

# Dryer Machine in Textile | Drying Techniques in Textile Industry

## **Textile Drying:**

Drying is defined as a process where the liquid portion of the solution (moisture content) is evaporated from the fabric. This is done after de-watering of fabric. The water dispersed in a textile material by a chemical–physical process is generally eliminated by the action of hot air, which makes the water evaporate. In [textile finishing](#) unit; dryer uses for dry the knit, woven fabrics and dyed yarn. But the drying process and drying mechanism of yarn and fabrics is different from one to another. Drying operations are done by textile drying machine. During the drying process, it is very important to carefully consider the way heat is directed on the fabric.

## **Drying can be done by various methods listed as follows:**

1. Heating
2. Blowing dry air on the materials
3. Centrifuging and throwing the moisture out
4. Using radio frequency (RF) waves
5. Using vacuum
6. Exposing to open sunlight and air and so on

In [textile manufacturing process](#) and while using textiles, drying is necessary to eliminate or reduce the water content of the fibers, yarns and fabrics after [wet processes](#). Drying, in particular by water evaporation, is a high-energy consuming step and hence attention is needed to reduce overall energy consumption by reuse/recycling options.

## **Drying Techniques in Textiles:**

Drying techniques may be classified as mechanical or thermal. In general, mechanical processes are used to remove the water which is mechanically bound to the fiber. This is aimed at improving the efficiency of the following step. Thermal processes consist of heating the water and converting it into steam. Heat can be transferred by means of convection, infrared radiation and direct contact and by RF.

## **Normal drying systems are as follows:**

1. The water content of the fiber is initially reduced by either centrifugal extraction or by mangling before evaporative drying. The evaporative drying is done by using dry and/or hot moving air.
2. The water content in hanks is initially reduced by using centrifugal extraction followed by evaporative drying.
3. The drying of cheeses after wet processing is normally carried out by centrifugal extraction followed by radio frequency drying (RFD).
4. The drying of yarn sheet after drying is done normally by using drying cylinders. In some cases, it is coupled with hot air drying or infrared drying.

5. The fabric drying in rope form is done by using mangle squeezing followed by blowing hot dry air.
6. The fabric in open width is dried by using a chain of drying cylinders or by using hot air drying after initial squeezing by mangles.

### **What is Textile Drying Machine?**

A textile dryer is a machine or device which is used to remove moisture content from fabric or garments. In technical way we can define, the dryer is integrated with motorized centring and tensioning device for individual conveyors.



Fig: Textile drying machine (SANTEX SANTASHRINK)

### **Considering points for selecting a dryer:**

Following points should consider during buy a dryer.

1. Heating methods: The textile fabrics may be heated by gas burner or steam.
2. Chamber: Number of chamber.
3. Burner: Number of burner.

### **Different Types of Dryer Machine Used in Textile Industry:**

1. Textile centrifugal extractors or hydroextractors
2. Mangling
3. Cylinder dryer
4. Hot air drying system
5. Yarn package dryer
6. Radio Frequency Drying (RFD)

7. Hydroextraction by suction
8. Stenter
9. Relax dryers

**Working Principle of Textile Dryer Machine:**

After de-watering then the fabric through the dryer. The main function of the textile drying machine is given below,

1. To dry the fabric.
2. To **increase the GSM** by over feed system.
3. To control the overfeed system.
4. To control the vibration which increase the G.S.M.
5. To control the **shade matching** such as for white shade if need few yellowish or reddish increase temperature and low speed. If need few red or yellow increase temperature and low speed.

This machine contains two chambers. Two mesh endless conveyors are placed lengthwise to the chamber named conveyor net and filter net, each chamber contain a burner, which supply hot air. This hot air is guided through the ducting line by suction fan. There are nozzles placed in between filter net and conveyor net. When the fabric pass on the conveyor net, hot air is supplied to the wet fabric to dry it. There are exhaust fan which such the wet air and deliver to the atmosphere through the ducting line.

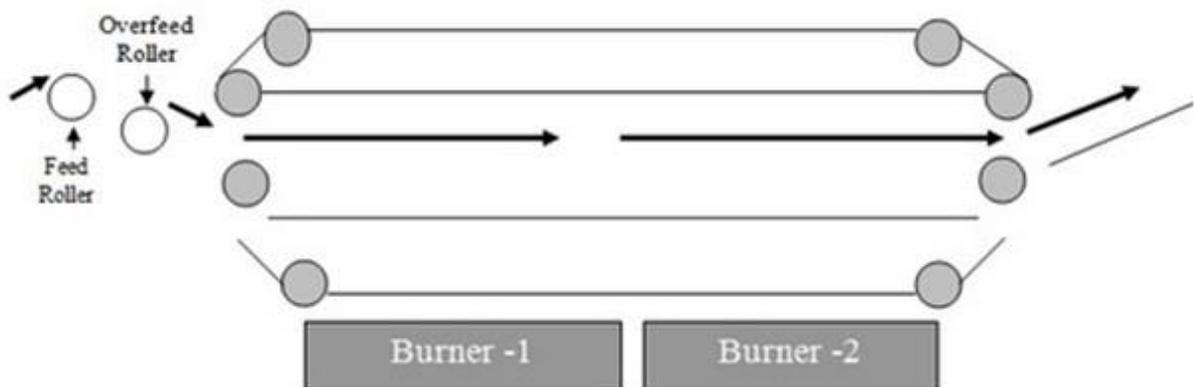


Fig: Passage Diagram of The fabric in Dryer Machine.

The speed of the dryer depends on the temperature of the machine and the **G.S.M of the fabric**. If the machine temperature is high then machine speed also high and the machine temperature is low then machine speed also low. The vibration speed of the machine for heavy fabric is 730 m/min and normal fabric is 480 m/min.

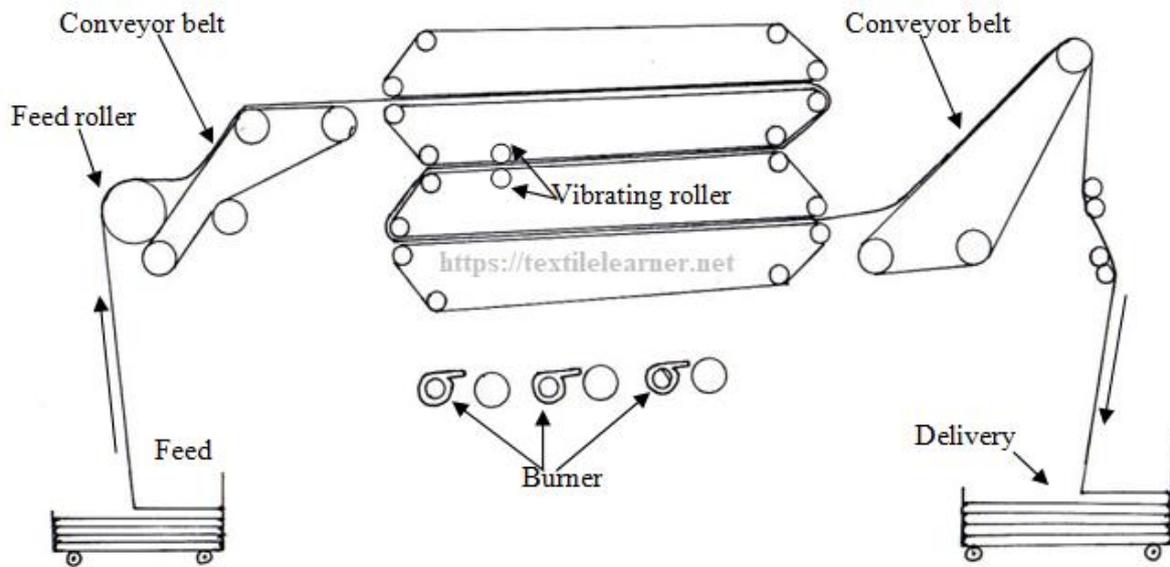


Fig: Schematic diagram of dryer with fabric path

**The temperature of different chambers according to the shade of the fabric:**

Shade	Chamber-1	Chamber-2
Light	120°C	130°C
Medium	135°C	140°C
Deep	150°C	170°C

**Operating Parameters:**

1. **Temperature:** Set the temperature between 120°C -130°C for white and 150°C -170°C for color fabric. (GSM temperature or moisture content temperature).
2. **GSM:** Set the over feed up to 10~20% or as required to get finish G.S.M.
3. **Speed:** Set the speed as much as possible (6~20m/min).

**Special Features of Textile Dryer machine:**

1. Steam dryer (two chambers ).
2. Vibration occur in heating zone.
3. Process air pressure switch present.
4. Maximum temperature increase up to 170°C .
5. Steam control switch present.
6. Two burners present.

7. Two conveyor belt is present.

**Parameters Used For Different Constructed Fabric:**

**For Cotton Fabric:**

Fabric Type	Overfeed%	Temperature,°C		Speed (m/min)		Folder Speed (m/min)
		Light Color	Deep Color	High G.S.M	Low G.S.M	
Single Jersey	-15% to -20%	145°C	165°C	6.5~7	8~9	2~3
Single Lacoste	-20% to -25%	145°C	165°C	6.0~7	8~9	2~3
Polo Pique	-20% to -25%	145°C	165°C	6.0~7	8~9	2~3
Interlock	-20% to -25%	155°C	170°C	5~6.5	7~8	2~3
Rib	-5%	145°C	165°C	4~4.5	5~5.5	3~4
Grey Mélange	-20 %	150°C	165°C	4~4.5	5~5.5	3~4

**For Polyester Fabric:**

Fabric Type	Overfeed %	Temperature,°C		Speed (m/min)		Folder Speed (m/min)
		Light Color	Deep Color	High G.S.M	Low G.S.M	
Single Jersey	-5%	135°C	115°C	10~12	8~10	4~6
Single Lacoste	-5%	135°C	115°C	10~12	8~10	5~6
Polo Pique	-5%	140°C	115°C	10~12	8~10	5~6
Interlock	-5%	135°C	110°C	6~8	8~9	4~5

Rib	-5%	145°C	115°C	4~4.5	4.5~6.0	5~6
Grey Mélange	-5%	130°C	115°C	6~8	5~5.5	5~6

**N.B:** For Polyamide: Temp range is 110°C~ 115°C. Speed range 16~18; Overfeed range- 5%. This Data's are varied depending upon the Gray G.S.M and Finished G.S.M and also on the dia of the fabric. All this parameters are suitable for G.S.M range 140~160 to get Finished G.S.M 170~185 without Lycra Fabric.

**Following things are also considered in case of textile drying machine:**

- If fabric is more redder than the standard one, then reduce the temperature.
- If fabric is more Yellower than the standard one, then increase the temperature.
- If fabric is more Bluer than the standard one, then increase the temperature.
- All this data's are practiced in mills which may varied factory to factory.

**Specification of Textile Dryer:**

1. Brand Name: Santex ag
2. Year of Manufacture: 1998
3. Company: Santex ag
4. Type: Santastretch 2K/240, GM, IR, GFI
5. Origin: Switzerland
6. Max. Working Speed: 30 m/min
7. Model: CH-9555, Tobel
8. Min. working Speed: 5~15 m/min
9. Overfeed Range: 0% to -25%
10. Max. Temperature: 185°C
11. No of Chamber: Two
12. No of Burner: 2