Sales}/\text{Investment})]$. Often the management concentration is on first part viz. “Opr. profit/Sales” and the second part on the Sales turnover Ratio i.e. (Sales/Investment) is overlooked. The sales turn over in many textile units is low due to excess inventory or excess collection period of receivables or making less priced products not commensurate with the investment involved.

The excess inventory is NOT only in Raw Material Stock, but also in WIP, Finished Goods and long Sale Credits. Periodical reporting about Non-moving, slow-moving inventory at the FG godown as well as in WIP is required.

The excess WIP inventory arises due to frequent changes in Product Mix, where the material in pipe line cannot be used for the revised product and therefore kept side. (This blocks the storage containers like lorries, batch frames in processing, various beams in weaving and different types of bobbins, cans etc., in spinning). Sometimes due to process defects and wrong specifications, the products are kept aside resulting in insufficient storage-containers (beams, bobbins etc.), in-adequate space for storage. Bottlenecks and frequent m/c break downs arising due to poor maintenance practices also add to the rise in WIP inventory.



For large units, the RM or indirect material or spare parts or packing material, supplier may keep a godown at the buyer’s premises and permit the buyer to draw the stock as and when needed. (An arrangement similar to customs bonded ware house). This will reduce the inventory cost for the buyer.

The MIS on Operational Performances involving Production and Sales are presented to the Operational Managers. The MIS of this nature is discussed below in detail.

The simple MIS reports for textile operation are:

SALES:

Daily: a) Total Sales Value, b) Total Sales collection

Weekly: a) Same as daily sales plus b) Qty and Value of sale of Major items like, Yarn Sale, Size Beam sale, Grey Fabric Sale, Finished Fabric Sale – a) Area wise sales in Rs, b) Export Sales separately

Monthly: a) Same as weekly report plus b) Salesman-wise sales Value, c) Report on specific quality to be introduced in a specific area, and d) exceptional report on excess discounts given for any grade of certain sorts or customers. e) Expenses on advertisement, f) salesman-wise travel expenditure Vs sales value brought in and collection made) g) List of Payables exceeding normal credit period (of say one month). h) Major customer complaints like non-delivery of fabrics in time, quality problems etc, and i) variance report showing qty, mix and price variance.

Value Loss: In Textiles, the loss in sales realisation arises due to generation of non-standard grades like, Two Parts (TP), Short lengths (SL), Seconds (Sec), Fents, Rags and Chindies and offering discounts to these grades for sale. Value loss is expressed as % w.r.t value of the standard grade (called “Fresh” or” Sound”). This is an important performance parameter to be reported. The variance analysis for the actual quantity sold should quantify the loss due to these two reasons separately viz. Generation of nonstandard product and discount offered., at least for “A” category products.

For Example: Quality 60651, Sold=1000m (total of all grades) The Price/mtr=Rs.20. The standard and actual performance for say Jan’2020 is as follows. (FRC sold in Kg form is converted to mtr)

	Standard		Actual				Value at std disc%
	Qty	Discount	Mtr	Qty%	Value	Disc%	
Fresh (*)	90.0	0	850	85	17000	0	17000



TP	2.0	3	50	5	965	3.5	970
SL	3.0	5.0	40	4	768	4.0	760
Sec	2.5	10.0	20	2	370	7.5	360
Fent	1.5	30	25	2.5	370	26	350
Rag	0.75	50	10	1	90	55	100
Chindies	0.25	90	5	0.5	15	85	10
Total	100	1.5	1000	100	19578	2.11	19550

(*) =Std Grade Adverse is (-)

The standard Value loss= **(1.5%)** i.e., $1000 \times 20 \times 0.015 = \text{Rs}300$

The total actual Value loss= **(2.11%)** i.e., $(1000 \times 20) - (19578) = \text{Rs}422$

Total Variance of Value loss% = $1.5 - 2.11 = (-0.611\%) = \text{Rs } 300 - 422 = (-\text{Rs}122)$

Variance due to higher/lower generation of non std grade = $(1.5 - 2.25\%) = (-0.75\%)$ i.e., $\text{Rs } (300 - 450) = (-150)$. The adverse variance indicates higher generation on non-std quality than the std.

Variance due to higher/lower actual discount = $(2.25\% - 2.11\%) = (+0.14\%)$ i.e., $\text{Rs } (150 - 122) = (+28)$. The favourable variance indicates lower discount given than the std.

N.B: Actual Disc% for TP is calculated as $\frac{[(\text{act. mtr} \times \text{std fresh price}) - (\text{act value realised})]}{(\text{act. Mtr} \times \text{std fresh price})} = \frac{[(50 \times 20) - (965)]}{(50 \times 20)} = \frac{35}{1000} = 3.5\%$. Similarly for other grades.

PRODUCTION (with variance report for Qty -with further split ups and Rate)

1. Spinning:

Daily:

- Total production (Kg) with a break up for R/F, OE and any other group and for major counts.
- Spindle Shift worked (indicating Utilisation%)

Weekly: Same as daily plus idle spindle%

Monthly:

- Reason wise loss in Spindle Utilisation (%)
- Idle spindle%
- Gms/spl. shift for major counts.
- Yarn Realisation for each count/mixing.
- Usable, Saleable and invisible waste %

- f) HOK for labour
- g) Power consumption index like Units per Kg
- h) Stores Expenses/1000 spl. shift (Rs)
- i) Special report on abnormalities like, OT expenses, labour strike, labour absenteeism, major break downs, fire etc.

2. Weaving:

Daily:

- Total production (total linear mtrs) with a break up for Ord. loom, auto loom, Shuttle-less looms etc., and for major sorts.
- Loom Shift worked (indicating Utilisation%)

Weekly: Same as daily plus idle looms%

Monthly:

- j) Reason wise loss in Loom Utilisation (%) for each type of looms.
- k) Idle looms%
- l) Sort-wise loom efficiency (for major sorts).
- m) Size mixing cost/Kg (for major group)
- n) Hard waste %
- o) Labour/100 loom shift (for each group)
- p) Power consumption index like Units per loom shift
- q) Stores Expenses/100 Loom-shift (Rs) –for each type of loom
- r) Special report on abnormalities like OT expenses, labour strike, labour shortage, major break downs, fire, major changes in loom programme etc.
- s) Fabric Defects Report showing % of “Fresh fabric”.

PROCESS HOUSE

(For each type of processing m/c like Kier, jumbo jigger, J Box, Dyeing Jigger, Jet Dyg, HTHP, Roller, Rotary Ptg, Flat Bed Ptg, Mercerising, Stenters)

Daily:

- Production in linear mtrs
- Fresh packing % (for major sorts and total)

Weekly: Same as daily plus reason wise loss in m/c utilisation (%).

Monthly:

- a) Same as weekly + Cols and Chemical cost of Bleaching, Mercerising, Dyeing (type of dye and shade grade wise), Printing and finishing with variances from recipes.
- b) Spares consumption (Rs)
- c) Labour Employment Actual Vs Budget
- d) Non fresh fabrics (%-department wise like Blg defect, Dyg defect, printing defect, finishing defect, handling defect etc.)
- e) Non-moving, slow moving WIP- stock details with reasons.

3. PACKING:

Daily & Weekly

Total Qty (Bales/mtr) packed (with break up for major sorts).

Fresh packing & (with break up for major sorts)

Monthly:

Same as weekly report plus, packing material expenses, No. Of Staff employed, OT Expenses if any,

Quality Report for major sorts showing

a) % defects due to yarn, weaving, Blg, Dyg, Ptg, Fng, Material handling and others,

b) % TP, SL, Sec, FRC.

Annexure-12

ENERGY CONSERVATION

Fuel cost of boilers is one of the major costs in a Process House. A systematic Energy Conservation measures will reduce the cost.

A. Steam/Thermopack boiler usage

1. **Conversion to Thermic oil heating:** Thermic oil has been found to be more efficient in heating in providing consistent temperature as well as higher temperature (up to 300-320 Deg C) and therefore, **wherever possible**, thermic oil should be preferred in place of steam – especially, in stenters, Printing drying chambers, Polymeriser etc. For this purpose, the steam radiators are to be modified for thermic oil heating. The cost benefit analysis shows that such conversions are worth taking up.

One can use thermic fluid to heat the bath in open vessels also. (ensuring there is no leakage of the thermic fluid into the bath). Usually in open vessels max 75 deg C temp. is attained in the bath when using thermic fluid. For the rest of the higher temperature required, steam can be used.

2. **Installation of Steam Gauges:** It is a common site in Process-house that a plume of steam vapours above the open vessels like jiggers, soapers is seen - due to excess supply of steam to the bath when the operator tries to maintain the required temperature. Often the steam valves are fully opened and kept so till the process is over. For a process where 85Deg C is enough, the operator plays safe by keeping the steam valve fully open. The temperature reached in such a situation is almost 100 Deg C, thus resulting in wastage of steam. **To avoid the wastage**, it is better to **install auto temp. gauge** to adjust steam valve (or at least install **temp. gauge** to manually adjust the steam valve) to maintain the required temperature.

3. **Machine Loading:** Planned machine loading will reduce fuel consumption. To the extent possible, Heat Setting (Thermosetting) should be run continuously for a few days in a week on all stenters and when heat setting is completed, on the other days in the week, the thermic boiler temperature can be lowered to save fuel (but will need more storage-trolleys and space). In case of steam boilers, instead of 10bar pressure kept for Heat setting, lesser pressure is maintained for non-heat- setting process.

4. The pressure setting on compressor can also be set to the required level. Often higher pressures are set to take care of pressure loss due to leakages. It is better to attend the leakages regularly than to set higher pressures.

5. Regularly (at least every month) - a) check mangle nip expression, b) vacuum extractor effectiveness and once a week, c) clean radiators, d) check working of steam traps and siphons, e) clean the surface of dryers/radiators, f) nip roll pressure in washers, g) air infiltration in chambers etc. to save fuel.
6. No over drying and no idle running of machine should be ensured to save energy.
7. Double- end of fabrics should be processed to save energy.
8. Instead of drying cloth before stretching for Printing, wet stretching can be followed to save energy.
9. Calculate HUE (Heat Utilisation Efficiency) once a month taking the fabric output and fuel input.
 - Detailed Boiler Efficiency is to be calculated to look for improvements (Std: Eff. =85% Flue Gas: Co₂= 12-14% O₂=2.3%)
 - Cheaper fuel may be used-lignite, pet coke, rice bran, wheat husk, cashew shells etc.
 - Calorific Value of fuel and ash content of coal etc. are to be checked regularly to compare with the standard.
 - Lagging/missing Insulations on the steam pipes are to be restored to reduce the distribution loss.
 - Re cycling of waste energy from exhaust of boiler, DG Sets, Sizing m/c drier hoods, Hot water blow (or steam from driers) in process m/cs, sizing machines, boiler etc.
10. Cutting liquor to material ratio – especially in Jiggers, Jet Dyeing, Yarn Dyeing etc.

B. Steps to be taken to save Electrical Energy

1. Shifting of capacitor banks near to load end to improve P.F.
2. Installing energy efficient pneumafil suction fans etc.

Motor line current to be regularly checked. The motor ventilation should be kept clean, to reduce motor burn out. Acute under voltage condition is the root cause for many motor burnouts. Bearing problems, excess end breakages leading to excess lapping etc. adverse ambient conditions esp.in Summer – leads to motor heating and burnouts. The Humidity Plant capacity suitable for Summer should be checked.

The burn out should not be more than 0.25% in a year in Spinning Preparatory depts. and 0.1% in Ring Frame.

3. Electronic end break detectors for S/F machines may be installed.
4. Lighter spindles with lower wharve diameter are to be selected.



5. Optimisation of ring diameter with respect to count processed (**For finer counts, 38mm/ 36mm diameter and for medium counts 40mm ring diameters are recommended**).
6. Modified outer pot for TFO machines.
7. Efficient utilisation of compressed air system (refrigerated air driers are preferable when compared to heatless air driers).
8. Optimisation of load on transformers (50-60%).

Annexure-13

Observation on Capacity Utilisation Determination

Capacity utilisation of a plant is given in CAS-2. The basis for Capacity Determination as per the CCRAR2014 is given below.

(a) Capacity shall be determined in terms of units of production or services or equivalent machine or man hours.

(b) Installed capacity is determined based on

- i) Manufacturers' technical specifications;
- ii) Capacities of individual or interrelated production centres;
- iii) Operational constraints or capacity of critical machines; or
- iv) Number of shifts

(c) In case manufacturers' technical specifications are not available, the estimates by technical experts on capacity under ideal conditions shall be considered for determination of installed capacity. In case any production facility is added or discarded the installed capacity shall be reassessed from the date of such addition or discard. In case the same is reassessed as per direction of the Government, it shall be in accordance with the principles laid down in the said directives. In case of improvement in the production process, the installed capacity shall be reassessed from the date of such improvement.

(d) Normal capacity shall be determined vis-a-vis installed capacity after carrying out adjustments for:

- i) Holidays, normal shut down days and normal idle time;
- ii) Normal time lost in batch change over;
- iii) Time lost due to preventive maintenance and normal break down of equipments;
- iv) Loss in efficiency due to ageing of the equipment; or
- v) Number of shifts.

(e) Capacity utilisation is the actual production measured as a percentage of installed capacity.

The last point is important. The actual production is taken with respect to the capacity. This means, the total effect of all the factors of production viz. men, material, machinery and in addition the lay out, ambient conditions, availability of material handling equipment, management policy - for instance on inventory, lot size etc. will be evaluated as per the above definition.



Holiday, Normal shut down days, No. of shifts: A plant can be run on (weekly and festival) Holidays and in night shifts (–if taken as shift not run normally) with O.T. payment. Additional 1/6 labour force may be employed to cover weekly-offs. A cost benefit analysis is required-the result of which will vary depending on the profitability/contribution of the product made.

The normal idle time: The lunch time may be taken as normal idle time but there is an option to have staggered lunch time to keep the m/cs running.

Time lost due to Preventive Maintenance to the extent it is recommended by the m/c manufacturer makes sense, as without this maintenance the m/c will not run flaw-less for rest of the time.

Thus, the loss due these reasons are set aside as “Normal” or uncontrollable in short runs, or as a management prerogative-although corrective actions will bring in production. In the word “Normal” cultural effect is hidden.

Annexure-14

Latest developments in textile industry

Digital printing:

Digital textile printing is considered to be the 'next generation' printing which is quite different from the conventional fabric printing. With fabric printing going digital, many textile entrepreneurs are coming forward to invest in digital printing technology, as it is the most budding method of printing. In India, the textile industry is embracing digital printing technology by printing novel designs on saris and dress materials to meet the demands of domestic and international markets.

In simple words, when digital images are reproduced on physical surface, it is called digital printing. The physical surface can be in forms like paper, cloth, plastic, film, etc. In digital textile printing, once the design is created, it can be directly printed on the fabric from the computer. This process does not require any other step. Just as an image is printed on the paper easily, one can print designs on fabrics.

The limitations are, 1) The Printing Paper cost is expensive, 2) Only ready-made designs are used as tailor made design are costlier, 3) The paper is used only once although some mills use the paper, for the second time with less sharper or dull prints, 4) The electrical heater of the "Thermosol Printing" M/c consume more power. 5) The output rate is less (about 10-15m/min).

To print the designs on the fabric digitally, a dye-sublimation printer is used, which carries out the printing process by using heat to transfer design onto the fabric. In digital printing, it is necessary to pre-treat the fabric. This will ensure that the fabric holds the ink well, and a variety of colors can be attained through the pre-treatment process.

The dyes used for digital textile printing are different from the dyes used in traditional printing. The most popular dyes for digital printing are acid dye, reactive dye and disperse dye. These dyes can be used for all commercial applications, and have properties like bright colors, low to medium salt content and high color fastness. Various dyes are used depending on the fabric for digital printing, like acid inks are used on silk and nylon; disperse inks on polyesters and reactive inks are used on all cellulose based fabrics such as cotton, linen and rayon. Moreover, these dyes are compatible with low cost ink systems.

As pollution from textile industry has become a serious problem, digital printing technology is environment friendly and saves water compared to

the conventional printing methods. It creates less pollution as there is no discharge of dyes and chemicals.

Technical textiles:

Technical Textiles is a high technology sunrise sector which is steadily gaining ground in India. Technical textiles are functional fabrics that have applications across various industries including automobiles, civil engineering and construction, agriculture, healthcare, industrial safety, personal protection etc. Based on usage, there are 12 technical textile segments; Agrotech, Meditech, Buildtech, Mobiltech, Clothtech, Oekotech, Geotech, Packtech, Hometech, Protech, Indutech and Sportech.

Technical Textile products derive their demand from development and industrialization in a country. Given the large scale at which emerging nations are industrialising, the market for technical textiles can only be expected to grow in tandem with industrial growth in different parts of the world.

Technical textiles have been slowly but steadily gaining ground due to one or more of the reasons such as: functional requirement, health & safety; cost effectiveness; durability; high strength; light weight; versatility; customization; user friendliness; eco friendliness; logistical convenience etc. Unlike conventional textiles used traditionally for clothing or furnishing, technical textiles are used basically on account of their specific physical and functional properties and mostly by other user industries.

Investment promotion schemes from the Government of India;

Investors establishing technical textile unit in India can avail several benefits from central government schemes:

- Technology Upgradation Fund Scheme (TUFS)
- Scheme for Integrated Textile Parks (SITP)
- Coverage of major machinery for technical textile manufacturing under concessional customs duty list of 5%
- Certain technical textile products are covered under Focus Product Scheme, under which exports of such products carry duty credit scrip equivalent to 2% of FOB value of exports
- Technology Mission on Technical Textiles (TMTT); Focus Incubation Centres (FIC); Scheme for promoting usage of Agro-textiles in India
- Scheme for promoting usage of Geotechnical textiles in North East Region

Additionally, several states in India also offer incentives and assistance to investors, which can include electricity and stamp duty exemptions, concessions in land registration, and single window clearance facilities for investment project applications.

Annexure-15

Production Linked Incentive (PLI) Scheme for textile sector

In the Union Budget 2021-22, the Indian government announced a production-linked incentive (PLI) scheme for 13 sectors (including textiles) at an estimated outlay of Rs. 1.97 lakh crore (US\$ 26.70 billion) to boost domestic production and employment. As part of this, in September 2021, Prime Minister Mr. Narendra Modi approved the production-linked incentive (PLI) scheme in the textiles sector—for manmade fibre (MMF) apparel, MMF fabrics and 10 segments/products of technical textiles—at an estimated outlay of Rs. 10,683 crore (US\$ 1.45 billion). Through this scheme, the government aims to boost the manufacturing of high-value MMF fabrics, garments and technical textiles and promote investments from global players in the sector.

1. Under PLI, the Centre will subsidise eligible manufacturers by paying incentives on incremental production.
2. Companies investing over Rs 300 crore in plant, machinery, equipment and civil works to produce the identified products will get an incentive of 15 percent of their turnover, which needs to be Rs 600 crore in the third year.
3. The companies investing between Rs 100 crore and Rs 300 crore will also be eligible to receive duty refunds and incentives (lower than 15 percent of their turnover).
4. The government expects to achieve “fresh investment of over Rs 19,000 crore and a cumulative turnover of more than Rs 3 lakh crore”.

The main target of the PLI scheme is to increase the levels of production of Man-made fabrics thus leading to the increase of manpower in one of the fastest-growing sectors of the world economy. Indian textile workers can now compete on par with the Chinese textile mills and can engage in productive ancillary activities.

Technical textiles are getting huge fashion interest across the world. The quality of technical textiles is in huge demand in the western markets.

- The PLI scheme intends to identify the bottlenecks that are creating impediments in the production of world-class material in Indian textile mills.
- The important target for investment is the acquisition of raw materials. Acquiring raw material at a reasonable cost is one of the main parameters of profitability for small artisans.
- The government is focusing on enhancing the marketing skills of the textile workers so that there will be more visibility for the products.



- The government has given priority to the concept of skill-building from the grassroots level. It is the intention of the government to introduce international skills to the average textile worker by ramping up R&D efforts. The setting up of the National Textile Technical mission showcases the previous capacities of the Indian textile industry and charts out a road map as to how to best use the existing innovative methodologies to ramp up the quality of the final product.
- This scheme is expected to be implemented through Focus Product Incentive Scheme (FPIS), which aims to create champion companies in textiles and MMF segments. The government is likely to offer scheme incentives to both brownfield and greenfield investments to achieve a faster recovery via diversification of India's export basket.
- The PLI scheme will provide an immense boost to domestic manufacturing, and prepare the industry for making a big impact in global markets in sync with the spirit of Atmanirbhar Bharat (self-reliant India). In addition, PLI scheme for textiles is expected to be the key force in attracting huge investments and generating employment for the youth in the country. Key players in the Indian textiles industry are actively focusing on leveraging the PLI scheme for numerous opportunities. With all the combined efforts, the PLI scheme is expected to augment India's manufacturing capabilities, contributing to the Atmanirbhar Bharat initiative and exports, boosting the country's position to become a leading exporter of textiles.

Abbreviations used:

- A. ABC**=Activity Based Costing
- B. B/R**=Blow Room **Blg**= Bleaching
- C. C**=Combed,
- CAS**= Cost Accounting Standards,
- Col**=Colours,
- Chem**=Chemicals,
- CCRAR2014**=Companies (Cost Records and Audit) Rules 2014,
- CARR**=Cost Accounting record Rules,
- C/W**= Cone winding
- D. Diff.**=Different,
- D/F**=Draw Frame,
- dept**=Department,
- DM**=Direct Material,
- Dyg**=Dyeing,
- D/R**=Drying range
- E. EFF**= Efficiency,
- Eg**= Example,
- EPI**=Ends per Inch,
- ETP**=Effluent Treatment Plant
- F. FAQ**= Frequently Asked Questions,
- Fig**=Figure,
- Fil**=Filament,
- FG**=Finished Goods,
- Fng**=Finishing,
- FRC**=Fents, Rags & Chindies
- G. GAAP**=Generally Accepted Accounting Principles,
- gms**=Grams,
- GN**=Guideline Note,
- H. Hr**=Hour,
- HS**=High Speed,
- HT**=High Twist,
- HTY**=High Tenacity,
- HW**=Hard Waste
- I. Ind AS**=Indian Accounting Standards,
- incl**=Including
- J. XX**
- K. Kg**=Kilogram,
- K= Carded**
- Km**=Kilo Metre,
- Ktg**=Knitting

L. Ib=Pounds

M. Maint. =maintenance,

M/c=Machine,

Mtr=Metre,

MoT=Ministry of Textiles,

mpm=Metres per Minute

N. No.=Number,

Ne=Number English,

Nm=Number Metric,

npm= Nips per Minute

O. O.E=Open End

P. Pkg=Packing,

PPI=Picks per Inch,

Prod'n=Production,

Ptg: Printing

Q. XX

R. RA=Research Associations,

R&D=Research & Development,

RM=Raw Material,

R/F=Ring Frame,

rpm= Rotations per Minute

S. S/F=Speed Frame,

SL=Short Length,

Spg=Spinning,

Spl=Spindle,

Szg=Sizing.

T. T&C: Textiles and Clothing,

TDRO1993/2001-The Textiles (Development and Regulation)
Order1993/2001,

TL= Tape Length,

Temp: Temperature,

TPI=Turns per Inch,

TPM=Turns per Metre,

U. Uom=Unit of measurement.

V. XX

W. Wdg= Winding,

WG: White Ground,

W&S=Wages & Salary,

WIP=Work in Process,

WM= Waste Multiplier,

Wp=Warp,

Wft=Weft,



Wt.=Weight,

Wvg=Weaving

X. XX

Y. **Yds**=Yards,

Yr=Year
