

CHAPTER- 3

AIM AND OBJECTIVES OF THE STUDY

3.1 AIM OF THE PRESENT STUDY

To produce 240/12 PET mother/parent yarn (denier per filament – 20) on the existing PET-FDY spinning line running on average deniers and to split the same to get 20/1PET monofilament.

3.2 OBJECTIVES OF THE STUDY

Since denier per filament of 240/12 PET mother/parent yarn is 20 which is 5.7 times greater than the average running dpf of 3.5 at existing spinning line, one has to ensure for proper, and timely quenching of such heavy dpf yarns, uniform spin finish application throughout the surface of the individual filament and appropriate winding system to facilitate smooth splitting operation.

Therefore to achieve these necessary prerequisites to produce 240/12 on existing PET-FDY line, under mentioned objectives are set:

1. Modification of quench system for appropriate quenching.
2. Modification of spin finish application system to ensure even and thorough application.
3. Modification of winding system to facilitate smooth splitting operation.

3.2.1 Modification of quench system for appropriate quenching

To meet the quenching requirements of a filament having 6 times higher dpf (20 against 3.5), following quench parameters are optimized:

- a) Modifying quench screens to increase the area
- b) Increasing quench air velocity to optimum level
- c) Reducing the temperature of quench air
- d) Optimization of % Relative humidity (RH) of quench air

By increasing the area of quench screens (about 76%) , increasing quench velocity up to 0.8 meters/second, reducing the temperature of quench air from 20⁰ C 17⁰C , one can quench the high dpf (20/1) filaments.

3.2.2 Modification of spin finish application system

The present jet spray spin finish application system is not appropriate to ensure smooth splitting operation of 240/12 PET mother yarn because it requires even and proper spin finish application throughout the surface of the individual filament. Therefore kiss roll spin finish application system is incorporated instead of jet spray system.

In the case of 240/12, PET mother yarn one has to relocate the spin finish application system from existing location at quench duct to take-up area because the temperature of filaments is more than 100⁰C at the exit of quench ducts.

Since the temperature of filaments in the case of 240/12 PET FDY mother/parent yarn at the exit of quench duct is around 100⁰C, therefore spinner has to relocate spin finish application system from quench duct to take-up area and also mode of spin finish application system has to be changed from jet application system to kiss roll finish application system. In kiss roll finish application system it is possible to apply spin finish evenly and thoroughly on the surface of individual filaments which facilitates splitting process.

3.2.3 Modification of winding system

For smooth splitting operation parallelism of the individual filament in yarn bundle wound on the package is very much required otherwise frequent breakages will occur at the splitting end and also deflection angle should be minimum before final winding to avoid twisting of the filaments. Therefore it is better to have 4 end winders with traverse cam and guide instead of present 8 end bi- rotor winders

