**THERMAL PROPERTY**

**Thermal property:**

The property which is shown by a textile fiber when it is subjected to heating is called thermal property.

**Thermal properties are including:**

1.    Thermal conductivity

2.    Heat of wetting or heat of absorption

3.    Glass transition temperature

4.    Melting temperature

5.    Heat setting

6.    Thermal expansion

**Ø Thermal conductivity:**

Thermal conductivity is the rate of heat transfer in degree along the body of a textile fiber by conduction. Higher the thermal conductivity indicates the fiber more conductive.

Thermal conductivity is measure by co-efficient of thermal conductivity.

**Ø Heat of wetting:**

When a textile fiber absorb moisture or water it gives of some amount of heat which is called heat of wetting or heat of absorption. Heat of absorption resulting from changes in moisture regain rather than the thermal conductivity.

If 1gm of dried textile fiber is completely wetted then heat in calorie/gm is involved which is known as heat of wetting for that fiber.

**Ø Glass transition temperature(Tg):**

The temperature up to which a fiber behaves hard as like glass and after which it behaves soft as like rubber is called Glass transition temperature and it is denoted by Tg.

The range of Tg is lies between -100˚C to 300˚C

**Ø Melting temperature:**

A temperature at which fiber melt completely is called melting temperature.

At melting temperature fiber losses its identity and convert it into a viscous liquid.

At melting temperature fiber also loses its strength and some molecular weight.

**Ø Thermal expansion:**

Thermal expansion can be measured by co-efficient of thermal expansion and which is defined as the fractional increase in length of a specimen to rise in temperature by 1˚C.

Co-efficient of thermal expansion:

═ Length increased / initial length of specimen

═ ∆L / L

═ L2-L1 / L1

**Ø Heat setting:**

Heat setting is the process of stabilizing the form of fibers, yarns, fabric or garment by means of successive heating or cooling in dry and wet condition.

|  |  |  |
| --- | --- | --- |
| Fiber | Tg(˚C) | Tm(˚C) |
| Polyester | 64 | 269 |
| PVC | 81 | 310 |
| PAN | 97 | 314 |
| Rubber | - | 36 |
| Tri-acetate | 73 | 306 |
| Nylon-6 | 50 | 250 |
| Nylon 6:6 | 50 | 270 |