EXECUTIVE SUMMARY

1. Draw twisting and Draw texturising are indispensable processes for imparting certain useful properties in man-made yarn for ensuring consecutive processing into ready textile goods with high service characteristics.

2. Draw twisting is essentially a process after spinning stage wherein the fibres (filaments) are drawn and given a very low level of twist. This twist is generally known as producer's twist and is essential for keeping all the filaments in a drawn yarn condition. The drawing achieved could either be full or partial. These yarns could thus be used either for texturising or direct for other end uses, as desired.

3. Draw texturising combines the economics of drawing and texturising steps (texturising is a process through which desired bulk, loft and stretch is introduced in a textile yarn). Draw texturising has been responsible for the rapid growth of the texturising industry in the last 10-15 years. This has attracted the attention of many researchers, which had led to not only the process developments but also the machinery development.

4. Draw texturisers are either sequential or simultaneous and have obvious advantages, particularly with polyester POY, since the storage stability of polyester POY is much longer than the undrawn yarn and which may be kept upto 90 days without significant loss in mechanical property. The greatest advantage is the considerably low crystallinity (less than less 5%) which has increased the speed of present day texturising. Today, the yarns can be texturised at around 1000 m/min. With rate of setting curves, it has been shown that the heating time can be reduced to less than half of what is required by a fully drawn yarn. The migration of filaments, as a result of twisting, in POY and undrawn yarns is poor, leading to greater loss in strength. This is minimised by reducing the draw ratio in simulating draw texturising by 10-15% of completely drawn yarn.

5. In India, presently there are two units in operation, which are manufacturing Draw Twisters/Draw Texturisers. The units are:

   a) M/s Himson Textile Engineering Industries (P) Ltd., Surat in technical collaboration with M/s Reiter Scragg, U.K. for manufacture of 192/216 draw texturisers. The unit has licensed & installed capacity to manufacture 120 draw texturiser/annum. and 24 draw twister/annum. The Company manufactures 144/156 draw twister in technical collaboration with M/s Teijin Seiki, Japan.

b) M/s Marchon Textile Industries (P) Ltd., Bombay has technical collaboration with M/s Giudici, Italy, for manufacture of 192/216 draw texturisers. The licensed & installed capacity of the unit is 50 and 35 machines per annum respectively.

6. The combined production in India of 192/216 draw twisters, 144/156 draw texturisers, texturising & crimping machines has incresed from 73 in 1986-87 to 106 in 1988-89.

7. The performance of Indian manufacturers of 144/156 draw twisters and 192/216 draw texturisers has been satisfactory, both in terms of technical & financial aspects.

8. Due to significant growth of man-made fibre industry, ancillary industry such as twisting, texturising, etc. have also grown to a considerable extent. There are about 300 texturisers & 2000 twisters in the country operating in medium and small scale sectors.

9. Manufacturing technology of 144/156 draw twisters and 192/216 draw texturisers was developed in Western countries. Major manufacturers are Barmag, Rieter Scragg, Davide Giudici, RPR, Lemalezzini, Teijin Seiki, Zinser and Ratti. It is reported that two manufacturers viz., ARCT and MARZOLI, have now closed down their operations. Significant developments have taken place since first introduction of these machines through continuous R&D efforts. This has resulted in development of machines like spin-draw texturising which can perform spinning, drawing and texturising in one stage rather than through three different stages viz. spinning, drawing and texturising. The latest developments are spin draw, draw warping, draw sizing, draw texturising, spin draw texturising and air-jet texturising having operations of spinning & drawing, drawing & beaming, drawing beaming & sizing, drawing & texturising, spinning drawing & texturising and drawing texturising stabilising & setting respectively.

10. Salient features of major contemporary technologies have been dicussed in this report. Basic process of manufacture remains the same in all the technologies with difference in operational features.

11. Barmag AG has supplied 144/156 draw twisters, two for one twisters, 192/216 draw texturisers, etc. all over the world.It has developed machines like spin draw texturisers, draw warping which can operate at machine speeds of 500-10000 m/min and with a package output of 12 kgs. These machines enjoy excellent market reputation due to cost efficient, easy to operate and versatality in operations.

12. Rieter Scragg manufactures different types of false twist texturising machines. Their manufacturing range includes SDS-700, SDS-900, SDS-1200, DCS-1200

and JETEX -1200 models. The manufacturing technology incorporates single heater/twin heater false twist alongwith variable speed draw zones.

13. Zinser manufactures 144/156 draw twisters with spindle speed upto 16,000 rpm/min. Their product range incorporates automatic doffing system, microprocessor based control panel and each delivery cylinder and drafting roller is driven by its own electric motor.

14. Giudici offers complete range of 192/216 draw texturising machines based on advanced techniques suitable for any friction and air texturising requirements. Their machines are low profile, incorporates optimised thread line for cost effectiveness.

15. Selection of adapted technologies should be based on the criterion such as run denier, package weight, traverse system, control system, versatality, operation stages , handling and economy.

16. Himson Textile Engineering Industries Ltd, Surat (HTEIL) has manufacturing capabilities for manufacture of 192/216 draw texturising and crimping machines upto 1200 m/min. The plant of HTEIL is equipped with machine shop with CNC machine fabrication shop. The company commands a market share of 90% and has been able to reduce the imported bought out components through its inhouse R&D efforts.

17. Marchon Textile Industries Pvt Ltd, Bombay have facilities for manufacturing super high speed 192/216 draw texturising, texturising, crimping, up-twister and rewinders machines. Marchon - Giudici machine provides unique features which includes mechanical take-up speeds upto 900 rpm, low coefficient of friction, and diamond coated stacked disc friction spindles. The company is equipped with machine shop, fabrication shop etc.

18. Benelon Industries, Bombay and Mafatlal Engineering Industries, Bombay presently are non-operational due to financial and labour problems.

19. Research institutes are not engaged in developing latest technologies which may have more commercial value. For this purpose an organised effort is required. Manufacturers are operating in water tight compartments.

20. Technology absorption efforts have resulted in indigenisation of certain parts and components. However, few components are still being imported due to high investment, non-availability of raw material etc. Tendency of industry for package import reduces technology absorption efforts.

21. The industry has only made efforts in changing the operational features in small steps, but there has not been any substantial effort for change in level of technology.

22. Technology upgradation efforts are in low profile due to lack of R&D efforts and high investments.

23. Trend in respect of obsolete equipments in Western countries is to stop the manufacturing. Indian industry keeps on operating with the outdated technologies.

24. The technology has undergone lot of changes at international level and technological gaps exist between India and developed countries.

25. Manufacture of latest machines like spin draw, draw warping, draw sizing, spin draw texturising, air texturising are the machines where technology gaps exist.

26. Due to various reasons, yarn producing capacities in India has remained very low for many years. However, due to liberalised policies for yarn industry, industries engaged in manufacture of draw twister/draw texturisers shall be benefited.

27. Thrust areas of indigenous technology should be for adaption of latest technology. Immediate target should be to import latest technology and modernise facilities at end user industry.

28. A central level organisation having engineering expertise and having a close link with research institutions, BIS, end user industries should be made responsible for technology selection and adaption. Continuous efforts should be made to absorb and upgrade the latest technology for horizontal transfer of latest technology.

29. Efforts for standardisation of various components wherever possible should be emphasised and manufacturers must extend co-operation to Bureau of Indian standards, in this respect.

30. The central level organisation should identify and select only one state of art technology from a well known proven foreign source, in order to minimise number of designs for a particular model of machine.

31. Policy regarding R&D incentives should be revised enabling industries to enable investment on R&D projects.

32. Development of critical spare parts/components should be done at the national level.