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1. Basic Textile Terms of Spinning:

Fiber: The fundamental component used in making textile yarns and fabrics. Fibers are fine substances with a high ratio of length to thickness. They can be either natural (e.g. cotton, wool, silk etc.) or synthetic (e.g. polyester, nylon, acrylic etc.).

Blow room Lap: The Loose strand, roughly parallel, untwisted fiber sheet produced in blow room.

Chute feed system: It is a system of feeding small tufts of fibers directly from blow room to a series of cards, arranged in a circuit through pneumatic pipe.

Sliver: The strand of loose, roughly parallel, untwisted fibers produced in Carding.

Roving: The soft strand of carded/combed fibres that has been twisted, attenuated, and freed of foreign matter, which is a feed material to spinning.

Yarn: A continuous strand of textile fibers that may be composed of endless filaments or shorter fibers twisted or otherwise held together.

Spinning: The process of making yarns from the textile fiber is called spinning. Spinning is the twisting together of drawn out strands of fibers to form yarn.

Yarn Count/Sliver Hank

Yarn count is the numerical expression of yarn, which defines its fineness or coarseness. (Linear density).

Yarn count system:

Indirect system: English count (Ne), Worsted Count etc.

i.e. Higher the yarn number, finer the yarn.

Direct System: Tex, Denier

i.e. Higher the yarn number , Coarser the yarn.

Similarly numerical expression of fineness or coarseness of Lap, sliver & roving are called Hank.

Note: English (Ne) count system is commonly followed in India.

English Count: No. of Hanks of length 840 yds weighing in 1 pound

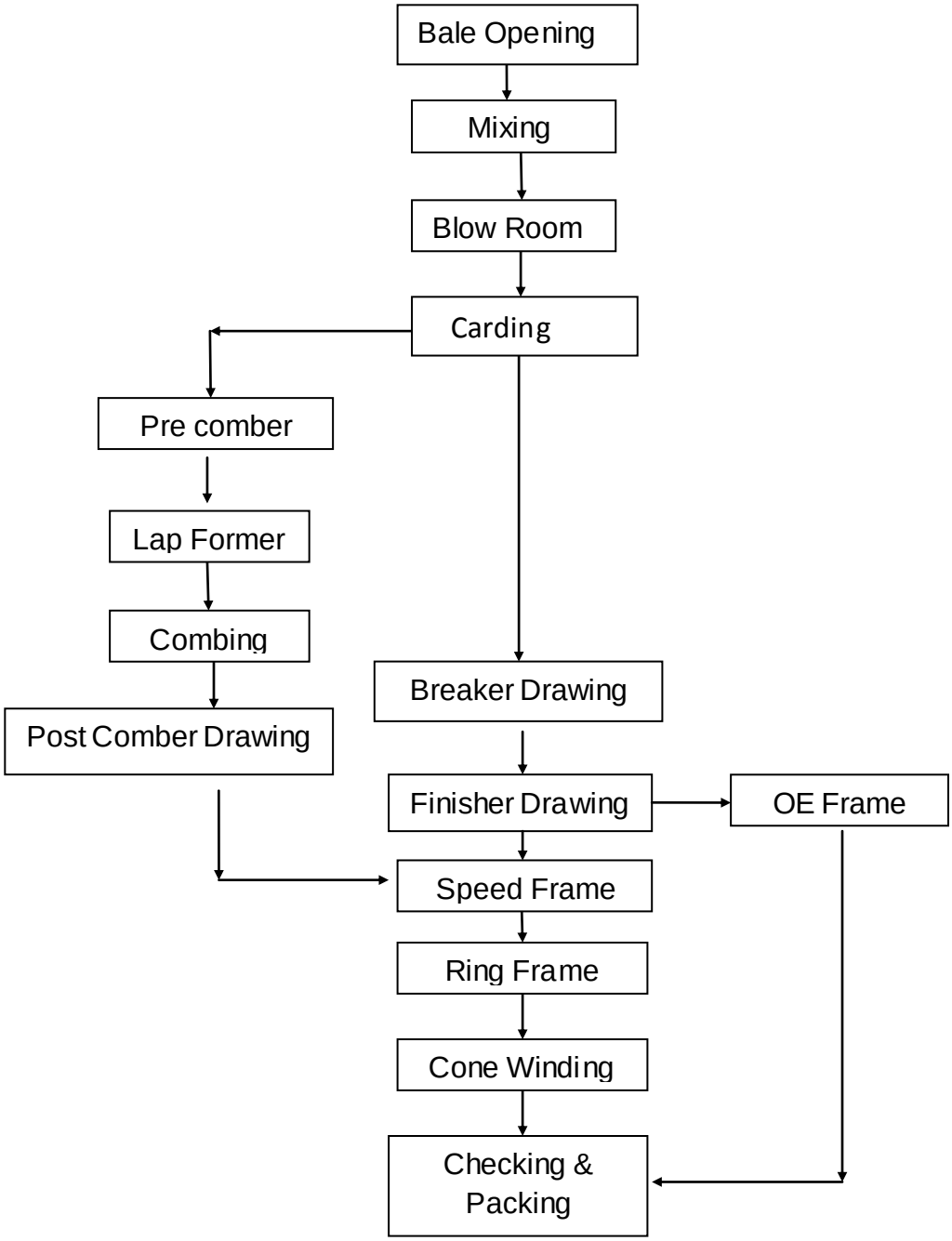
1yds: 0.9144mtrs

1lbs: 0.453 Kgs.

e.g. 40^S Ne = 40 hanks of 840 yds weighs 1 lbs.

20^S Ne = 20 hanks of 840 yds weighs 1 lbs.

2. Sequence of Spinning Process:



3. Material Flow in Spinning:

Carded Yarn Manufacturing:

TABLE-1

STAGE	MACHINE	INPUT MATERIAL	OUT PUT MATERIAL	PACKAGE FORM
Opening & cleaning	Blow Room machines	Raw cotton	Lap or chute feed	-
Carding	Card	Lap or chute feed	Card sliver	Slivers in Can
1st drawing	Breaker Draw frame	Card sliver	Drawn sliver	Sliver can
2nd drawing	Finisher Draw frame	Drawn sliver	Drawn sliver	Sliver can for Roving
Roving	Speed Frame	Drawn sliver	Roving	Roving bobbin
Spinning	Ring spinning frame	Roving	Ring-spun yarn	Spinning Cops
Post-Spinning processes	Winding & Reeling	Yarn in spinning cops	Yarn	Cone, Cheese & Hank

Combed Yarn Manufacturing

TABLE-2

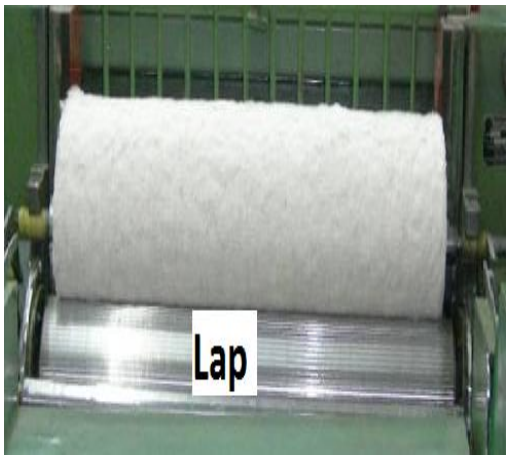
STAGE	MACHINE	INPUT MATERIAL	OUT PUT MATERIAL	PACKAGE FORM
Opening & cleaning	Blow Room machines	Raw cotton	Lap or chute feed	-
Carding	Carding machine	Lap or chute feed	Card sliver	Carded slivers in Cans
Pre comber Drawing	Breaker Draw Frame	Carded sliver	Drawn sliver	Drawn slivers in cans
Lap Formation	Super Lap or Lap Former	Drawn slivers	Lap	Laps in spools
Combing	Comber	Lap	Combed Sliver	Combed sliver in Cans
Post comber Drawing	Finisher Draw Frame	Combed sliver	Drawn sliver	Finisher sliver in can
Roving	Speed Frame	Finisher sliver	Roving	Roving bobbin
Spinning	Ring spinning frame	Roving	Ring-spun yarn	Spinning Cops
Post-Spinning processes	Winding & Reeling	Yarn in spinning cops	Yarn	Cone, Cheese & Hank

Open End Yarn Manufacturing:

TABLE-3

STAGE	MACHINE	INPUT MATERIAL	OUT PUT MATERIAL	PACKAGE FORM
Opening & cleaning	Blow Room machines	Raw cotton	Lap or chute feed	-
Carding	Card	Lap or chute feed	Card sliver	Slivers in Can
Drawing	Draw frame	Card sliver	Drawn sliver	Sliver can
OE Spinning	**OE Frame**	**Drawn sliver**	**OE yarn**	**Cheese**

Various Package Forms:



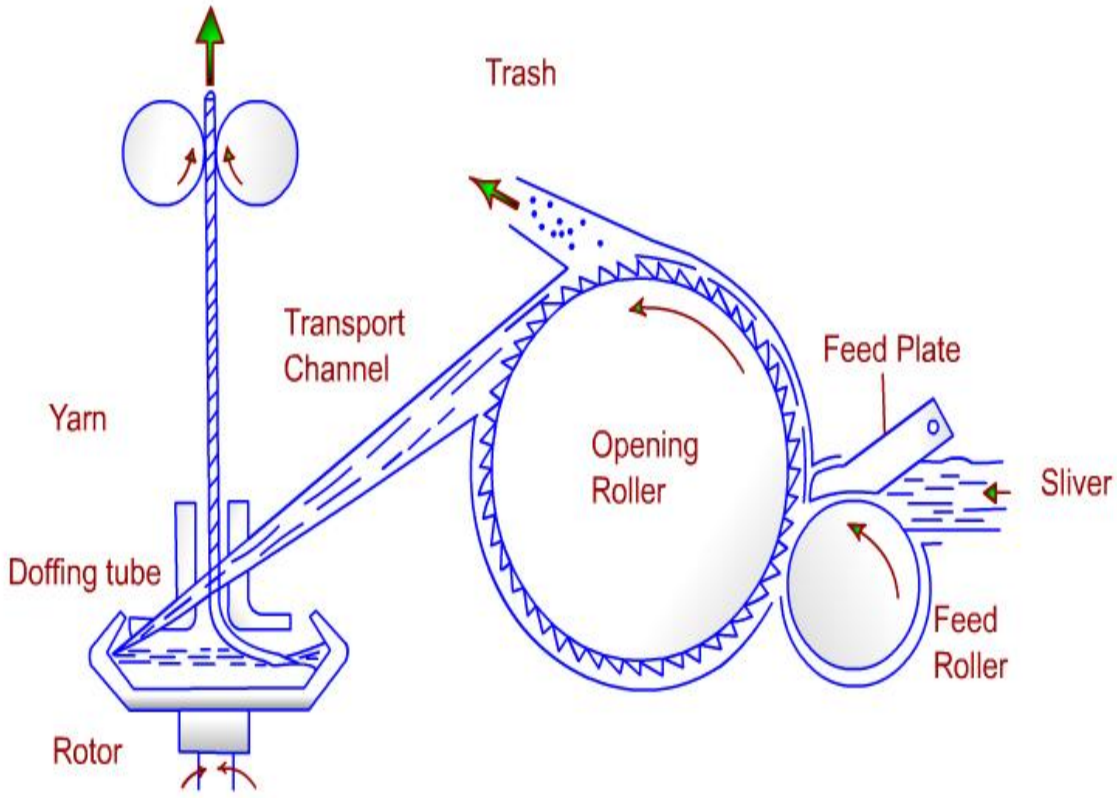
Roving Bobbin

4. Functions of Open End(OE) Spinning Machine:

Open End Spinning frame is also termed as Rotor Spinning machine.

- Drafting the slivers
- Separating the fibers in sliver into single fibers
- Bringing by air the separated fiber material to a collecting surface
- Drawing off the fibres from the collecting surface
- Imparting rotation to twist the fibre into the yarn structure to form a continuous strand of yarn.
- To wind the yarn onto cheese to form the yarn package.

5.Details of Open End Spinning Machine



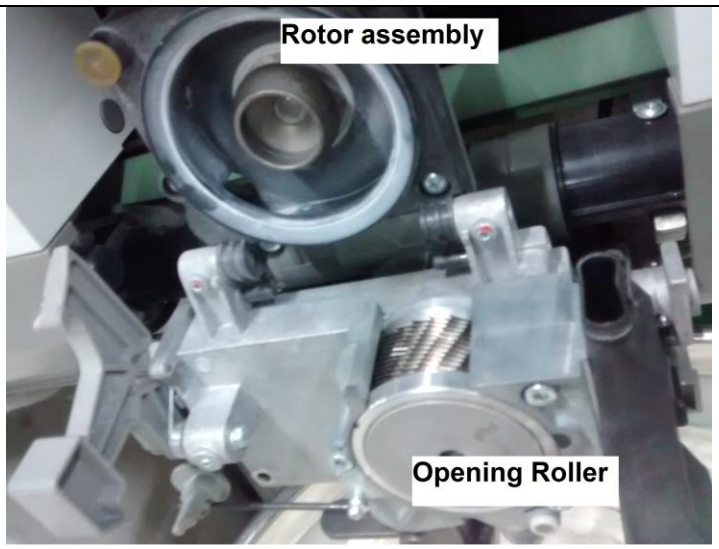
Main features of rotor spinning system

OE Frame Machine & Parts:

Creeling: Draw frame slivers are fed to the OE frame in large cans. The slivers are guided over the guide rollers and tension rollers. The slivers then pass through the rotors.	

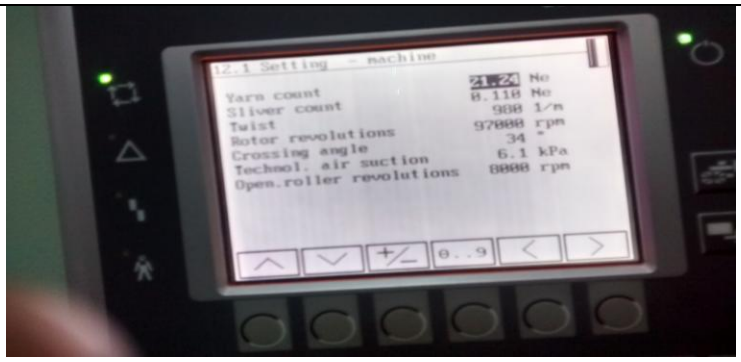
Opening Roller & Rotor Assembly:

Fibres are presented to the rotor system in the form of sliver. The sliver comes in contact with opening roller which opens the sliver to individual fibres. By air suction the individual fibres are transported to Rotor where the fibres accumulate to form a ribbon of fibres. The tail end of the yarn from already wound on to the package is threaded through the nip of the delivery rollers by the rotation of the rotor ,simultaneously the tail end is twisted with each revolution of the rotor resulting in the formation of yarn.



Winding Zone:

The yarn formed in the rotor unit passes through thread guide & tensioners to wind on the cheese mounted on the drums

Signal Lamps: Signal lamps are provided on the machine/drums to indicate the reason for stoppage. Understand each signal lamp and their purpose in the machine.	
Display Panel: It displays various operating machine parameters like yarn count, sliver count, speed, production etc. Understand the details in the display panel and work accordingly.	

6. Operating Open End Spinning Machine:

- Creel the required number of cans and draw the slivers towards the feeding zone
- Operate the control switches for starting and stopping of OE frame.
- Follow the different signal lamps & stop motions used in machines.
- Piece the sliver during breakages
- Piece the yarn during yarn breakage in winding the cheese
- While opening the rotor unit for attending breakage clean the rotor unit also safely
- Doff the full cheese and put them in the conveyor.
- At delivery end of the machine collect the doffed cheeses and keep them in the trolley
- View the display panel and identify the reasons for machine stoppages if any.
- Inform the supervisor and maintenance in charge in case of any break-downs and support him for carrying out maintenance activities.
- Carryout cleaning activities in creeling, rotor unit and in winding zones.
- Remove the suction waste periodically & segregate the wastes collected and put them in the designated bins.
- Always keep OE frame area clean.

- **Importance of Colour coding:**
  The details related to colour coding of draw frame sliver can, empty cheese and other relevant information like count of Yarn/Hank of sliver etc, are normally displayed in respective machine's display board. It is the responsibility of the machine operator to understand them & work accordingly.

Identifying Defects:

- Defects in sliver like, uneven sliver, neps in slivers, slivers with high variation etc., are to be identified and informed to supervisor for necessary action.
- Defects in cheese like ribboning, soft or hard cheese, cuts in the cheese & missing tail ends etc. are to be identified and informed to supervisor for necessary action.

Attending the Machine on Sliver Break:

- Patrol in the OE machine work area and identity the sliver breakage by viewing in the signal lamps provided at each rotors.
- Identify the reason for stoppage.
- Ensure minimum time is taken for attending the breakage.
- Open the rotor unit safely and complete piecing.
- When opening the rotor unit clean it safely and remove the waste there.
- Ensure that the sliver passes through the rotors without affecting the quality of sliver.
- Ensure proper length of sliver is available from sliver can to rotor tip
- Feed the sliver end to the rotor.
- Piece the sliver between cans in the event of sliver exhaust in sliver can and replace with a full sliver can
- Take minimum time for piecing the sliver.
- Keep the sliver waste in the respective waste collection box.
- Segregate the reusable wastes and weigh them.

Attending yarn breakage

- patrol around the machine to ensure proper production of OE yarn
- If there is any yarn breakage lift the cheese package from the winding drum
- Unwind the broken yarn end from the cheese to the rotor section, piece it and start new yarn formation
- Ensure proper yarn passage and tension variator position after knotting.
- Ensure safety while carrying out piecing activities

Carry out doffing activities

- Identify which drums are ready for doffing.
- Check the cheese package is fully would to the predetermined length or weight and start doffing.
- Weigh the cheese package and ensure the required weight have been achieved if the weight is not achieved fix the cheese in the cheese holder and run it again till the cheese reaches the predetermined weight .

Operator taking the doffed cheese from OE Frame

- Remove full cheese package from cheese holder.
- Place the cheese in the cheese trolley and store in the storage area as instructed.
- Reserve the correct colour coded empty paper cheese in the reserve area for doffing.
- After doffing insert the empty cheese.
- Ensure the proper passage of yarn in OE machine.
- Keep the hard waste removed during doffing in separate waste collection boxes.

Cleaning of Open End Spinning machine & Waste disposal

- Carry out cleaning of machine at periodic intervals as instructed.
- Clean the creeling area & ensure that the sliver cans are free from fluff accumulation.
- Ensure cleanliness in the yarn passage.
- Clean the rotor at regular intervals.
- Collect the sliver wastes & yarn waste while attending to breaks in the hip bag provided and deposit them category wise in the designated bags at specified places.
- Clean around the OE machine using proper cleaning equipments.
- Keep the OE department clean.

7. Instructions for Shift Change:

Take Charge of the Shift

- Come at least 10 - 15 minutes earlier to the work spot.
- Meet the previous shift operator and discuss regarding the issues faced by them with respect to the quality or production or spare or safety or any other specific instruction etc.
- Understand the count produced, colour coding, followed for sliver cans and cheeses for his allocated number of drums or machines.
- Check and understand the technical details mentioned in the display board.
- Check for the availability of sliver cans for the allotted OE machine
- Ensure all the rotors are running properly, if any rotor is not running get clarified with the supervisor and operator.
- Check the condition of all the drums, ensure proper functioning of OE machine parts.
- Check the cleanliness of the machines & other work areas.

- Check the waste collection boxes are empty while taking charge of shift.

Handing over the Shift:

- Properly hand over the shift to the incoming shift operator.
- Provide the details regarding count produced, colour coding for sliver cans and empty cheese for the allocated drums/ machines.
- Provide all relevant information regarding the, idle rotors, damaged machine parts etc.,
- Collect the wastes from waste collection bags weigh them and transport to storage place.
- Check whether the cleanliness of the work place.
- Get clearance from the incoming counterpart before leaving the work spot, in case if the next shift operators do not come report to shift supervisor.
- Report to the shift supervisor about the quality / production / safety issues/ any other issue faced in the shift and leave the department only after getting concurrence for the same from supervisors.

8. Importance of Health & Safety:

- Follow the work & safety instructions and adopt safe working practices like not opening the doors of the machine, not cleaning the interior parts & not taking any choked material when the machine is in running condition.
- Do not open the rotor unit while it is in running condition.
- Always use head cap and face mask in the work spot.
- Do not carry any metallic parts during machine running as there are chances of fire and damage to machine parts.
- Take action based on instructions in the event of fire, emergencies or accidents, participate in mock drills/ evacuation procedures organized at the workplace as per organization procedures

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