

Weaving and Knitting Operation Level-II

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Module Title: Weighing and Checking Textile Materials and Products

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Prepared By: Ministry of Labor and Skill

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Acronyms

OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
SOP	Standard Operational Procedure
RPE	Respiratory protective equipment
WRI	Wraps per Inch
PPI	Picks per Inch
GSM	Gram per Square Meter
EPI	Ends per Inch

Introduction to Module

Textile weighing is a method of checking, evaluating and analyzing of textile materials and products by using different weighing equipment for the purpose of knowing quantitative status of textile materials and products for the purpose of many things such as to promote fairness in the work place, maintain standards of measurement, approvals of trade devices, conducting inspections on trade devices, commodities and used to know acceptance limits of error.

Module units

- Preparation of Textile materials and products for weighing
- Weigh textile materials and products
- Check textile materials and products
- Documentation

Learning objectives of the Module

At the end of this session, the students will able to:

- Prepare for weighing
- Weigh materials and products
- Check materials and products
- Confirm documentation

Module Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks

Unit one: Preparation of Textile materials and products for weighing

This learning unit is developed to provide the trainees the necessary information regarding the following content coverage and topics:

- Textile material and products
- Tools and equipment's
- Calibration

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Prepare Textile material and products
- Prepare Tools and equipment's
- Perform Calibration

1.1 Textile material and products

Textile products defined as a raw material, semi-worked, semi-manufactured, fully manufactured, semi-made-up or made-up of products which are exclusively composed of textile fibers regardless of the mixing or assembly process employed.

Textile materials and products are divided into two groups: domestic(consumer) purpose and technical textiles. In consumer textiles, aesthetics and comfort are the most important factors, but in technical textiles, functional properties are the priority. Each component of a textile materials and products including fiber, yarn, fabric, and cloth.

Fiber is the smallest component of a textile product; fibers are typically spun into yarn, and yarns are used to manufacture fabrics. Fibers has a hair like structure and a higher length to width ratio. The sources of fibers may be natural, synthetic or both.

Yarn: the spun fiber converted in to thin long strand of textile material

Fabric is defined as any thin, flexible material made from yarn, directly from fibers, polymer film, foam, or any combination of these techniques.

Cloth is a kind of fabric that consists of a fine, flexible network of yarns. While the term cloth is fabric synonymous with fabric, not all fabrics can be defined as cloth.

sed extensively now a days for both domestic and technical application

1.1.1 Sizing Chemicals and Additives

Sizing is the process of coating warp yarns by chemicals to produce strong and smooth warp yarns that will weave satisfactorily without suffering any consequential damage due to yarn-to-yarn friction and abrasion with the moving parts of the loom.

Different types of sizing chemicals are used during weaving and knitting fabric manufacturing process in order to improve weave ability and increase productivity due to produce strong and smooth warp yarns. These are:

- **Waxes:** Several reasons are often cited for the inclusion of wax in a size formulation:
 - ✓ Reduce dryer can sticking
 - ✓ Weaken film for easier split
 - ✓ Minimize clinging on looms
 - ✓ Improve lubrication for the size coating

- **Starch, Polyvinyl alcohol (PVA), CMC & others**

These are the principal film formers which are used during sizing process. They may be used independently or by mixing them together with other additives.

- **Defoamers:**

Size solutions can exhibit foam due to a variety of reasons, including water quality, spin finishes, chemical additives, and type of polyvinyl alcohol and starch.

Defoamer is sometimes required to control the level of foam formation and the recommended level is 0.25-1.00% based on weight of the film former.

- **Antistatic:**

Antistatic are needed with starch-containing formulations to minimize static on warp yarns. Generally, they are not needed with 100% polyvinyl alcohol sizes. Antistatic helping to retain moisture in the film while simultaneously plasticizing the film. Commonly used antistatic include urea, ethylene glycol and glycerol. Recommended level is 3-7% based on weight of the film former.

- **Binders:**

Liquid binders have been used predominantly to improve adhesion of formulations based on starch and/or fully hydrolyzed polyvinyl alcohol. They are not required for partially hydrolyzed polyvinyl alcohols which possess superior adhesion to synthetic fibers. Two major types of

binders are polyester and polyacrylic solutions (~25% solids). Binder films are somewhat tacky and care should be taken to minimize sticking on the slasher.

1.1.2 Worsted and Woolen yarns

Wool is one of most popular naturally sourced animal fiber, common name applied to the soft, curly fibers obtained chiefly from the fleece of domesticated sheep, and used extensively in textile manufacturing. The fleece of sheep raised or removed from the animal for wool is generally shorn once yearly, in the spring or early summer.

The quality of wool fiber depends primarily on fineness and length of fiber. Strength, elasticity, amount of crimp, and uniformity are also considered.

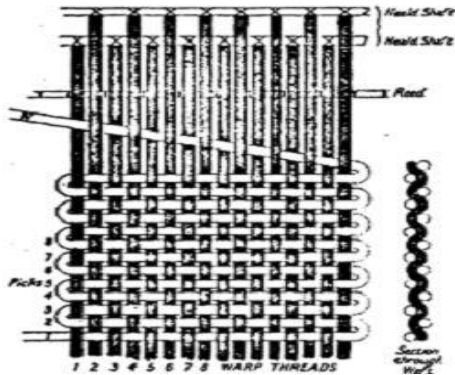
After spinning process, the fleece or wool fiber is spun and form yarn. There are two different systems are followed in wool processing, the woolen system and the worsted system.

- ✓ **Woolen yarn system-** the fibers are carded and then spun.
- ✓ **Worsted yarn system-** the fibers proceed to a combing process, which separates the long from the short fibers. Before the wool can be used for commercial purposes it must be scoured or cleaned. Scouring & cleaning may be done using warm water, detergent, alkali & carbonization.

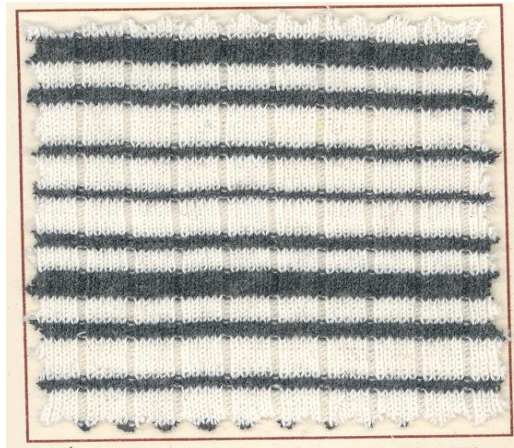
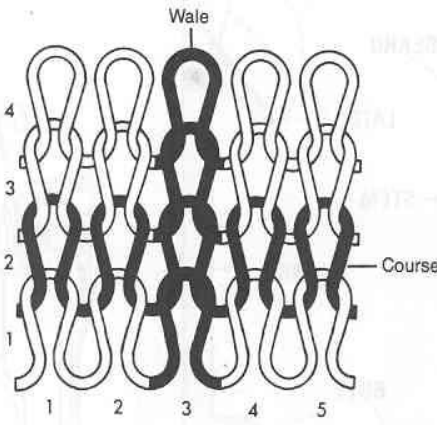
2 Fabrics

A fabric is a flat structure consisting of fibrous products, either natural or "man made". Textile fabrics can be classified in to three categories:

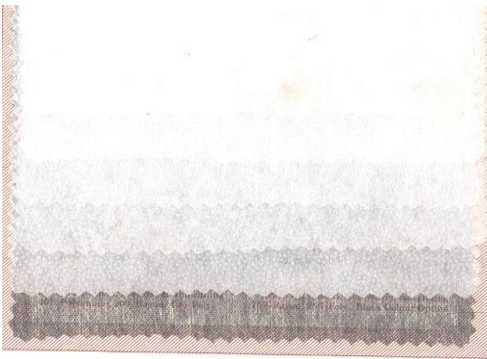
- **Woven Fabric:** made with two or more sets of yarns interlaced at right angles . the sets of yarn are;
 - ✓ warp yarns: yarns in lengthwise direction (ends)
 - ✓ weft yarns—yarns in crosswise direction (filings)
- **Knitted fabric:** Made by Interlacing of one thread with itself in the form of loops. Knitted loops are called stitches when they are pulled through another loop. Vertical columns of stitches in a knitted fabric are called *Wales* and Horizontal rows of stitches are called *Course*. Stockings, Hosiery , sportswear, upholstery, laces, under wears, fish nets etc. are made on this principle.
- **Non woven or Felt fabric:** Nonwoven fabrics are broadly defined as sheet or web structures bonded together by entangling fibre or filaments mechanically, thermally or chemically.



• Fig1.1: Woven fabric



• Fig1.2: Knit fabric



• Fig1.3: Non-woven fabric

1.2 Tools and Equipment

The terms “scale” and “weighing device” encompass all components connected together in a modern weighing “system”. A typical modern system entails multiple sets of marking and identification, and may be covered on multiple type evaluation certificates.

Weighing scales are useful for a variety of applications related to the textile and clothing industry, including raw materials fiber, yarn, fabrics and clothes to measure specific amount of the products for production process control and for approval of buying selling the products. In every commercial transaction involving the weighing of a commodity over a scale, accurate weights and proper weighing practices protect both the buyer and seller. They help ensure equity for buyer and seller and provide purchasers with the means to compare values. There are many types of scales can be used to weigh:

1.2.1 Digital Balance

The digital mass balances in the General textile and Chemistry labs are very sensitive instruments used for weighing substances and textile materials to the milligram (0.001 g) level. There are different types of digital balance scales.

- **DS Platform scale:** this type of scale is perfectly suited for weighing fabric, paper, and cloth, lengths of string offering freely programmable weighing units such as g/m. This weighing device is considered one of the best GSM measuring tools in the textile manufacturing industry. DS scale can be used for the determination of weight for the textile materials and product.



Fig1.4: DS plat form scale

- **GFK Floor check weighing scale:** is a heavy-duty floor scale complete with parts counting and check weighing application. The GFK is well suited for use in ware house and factory environments and is often used to weigh larger, heavier amounts than standard benchtop scales. It can be used for weighing bulk yarns, fabrics and clothes.

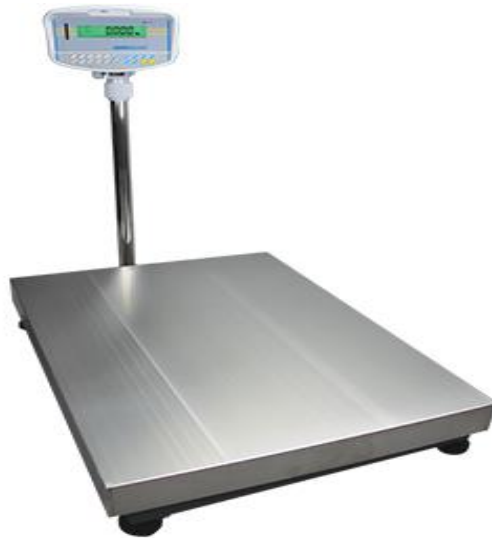


Fig 1.5: GFK floor check weighing scale

- **CKT bench weighing scale:** is a dependable, multi-purpose weighing scale well suited to ware house and inventory control tasks. It can be operated from a worktop or workbench and offers reliable check weighing, parts counting, and percentage weighing application. The scale comes complete with built-in check weighing lights for accurately monitoring the weight of products prior to distribution.

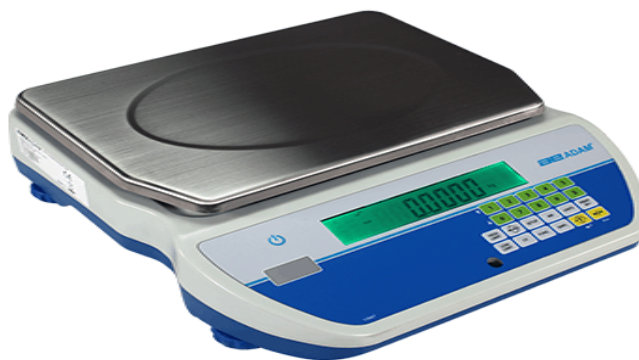


Fig 1.6: CKT bench weighing scale

Procedures for digital weighing balance

- The balance weighing pan is surrounded by a glass draft shield.
- The doors on the right, left, and top of the shield slide open to allow access to the weighing pan.
- Then close the draft shield doors to prevent changes in air pressure and measured mass.
- To turn most balances on, press the bar once and wait a few seconds for the digital display to read "0.000 g". However, some balances require you to press "on/off" and then press the small circle to right of display for the digital display to read 0.000g.
- To weigh an object, slide open one of the draft doors and place the object in the center of the pan.
- Close the door and wait a few seconds for the digital display to read a constant mass.
- Record all displayed numbers

Precaution:

- Always use tongs, clamps, or a tissue to handle solid objects or liquid containers.
- Do not use your fingers, as oil and water from them initially adds a few milligrams to the mass that then partially evaporates, resulting in an error.
- Lighter objects (< 75 g or 200 g, depending on the scale) are weighed to the milligram level (0.001 g). Heavier objects (> 75 g or 200 g, depending on the scale) are weighed to the centigram level (0.01 g). All numbers displayed should be recorded as they indicate the sensitivity of the scale (they are all significant figures).
- A balance in the "centigram mode" will NOT automatically return to the milligram mode. To reset the balance, press the bar until the display reads "0.000 g".
- The balance will now measure in the milligram range until a heavy object is again placed on the pan.

1.2.2 Mechanical Scale/weighing balance

A Mechanical Scale uses a system of Levers to transfer and proportionately divide down the weight applied to the weigh bridge. The forces are transferred via knife edge `Pivots` `The resulting forces from two or more levers are summed mechanically and then applied to an indicating device. The Lever Ratio on a truck scale is usually between 100 and 200 to 1. Most mechanical scales have a suspension system that allows them to rock freely. This is a good way to ensure that the deck is not jammed up.

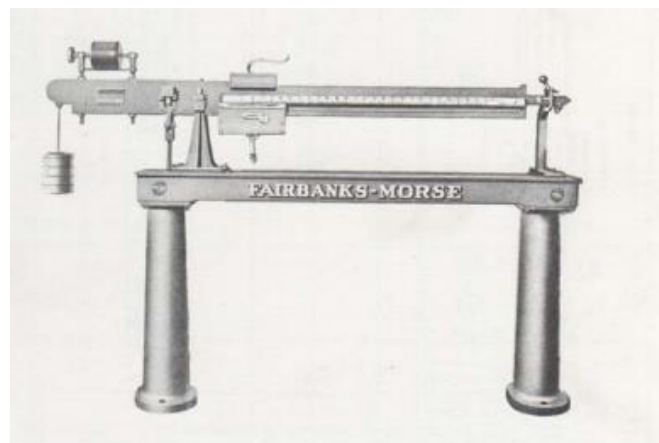
Mechanical Scale with weigh beam as indicating device Inspect the scale house's foundation because it has to support the beam stand. The beam stands should be rigid and not spring under loads especially when a loaded truck Is driven onto the Scale platform.

Normally, one end of the scale house attaches directly to the scale's outer frame while the other end is supported by adjustable legs or timbers.

The weigh beam is connected to the lever system by a metal rod called a steelyard. Make sure the steelyard is plumb and has ample clearance where it passes through the floor. Remove any rags, paper or other material from around this opening. Any contact with debris could cause the steelyard to bind and give an incorrect reading(s).

Other equipment and devices

- GSM cutter: is gram per square meter, it used to cut sample fabric for mass of unit square meter
- spoon: used to add recipes in to weighing device
- cup/container:
- beaker: for liquid paste preparation
- scissor:



Truck Scale Beam Indicator

Figure 1.7: Mechanical Weighing Scale

1.3 Calibration of weighing Equipment

1.3.1 Calibration

“Calibration” and “adjustment” are often confused as being the same process. Although they both work to improve balance measurement accuracy and provide accurate balance readings, they differ in their procedures. Calibration is the understanding of how a scales behaves, while adjusting is the changing of this behavior.

what is calibration? In simple terms, calibration is a quantitative comparison. To check the reading of a balance or scale, a reference weight is placed on the pan. The error is defined as the difference between the measured value (the reading) and the true value (the reference weight). The question whether this error is trustworthy or not, will be outlined below. At the end of balance calibration, a certificate is created, which reports the balance or scales readings and compares them to a reference value. Applied tolerances result in a Pass/Fail statement.

1.3.2 Weighing Scale Calibration

Weighing Scale Calibration is a set of processes under controlled conditions that show the relationship between the values of quantities using measurement and the corresponding values according to standards set. The standards output and accuracy are known which means the measurement can be compared with a measurement from the instrument being calibrated. Calibration reports can be made which show whether or not the balance has passed or failed certain conditions.

Balance or scale calibration is essential to achieve accurate weighing results. Ignoring this important service activity turns measuring into guesswork. In other words, it is negligent to weigh with a non-calibrated balance or scale. The accuracy of balances and scales becomes less reliable over time. This is the result of normal wear and tear caused by regular use and external factors such as mechanical shocks or hazardous environments. This may lead to a rather quick degradation or deterioration over a longer time. Periodically scheduled balance calibration in combination with frequent routine testing greatly enhances the life time of your balance or scale and its weighing accuracy.

Measurement uncertainty: is becoming increasingly emphasized in measurement communities. Measurement uncertainty is the “doubt” of measurements. Every measurement we make has

some level of doubt so we need to assess how much “doubt” there is so we can establish how reliable the reading is. If the measurement uncertainty for a device is not know, then there is no point in taking a reading at all. Measurement uncertainty must be included in calibration certificates according to the ISO 17025 standard for assessing the competence of calibration and testing laboratories

Tolerances to balance calibration: Calibration of a scales often does not require any adjustment if everything is running well. A “tolerance” is if the scales is measuring well enough to successfully complete the task, without being 100% precise. Tolerances are subject to change and can be set by customers and manufacturers.

Tolerances determine whether a balance or scale behaves "well enough" to meet a particular set of process requirements. Tolerances set the criteria to issue a Pass/Fail statement. Tolerances can stem from a variety of sources, including legal agencies, manufacturing industries, and the process itself.

1.3.3 Methods of calibration

External Calibration:

External calibration is a manual process. It involves using trade approved calibration weights. A wide variety of calibration weights are used to test the weight capacity and level of accuracy. The weights are placed on the scale and their reading is set as the standard. The purchasing and management of these weights is very important. Weights must be bought from a trusted source and preserved carefully to make sure they don’t gain or lose mass.

Internal Calibration:

Internal Calibration is a more automatic process that does not involve calibration weight sets or manual user input. This is used for scales with built in calibration weights and some of these scales can even be programmed to calibrate at specific times.

1.3.4 Benefits of calibration

Calibration, performed by an authorized provider offers the following benefits:

- **Cost savings-** Calibrated equipment allows sound decision making, which avoids waste, rework or product recall.

- **Reliable measurements-** Using calibrated equipment assures that measurements made in one place are compatible with those made in another. Results from any balance in the process will be accurate and reliable, as will the final product.
- **Compliance-** Calibration facilitates smooth passing of internal and external audits.
- **Detection of aging equipment-** All equipment ages over time and critical components may sustain mechanical stress or wear and tear. Drift cannot always be eliminated but it can be detected through periodic calibration.
- **Process and profit improvement-** Interpretation of calibration results according to defined tolerances improves processes and ultimately increases profit.

1.3.5 Calibration Procedures

The procedure should include tests for the following parameters, except where the construction or use of the machine renders a particular test inappropriate:

- **Set up the scale** in a location away from drafts or excessive air movement.
- **Level the scale**, and if weighing under water, observe that the apparatus is free of any obstruction that may affect its movement.
- **Perform Span Check:** Place the verification weights in the center of the scale.

Record the weight to readability of the scale. Confirm repeatability by placing one of the weights on the scale a second time to obtain the same weight.

- ✓ For weighing devices with a capacity of up to 1,000 grams, the suggested verification weights are 100g and 200g. External scale calibration weight shall be 200g.
- ✓ For 12kg weighing devices, suggested verification weights of 5kg and 10kg. External scale calibration weight shall be 10kg.
- ✓ For 30kg weighing devices, suggested verification weights of 10kg, and 20kg. External scale calibration weight shall be 20kg.
- ✓ For platform weighing devices used for standard density determination, the suggested verification weights are 10kg and 20kg.

Note: It is desirable to perform additional checks on scales for accuracy after they have been installed in construction field lab.

- **Perform Corner load Check:**
Place the weight in the center of the scale and re-zero the scale.

Place the weight in the four locations (Front/Back, Left/Right) as indicated on the Calibration Sheet.

- Record the weight of each reading.

For 12kg and 30kg weighing devices use verification weight of 5kg.

If any readings indicate out of tolerance, perform external scale calibration, if applicable, as per scale instruction Manual and repeat steps 3 and 4, or remove the scale from service until it can be recalibrated.

- Record results on Balance or Scale Calibration Sheet

Self-Check 1	Written Test
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Direction1: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are personal protective equipment used in the work place? (5)
2. Which textile materials should be weighed by using weighing balance? (5)
3. List two types of weighing machines and state the difference b/n them? (5)

Part II Multiple choice

Direction2: Choose the best answer for the questions listed below.

1. Which one is not textile material and products that to be weighed in weaving process?
A. Fiber B. Fabric C. Yarn D. sizing chemical
2. -----weighing tool is considered one of the best GSM measuring tools in the textile manufacturing industry
A. Floor check weighing scale B. Mechanical scale C. DC Flat form scale D. all
3. A raw material, semi-worked, semi-manufactured, fully manufactured, semi-made-up or made-up of products which are exclusively composed of textile fibers is called—
A. Weighing tool. B. calibration C. Textile machine D. Textile product
4. ---- type of fabric made by Interlacing of one thread with itself in the form of loops.
A. Woven B. knitted C. Nonwoven D. felt fabric
5. Which scale does uses a system of Levers to transfer ?
A. Mechanical B. . DC Flat form scale C. . DC Flat form scale D. Digital balance

Part III Matching:

- | | |
|----------------------------|----------------------------|
| A | B |
| 1. External calibration | a) quantitative comparison |
| 2. calibration | b) internal calibration |
| 3. Measurement uncertainty | c) manual process |
| 4. Starch | d) sizing chemical |
| 5. Method of calibration | e) doubt” of measurements |

Unit two: Weighing Textile Materials and Products

This learning unit is developed to provide the trainees the necessary information regarding the following content coverage and topics:

- OHS practice
- Weighing textile material and products
- Testing and adjusting equipment
- Record and Documentation

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Apply OHS practice
- Perform textile material and products.
- Conduct Testing and adjust equipment
- .Maintain record and documents

2.1 OHS Practice

2.1.1 Definition of OHS

Occupational health and safety (OHS) is a branch of public health aimed at improving workplace health and safety standards. It studies injury and illness trends in the worker population and offers suggestions for mitigating the risks and hazards they encounter on the job. Every occupation has health or safety risks associated with it, and it is every employer's responsibility to ensure that their employees can carry out their work as safely as possible.

Occupational health and safety is one of the most important aspects of human concern. It aims an adaptation of working environment to workers for the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations.

2.1.2 Occupational Safety and Health Act

In December of 1970, President Richard Nixon signed the Occupational Safety and Health Act into law, becoming the first far-reaching federal law to protect American workers. Soon after, the Occupational Safety and Health Administration (OSHA) was established to ensure the proper and thorough implementation of the law.

OSHA not only enforces occupational health and safety standards, but continuously updates those standards in light of new research findings, best practices,.

Some activities that ensure how to stay safe on the Job are:

2.1.3 Manual Handling

A manual handling operation takes place every time a load is moved or supported by a person's hands or arms, or by some other forms of bodily effort. It includes lifting, lowering, pushing, pulling and carrying the load. The definition of a load encompasses goods, baggage, humans and other living beings as well as an object that comprises or includes any living beings.

2.1.4 Personal Protective Equipment (PPE)

PPE is a personal protective equipment which used to protect a worker at working area from accidents and hazards.

It is the employer's responsibility to ensure that workers have the personal protective equipment required to work safely. Depending on the job and work environment, this can include fall protection devices, hard hats, high-visibility clothing, or safety gloves. Take care when choosing PPE and make sure that it is appropriate for the work. PPE should be used properly and maintained in good condition.

Coveralls of close-weave fabric (or suitable disposable ones) should be worn when handling dyestuffs.

Gloves and aprons may be needed for some jobs. These should be impermeable and either disposable or cleanable. They should be removed when not needed because they may be a continuing source of dust if contaminated. Workers should remove gloves and aprons in a way that does not contaminate skin or cloth.

Respiratory protective equipment (RPE) may be needed for short-duration jobs, such as filter changing. RPE should be carefully selected to provide adequate protection. It needs to be suitable for the wearer as well as for the task. Correct fitting is important and suppliers can help by offering face-fit testing. Beards and stubble growth prevent a good fit and facemask type respirators cannot be used in these circumstances. Where suitable for the wearer, disposable respirators giving protection against fine particulates.



Fig2.1: Personal protective equipment

2.1.5 Standard Operating Procedures

Standard operating procedures (SOPs) are a set of instructions that have been developed to define or standardize the exact steps to perform specific tasks. These steps have been found to provide consistent, repeatable results regardless of who is performing the task. Controlling costs and assuring quality are keys to being successful in any business. SOPs help accomplish both of these objectives.

In manufacturing SOPs should be in place for:

- ✓ Equipment startup and operation
- ✓ Equipment set up and change over
- ✓ Product assembly
- ✓ Inventory tracking
- ✓ Material ordering
- ✓ Material receiving
- ✓ Maintenance procedures
- ✓ Material processing (e.g., mixing, batching)
- ✓ Quality control

2.1.6 Housekeeping

Containers - use robust containers with a closable lid for storage. However, repeated removal and replacement of container lids and opening and closing of bags can also generate more dust. Plan to dispose of containers safely. Bags especially can cause problems and are best placed into disposal sacks at the workstation, under LEV. Also plan how you will deal with damaged containers and how to dispose of unwanted dyes.

Areas where dyes are handled should be easy to clean, with walls and floors that are sound and smooth. Rounded corners are easier to clean. Shelving and workbenches should be easy to clean too or else covered with impervious, disposable covering. They should have a lip to retain spills. Cleaning and dealing with spillages - dry vacuum cleaning, using a piped system or a type H industrial vacuum cleaner, is best for larger dry spillages and most cleaning tasks. Wet vacuuming or other wet cleaning methods may be appropriate in some situations or for smaller spillages. Don't use brushes or brooms or compressed air, as these will simply spread the dust into the air.

2.1.7 Ergonomic arrangements of work places

Definitions of ergonomics

Ergonomics is a means of improving working conditions and reducing illness at work

It attempts to 'Fit the Job to the Man' rather than 'Fit the Man to the Job'

It is concerned with the design of systems in which people carry out work

Ergonomics optimizes Efficiency, Health, Safety and Comfort of people through better designs of products and work places

Basic aims of ergonomics

- Efficiency in purposeful activity
- To achieve desired result without
 - ✓ Waste
 - ✓ Error
 - ✓ Damage to persons
- Working situation in harmony with the activities of the worker

2.1.8 Hazard identification

The Plant Regulations require employers not to depend solely on the use of administrative controls (e.g. training, safety procedures, safety signs, supervision) or personal protective equipment (e.g. safety gloves, safety glasses) to control risk unless the following are not practicable measures:

- Substituting the machine with one which has a lower level of risk; or
- Use of engineering controls to change the physical characteristics of the machine to eliminate or reduce risk; or
- Isolation of the machine from people.

The Plant Regulations require employers to consult with the relevant health and safety representative when undertaking hazard identification, risk assessment and risk control processes.

Employers should also involve machine operators, people who carry out inspection, maintenance, repair, service and cleaning of machines in those processes. They are a valuable source of information on hazards and measures for controlling risks because of their day to day experience.

Work Safe Victoria's publication "Plant Hazard Checklist" can be used to identify hazards associated with machines for use in your workplace. This is available from Work Safe publications.

To help identify areas of the machine which can cause injury or illness, look for:

- **Mechanical hazards:**
 - ✓ "drawing in" points
 - ✓ impact and crushing areas
 - ✓ abrasion areas
 - ✓ flying particles
- **Non-Mechanical hazards:**
 - electrical shocks and burns
 - chemical burns, toxicity, flammability
 - noise, vibration
 - radiation
 - biological hazards, viral mist, dust, fumes

Assessing Risks

Once the potentially dangerous areas of the machine are identified, the risk (likelihood of injury or illness) associated with those areas should be assessed by considering: whether any person (workers and visitors) would be exposed to those areas during installation, commissioning, erection, operation, inspection, maintenance, repair, service and cleaning of the machine; what existing measures are in place to protect the health and safety of people who may be exposed; and how adequate the existing measures are for protecting the health and safety of people who may be exposed.

Controlling Risks

If there is a likelihood of injury or illness associated with certain areas of the machine when all existing control measures are considered, the Plant Regulations require employers to eliminate or reduce the risk so far as is practicable by adopting the hierarchy of control as outlined in the background-section.

Provision of appropriate guarding for danger areas of a machine is a form of engineering control designed to:

- ✓ prevent access to the danger areas of the machine; or
- ✓ contain flying particles generated from the materials which the machine processes; or
- ✓ contain work pieces ejecting or disintegration of machine parts

2.2 Weighing textile material and products

Weighing of textile materials and products can help the textile industry improve efficiency by measuring each stage of the production process and weighing outgoing bales of finished product. The terms “scale” and “weighing device” encompass all components connected together in a modern weighing “system”. A typical modern system entails multiple sets of marking and identification, and may be covered on multiple type evaluation certificates.

In every commercial transaction involving the weighing of a commodity over a scale, accurate weights and proper weighing practices protect both the buyer and seller. They help ensure equity for buyer and seller and provide purchasers with the means to compare values.

Importance of weighing

- Check the quantity statements on the goods you buy.
- Make sure you have a clear view of the scales. When buying goods by weight over the counter, the trader must place the scales so you can see the weight, price per kilogram, total price and the goods being weighed, otherwise ask for a written statement of the measurement.
- Ensure the shop scales display zero weight before your goods are weighed. If they don’t – tell the trader.
- Make sure that the scale is clear of other items and only the goods you are purchasing are being weighed when the price is being calculated.
- Check the price per kilogram on the scales matches the advertised price.

- Check the total price on the scales is the price you are charged at the checkout.
- Check your receipt to ensure the calculated price matches the advertised price.
- Pay only for the product, not the packaging material.

2.2.1 Methods for Weighing

Two common methods used to weigh a chemical are "weighing by difference" or "taring the balance".

a) Weighing by Difference:

The mass of the chemical is calculated by subtracting the weight of an empty container from the total weight of the container and chemical. Place an empty container on the pan, close the draft shield doors and wait a few seconds for the display to read a constant mass. Record the mass of the empty container to three decimal places; do not round off. Remove the container from the pan, spoon the chemical into the container, and record the mass of both container and chemical. The mass of the chemical is the difference of the two recorded masses. Remember to handle the container with tongs or tissue; moisture from fingers can cause an error in the apparent mass

b) Taring the Balance

The balance is set to ignore the mass of the container so the mass of the added chemical is measured directly. Place the empty container on the pan and close the draft shield. Wait a few seconds for the display to register a constant mass. Press the bar so the display reads "0.000 g". The balance is now set to "ignore" the mass of the container (a process called "taring" the balance). Now if a chemical is added to the container, the balance displays only the mass of that chemical. When the container and chemical is removed from the pan a negative weight will be displayed. (This negative weight is the mass of the original empty container which the balance was instructed to ignore.) To erase this weight from memory, press the bar again. The display should read "0.000g".

2.2.2 Weighing Techniques

a) Top loader

- **Direct Weighing**
 - ✓ With nothing on the pan, set to zero by pressing the "on" button.
 - ✓ Place weighing bottle, beaker, or vial on balance and set to zero again.
 - ✓ Use a clean scoopula to transfer sample into container slowly, until you reach the desired mass.

- **Indirect weighing (Weighing by difference)**

- ✓ Place enough of the sample in a weighing bottle, put the lid on, and place on the scale. Record the mass.
- ✓ Take some out and place it in a different container (whatever you will be using for the experiment). Record the new mass. The difference in mass is the mass of the sample transferred.
- ✓ Continue this procedure until you have as much sample as you need.
- ✓ It is best to transfer small amounts at a time, so you do not take more than you need. You should not put excess sample back into the weighing bottle.

b) Analytical Balance

- Use the same procedure as with a top loader, remembering these additional points:
 - ✓ Close all the doors before taking measurements.
 - ✓ Remember the number of significant figures. It is higher than on a regular top loader.
 - ✓ Make sure the sample is completely cooled when weighing. If a sample is still warm, it will weigh less because of buoyancy due to upward circulation of hot air.



Fig 2.2: Analytical balance



Fig 2.3: A top-loading balance

2.3 Test and adjust measuring equipment

Generally during weighing and testing of textile materials and products the following areas must be checked and evaluated accurately.

2.3.1 Raw materials Testing:

Raw material testing and quality control, Intertek tests raw materials, feed stocks and other commodities, ingredients and components used in a wide range of products. Testing raw materials can include evaluation and screening of feed stocks, unprocessed materials, semi-processed materials and finished products for quality specifications, impurities and more,

including higher-end analytical testing and characterization if required. Raw materials tested include chemicals, spun cotton, sizing material, recipes, additives and polymers. Commodity raw materials sampling, testing and inspection services for incoming bulk materials and products are available on a global basis.

- **Yarn:** is a long continuous length of interlocked fibers, suitable for use in the production of textiles, sewing, crocheting, knitting, weaving, embroidery, and rope making. Thread is a type of yarn intended for sewing by hand or machine. Modern manufactured sewing threads may be finished with wax or other lubricants to withstand the stresses involved in sewing. Embroidery threads are yarns specifically designed for hand or machine embroidery.

Spun yarn is made by twisting staple fibers together to make a cohesive thread, or "single." Twisting fibers into yarn in the process called spinning can be dated back to the Upper Paleolithic, and yarn spinning was one of the very first processes to be industrialized. Spun yarns may contain a single type of fibers, or be a blend of various types. Combining fibers (which can have high strength, luster, and fire retardant qualities) with natural fibers (which have good water absorbency and skin comforting qualities) is very common. The most widely used blends are cotton-polyester and wool-acrylic fibers blends. Blends of different natural fibers are common too, especially with more expensive fibers such as alpaca, angora and cashmere.

Yarn is selected for different textiles based on the characteristics of the yarn fibers, such as warmth (wool), light weight (cotton or rayon), durability (nylon is added to sock yarn, for example), or softness (cashmere, alpaca).

Filament yarn consists of filament fibers (very long continuous fibers) either twisted together or only grouped together. Thicker monofilaments are typically used for industrial purposes rather than fabric production or decoration. Silk is a natural filament, and synthetic filament yarns are used to produce silk-like effects.

Texturized yarns are made by a process of air texturizing filament yarns which combines multiple filament yarns into a yarn with some of the characteristics of spun yarns.

Yarn may be used undyed, or may be colored with natural or artificial dyes. Most yarns have a single uniform hue, but there is also a wide selection of variegated yarns:

- Heathered or tweed: yarn with flecks of different colored fiber

- Ombre: variegated yarn with light and dark shades of a single hue
- Multicolored: variegated yarn with two or more distinct hues
- Self-striping: yarn dyed with lengths of color that will create stripes in a knitted object
- Marled: yarn made from strands of different-colored yarn twisted together

2.3.2 Yarn testing

A comparison of yarn weights (thicknesses): the top skein is arrant weight, suitable for knitting a thick sweater or hat. The manufacturer's recommended knitting gauge appears on the label: 5 to 7 stitches per inch using size 4.5 to 5.1 mm needles. The bottom skein is sock weight, specifically for knitting socks. Recommended gauge: 8 to 10 stitches per inch, using size 3.6 to 4.2 mm needles.

Yarn quantities for handcrafts are usually measured and sold by weight in ounces or grams. Common sizes include 25 g, 50 g, and 100 g skeins. Some companies also primarily measure in ounces with common sizes being three-ounce, four-ounce, six-ounce, and eight-ounce skeins. Textile measurements are taken at a standard temperature and humidity, because fibers can absorb moisture from the air. The actual length of the yarn contained in a ball or skein can vary due to the inherent heaviness of the fiber and the thickness of the strand; for instance, a 50 g skein of lace weight mohair may contain several hundred meters, while a 50 g skein of bulky wool may contain only 60 meters.

There are several thicknesses of craft yarn, also referred to as weight. This is not to be confused with the measurement and/or weight listed above. The Craft Yarn Council of America is making an effort to promote a standardized industry system for measuring this, numbering the weights from 1 (finest) to 6 (heaviest). Some of the names for the various weights of yarn from finest to thickest are called lace, fingering, sport, double-knit (or DK), worsted, heavy worsted, bulky, and super-bulky. This naming convention is more descriptive than precise; fiber artists disagree about where on the continuum each lies, and the precise relationships between the sizes.

Another measurement of yarn weight, often used by weavers, is wraps per inch (WPI). The yarn is wrapped snugly around a ruler and the number of wraps that fit in an inch are counted.

Labels on yarn for handicrafts often include information on gauge, known in the UK as tension, which is a measurement of how many stitches and rows are produced per inch or per cm on a specified size of knitting needle or crochet hook. The proposed standardization uses a four-by-

four inch/ten-by-ten cm knitted or crocheted square, with the resultant number of stitches across and rows high made by the suggested tools on the label to determine the gauge.

In Europe, textile engineers often use the unit tex, which is the weight in grams of a km of yarn, or decitex, which is a finer measurement corresponding to the weight in grams of 10 km of yarn. Many other units have been used over time by different industries.

2.3.3 Product Testing

Product testing, also called consumer testing or comparative testing, is a process of measuring the properties or performance of products.

The theory is that since the advent of mass production manufacturers produce branded products which they assert and advertise to be identical within some technical standard.

Product testing seeks to ensure that consumers can understand what products will do for them and which products are the best value. Product testing is a strategy to increase consumer protection by checking the claims made during marketing strategies such as advertising, which by their nature are in the interest of the entity distributing the service and not necessarily in the interest of the consumer. The advent of product testing was the beginning of the modern consumer movement.

Product testing might be accomplished by a manufacturer, an independent laboratory, a government agency, etc. Often an existing formal test method is used as a basis for testing. Other times engineers develop methods of test which are suited to the specific purpose. Comparative testing subjects several replicate samples of similar products to identical test conditions.

Product testing might have a variety of purposes, such as:

- Determine the requirements of a specification, regulation, or contract are met
- Decide if a new product development program is on track: Demonstrate proof of concept
- Provide standard data for other scientific, engineering, and quality assurance functions
- Validate suitability for end-use
- Provide a basis for technical communication
- Provide a technical means of comparison of several options
- Provide evidence in legal proceedings: product liability, patents, product claims, etc.
- Help solve problems with current product
- Help identify potential cost savings in products

Product tests can be used for:

- Subjecting products to stresses and dynamics expected in use
- Reproducing the types of damage to products found from consumer usage
- Controlling the uniformity of production of products or components

2.3.4 Analytical Balances and Proper Weighing Practices

Five precautions to take for correct weighing of laboratory samples

It is crucial that you take the right precautions and adhere to the standard operating procedures to ensure the reliability of your reports.

- Keep the balance calibrated
- Ensure appropriate environment
- Handle the weights properly
- Store the weights in the right manner
- Take the right measures to weigh the samples

2.3.5 Factors that affect readings on analytical balances

Several factors can affect the analytical balance and produce incorrect readings of the samples.

Some include:

- Temperature
- Vibrations
- Air drafts
- Chemical reactions
- Uncalibrated scales
- Magnets
- User error
- Improper grounding
- Slope
- Inappropriate handling of the sample

2.3.6 Inspection and Testing Procedures:

Determine that the scale is Legal for Trade

Weights and Measures Act states that weighing device for use in trade must have been approved for its class, type or design and has been inspected by an inspector who has certified that the

device meets the requirements of this Act and the regulations. Weights and Measures Inspection Certificate is issued by the recognized technician of an authorized service provider and is used to collect data on device performance and establishment history.

Inspecting the Equipment, Foundation, Installation:

Test weights in order to certify portable scales, scale companies are required to have their test weights re-certified annually. The paper certificate, intact stamped lead seals, and an inspection for damage or build up of debris is a requirement before a test weight can be used as a ``Certified and Traceable`` test standard.

2.3.7 Accuracy Test:

Limit of error, most contractors use Class III HD portable scales with a capacity less than 100,000 kg and a graduation size (verification scale interval) of 10 kg.

Complete the Scale Accuracy Inspection Form:

Each time a scale is moved and installed measurement requires the scale owner to provide the following information:

- Name and address of the Contractor;
- Make, model and serial number of the device(s);
- Capacity of the device, and
- Address and description of the place where the device is installed.

After weighing of the material the following tasks must be done:

- Interpret work specifications: A person who demonstrates competency in this unit must be able to provide evidence of the ability to: locate, interpret and apply relevant information, standards and specifications comply with site safety plan, OHS regulations and state and territory legislation applicable to workplace operations comply with
- Interpret technical data: It also covers explaining and using the information, and identifying implications of changes to technical information. Application of the unit. This unit goes beyond routine accessing and interpretation of technical information.
- Results and specifications: An end-result specification is one in which the final characteristics of the product are stipulated, and the contractor is given considerable freedom in achieving those characteristics.
-
-

2.4 Record and Documentation

For a document to be recorded in the recorder's office, it must meet the following requirements:

- It must be an original document or be an electronic document that satisfies the requirements. It must contain a brief caption stating the nature of the document
- It must contain a legal description
- It must contain the names and mailing addresses of the grantees
- It must be sufficiently legible for the recorder to make certified copies
- It must contain a notary certificate containing the words “subscribed and sworn” or the equivalent, that is signed and certified by the officer taking the acknowledgement.
- The names of all persons whose signatures appear on the instrument must be typed or printed on the instrument
- When title to real property is granted to a person as trustee, the following terms of the trust must be included: the name and address of the trustee; and the name and date of the trust
- A court judgment or an abstract of a court judgment must be an original or certified copy and include the information identifying the judgment debtor as referred to in Subsection
- Judgments, abstracts of judgments, and separate information statements of the judgment creditor do not require an acknowledgment or a legal description to be recorded
- To release or assign a judgment lien must include the name of any judgment creditor, debtor, assignor, or assignee; the date of recording; and the entry number creating the judgment The tax serial number of each parcel affected by the instrument should appear on each instrument, though it is not considered part of the legal description
- Document shall be an original or certified copy of the document
- Document shall be in English or be accompanied by an accurate English translation of the document
- Document shall contain a brief title, heading, or caption on the first page describing the document

Self-Check 2	Written Test
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Part I: Multiple choice

Direction1: choose the right answer for the following question

1. which one of the following is not PPE?
A. face mask B. Gloves C. Weighing device D. . Eye glass
2. all are factors that affect readings on analytical balances, except:
A. Temperature B. Vibrations C. Air drafts D. None
3. From following one is mechanical hazards:
A. Flying B. Electrical shocks and burns C. chemical burns, D. toxicity, flammability
4. is set to ignore the mass of the container so the mass of the added chemical is measure directly
A. Taring the Balance B. weighing balance C. analytical balance D. indirect weighing

Part II: Short answer

\Directions2: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the tasks must be done after weighing? (5)
2. What are the procedures used to follow to weigh the material ? (5)
3. Explain methods for weighing

Part III: Matching

A

1. Chemical hazard
2. Weighing technique
3. Product testing

B

- a) Consumer testing
- d) Breathing organ damage
- c) Analytical Balance

OPERATION SHEET-2

OPERATION TITLE: Weigh sizing chemicals

PURPOSE: To train the trainees about the way of **Weigh sizing chemicals**. By studying all steps and procedures.

CONDITIONS OR SITUATIONS FOR THE OPERATIONS: The operation process can be performed by following the procedure and steps illustrated given below.

EQUIPMENT TOOLS AND MATERIALS:

To perform machine setting use equipment and material needed are:

Digital Weighing balance

CMC

Starch

Recording book

PROCEDURE: Include if appropriate,

- Read the instruction sheet well
- Apply OHS practices
- Follow the steps for the preparation of work station
- Prepare the sizing chemicals and additives according the required amount
- Set-up weighing tools according to specification and manufacturer requirement.
- Weigh sizing chemicals according to SOP
- Record the result
- Clean the area and handle the waste properly
- Complete the operation

PRECAUTIONS: The operation can be performed by following occupational health and safety rule. Use of proper OHS materials

- Operational workplace activities
- Restricted space
- Hazardous, controlled or exposed conditions
- Work may be conducted in small to large scale enterprises and may involve individual and team activities.

QUALITY CRITERIA:

The final operation for the preparation of work station can be checked by the trainers and trainee's .If there is an operational problem checking again and if they completed the setting pass to next learning out come.

LAP Test 2	Practical Demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, workshop, tools and materials you are required to perform the following tasks within 1 hours.

Task 1: Identify and implement the key steps of textile material weighing

Task 2: weigh sizing chemicals by using digital weighing balance

Task 3. Complete the operation and record the data

Unit three: Checking of textile materials and product

This learning unit is developed to provide the trainees the necessary information regarding the following content coverage and topics:

- Checking of textile materials and products
- Checking Weights of textile material and products
- Weighing and measuring

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Check textile materials and products
- Check weight of materials and textile products
- Perform Weighing and measuring

3.1 Checking of raw materials and products

3.1.1 Checking Raw Materials

The production cycle as far as testing is concerned starts with the delivery of raw material. If the material is incorrect or sub-standard then it is impossible to produce the required quality of final product. The textile industry consists of a number of separate processes such as natural fiber production, man-made fiber extrusion, wool scouring, yarn spinning, weaving, dyeing and finishing, knitting, garment manufacture and production of household and technical products. These processes are very often carried out in separate establishments, therefore what is considered to be a raw material depends on the stage in processing at which the testing takes place. It can be either the raw fiber for a spinner, the yarn for a weaver or the finished fabric for a garment maker. The incoming material is checked for the required properties so that unsuitable material can be rejected or appropriate adjustments made to the production conditions. The standards that the raw material has to meet must be set at a realistic level. If the standards are set too high then material will be rejected that is good enough for the end use, and if they are set too low then large amounts of inferior material will go forward into production.

3.1.2 Checking the Final Product

In this process the bulk production is examined before delivery to the customer to see if it meets the specifications. By its nature this takes place after the material has been produced. It is

therefore too late to alter the production conditions. In some cases selected samples are tested and in other cases all the material is checked and steps taken to rectify faults. For instance some qualities of fabric are inspected for faulty places which are then mended by skilled operatives; this is a normal part of the process and the material would be dispatched as first quality

3.1.3 Monitoring Production

Production monitoring, which involves testing samples taken from the production line, is known as quality control. Its aim is to maintain, within known tolerances, certain specified properties of the product at the level at which they have been set. A quality product for these purposes is defined as one whose properties meets or exceeds the set specifications. Besides the need to carry out the tests correctly, successful monitoring of production also requires the careful design of appropriate sampling procedures and the use of statistical analysis to make sense of the results.

3.2 Check weight of materials and textile products

3.2.1 Fabric weight

Fabric weight is a way to measure different textiles like cotton, silk, polyester, and canvas. This measurement is determined by the thickness of the threads that make up the material.

Fabric weight is most often given in grams per square meter (g/m² or gsm) or in ounces per square yard (oz), depending upon whether you use the metric or imperial system of measurement. Grams per square meter is simply the weight, in grams, of a piece of cloth that is one meter long and one meter wide. Of course, fabric isn't sold in square meters, but in linear meters (or yards) with varying widths.

Most fabric items will fall into one of these categories:

- **Lightweight fabrics**

1gsm - 150gsm

0.3 oz. - 5 oz

Examples: linen, lace, mesh, chiffon, silk, cotton, PVC, neoprene, felt

- **Medium weight fabrics**

150gsm - 350gsm

5.29 oz. - 12 oz.

Examples: velvet, taffeta, charmeuse, sateen, chambray, polyester, chino, nylon, jersey cloth

- **Heavy weight fabrics**

350gsm+

12.34oz.+

Examples: canvas, denim, suede, corduroy, polyester fleece, wool, flannel, tweed

3.3 Weigh and measure textile materials and products

3.3.1 Check sealing of calibrated equipment for weighing

The Laboratory shall have procedures to prevent adjustable devices on measuring and test equipment (other than those intended for the user), whose setting affects the performance, being altered by unauthorized staff. Where seals (labels, solder, wire, paint etc) are used, they shall be designed to indicate clearly when unauthorized adjustment has been made. The procedures shall ensure that, where a seal has been damaged or broken, the requirements of the measuring equipment met.

Labeling of calibrated equipment and reference materials

The requirements for labeling, codifying, or otherwise identifying the status of calibration of measuring and test equipment used by the Laboratory are given in ELOT EN ISO/IEC 17025.

When equipment has been calibrated, or reference materials certified by an external organization, the Laboratory shall ensure that the equipment/reference material is fit for use, is labeled and that it has a certificate (or notification, where a certificate might be delayed) to indicate the results of the calibration.

Labels, or other methods of codifying or identifying the equipment/reference material, shall, as well as indicating calibration status, clearly indicate to the staff using the equipment/reference material, any limitations of the calibration and/or any restrictions on the use of the equipment/reference material.

Any item of measuring or test equipment, or any reference material, that is not calibrated, shall not be used for accredited calibration/testing. If there is any possibility that staff might at any time use such equipment or material for accredited calibration/testing before it has been calibrated, it shall be appropriately labeled and, if possible, segregated

3.3.2 Weigh fabric weight

Fabric weight is measured per surface area. A section of the fabric is taken at a time and then weighed in either grams or ounces. This will look like this:

Fabric Measured in Grams: g/m² or gsm

Fabric Measured in Ounces: oz./y² or oz.

Procedure

- Prepare the required amount fabric by GSM cutter
- Adjust balance weighing scale according to manufacturer specification and requirement.
- Open doors on the right, left, and top of the shield slide to allow access to the weighing pan.
- Press “on”, of the balance
- Put the prepared sample of fabric on the balance
- Then close the draft shield doors to prevent changes in air pressure and measured mass.
- Then wait a 30 seconds for the digital display to read "0.000 g".
- Read the result
- Record all displayed numbers
- Record and complete the measurement

3.3.3 Weigh sizing chemicals and additives

Weighs sizing chemicals is very necessary tasks to prepare the required amount of recipes its needed purpose, sizing paste preparation. To measure the weighs of the materials which used in warp sizing paste are weighed by digital weighing balance/scale.

Basically, there are three ways to measure recipe ingredients; dry volume, liquid volume, and weight. Weight is easy. If a recipe is correctly written, and it asks for an ingredient in ounces or pounds, you weigh it or, in many cases, approximate the weight. If a recipe asks for a teaspoon, tablespoon, cup, quart, etc., it is asking for a volume measure. The ingredients, such as starch, rice, or sugar, softener, need to be measured in a dry measuring cup; you fill the cup over the top, and then scrape flat to get an accurate measurement. For liquid measuring, such as additives, water, pastes, etc., simply use a graduated liquid measure cup, and fill to the line.

Procedure

- Calibrate the weighing scale
- Calculate the required amount/mass of the chemicals

- Place the empty container on the pan and close the draft shield
- Press the bar so the display reads "0.000 g
- Add the prepared recipes on container
- Wait 30s for the display to register a constant mass
- Record the result
- Press off button of the balance and complete the measurement.

Investigation of Faulty Material

If faulty material is discovered either at final inspection or through a customer complaint it is important that the cause is isolated. This enables steps to be taken to eliminate faulty production in future and so provide a better quality product. Investigations of faults can also involve the determination of which party is responsible for faulty material in the case of a dispute between a supplier and a user, especially where processes such as finishing have been undertaken by outside companies. Work of this nature is often contracted out to independent laboratories who are then able to give an unbiased opinion.

Self-Check 3	Written Test
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Part I: : choose the best answer

- is measured per surface area
A. Yarn weight B. fiber weight C. chemicals weight D. fabric weight
- Which one of the below is not used to measure weighs of sizing recipes?
A. GSM B. weighing balance C. container D. beaker
- What is the reason for wait 30s during weighing
A. to register a constant mass B. to get highest data C. A and B D. non

Part II: Matching

- | A | B |
|---------------------------|------------------|
| 1. Lightweight fabrics | a) spoon |
| 2. Fabric weigh unit | b) GSM, oz, pl |
| 3. Chemical weighing tool | c) 1gsm - 150gsm |

Part III: Answer all the questions listed below.:

- Why we try to check or evaluate the final product? (5)
- What are the specific areas we must be check/evaluate the final product? (5)
- List three ways to measure recipe ingredients

OPERATION SHEET-3

OPERATION TITLE: Evaluate textile products after weighing

PURPOSE: To train our trainees about the way of evaluating textile final products products. By studying all steps and procedures.

CONDITIONS OR SITUATIONS FOR THE OPERATIONS:

The operation process can be performed by following the procedure and steps illustrated on the information sheet

EQUIPMENT TOOLS AND MATERIALS :

To perform machine setting use equipment and material needed are :-

Calibration machine

Scissors

Fabric

GSM cutter

Clothes

PROCEDURE: Include if appropriate,

Read the information sheet well

Apply OHS practices

Follow the steps for the preparation of work station

Follow standard operating procedures -

Prepare work station according to specification and manufacturer requirement.

clean the area and handle the waste properly

PRECAUTIONS: The operation can be performed by following occupational health and safety rule. Use of proper OHS materials

- Operational workplace activities
- Restricted space
- Hazardous, controlled or exposed conditions
- Work may be conducted in small to large scale enterprises and may involve individual and team activities.

QUALITY CRITERIA:

The final operation for the preparation of work station can be checked by the trainers and trainee's .If there is an operational problem checking again and if they completed the setting pass to next learning out come.

LAP Test 3	Practical Demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, workshop, tools and materials you are required to perform the following tasks within 1 hour.

Task 1: Evaluate the textile product and materials by using calibration machine

Task 2: interpret and analyze the data

Task 3. Complete the operation and record the data

Unit Four: Documentation

This learning unit is developed to provide the trainees the necessary information regarding the following content coverage and topics:

- Documentation.
- Maintain accurate records

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify the Documentation and appreciate documentation process
- Maintain accurate records

4.1 Documentation

Documentation is any communicable material that is used to describe, explain or instruct regarding some attributes of an object, system or procedure, such as its parts, assembly, installation, maintenance and use. As a form of knowledge management and knowledge organization, documentation can be provided on paper, online, or on digital or analog media, such as audio tape or CDs. Examples are user guides, white papers, online help, and quick-reference guides. Paper or hard-copy documentation has become less common.

4.1.1 Types of documentation

There different types of documentation via website, software products and other online application. The following are typical documentation types:

- Request for Proposal (RFP)
- Requirements/ Statement of work/ Scope of Work (SOW)
- Software Design and Functional Specification
- System Design and Functional Specifications
- Change Management, Error and Enhancement Tracking
- User Acceptance Testing

4.2 Maintain accurate records

4.2.1 Recording and reporting practices

- The Laboratory shall maintain records for each item of measuring equipment, including reference measurement standards and reference material standards and test equipment, used in the performance of calibration or tests. The records shall show, either through in-house documentation or calibration certificates from external organizations, that each calibration in the chain of traceability has been carried out.
- The Laboratory shall ensure that the records contain detailed information of the equipment/reference material used for calibrations and that there is also a full and up-to-date history of the calibration of this equipment/reference material.
- The records shall provide sufficient information to demonstrate the measurement capability and traceability of each item of measuring equipment and the range of use of each reference material, its lifetime and required storage conditions.

Each record shall include or refer to:

- The date on which each calibration was performed
- The calibration results obtained after and, where relevant, before any adjustment and repair
- The specified calibration interval
- Reference to the calibration method or procedure used and any relevant standard or specification
- The specified limits of permissible error
- Calibration certificates, bearing the standards logo, from standards accredited calibration
- Laboratories of appropriate measurement capability or from the Laboratory holding the national standard for the measurement standards used, or from a laboratory meeting the requirements for traceability specified in standards, Traceability of Measurement
- Certificates or other documentation, for all reference materials used for calibration, providing evidence of characterization of the material, and evidence of traceability to national or international standards of measurement, or to national or international standard reference materials the environmental conditions at the time of calibration and the corrections made, where necessary, for such conditions

- A statement of the uncertainties of measurement involved in the calibration
- Any design or performance specifications met
- Name of persons performing the calibration and checking the results
- Any limitations in use resulting from the calibration data obtained
- Details of any maintenance carried out in accordance with the requirements of ELOT EN ISOIEC 17025 and of any servicing, adjustment, repair or modification, particularly at the time of calibration.
- Similar records, as appropriate, shall be maintained for any checks carried out on equipment or reference materials between calibrations.

4.2.2 Calibration intervals

The Laboratory shall have documented criteria for the selection of calibration intervals for all measuring and test equipment used. Reference measurement standards shall be calibrated at intervals approved by standards. Reference materials shall be checked for deterioration and, if necessary, replaced.

All other measuring and test equipment shall be calibrated at intervals approved by standards and determined by the following factors:

- (a) the requirements of any relevant standard specifications for the measurements/tests involved
- (b) the recommendation of the equipment manufacturer
- (c) the type and stability of the equipment
- (d) the extent and severity of use
- (e) the influence of the environmental conditions (eg temperature, humidity, vibration and dust)
- (f) the accuracy of measurement needed for the calibration or test concerned
- (g) trends determined by examination of records of previous calibrations
- (h) evidence obtained from service and maintenance records
- (i) any known or observed tendency for the equipment to exhibit wear or to drift in performance
- (j) the frequency of, and information from, in-house checks, using known standards.

Generally, in textile material and product weighing process, the following tasks must be documented.

- production order
- delivery documentation
- tickets or labels

- specification sheet

Self-Check 4	Written Test
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Direction1: choose the best answer

- which one is not true statement?
 - Reference measurement standards shall be calibrated at intervals approved by standards.
 - Reference materials shall be checked for deterioration and, if necessary, replaced.
 - All other measuring and test equipment shall be calibrated at intervals approved
 - None
- is any communicable material that is used to describe, explain or instruct regarding some attributes of an object
 - Recording
 - documentation
 - calibration
 - adjustment
- Each record shall includes:
 - The date
 - The calibration results
 - The specified calibration interval
 - All
- The Laboratory shall maintain records for each item of measuring equipment, includes
 - Reference measurement standards
 - Reference material standards and
 - Reference Test equipment
 - Reference book

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

- What information's to be recorded after completing weighing of textile materials? (5)
- What information's to be included during recording? (5)
- Write the tasks that must be documented.
- List down types of documentation.
- Explain how documentation can be provided?

Reference

1. Weighing of textile material LG -01
2. <http://www.gnu.org/licenses/gpl.html>
3. <http://www.opensource.org/licenses/mit-license.php>
4. Quality Manager of ESYD (guidance on the application of the laboratory accreditation criteria)

Developers Profile

No	Name	Qualification (Level)	Field of Study	Organization/ Institution	Mobile number	E-mail
1	FEKADU LABENA	A	Textile Techno.	DDPTC	0983883129	fekadulabena@gmail.com
2						
3						
4						
5						
6						
7						