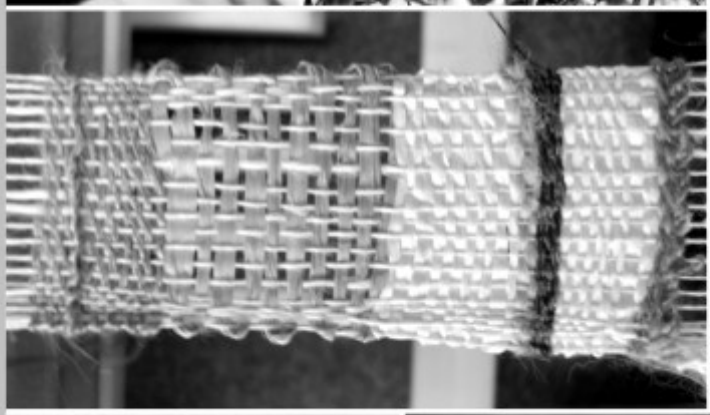
Section VII

Speciality Fibre





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INTRODUCTION

I. Fibres used in Technical Textiles can be segregated into three categories:

- Regular/ Generic fibres,
- Speciality variants of regular/ generic fibres, and
- High tech/ high performance fibres

II. While the regular fibres like natural fibres and synthetic fibres (polyester, viscose,nylon, polypropylene) account for 70% of the total fibre used in technical textiles, speciality fibres constitute the remaining 30%. While speciality variants of regular fibre constitute majority of speciality fibres (25% of the total 30%), the high performance fibres constitute a small proportion, i.e. 5%.

III. The sub-group on speciality fibres for the National Fibre Policy has focused only on the 30% of these fibres, namely - speciality variants of regular fibre and hi-tech/ high performance fibres.

In India, indigenous production of speciality fibres is limited and majority of specialty fibres are imported to cater to growing demand. Among various fibres, polypropylene and polyester account for 34.4% of total fibre consumption in Technical Textiles.

IV. India has large plants and adequate capacities in regular synthetic fibres but players have shied from the production of speciality fibres till date due to low demand and lack of requisite technology. However, if India needs to increase its share of technical textiles in the next 5-10 years, due attention is also required on the indigenous development of speciality fibres in order to attain near self-sufficiency in the key raw materials required for production of technical textiles.

V. There are over numerous types of speciality fibres present globally, but not all are of strategic importance from the policy attention point of view. The sub-group decided that there is a need to identify limited number of speciality fibres that can be successfully developed in the country and be useful to the industry and the economy in the future. Such fibres can be provided additional policy benefits. List of the 23 speciality fibres as identified by the sub-group are:

- Meta Aramids
- Para Aramids
- FR Modacrylic
- Superabsorbant Fibre

- High Density Polyethylene (HDPE), High Modulus Polyethylene (HMPE)
- Carbon Fibre
- Polyphenylene sulfide Fibres (PPS)
- Glass Fibre
- Flame Retardant (FR) Viscose
- Flame Retardant (FR) Polyester
- High Tenacity/ Super high tenacity Nylon (more than 7 gpd)
- High Tenacity/ Super high tenacity Polyester (more than 7 gpd)
- High Tenacity/ Super high tenacity Polypropylene (more than 7 gpd)
- High Tenacity/ Super high tenacity Viscose (more than 7 gpd)
- Ceramic Fibre
- Polytetrafluoroethylene (PTFE)
- PBI Fibres
- PBO Fibres
- Anti-microbial/Anti-fungal/Anti-bacterial Fibres
- Phenolic Fibre
- Conductive Fibre
- Fibre for concrete re-enforcement
- Alginate Fibre

ISSUES AND CONCERNS

VI. **Low** penetration: Technical textiles sector in India is at a nascent stage in terms of market development. There is lack of awareness amongst the entrepreneurs as well as consumers about the usage, benefits and high growth potential. At present, the major deterrent for expansion of the sector is low demand.

VII. **Lack of R&D**: A major concern related to development of speciality fibres is lack of indigenous research and development in the area of speciality fibres. Further, the technology required for manufacturing of most of the speciality fibres is proprietary and very expensive. High cost and low demand have also deterred Indian players to develop speciality fibres indigenously.

VIII. **Absence of** HSN **codes**: The HSN code classification for a number of speciality fibres is not available at the eight-digit level, while for some of the speciality fibres, such as meta-aramid and para-aramid fibre, the HSN code is same. This creates difficulty in studying the trend in production, imports and exports of the speciality fibres. Also, a number of speciality fibres are clubbed together under the heading 'Others', thus making it impossible to study the trends of the individual speciality fibres.

IX. **Fiscal** anomalies: There exist duty anomalies in the technical textiles industry wherein an **excise duty** is levied on the raw material while the finished product has been exempt from the duty. Some of the products exhibiting such anomaly are – Baby diapers, Incontinence diapers and Sanitary napkins. Anomaly also exists with respect to customs duties. One of the **customs duty related anomaly** has been observed in case of aramid yarn. At present aramid yarns can be imported without attracting any import duty only if conditions specified in Sr. no. 16 under general exemption 9 of provisions for Government imports including for defence and police are met. Customs duty on aramid yarn is waived off only if it is used in the manufacture of bullet-proof jackets. However, independent manufacturer of aramid fabric (which is used in manufacture of bullet-proof jackets) is not entitled to this exemption and has to pay customs duty. Further, currently, the VAT rate in some states (like Tamil Nadu, Karnataka) is different for the same products based on the base fibre used. There also exists a discrepancy in fiscal treatment of nonwovens and other textile products. Also, DEPB for nonwoven and converted products do not find a mention and needs to be notified.

X. **Regulatory issues**: One of the reasons for low penetration of technical textiles, especially in the meditech segment is the existence of regulations that discourage use of modern technical textile products. For instance, the Indian Drugs & Cosmetics Act 1940 and Indian Pharmacopoeia recognize only woven medical products, due to which the consumption of nonwoven fabrics in medical area is very low. Similarly, in other segments like geotech, absence of Indian standards has led to a low consumption of geo-textiles over conventional methods. Further, the usage of fire retardant textiles in public places is currently suggested in the National Building Code (NBC) but is not mandatory.

XI. **Concerns over GST**: Textile industry is concerned over the applicability of GST as the industry involves a lot of inter-state transfers especially at the fabric stage. As GST would be applicable on inter-state depot transfers, it could lead to blockage of funds/cash flow issues as no credit would be available on the finished goods stock at such depots, unless they are sold. The same concern holds for imported goods as well. Another area of concern is the treatment of stock transfers and job work under GST. It is also not clear whether optional cenvat would be available for textile industries under GST.

RECOMMENDATIONS

XII. The indigenous development of speciality fibres is highly dependent upon the demand for these fibres in the domestic market from the downstream industry, i.e. the technical textile manufacturers. Thus, besides the recommendations for speciality fibres, the group has also proposed specific fiscal and non-fiscal recommendations for technical textile products with a view to increase their consumption and production in India. The fiscal and non-fiscal recommendations of the sub-group for speciality fibres and technical textiles are as below.

XIII. Fiscal Measures for Identified Speciality Fibres

21. Excise duty on focus speciality fibres should be reduced to 4% (from the current level of 8%)
22. Import duty and CVD on additives used in Flame retardant speciality fibres and other speciality fibres should be removed
23. Capital equipment used in the manufacture of identified speciality fibres should be exempted from Custom duty
24. The government should consider introduction of a *Special Incentive Package* for enabling Indian or foreign companies to set up manufacturing facilities for speciality fibres, thereby strengthening the raw material base for Indian technical textile industry

XIV. Fiscal Measures for Technical Textiles

25. Excise duty levied on nonwovens should be uniform with that levied on other textiles
26. Excise duty on baby diapers, sanitary napkins and incontinence diapers should be rationalised
27. The customs duty exemption may be allowed even to an independent manufacturer of aramid fabric, which will be used for production of bullet-proof jackets for defence and police personnel
28. VAT rates should be uniform for technical textiles products irrespective of the base fibre used and irrespective of the source of origin of the product, whether from domestic market or from imports
29. Technical Textiles should be exempted from GST for a period of at least two years.
30. To provide incentives to encourage development of technical textiles industry, 25% capital subsidy should be provided in lieu of 10% capital subsidy and 5% interest rate subsidy to small & medium entrepreneurs (upto capital investment of Rs 2 crores) engaged in manufacture of technical textile products

xv. Non-fiscal Measures for Identified Speciality Fibres

31. An R&D centre with a funding of at least Rs 50 crores is recommended at either NCL Pune, one of the IITs or UICT Mumbai
32. It is recommended that incubation centres should be set-up for transfer of technology and acceptance of innovative technologies by the industry
33. Well-equipped laboratories should be set-up in the four Centres of Excellence to extend support of the industry in fields of testing and development, as per the requirements
34. Specific HS codes have been proposed for Speciality fibres whose HS codes could not be identified. These include:
    - Super high/ High tenacity polyester fibre – 55022001
    - Super high/ High tenacity nylon fibre – 550319001
    - Super high/ High tenacity polypropylene - 55034020/30
    - FR polyester - 5503200015/25/45/65
    - FR Viscose - 5502000010/90
    - FR Modacrylic - 5503300010/90
    - Meta aramid - 5503190010/90,5402111010/90
    - Para aramid - 5503190010/90, 5402111010/90
    - HMPE/ HDPE/ UHMWPE - 55039070/80
    - Carbon fibre - 55039070/80
    - Superabsorbent fibre (acrylic) - 5503300000/10
    - PPS - 5503901000/5503909000
    - Phenolic fibre
    - PBO - 55090010/ 20/30/40
    - Antimicrobial/ antibacterial fibre (polyester, polypropylene, viscose) - 54022021/54060011/55032010
    - Fibres for concrete re-inforcement - 55034010, 55032030 for polypropylene and polyester

xvi. Non-fiscal Measures for Technical Textiles

35. Standard quality Technical Textiles are needed for maximum benefits and their installation should be carried out as per standard guidelines and procedures. Specific segments of

Technical Textiles where standardization is required on a priority basis include Geotech, Buildtech, Protech, Meditech, and Agrotech

36. Some Ministries could issue guidelines which would increase the level of adoption and awareness levels of Technical Textile products and aid in creation of a large market for these products in India. Some specific initiatives and support required from other ministries include:

    - Mandatory usage of fire retardant fabrics in exhibition centres, cinema halls and other public places
    - Mandatory usage of fire retardant apparel for fire-fighting personnel
    - Increased usage of geo-synthetics in infrastructure development projects
    - Increased usage of nonwoven disposable Meditech products in medical institutions and hospitals

37. In order to boost the consumption of Technical Textile in India, it is recommended the government increases awareness about the usage and benefits of these products. Following measures can be undertaken by concerned Ministries to increase the level of awareness of Technical Textiles:

    - Participation in medical fairs to promote the usage of Meditech products (especially nonwoven single use products)
    - Organization of symposiums, road shows in different parts of India so as to familiarize people with the application and benefits of products
    - Creation of framework for partnership in rural areas
    - Creation of specific programs for end use application to educate users about benefits of the products
    - Incorporation of new generation medical textiles manufactured from MMFs and their blends in Indian Pharmacopoeia and change in Schedule F-2 of Indian Drugs & Cosmetics Act
    - Infrastructure projects could be modified to DBOT from BOT to emphasize more on initial design so as to enhance usage of latest material and technology relating to geotextiles
    - Various Ministries could make amendments in certain existing Policies/Acts/Guidelines to directly/indirectly boost the growth of Technical Textiles in India

38. Under the Scheme for Integrated Textile Parks (SITP), at least 10% of textile parks should be dedicated technical textile parks

39. Technology Mission on Technical Textiles should be initiated at the earliest as it will boost domestic production as well as consumption of Technical Textiles in the country

40. In order to meet the stringent and critical performance related requirements of Technical Textile products in the international markets, it is recommended that world class testing facilities should be set-up in India. These facilities will assist in accurately evaluating the products to meet international requirements

41. Technical textiles need to be included in the syllabus and curriculum of educational institutions at B.Tech/B.E. and higher levels in all related branches of engineering and technology, architecture and medicine to ensure availability of skilled manpower over the long-term

7.1. INDIAN TECHNICAL TEXTILES INDUSTRY: AN OVERVIEW

INTRODUCTION

7.1.1. The Expert Committee on Technical Textiles (ECTT) has defined Technical Textiles as "textile materials and products used primarily for their technical performance and functional properties rather than their aesthetic or decorative characteristics". Technical Textiles (TT), unlike traditional textiles which were used for clothing and furnishing, are used primarily for their specific physical and functional properties. Some of the similarities between traditional textiles materials and contemporary technical textiles materials include: manipulation of fibres, fabrics, finishing techniques and a knowledge of correct combinations of different fibres in terms of its interactions and performance in diverse environments.

7.1.2. Some of the terms used for Technical Textiles include "industrial textiles", "functional textiles", "performance textiles", "engineering textiles", "invisible textiles" and "hi-tech textiles". Technical Textiles are used individually to satisfy a specific function (fire retardant fabric used in the uniforms of firemen) or as a component of another product for enhancing its strength, performance or other functional properties (tyre cord fabrics used in automobile tyres). They are also sometimes used as accessories in processes to manufacture other products (paper maker felt in paper mills). Some examples of Technical Textiles in our day-to-day include- floor mops, tea bags, coffee filters, interlinings in clothes, carpets, wall coverings, sanitary napkins, baby diapers, mattresses, blankets amongst others.

7.1.3. Technical textiles is not a single industry, it caters to a wide gamut of industries right from agriculture to automobiles to construction activities etc. The range and variety of raw materials, processes and applications it includes is enormous. Based on the characteristics of the product, functional requirement and end-use, the variety of Technical Textiles products have been classified into 12 segments as follows:

Exhibit 7.1.1: Segments of Technical Textiles	
Segment	**Usage**
Agrotech	Agriculture, horticulture and forestry
Buildtech	Building and construction
Clothtech	Technical components of shoes and clothing
Geotech	Geotextiles, civil engineering
Hometech	Components of furniture, household textiles and floor coverings
Indutech	Filtration, cleaning and other industrial usage
Meditech	Hygiene and medical
Mobiltech	Automobiles, shipping, railways and aerospace
Oekotech	Environmental protection
Packtech	Packaging
Protech	Personal and property protection
Sporttech	Sport and leisure

Source: ECTT

7.1.4. There are over 150 products classified under Technical Textiles and its coverage in terms of application areas is expanding globally with each passing day on account of technological advancement in raw materials and processes. Though the Indian Technical Textiles industry consumes products under all twelve segments, the majority technical textiles products that are **manufactured in India** include– Clothtech, Packtech, Sporttech and Hometech.

7.1.5. Unlike India's textiles and garments industry which is export intensive, the Technical Textiles industry is **import intensive**. Many products are imported in order to cater to the domestic demand. The only **products which are exported** in large quantities from India (like fishnets, surgical dressings, flexible intermediate bulk containers, among others) do not require high levels of R&D and technology. Also, the size of manufacturing units varies to a great extent. For instance, despite presence of big players, production of certain products (like shoe laces, woven sacks, stuffed toys, carpet backing, among others) are concentrated in the small scale segment.

7.1.6. Technical textiles in developed countries have matured and hence its growth in these regions is expected to be moderate. Developing economies like China and India are expected to register a robust growth in Technical Textiles on account of heavy infrastructure activities in these regions. Also, as the consumption of disposable Technical Textiles products (like wipes, sanitary napkins, adult/baby diapers) is directly related to disposable income, an increase in disposable income of a country is

expected to drive the demand of these products. India has huge advantage in manufacturing of textiles and garment due to its inherent low cost advantage. Therefore, in niche segments of technical textiles India can gain cost advantage through tie-ups with research institutes for the development of new technologies.

GLOBAL SCENARIO

7.1.7. The global market size of Technical Textiles was estimated to be US$ 106.8 billion in 2005 (20 billion kg). Amongst all the segments of Technical Textiles, Mobiltech, Indutech and Sporttech are the more prominent ones which collectively accounted for 56% of global market size in 2005.

7.1.8. Globally, production of segments in the textiles industry has reached a saturation point and its manufacture has become extremely competitive due to shift in production to low cost nations. Hence, these nations have shifted their focus on manufacture of value added products namely Technical Textiles which offer good margins and are technology intensive.

Exhibit 7.1.2: Global market size

Segment	Year				CAGR (%)	
	2005		2010			
	Volume (bn kgs)	Value (US$ mn)	Volume (mn kgs)	Value (US$ mn)	Volume	Value
Mobiltech	2.8	26,861	3	29,282	3	1
Indutech	2.6	16,687	3	21,528	4	5
Sporttech	1.2	16,052	1	19,062	3	3
Buildtech	2.0	7,296	3	9,325	5	5
Hometech	2.5	7,622	3	8,778	3	3
Clothtech	1.4	7,014	2	8,306	3	3
Meditech	1.9	6,670	2	8,238	4	4
Agrotech	1.6	6,568	2	8,079	4	4
Protech	0.3	5,873	0	6,857	4	3
Packtech	3.0	5,329	4	6,630	4	4
Geotech	0.3	927	0.3	1,203	5	5
Total	**19.7**	**106,899**	**24**	**127,288**	**4**	**3**

Source: DRA

INDIAN SCENARIO

7.1.9. India is the second largest textiles economy in the world after China, however, its contribution to the global technical textiles market is insignificant. *The current market size of Technical Textiles in India stands at Rs 417.6 billion and it has grown at a CAGR of 9.6% from Rs 219.9 billion in FY02. Packtech is the largest segment accounting for a 35% share in overall market size of Technical Textiles in India in FY08 followed by Clothtech (16.5%), Hometech (12%) and Indutech (7.7%).*

Exhibit 7.1.3: Segmental market size (Rs mn)

Segment	FY02	FY08	CAGR (%)
Agrotech	2,610	5,530	11.3
Buildtech	10,511	21,570	10.8
Clothtech	53,951	69,080	3.6
Geotech	1,100	2,720	13.8
Hometech	7,579	50,250	31.0
Indutech	26,220	32,060	2.9
Meditech	11,933	16,690	4.9
Mobiltech	12,764	31,830	13.9
Oekotech	-	680	-
Packtech	35,877	146,300	22.2
Protech	3,475	13,020	20.8
Sporttech	53,898	28,510	-8.7
Total	**219,917**	**417,560**	**9.6**

Source: ECTT, Baseline Survey on Technical Textiles

7.1.10. A brief snapshot of various segments of technical textiles is provided in annexure 7.A.1. An review of the existing regulatory framework for technical textiles in India is provided in the annexure 7.A.2.

7.1.11. The technical textiles segment in India has a potential to attract investment and create additional employment opportunities in coming years. ***Investments of Rs 5,000 crores*** are expected by 2012 and ***employment is expected to increase to 12 lakhs*** by 2012.

GROWTH PROJECTIONS

7.1.12. According to the baseline survey of technical textiles commissioned by the office of textiles commissioner, the technical textiles industry is expected to register a growth of 11% per annum till 2012-13.

7.1.13. Due to non-availability of time-series data on production/ consumption of various technical textile products, it has been difficult to estimate growth projections for various segments of the sector.

7.1.14. However, the members of the sub-group on Speciality fibres are of the opinion that the technical textile industry is likely to grow at **6-8% per annum till 2020** without any policy interventions. However, if government interventions take place in the form of regulatory push the growth of technical textiles industry can be estimated at **12-15% per annum till 2020**.

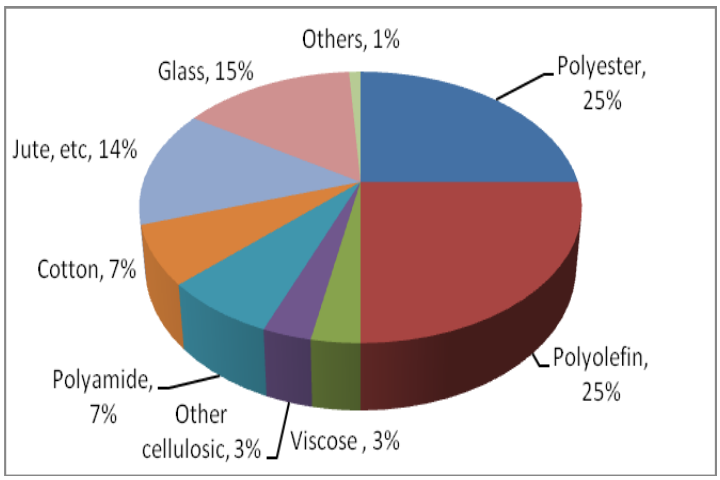
RAW MATERIALS

7.1.15. Technical Textiles products are manufactured from various fibres depending upon the end usage of the product. All types of fibres – natural (cotton, silk, jute, coir and wool), man-made fibres (viscose, polyester, nylon, acrylic, etc) as well as high performance specialty fibres find usage in Technical Textiles. Man-made fibres (MMFS) find more usage in manufacture of Technical Textiles due to their inherent advantage of having higher strength and versatility as compared to natural fibres.

Global scenario

7.1.16. World consumption of fibres in Technical Textiles in 2005 was 22% of the total fibres consumed. Of the total fibres consumed (19.68 mn tonnes), around 80% comprised of MMFs and remaining comprised of natural fibres. Industry experts believe the share of MMFs in total fibre consumption will further increase to 81.3% by 2010. Among various fibres, polyoliefin and polyester collectively accounted for 50% of total fibre consumed in Technical Textiles in 2005 followed by glass (15%) and jute (14%). Specialized fibres like aramid and carbon account for 1% of fibres consumed in Technical Textiles. Natural fibres find application in comparatively less demanding applications like sacks, twine and carpet backing.

Exhibit 7.1.4: Fibre composition in Technical Textiles

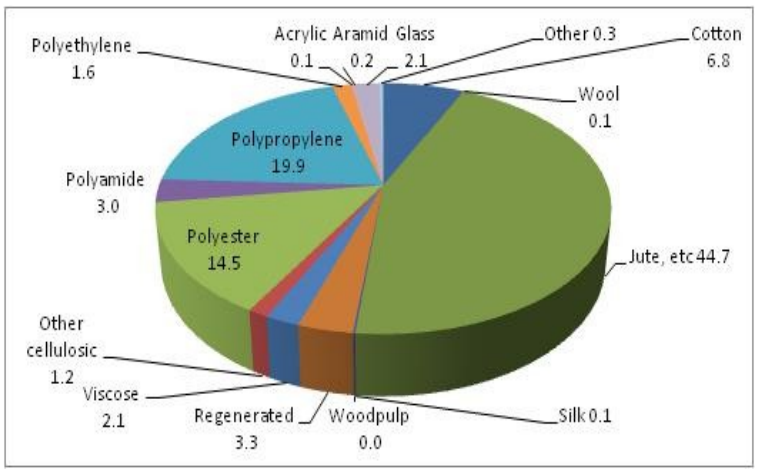


Source: ECTT

Indian scenario

7.1.17. In India, indigenous production of fibres is limited and majority of specialty fibres are imported to cater to growing demand. Among various fibres, polypropylene and polyester account for 34.4% of total fibre consumption in Technical Textiles. While jute has mostly been replaced by HDPE or Polypropylene all over the world, India still uses jute in manufacturing of packaging products due to mandatory packaging in jute materials Act. Also, other traditional fibres like hemp, sisal and cotton are rapidly getting substituted by synthetic fibres like polyester, polyethylene, nylon, etc due to better performance and functional properties of these fibres.

Exhibit 7.1.5: Fibre composition in Technical Textiles



Source: ECTT

7.1.18. Type of fibres used in the manufacture of Technical Textiles products depend upon the desired properties of the end products. Majority of products of Technical Textiles are manufactured from MMFs (polyester, nylon and polypropylene) and polymers (HDPE, LDPE, and Polypropylene (PP).

Some of the speciality fibres used in the manufacture of Technical Textiles include Aramid, UHMPE, Carbon fibre, Nomex, Trevera and glass fibres. An overview of various fibres used in manufacturing of technical textiles is provided in the annexure 7.A.3.

Exhibit 7.1.6: Snapshot: Fibres used in Technical Textiles

Segment	Cotton	Jute	Viscose	Polyester	Nylon	PP	HDPE	LDPE/ LLDPE	Aramid	Glass	Carbon
Agrotech	√	√		√	√	√	√	√			
Meditech	√			√		√					
Mobiltech	√		√	√	√	√	√				
Packtech		√		√	√	√	√	√			
Sportech	√			√	√	√	√	√			
Buildtech	√			√	√	√	√				
Clothtech	√		√	√	√	√					
Hometech	√		√	√		√					
Protech				√	√				√		√
Geotech		√		√	√	√		√			
Oekotech		√		√	√	√	√	√			
Indutech	√		√	√	√	√	√		√	√	

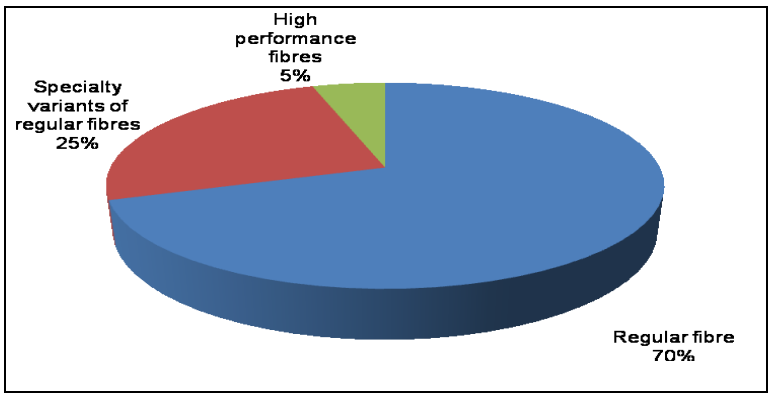
Source: Baseline Survey on Technical Textiles

7.1.19. Fibres used in Technical Textiles can be segregated into three categories:

- Regular/ Generic fibres,
- Speciality variants of regular/ generic fibres
- High tech/ high performance fibres

7.1.20. While the regular fibres like natural fibres and synthetic fibres (polyester, viscose,nylon, polypropylene) account for 70% of the total fibre used in technical textiles, speciality fibres constitute the remaining 30%. While speciality variants of regular fibre constitute majority of speciality fibres (25% of the total 30%), the high performance fibres constitute a small proportion, i.e. 5%.

Exhibit 7.1.7: Types of fibres used in Technical Textiles



Source: Industry

7.1.21. Some of the high tech speciality fibres that are popular include Kevlar, Twaron, Nomex, carbon fibre and high molecular weight polyethylene (Dyneema, Spectra). Lately, the usage of high performance fibres has been growing due to reduction in price of aramids (on account of competition and economies of scale).

7.1.22. *The sub-group* on *speciality fibres for the National Fibre Policy has focused only on the 30% of these fibres, namely - speciality variants of regular fibre and hi-tech/ high performance fibres.* Details of speciality fibres identified by the group are provided in the following chapter of this report.

7.2. SPECIALITY FIBRES

INTRODUCTION

7.2.1. Improved technology in fibre spinning like melt spinning, wet spinning, etc has made the production of fibres with functional characteristics suitable for Technical Textiles. Also, the manufacturing of speciality fibres has become commercially viable on account of advancement of technology. However, the production of speciality variants of regular fibres and high performance fibres (that constitute 30% of the total fibres used in technical textiles) is largely based in developed countries like the US, Japan, Canada and some EU countries and has started developing in countries like China and Korea. However, India's synthetic fibre portfolio at present largely constitutes only the regular fibres and while speciality fibres are being commercially developed in the country, their volumes are very small and almost negligible for high-performance fibres.

7.2.2. Most of the speciality fibres used in technical textiles in India are at present being imported from countries like the US, EU and China. India has large plants and adequate capacities in regular synthetic fibres but players have shied from the production of speciality fibres till date due to **low demand and lack of requisite technology**. However, if India needs to increase its share of technical textiles in the next 5-10 years, due attention is also required on the indigenous development of speciality fibres in order to attain near self-sufficiency in the key raw materials required for production of technical textiles.

7.2.3. There are over numerous types of speciality fibres present globally, but not all are of strategic importance from the policy attention point of view. *The sub-group decided that there is a need to identify limited number of speciality fibres that can be successfully developed in the country and be useful to the industry and the economy in the future. Such fibres can be provided additional policy benefits.*

IDENTIFICATION OF FOCUS SPECIALITY FIBRES

7.2.4. The baseline survey of Technical Textiles lists around 32 types of speciality fibres having application across different user industries like automotive, defence, industrial applications, construction, etc. Of these, the sub-group selected certain fibres and additionally identified 6 more fibres as the focus speciality fibres based on their application, importance to the economy in the near future, potential for large volumes in the future, etc. List of the 23 speciality fibres as identified by the sub-group are presented in the table below:

Exhibit 7.2.1:	
S. no.	**Identified speciality fibres**
1	Meta Aramids
2	Para Aramids
3	FR Modacrylic
4	Superabsorbant Fibre
5	High Density Polyethylene (HDPE), High Modulus Polyethylene (HMPE)
6	Carbon Fibre
7	Polyphenylene sulfide Fibres (PPS)
8	Glass Fibre
9	Flame Retardant (FR) Viscose
10	Flame Retardant (FR) Polyester
11	High Tenacity/ Super high tenacity Nylon (more than 7 gpd)
12	High Tenacity/ Super high tenacity Polyester (more than 7 gpd)
13	High Tenacity/ Super high tenacity Polypropylene (more than 7 gpd)
14	High Tenacity/ Super high tenacity Viscose (more than 7 gpd)
15	Ceramic Fibre
16	Polytetrafluoroethylene (PTFE)
17	PBI Fibres
18	PBO Fibres
19	Anti-microbial/Anti-fungal/Anti-bacterial Fibres
20	Phenolic Fibre
21	Conductive Fibre
22	Fibre for concrete re-enforcement
23	Alginate Fibre

Source: Sub-group on speciality fibres

7.2.5. These speciality fibres have been analysed individually in the following section so as to understand their properties, applications, manufacturing process and demand. **The table in the annexure 7.A.4. provides a snapshot of the identified speciality fibres.**

Meta-aramid Fibres

Properties

7.2.6. Meta-aramid fibre is a high tenacity heat resistant synthetic fibre. DuPont was the first company to introduce this fibre during late 1960s under the brand name *"Nomex"*. Hence, because of its inherent high strength and high impact absorbing capacity, these fibres found their applications in manufacturing speciality products under Indutech and Protech segments.

7.2.7. *Meta-Aramids are best known for their combination of heat resistance and strength. In addition, these do not ignite, melt or drip; a major reason for their success in FR apparel market. Some of the typical applications of meta-aramids include: automotives, hot gas filtration, safety and protective clothing, reinforcement, thermal insulation, heat shields, high temperature filtration; etc*

Applications

7.2.8. The broad applications for Meta-aramid fibres are given below:
Defence application: Manufacturing of bullet proof jackets, body armor and helmets.
Industrial application: Manufacturing of flame resistance clothing, ropes, cables, hand gloves, etc.

Global Scenario

7.2.9. DuPont (USA) is the leading producer of this fibre in the world. Some of the other key manufacturers of this fibre are Teijin Twaron (Japan), SRO Group (China), Yantai Spandex (China), Kermel (France), etc.

Indian Scenario

7.2.10. The domestic demand of meta-aramid fibres are predominantly met through imports from European Union (EU), China and USA, as there are no indigenous manufacturers of this fibre in India. (Refer Table given below). These fibres imported for defence applications are exempted from custom duty and counter veiling duties (CVD).

Exhibit 7.2.2: Aramid - Imports for FY09			
Regions	**Rs (mn)**	**Regions**	**Rs (mn)**
Taiwan	110.0	China	29.8
European Union (EU)	70.1	Others	27.4
USA	33.8	**Total**	**271.0**

Source: CMIE

Note: 1) Imports for aramid fibres are taken from HS codes 55031900, 54021110.

2)Import under this HS Code is given only for FY09, hence CAGR cannot be calculated

Para-aramid Fibre

Properties

7.2.11. Dupont *"Kevlar"* brand was the first para-aramid fibre to be introduced during 1970s. This fibre was known for its high strength to weight ratio, high modulus, and excellent chemical and thermal stability. Hence due to its high strength and flame resistance ability, these fibres are mainly used in manufacturing protective clothing used in fire fighting and defence.

Application

7.2.12. The applications of para-aramid Fibre are quite similar to that of meta aramid fibre. Some of the key applications of para-aramid fibres are as follows:

Defence application: Manufacturing of bullet proof jackets, body armor and helmets.

Industrial application: Manufacturing of flame resistance clothing, ropes, cables, hand gloves, etc.

Global Scenario

7.2.13. Du Pont is the leading manufacturer of para-aramid fibres in the world. The company markets its product under the brand name "*Kevlar"*. Some of the other key global manufacturers are, Teijin Twaron (Japan), Yantai Spandex (China), etc.

Indian Scenario

7.2.14. The domestic demand of para-aramid fibres are predominantly met through imports from European Union, China and USA, as there is no indigenous manufacturer of this fibre in India. Para-aramid fibres imported for defence pupose is exempted from both customs duty and CVD. Since the imports of both meta aramid and para aramid are clubbed under HS codes 55031900 and 54021110. The imports of para-aramid and meta-aramid fibres can not be estimated separately. (Refer to above table).

Fire retardant modaacrylic Fibres

Properties

7.2.15. Moda acrylic Fibres is one of the most resilient fibres, these fibres are easy to dye in to bright shades, abrasion resistant, flame resistant, resistant to acids and alkalies, etc. The first commercial production of modacrylic fiber began in 1949 in Union Carbide Corporation in the United States. This fibres do not combust and hence difficult to ignite. Due to these properties it is widely used in manufacturing of flame retardant clothing.

Application

7.2.16. Some of the important applications were Modaacrylic Fibres are given below:
Apparels: Children wear, wigs, simulated fur, trims and linings, and deep pile coats, etc.
House Furnishing: Manufacturing of fire resistance blankets, curtains, carpets, sofa covers etc.

Global Scenario

7.2.17. Solutia Inc (USA), Kaneka Corporation (Japan), Yalova Eliat (Turkey), Montefibre (Italy), Mosanto (USA), etc. are some of the key global suppliers of this fibre.

Indian Scenario

7.2.18. Moda-acrylic fibres are not manufactured in India, it is majorly imported from Japan, EU, Thailand, China, USA, etc. (Refer to below Table)

Exhibit 7.2.3: Moda acrylic - Imports for FY09

Region	Rs (mn)	CAGR (FY07-FY09)
Thailand	216.4	-2.6%
Japan	201.4	-12.1%
European Union	148.8	-9.0%
China	98.7	268.8%
USA	28.9	2.9%
Taiwan	20.3	9.5%
Singapore	20.3	9.5%
Others	7.1	-61.8%
Total	**741.9**	**-2.9%**

Source: CMIE
Note: Imports for both modaacrylic and superabsorbant fibres are taken under same HS code: 55033000

Super-absorbant fibre (acrylic)

Properties

7.2.19. Super absorbant fiber is a type of acrylic fibre which is manufactured by coating super absorbent particles to the fibre. Super-absorbent fiber has the property of absorbing moisture several thousand times more than its original weight and subsequently undergoes significant expansion, and eventually forming into a gel form.

Applications

7.2.20. *Hygiene products:* These fibres are primarily used as an absorbent for water and aqueous solutions in diapers, adult incontinence products, feminine hygiene products, and other similar applications.

Global Scenario

7.2.21. Some of the key global manufacturers of super absorbant fibres are Technical Absorbant Ltd. (UK), Technical Absorbant Ltd. (UK), Camelot Technologies (Canada), etc.

Indian Scenario

7.2.22. Super absorbant fibres are not manufactured in India, they are mainly imported from countries like Japan, USA, China and Thailand. The imports of this fibre are clubbed under HS code 55033000 which also include modaacrylic staple fibres. (Refer to the above table).

High Density Polyethylene (HDPE)/ High Modulus Polyethylene (HMPE)/ UHMWPE

HDPE: Properties

7.2.23. HDPE is a polyethylene thermoplastic made from petroleum. It requires around 1.75 kilograms of petroleum (in terms of both energy and raw materials) to manufacture one kilogram of HDPE. HDPE has a strong intermolecular force which gives it high tensile strength. This fibre was first produced in USA during late 1950s.

Application

7.2.24. Typical applications of HDPE are marine ropes and cordages, sailcloth, netting, sacks, carpet backing, furniture lining, and medical applications, etc. UHMWPE is used for protective clothing (ballistic protection)

House applications: HDPE is used in sanitary landfills, wherein large sheets of HDPE are extrusion or welded to form a homogeneous chemical-resistant barrier.

House furnishing and construction: HDPE is also used in wood plastic composites. Recently, it is increasingly applied in manufacturing of tubes instead steel or PVC, because of its greater durability and strength.

Global Scenario

7.2.25. Globally major producer of these fibres are Mitsui Petrochemical Co. (Japan), Honeywell (USA), Taniyama Chemical Industry (Japan), etc.

Indian Scenario

7.2.26. In India the consumption of low density polyethylene (LDPE)/ HDPE consumption is estimated to be around 1.7 million tonne presently. Reliance Industries, GAIL and Haldia Petrochemicals Limited (HPL) are the major producer of HDPE in India. India is a net exporter of this product.

HMPE/ UHMWPE: *Properties*

7.2.27. HMPE is a subset of the thermoplastic polyethylene. Due to its extremely long molecular chain this fibre is extremely strong and it has high impact absorbing strength compared to any other thermoplastic. HMPE is highly resistant to corrosive chemicals and has extremely low moisture absorption. HMPE also has friction resistance quality and is self-lubricating. This fabric was first developed by Royal DSM (Netherlands) under the trademark Dyeenma in 1979.

Application

7.2.28. *Medical application:* HMPE is widely used in medical application for manufacturing biometric implants for hip, knee and spine.
Construction: Due to its high impact resisting strength, it is used in manufacturing of windows panels and doors.
Defence application: This fibre is also used in manufacturing of bullet proof vests, ballistic body armor, etc.

Global Scenario

7.2.29. Some of leading global manufacturers of this fibre are Taniyama Chemical Industry (Japan), Royal DSM (Netherlands), Honeywell (USA), etc.

Indian Scenario

7.2.30. HMPE Fibres are not manufactured in India, it is majorly imported from countries like Japan, EU, China, South Korea and USA. The HS code of HDPE and HMPE fibres are combined together under HS Code 55039090. (Refer to table given below).

Exhibit 7.2.4: HDPE/ HMPE - Imports for FY09		
Region	**Rs (mn)**	**CAGR (FY07-FY09)**
China	116.8	30.9%
USA	67.0	83.6%
Japan	25.2	126.2%
South Korea	23.1	714.4%
European Union	18.1	-10.5%
Taiwan	3.5	12.6%
Thailand	3.5	94.9%
Others	13.2	7.8%
Total	**270.3**	**43.7%**

Source: CMIE

Note: Imports for both HDPE, HMPE, carbon fibres and PPS are taken under same HS code: 55039090

Carbon Fibre

Properties

7.2.31. Carbon fibres are extremely thin fibres composed from carbon atoms. The carbon atoms are bonded together in microscopic crystals that are aligned parallel to the long axis of the fiber. Carbon fibers can be combined with a plastic resin or molded to form composite materials such as carbon fiber reinforced plastic to provide a high strength-to-weight ratio material. The density of carbon fiber is also considerably lower than the density of steel, making it ideal for applications requiring low weight and higher strength.

Application

7.2.32. *Automobile* Industry*:* Due to its inherent strength and light weight, carbon fibres are majorly used in racing cars. Automobile industry recently has become the major growth driver for this fibre segment globally.

Aviation Industry: Aero planes external bodies,

Power Industry: Manufacturing of wind energy equipments.

Global Scenario

7.2.33. The global demand for Carbon fibre was expected to be around 35,000 tonnes in 2005 and it is expected to have increased to around 48,000 in 2007. Toray Industries (Japan), Toho Tenax (Japan), Mitsubishi Rayon (Japan), Zoltek (USA), Hexcelcorp (USA), SGL Carbon AG (Germany) are some of the leading producers of carbon fibres in the world.

Indian Scenario

7.2.34. The first manufacturing facility for carbon fibre in India was set up by The National Aerospace Laboratories (NAL) in Bangalore with an investment of around Rs 30 crore. The plant has a capacity of 20 MT/annum. Kemrock Industries and Exports Ltd (Vadodara), a manufacturer of fibre-reinforced plastic composites, is planning to set up carbon fibre plant in near future. Reliance Industries Ltd is also expected to set up carbon fibre manufacturing plant by the end of this fiscal.

Polyphenylene sulfide Fibres (PPS)

Properties

7.2.35. The PPS polymer is formed by reaction of sodium sulfide with p-dichlorobenzene. Polyphenylene sulfide is an engineering plastic and a high-performance thermoplastic. PPS can be molded, extruded, or machined to high tolerances. In its pure solid form and highly resistance to heat, acids and alkaline, It absorbs only small amounts of solvents and resists dyeing.

Applications

7.2.36. *Electric* applications*:* It is used in manufacturing electrical products due to its strong heat and chemical resistance properties.
Other: It is used in heat resistance bag filter, dryer canvas, liquid filtration cloth, etc.

Global Scenario

7.2.37. Some of the key global manufacturers of PPS Fibres are, Armoco Fabrics & Fibres Co (USA), Toyobo (Japan), Toray Industries (Japan), etc.

Indian Scenario

7.2.38. No manufacturer was observed to be involved in manufacturing of PPS Fibre in India. Hence major portion of this fibre is imported. The imports of PPS are clubbed with imports of HDPE/HMPE and carbon fibres under HS code 55039090.

Glass Fibre

Properties

7.2.39. Glass fibres are extremely thin fibres of glass used as a reinforcing agent for many polymer products. It is formed when thin strands of silica-based or other formulation glass is extruded into many fibers with small diameters suitable for textile processing. The first commercial production of fiberglass was done in 1936. Glass fibre is useful because of its good properties of thermal insulator.

Application

7.2.40. *Construction:* Glass fibre is majorly used in thermal insulation, electrical insulation, reinforcement of various materials, tent poles, sound absorption, heat- and corrosion-resistant fabrics, high-strength fabrics, pole vault poles, arrows, bows and crossbows, translucent roofing panels,
Automobile industry: It is used in manufacturing of automobile bodies
Sports equipments: Glass Fibres are also used in manufacturing of hockey sticks, surfboards, boat hulls, etc.

Global Scenario

7.2.41. Owens-Corning Fibreglas, Nicofiber (USA), Fibreglass (Canada), Asahi Fibre Glass Co (Japan), Chemitex-Anilana (Poland), etc.

Indian Scenario

7.2.42. The major domestic manufacturers of glass fibre are Owens Corning (India) Ltd (subsidiary of Owen-Corning Fibreglas), Goa Glass Fibre Ltd, UP Twiga Fibres, etc. The total installed capacity is estimated to be around 82,000 MT/per annum. Owens Corning and Goa Glass are the major manufacturers with estimated share of around 70 – 75% in the total installed capacity. Imports also constitutes major portion of the domestic demand. (Refer to the table below).

Exhibit 7.2.5: Glass fibre - Imports for FY09

Region	Rs (mn)	CAGR (FY07-FY09)
China	219.7	33.8%
USA	140.5	26.3%
European Union	138.9	-30.7%
South Korea	60.8	141.7%
Japan	11.2	75.3%

Exhibit 7.2.5: Glass fibre - Imports for FY09		
Region	**Rs (mn)**	**CAGR (FY07-FY09)**
Others	33.0	-49.7%
Total	**604.0**	**-3.2%**

Source: CMIE

Note: Imports of Glass Fibres are taken under HS Code 70199010

Fire Retardant (FR) Viscose

Properties

7.2.43. A viscose is a cellulose-based fibre produced primarily from wood. Viscose fibres are completely bio-degradable and are compared to naturally grown cellulose fibres which offer many advantages including absolute pureness, evenness of fibre quality and staple length. FR Viscose is a highly flame resistant adaptation of viscose. Hence it is mainly used in manufacturing of protective garments, as these fibres have quality of evenness, even when it is worn directly on the skin they are soft and friendly to the skin.

Applications

7.2.44. *Protective* garments*:* It is used in manufacturing of work garments made from FR Viscose blends which offer protection against potential risks such as electric arcs, fire, temporary flames, sparks and molten metal splashes.

Automotive industry: It is also used in manufacturing of automotive seat fabrics

House Furnishing: FR Viscose is used in manufacturing fire resistant mattress, carpets, sofa cover, etc.

Global Scenario

7.2.45. Some of the key global manufacturers of FR Viscose fibre are Shandong Helon Textile Sci. & Tech. Co. Ltd (China), Lenzing AG (Austria), etc.

Indian Scenario

7.2.46. FR Viscose fibre is not manufactured in India and is majorly imported from countries like USA, EU, Japan, etc.

Exhibit 7.2.6: FR Viscose - Imports for FY09		
Region	**Rs (mn)**	**CAGR (FY07-FY09)**
USA	813.3	25.9%
EU	605.5	59.3%
Japan	155.4	-2.5%
China	27.6	63.0%
Others	37.5	128.7%
Total	**1,639.3**	**32.6%**

Source: CMIE

Note: Imports for FR Viscose is estimated by clubbing imports under 55020010 and 55020090

Flame Retardant (FR) Polyester

Properties

7.2.47. FR Ployester is manufactured by adding flame retardant agent in the polymerization process of the polyester, and via contraction, the phosphor flame retardant is polymerized. Because the flame retardant components are evenly distributed in the large molecule chain, a long lasting flame retardant performance is created. Even under high temperature and pressure, the flame retardant components do not break or separate out. Therefore, in addition to maintaining good spinning quality for the fabric, washing resistance is also maintained.

Applications

7.2.48. *Automotive Industry:* It can be used in manufacturing of automobile seat covers,
House furnishing: FR polyester is used in manufacturing of fire retardant curtains, carpet, tents used in commercial complexes, shopping malls, etc.
Protective clothing: It is used in manufacturing special working fire retardant clothes used for industrial applications.
It can also be used for Fire Retardant uniforms for workers, FR tarpaulins & awnings, FR upholstered furniture material, etc.

Global Scenario

7.2.49. Some of the key global manufacturers of FR Polyester Fibres are, DuPont, Shanghai Jingmao Industrial Co. Ltd (China), Aquafil SpA (Italy), Trevira, etc.

Indian Scenario

7.2.50. Reliance is the only manufacturer of this fibre in India, hence these are majorly imported from countries like Japan, USA, China, EU, etc to cater domestic demand. (Refer to the table below).

Exhibit 7.2.7: FR polyester - Imports for FY09

Region	Rs (mn)	CAGR (FY07-FY09)
Malaysia	344.5	5.3%
China	256.4	96.9%
South Korea	138.1	114.7%
Indonesia	62.5	48.0%
Taiwan	36.8	-14.2%
Thailand	33.9	-49.1%
EU	29.2	-21.7%
Others	20.7	36.1%
Total	**922.2**	**16.9%**

Note: Imports for FR Polyester are taken under HS Code 55032000

High Tenacity/ Super high tenacity Nylon

Properties

7.2.51. High Tenacity Nylon is a multi-filament polyamide fibre characterized by high tenacity and low shrinkage properties. Such fibres are used in various industrial applications.

Application

7.2.52. High tenacity nylon filament yarn is used for manufacturing ropes, twines, seat belt webbing, automobile airbags, watch and bag straps, etc and used for reinforcement of tyre and MRG (Mechanical Rubber Goods).

Global Scenario

7.2.53. Some of the major global manufacturers of this fibre are Junma (China), Kordsa (Turkey), etc.

Indian Scenario

7.2.54. Even though, India has achieved self-sufficiency in nylon industry, high tenacity nylon is majorly imported from countries like China, Taiwan, Indonesia, EU, etc. SRF is the only Indian manufacturer which manufactures this product.

Exhibit 7.2.8: High Tenacity Nylon - Imports for FY09

Region	Rs (mn)	CAGR (FY07-FY09)
China	540.2	-9.0%
Taiwan	322.8	38.3%
Indonesia	318.8	-24.5%
EU	143.8	-10.5%
South Africa	70.8	30.6%
Other European countries	37.3	-53.7%
USA	26.0	-7.4%
Others	67.2	-52.6%
Total	**1,526.9**	**-14.9%**

Source: CMIE

Note: Imports for High Tenacity Nylon are taken under HS Code 54021910 and 54021990

High Tenacity/ Super high tenacity Polyester

Properties

7.2.55. High Tenacity Fibre is strong, has resistant to stretching and shrinking and resistant to most chemicals. It also has properties of quick drying, crisp or resilient when wet or dry, wrinkle resistant, mildew resistant, abrasion resistant. Thus, it is extensively used in house furnishing.

Application

7.2.56. *House furnishing:* This fibre is majorly used in manufacturing of ropes, carpets, mattresses, curtains, etc.

These are also used for slings, webbings and tapes; conveyor belts, belting duck, mooring ropes, cordages, sewing threads, industrial safety nets, sports nets, tarpaulins, tents, awnings, geosynthetics, industrial filters, etc and also used for reinforcement of tyre and MRG (Mechanical Rubber Goods).

Global Scenario

7.2.57. Some of the major global manufacturers of this fibre are, Performance Fibres (USA), Teijin Twaron (Japan), Toray Industries (Japan), Hyosung Corp, etc.

Indian Scenario

7.2.58. In India, Reliance and SRF are the major manufacturers of this fibre. However major portion of domestic demand is catered through imports from China, Taiwan, Indonesia, EU, etc.

Exhibit 7.2.9: High Tenacity Polyester - Imports for FY09

Region	Rs (mn)	CAGR (FY07-FY09)
China	576.1	62.8%
Taiwan	364.6	50.1%
Indonesia	194.1	10.0%
EU	178.2	-10.6%
South Africa	86.0	-30.8%
Other European countries	17.7	296.3%
USA	40.6	-67.0%
Total	**1,457.3**	**5.3%**

Source: CMIE

Note: Imports for High Tenacity polyester are taken under HS Code 54022010 and 54022090

High Tenacity/ Super high tenacity polypropylene

Properties

7.2.59. High Tenacity Polypropylene fibre is known for its high strength and stability. Hence this fibre is mostly consider to manufacturing various products used in construction and industrial applications

Application

7.2.60. *Industrial application:* This fibre is used in manufacturing of ropes, cordages, etc used in different industrial applications.

Construction: This fibre is also used in different construction and building as roofing sheets etc.

Others: Manufacturing of safety belt, Christmas tree, etc.

Global Scenario

Some of the key global manufacturers of this fibre are DuPont (USA), Drake (Fibres) Ltd (UK), etc.

Indian Scenario

7.2.61. Reliance and Haldia Petrochemical **can supply** the raw material for this product. However majority of demand is met through imports from USA, EU, S Korea, China, etc.

Exhibit 7.2.10: High Tenacity Polypropylene - Imports for FY09		
Region	**Rs (mn)**	**CAGR (FY07-FY09)**
USA	3.7	-23.4%
EU	3.2	2.0%
S Korea	2.7	-47.9%
China	1.3	12.8%
Malaysia	1.2	79.3%
Others	5.1	-40.5%
Total	**12.8**	**-39.6%**

Source: CMIE

Note: Imports for High Tenacity polypropylene are taken under HS Code 55034000

High Tenacity/ Super high tenacity Viscose

Properties

7.2.62. Viscose fibre is made from lumber, bulrush, linter or cellulose via a chemical process. Viscose fibre consists of filament and short fibre. Filament is also called rayon or tenasco, while short fibre consists of artificial cotton, imitation wool and medium length fibre. Presently, high tenacity viscose fibre and koplon (including polynosic) have cast off the shortcomings of common novamat like low strength and low humidity. Viscose fibre has its properties close to natural fibre.

Applications

7.2.63. High tenacity viscose fibre in cord thread and ropes used in different industrial and construction applications.

Global Scenario

7.2.64. Some of the key global manufacturers of high tenacity viscose are Toyoba (Japan), Glanzstoff Austria GmbH, Lenzing AG (Austria), etc.

Indian Scenario

7.2.65. Century Rayon Ltd is the major manufacturer of this fibre in India. Major portion of this fibre is imported from countries like China and EU.

Exhibit 7.2.11: High Tenacity Viscose - Imports for FY09

Region	Rs (mn)	CAGR (FY07-FY09)
China	60.5	227.4%
EU	2.1	-60.9%
S Korea	1.5	n.m.
Total	**64.3**	**55.9%**

Source: CMIE

Note: Imports for High Tenacity viscose are taken under HS Code 54031010, 54031020 and 54031090

Ceramic Fibre

Properties

7.2.66. Ceramic fibres are manufactured from alumino silicate glass which is used for thermal insulation in high temperature applications. In 1960s aluminium-silicate-based "ceramic fibres" were first time introduced in Europe. Due to their high temperature-resistance and good technical properties, they quickly became the reference for industrial high-temperature insulation.

Application

7.2.67. *Home appliances:* Ceramics are used in the manufacture of knives, heating appliances, etc. *Industrial application:* It is also used in manufacturing of furnace, insulation for steam and gas turbines. *Aero planes:* Due to its high strength and low weight, it is also used in manufacturing of aero plane bodies.

Global Scenario

7.2.68. Some of the major global manufacturers of this fibre are, Nippon Carbon (Japan), 3M, Techno-Physik Engineering GmbH (Germany), etc.

Indian Scenario

7.2.69. Unifrax India Ltd is one of the Indian manufacturers of this product in India. The major portion of the domestic demand is satisfied through imports. (Refer the table below).

Exhibit 7.2.12: Ceramic fibre - Imports for FY09

Region	Rs (mn)	CAGR (FY07-FY09)
China	22.9	52.9%
USA	14.7	76.2%
European Union	20.9	157.1%
Others	1.8	156.8%
Total	**60.2**	**83.2%**

Source: CMIE

Note: Imports of Ceramic Fibre are taken under HS Code 69039030

Polytetrafluoroethylene (PTFE)

Properties

7.2.70. PTFE has an excellent dielectric property, making it suitable for the use of insulator in cables and connector assemblies. Combined with this PTFE also has high melting temperature, which makes it the material of choice as a high-performance substitute for the weaker and lower melting point polyethylene that is commonly used in low-cost applications.

Applications

7.2.71. *Home appliance:* PTFE is majorly used in non-stick coating for pans and other cookware.
Laboratory applications: PTFE's high corrosion resistance makes it ideal for laboratory environments as containers, magnetic stirrer coatings, and as tubing for highly corrosive chemicals such as hydrofluoric acid, which will dissolve glass containers.

Global Scenario

7.2.72. Some of the key global manufacturers of PTFE Fibres are, DuPont (USA), Newton Filaments, Inc (USA), Albany Internation Inc. (USA), Toyobo (Japan), etc.

Indian Scenario

7.2.73. PTFE fibres are not manufactured in India and are majorly imported from countries like USA, EU and China, etc. (Refer to the table given below).

Exhibit 7.2.13: PTFE - Imports for FY09		
Region	**Rs (mn)**	**CAGR (FY07-FY09)**
Nepal	2.4	nm
USA	1.1	36.5%
European Union	0.9	-70.5%
Others	0.3	-60.6%
Total	**4.7**	**-39.0%**

Source: CMIE

Note: Imports for PTFE is taken from HS Code 54026950

nm: Not meaningful as there were no exports in FY07

PBI Fibres

Properties

7.2.74. PBI (Polybenzimidazole) stable fiber is an organic fiber that provides thermal stability for a wide range of high temperature applications. PBI fiber does not burn in air or melt. It shows high strength and flexibility when exposed to flame. As the backbone of various flame resistant fabric blends, PBI fiber enhances the performance of complementary fibers, combining flame-resistance and thermal protection with the highest level of comfort, durability, and protection available in the world.

Applications

7.2.75. *Aero planes:* It is used manufacturing various part used in aero planes

Automotive industry: It is also used in manufacturing various automotive parts and components such as bearings, bushings, etc.

Electrical equipments: It is also used in manufacturing of electrical parts, insulation shield, sealing devices, semiconductor molding compounds. Etc.

Global Scenario

7.2.76. Celanese Acetate is the only global manufacturer which is involved in manufacturing of this fibre

Indian Scenario

7.2.77. No manufacturer was observed to be involved in manufacturing of PBI Fibre in India. Further, as HS Code are not designated to this fibre, the import of the same cannot be estimated.

PBO Fibres

Properties

7.2.78. PBO – Fibre Zylon is said to be the strongest fibre that is commercially available. The tensile strength of this fibre is higher than para-aramids like Kevlar and Twaron and high performance polyethylene (Dyneema and Spectra).

Applications

7.2.79. *Defence* application*:* Due to its inherent high tensile strength and high flame resistance properties this bullet proof vests, body armor, etc.
Other protective clothing: This fibre is use in manufacturing of protective clothing like helmets, fire fighting clothing, etc.

Global Scenario

7.2.80. Toyobo Co. Ltd. (Japan) is the only global manufacturer which is involved in manufacturing of this fibre

Indian Scenario

7.2.81. No manufacturer was observed to be involved in manufacturing of PBO Fibre in India. Further, as HS Code are not designated to this fibre, the import of the same cannot be estimated.

Anti-microbial/Anti-fungal/Anti-bacterial Fibres

Properties

7.2.82. An anti-microbial and/or anti-fungal and/or anti-bacterial fibre comprises of various thermoplastic polymers and additives in a mono-component or bi-component form. The active agent, incorporated into the fibre, prevents and limits the growth of bacteria/fungi/microbes. These fibres find application in dressing materials, surgical threads, sanitary materials, home textiles, sportswear, amongst others. They can also be used for making packaging materials for the pharmaceutical industry, food processing industry, footwear industry.

7.2.83. Two types of anti-microbial agents used in anti-microbial fibres are metallic silver and organic surface treatments. The agent present in the fibre reduces the spread of infection, reduces offensive odor due to bacterial and/or fungal growth and also reduces staining and degradation of textiles.

Application

7.2.84. *Medical applications:* Antimicrobial fibres including anti-bacterial and anti-fungal fibres find application in the areas like, protective clothing for doctors, nurses, care staff, employees in food manufacturing and food processing, etc.

Sports application: It is also used in manufacturing of Sportswear,

House furnishing: These fibres are also recently used in manufacturing of household apparels like curtains and drapes, upholstery fabrics, filling materials for pillows, blankets, towels, etc.

7.2.85. These also find applications as patients uniforms, hospital bed linens, uniforms for defence personnels and para military forces working in adverse climatic conditions, children's school uniforms, bandages, crepe bandages, etc

Global Scenario

7.2.86. With growing awareness about a healthy lifestyle and availability of antimicrobial fibre technologies, a number of textile products using antimicrobial agents have been developed and a few of them are also available commercially. Some of the key global manufacturers engaged in manufacturing of this fibre are Trevira, Montefibre, Brilen, Sterling, Kaneba and Zimmer AG.

Indian Scenario

7.2.87. The demand for this fibre has also increased in India significantly due to rise in the middle class population and increase in the lifestyle. Reliance and Indo Rama are the major manufacturers of these fibres in India. The imports of these fibres cannot be estimated due to non-existence of the HS code.

Potential

7.2.88. There exists tremendous potential for anti-microbial fibres in India, as they find application in a number of fields. Antimicrobial based textile products and thus antimicrobial fabrics and fibers are likely to register healthy growth numbers in the coming years. Increasing awareness for a healthy environment, increasing consumer demand for comfort and functionality would lead to higher demand for products made from anti-microbial fabrics. The use of anti-microbial fibres in leisure wear, casual wear and fashion wear (largely due to its de-odorising properties) would increase in the coming years.

Phenolic Fibre

Properties

7.2.89. Phenolic resin based coir/glass hybrid composites were developed using compression molding followed by hand lay-up technique. Mechanical properties such as tensile and flexural properties of coir based hybrid composites were investigated as a function of fiber content and fiber volume

fraction. This study is focused on the mechanical performance of coir based and its hybrid composites.

Application

7.2.90. Phenolic fibres are used in manufacturing of automotive and electrical components.

Global Scenario

7.2.91. Some of the key global manufacturers of this fibre are Phenco (USA), The Vermont Organic Fiber Company (USA), etc.

Indian Scenario

7.2.92. No manufacturer was observed to be involved in manufacturing of this fibre in India. Further, as HS Code is not designated to this fibre, the import of the same cannot be estimated.

Conductive Fibre

Properties

7.2.93. Conductive fibres find application in the manufacture of woven/nonwoven textiles which are used to control electrostatic discharge in commercial, service or industrial areas where static electricity can lead to a wide range of problems. These fibres reduce danger and damage associated with electrostatic discharge. For the manufacture of conductive fibres, the outer layer of the nylon fibre is flooded with electrically conductive carbon particles. Thereby, the fibre retains the flexibility and strength of the nylon while carbon enables it to be electrically conductive. These combined features make the fibres ideal for usage in chemical, thermal and mechanical manufacturing processes.

Applications

7.2.94. Conductive fibre finds usage in the following:

- *House furnishing*: Conductive fibres are used in the manufacture of anti-static carpets and its backing.
- Nonwovens: These fibres are used in the manufacture of nonwoven products like dry filtration, conductive papers, among others.
- *Apparels:* Conductive fibres are best suited for the manufacture of garments like electronics manufacturing garments, clean room garments, military garments, refineries, paint spraying, medical applications, among others.

- *Industrial applications:* These fibres find application in manufacture of industrial products like seat belts, automotive upholstery, antistatic conveyor belts, conductive brushes, commercial upholstery, bulk bags, among others.

Global Scenario

7.2.95. Shakespeare Conductive Fibres LLC and Bekaert are the leading global manufacturers of conductive fibres.

Indian Scenario

7.2.96. Bekaert's Indian subsidiary is the only manufacturer of this fibre in India. Since HS Code has not been designated to this fibre, the imports cannot be estimated.

Fibre for concrete re-inforcement

Properties

7.2.97. Polypropylene and recently Polyester have been used as reinforcement fibres for this application. It offers following advantages:

- Prevents premature cracks of concrete
- Prolongs the life span of concrete
- Increases crack resistance in low temperature
- Increases fatigue resistance
- Improves flexibility, seepage resistance and wear resistance
- Improves stability in high temperature

Applications

7.2.98. This fibre is majorly used in construction and building activites

Global Scenario

7.2.99. Advansa (Turkey) and Sterling Fibres are a key manufacturer of Concrete Re-inforcement fibres globally

Indian Scenario

7.2.100. In India, the leading manufacturers are Reliance Industries Ltd for both Polyester and Polypropylene staple fibres and M/S Zenith fibres and M/S Tufropes for Polypropylene staple fibre which are used in concrete reinforcement.

Alginate Fibres

Properties

7.2.101. Highly absorbent and gelling calcium alginate fibres are manufactured from sodium alginate extracted from seaweed. Calcium alginate is used worldwide in the production of wound dressings where the principle of a moist wound environment encourages more effective healing.

Application

7.2.102. *Medical applications:* This fibre is used in medical applications for wound dressing and healing, *Other:* textile printing, food processing, chemical industries as a biocatalyst.

Gobal Scenario

7.2.103. Some of the key global manufacturers of this fibre are Speciality Fibres and Materials Ltd (UK), FMC Biopolymer (USA), Degussa Texturant Systems (Germany), Danisco Cultor (Denmark), Kimica Corporation (Japan), China Seaweed Industrial Association (China), etc.

Indian Scenario

7.2.104. No manufacturer was observed to be involved in manufacturing of this fibre in India. Further, as HS Code is not designated to this fibre, the import of the same cannot be estimated.

7.3. ISSUES AND CONCERNS

LOW PENETRATION IN DOMESTIC MARKET AND LIMITED AWARENESS

7.3.1. Technical textiles sector in India is at a nascent stage in terms of market development. There is lack of awareness amongst the entrepreneurs as well as consumers about the usage, benefits and high growth potential. At present, the major deterrent for expansion of the sector is **low demand**.

7.3.2. There is a need to create awareness and demand for technical textile products, especially those that can contribute towards safety and health of people and boost economic growth of country like providing good infrastructure etc. Some of the critical technical textiles segments are Agrotech, Meditech, Protech and Geotech. The government has recognised these segments as focus areas for promotion and various policy and promotional measures are being undertaken for these segments. However, more attention is required to enable faster development of market for these products.

INADEQUATE RESEARCH AND DEVELOPMENT

7.3.3. In India, research and development in the area of fibres is conducted by various Textile Research Associations like ATIRA, BTRA, SITRA, NITRA, WRA, SASMIRA and MANTRA, R&D institutions, IIT, various engineering/ technology colleges and Post Graduate departments under different universities, State Research Institutes/ Sector specific development boards and corporations under State/ Central govt. However, research on regenerated fibres has not been carried out by any of the research organisations except the in-house R&D centres. Similarly, research on manmade fibres has also been limited and most of the R&D for commercialisation is addressed by in-house R&D centres of big players.

7.3.4. In contrast, internationally, R&D on manmade fibres is carried out by various universities and research organisations devoted to textile research under public funded institutions. Moreover, there is focused effort on polymer research as well, which is critical for development of synthetic fibres. Internationally, many R&D centres for synthetic fibres development have backward integration for polymer research.

7.3.5. In order to promote indigenous development of high performance and speciality fibres, strengthening of India's research and development capabilities in the area of speciality fibres is extremely important.

TECHNOLOGY HURDLES

7.3.6. The technology required for manufacturing of most of the speciality fibres is **proprietary and very expensive**. **High cost and low demand** have deterred Indian players to develop speciality fibres indigenously. However, from a long term perspective, India needs to have the capability to indigenously manufacture most of the identified speciality fibres. Thus, there is a need to acquire the technology from abroad and incentivise purchase of same.

7.3.7. There is also a huge technological gap between technology used in competitor countries and that used in India for manufacturing of technical textiles as most of the production is in the unorganized sector. There is thus scope for massive technology up-gradation. Government can play a major role by subsidising/encouraging **acquisition of technology** by manufacturers for development of technical textiles. There is also need for strong world class **testing facilities** to be developed in India for accurate and relevant evaluation of technical textile to satisfy the stringent and critical requirements of performance related product parameters in the global market.

NON AVAILABILITY OF HSN CODES

7.3.8. The HSN code classification for a number of speciality fibres is **not available at the eight-digit** level, while for some of the speciality fibres, such as meta-aramid and para-aramid fibre, the HSN code is same. This creates difficulty in studying the trend in production, imports and exports of the speciality fibres. Also, a number of speciality fibres are clubbed together under the heading 'Others', thus making it impossible to study the trends of the individual speciality fibres.

7.3.9. Moreover, any fiscal incentive desired only for speciality fibres would be difficult to implement if no specific HS codes are available for the same. Thus, it is essential that HS codes for all the identified focus speciality fibres are identified and if not available, then suitable codes at 8 or 10 digit need to be proposed. A list of proposed HS codes prepared by the sub-group has been provided in the chapter on 'Recommendations'.

7.3.10. Another related issue of HS codes is with respect to classification of converted products of nonwovens, namely wet wipes consumer packs, nonwoven gauze and bandages, and nonwoven drapes, gowns, sheets and masks. These are presently not classified along with nonwoven under ITC code 5603.

7.3.11. **At present, Wet Wipes consumer packs** are covered under Chapter 33 ,Tariff item 3307 with general description-Pre-shave, shaving or after-shave preparation, personal deodorants, bath

preparation, depilatories and other perfumery, cosmetic or toilet preparations, not elsewhere specified or included, prepared room deodorizers, whether or not perfumed or having disinfectant properties. The reason for this is that the Notes to the Chapter 56 -1(a) mentions that this Chapter does not cover waddings, felt or nonwovens, impregnated, coated or covered with substances or preparations(e.g. perfumes or cosmetics of Chapter 33, soaps or detergents of heading 3401, polishes, creams or similar preparations of heading 3405 fabric softeners of heading 3809) where the textile material is present merely as a carrying medium. However, when Nonwoven fabric is used in downstream products as Wet Wipes Consumer Packs, it is not present nearly as a carrying medium. There are technical attributes in Nonwovens that are very important. The manufacturing process for the Nonwovens for this end use is known as spunlace technology. Thus, Consumer Wet Wipes Packs should not be disallowed in Chapter 56, Para 5603, as the textile materials is not present merely as carrying medium. It is fulfilling technical and functional requirement in this end use.

7.3.12. Further, there is no specific Tariff Heading of **Nonwoven Gauze and Bandages** in the Excise Schedule, this product is covered by Heading 3005 - Wadding, gauze, bandages and similar articles, impregnated or coated with pharmaceutical substances or put up in forms or packings for retail sale for medical, surgical, dental or veterinary purposes. These items are normally produced with 100%cotton fibres. However, synthetic and rayon fibres are used for production of Nonwovens. Thus, Gauze and Bandages without any medication should be covered by Tariff Heading 5603 - Nonwovens, whether or not impregnated, coated, covered or laminated. Similarly, there is no specific tariff for **Nonwoven Drapes, Gowns, Sheets and Face masks** also.

FISCAL ANOMALIES

7.3.13. Over the last decade, fiscal duties on synthetic fibres have been brought down drastically and most of the fiscal anomalies existing in past have been done away with. However, a few **products still exhibit anomalies with respect to the excise duties, customs duty and VAT**. The technical textile products that continue to face fiscal anomaly have been identified hereafter.

a) Excise duty anomalies

7.3.14. There exist duty anomalies in the technical textiles industry wherein an **excise duty is levied on the raw material while the finished product has been exempt from the duty.** Some of the products exhibiting such anomaly are – **Baby diapers, Incontinence diapers and Sanitary napkins**. On these three products, there exists an excise duty exemption. However, if a player wants to manufacture this product, he has to pay higher price for the raw material as raw materials used for manufacturing this (polypropylene/ polyethylene) attract an excise duty of 8%. If the manufacturer

does not pay an excise duty, he is not entitled to claim modvat on same. Thus, most industry players **prefer importing the finished product than manufacturing same indigenously** as imported product turns out cheaper.

b) Customs duty anomalies

7.3.15. One of the customs duty related anomaly has been observed in case of **aramid yarn**. At present aramid yarns can be imported without attracting any import duty only if conditions specified in Sr. no. 16 under general exemption 9 of provisions for Government imports including for defence and police are met. Customs duty on aramid yarn is waived off only if it is used in the manufacture of bullet-proof jackets. However, **independent manufacturer of aramid fabric** (which is used in manufacture of bullet-proof jackets) is not entitled to this exemption and has to pay customs duty. Thus it is suggested that there should not be discrimination between the importers of aramid yarn if that yarn is ultimately used for manufacturing of bullet proof jackets for defence and police personnel.

7.3.16. The existing provision for customs duty waiver on aramid yarn has another issue. Generally, the tenders for bullet proof jackets stipulate a **limited period for delivery**, which makes it difficult for the importer to import aramid yarn and then convert it into substrates and get it processed for fabrication into bullet proof jackets. Thus, the importers usually end up importing fabric itself, thereby defeating the purpose of said exemption to promote indigenisation.

7.3.17. Thus, it is suggested that an importer should be allowed to import yarn against advance licence without paying import duty with an obligation to fulfill conditions mentioned in Sr. no. 16 along with the description of goods or export to neighbouring countries. This would enable the importer to import yarn without paying import duty. At the same time, he will have to meet the conditions laid down in the Exemptions ensuring that such imports without payment of import duty is not used for the purpose other than the purpose for which the Exemption has been granted.

c) VAT anomalies

7.3.18. Currently, the VAT rate in some states (like Tamil Nadu, Karnataka) is different for the same products based on the base fibre used. For instance, in Tamil Nadu, Karnataka, VAT of 12.6% is levied on tarpaulins/awnings made from synthetic fibres while a VAT of 4% is charged on the product manufactured from cotton.

7.3.19. Also, there exists an anomaly in treatment of domestically manufactured textile products vis-à-vis that of imported textiles. For instance, some textile products which are indigenously manufactured are exempt from VAT while a duty of 4% is levied on the same products if they are imported.

7.3.20. Hence, it is suggested that VAT rates should be uniform for technical textile products irrespective of the base fibre used and irrespective of the origin source (domestic or imported).

d) Anomalies w.r.t. Nonwovens

7.3.21. At present, there exists a **discrepancy in fiscal treatment of nonwovens and other textile products. It** has been observed that several nonwoven products attract a higher excise duty as against other textile products. For instance, currently excise duty for packaged finished goods is 14%, for unpackaged products it is 10% and for rolled goods 8%.

7.3.22. Also, **DEPB for nonwoven and converted products** do not find a mention and needs to be notified.

REGULATORY ISSUES

7.3.23. Most of the technical textile products have high potential in the domestic market as the present level of consumption is very low. One of the reasons for low penetration, especially in the meditech segment is the existence of regulations that discourage use of modern technical textile products. For instance, the Indian Drugs & Cosmetics Act 1940 and Indian Pharmacopoeia **recognize only woven medical products, due to which the consumption of nonwoven fabrics** in medical area is very low.

7.3.24. Similarly, in other segments like geotech, absence of Indian standards has led to a low **consumption of geo-textiles** over conventional methods. Further, the usage of **fire retardant textiles in public places** is currently suggested in the National Building Code (NBC) but is not mandatory. Necessary regulatory amendments should be affected to the Municipal and Town Planning Acts to ensure compliance. The use of seat belts and airbags can limit serious chest injuries in frontal collision by 65 percent, and serious head injuries by 75 percent. Realising the importance of the safety of persons traveling in commercial vehicles, a rule for the installation and use of seat belts was introduced. However, no such provision exists for airbags.

7.3.25. Thus, it is desired that the concerned Ministries amend the existing regulations to include performance oriented modern technical textile product as well.

CONCERNS OVER GST

7.3.26. The Goods and Services Tax (GST) is to be introduced in the country from April 2010. It would be of similar nature of VAT but would include other indirect taxes such as Cenvat, service tax. It would be dual GST comprising of Central GST and State GST. GST would be destination based, while sales tax and VAT for inter-state transactions are origin-based. On inter-state transactions of goods &

services, IGST (Integrated GST) would be applicable which would be equal to C-GST and S-CST. The interstate transactions would include sales of goods and services and inter-state depot transfer of goods.

7.3.27. The textiles industry involves a lot of **inter-state transfers** especially at the fabric stage. As GST would be applicable on inter-state depot transfers, it could lead to blockage of funds/cash flow issues as no credit would be available on the finished goods stock at such depots, unless they are sold. The same concern holds for **imported goods** as well. Another area of concern is the **treatment of stock transfers and job work** under GST. It is also not clear whether **optional cenvat** would be available for textile industries under GST.

7.4. RECOMMENDATIONS

7.4.1. The policy recommendations made by the sub-group on Speciality fibres for the national fibre policy can be categorised into two types, namely:

- Fiscal recommendations and
- Non fiscal recommendations

7.4.2. The indigenous development of speciality fibres is highly **dependent upon the demand** for these fibres in the domestic market from the downstream industry, i.e. the technical textile manufacturers. Thus, besides the recommendations for speciality fibres, the group has also proposed specific fiscal and non-fiscal recommendations for technical textile products with a view to increase their consumption and production in India.

7.4.3. Fiscal measures mainly include rationalisation of the current duty structure, both excise and customs, and removal of anomalies, if any. The objective of these measures is to attain fibre neutral duty regime and do not put any segment of the value chain at any disadvantage. These measures are of utmost importance to boost production and consumption of technical textiles and speciality fibres in India.

7.4.4. Non-fiscal measures are also required to provide boost to the production and consumption of technical textiles in India. These measures take the form of any institutional support and incentives to encourage research and domestic production of fibres to ensure adequate supply of fibres to the industry over the long term.

7.4.5. Further, the **awareness** level with regard to benefits/ usage of technical textiles in the country is quite low. Therefore, for encouraging the adoption of technical textile products, some products require regulatory framework while some others require encouragement by the concerned Ministries.

7.4.6. Various fiscal and non-fiscal recommendations are discussed in detail below.

FISCAL MEASURES: FOR IDENTIFIED SPECIALITY FIBRES

Excise duty incentives

7.4.7. At present, there is very limited indigenous production of identified speciality fibres (only high tenacity fibres, carbon fibre, glass fibre, etc are being manufactured in India and in limited quantities). In order

to promote indigenisation of speciality fibres in India, it is desired that some excise incentives are provided to their manufacturers.

7.4.8. *Thus, to provide some additional boost to domestic production of the identified focus speciality fibres, it is recommended that excise duty on these focus fibres should be reduced to 4% (from the current level of 8%).*

Customs duty reduction

7.4.9. To reduce the input cost of manufacturing speciality fibres, it is desired that the import duties on key raw materials and certain additives should be lowered. Customs duties on the following items require revision:

(i) **Import duty and CVD on *additives used in Flame retardant speciality fibres and other speciality fibres* should be removed.**

Some of the additives identified for this purpose are:

- FR chemicals for viscose rayon – Alkyl, aryl and halogenated alkyl or aryl phosphates, phosphazenes, phosphonates, and polyphosphonates; antimony compounds such as antimony oxide, antimony trichloride and phosphoric acid
- FR chemicals for polyester - THPC, APO, PNC, Methylol dialkyl phosphonium carbonic acid amide.

(ii) ***Capital equipment used in the manufacture of identified speciality fibres should be exempted from Custom duty.***

Introduce Special Incentive Package Scheme

7.4.10. ***The government should consider introduction of a special incentive package for enabling Indian or foreign companies to set up manufacturing facilities for speciality fibres, thereby strengthening the raw material base for Indian technical textile industry.***

7.4.11. **Such incentive package will help in bridging the viability gap due to lack of adequate infrastructure and eco-system.** While this will involve an initial cost by the government, the return on investments in the form of contribution to GDP will justify the incentives planned.

7.4.12. The special incentive package scheme for speciality fibres should include following provisions:

i) The scheme should cover all **identified speciality fibres**

ii) A unit can claim incentives from the government in the form of **capital subsidy** or **equity participation,** as follows:

a. equity in project, not exceeding 26%

b. capital subsidy in the form of investment grant and interest subsidy, as detailed below:

The Central government or any of its agencies should provide incentive of 20% of capital expenditure during the first 10 years for the units in SEZs and 25% of capital expenditure for non SEZ units. Capital expenditure can be total capital expenditure in land, building, plant and machinery and technology, including R&D

iii) The special incentive package should be available for 5 years from the launch of the policy

FISCAL MEASURES: FOR TECHNICAL TEXTILES PRODUCTS

Removal of fiscal anomalies

a. Removal of anomalies w.r.t. Nonwovens

7.4.13. It is desired that there should be uniform excise duty across the entire value chain of Technical Textiles. At present, there exists excise duty differential in nonwovens and other textiles.

It is recommended that the excise duty levied on nonwovens should be uniform with that levied on other textiles.

7.4.14. Further, the government to promote exports announced the Duty Entitlement Passbook Scheme (DEPB) which allows drawback of import charges that are levied on raw materials used in the manufacture of export products. Currently, nonwoven and converted products are not included in the DEPB scheme and hence it is recommended that these two categories of Technical Textile products are covered in the scope of the DEPB scheme.

b. Removal of excise anomalies

7.4.15. The excise duty anomaly present for baby diapers, sanitary napkins and incontinence diapers have discouraged indigenous production of these products.

It is desired that the excise duty on these products is rationalised

7.4.16. Excise duty anomaly also exists with respect to manufacture of **aramid fabric** by an independent manufacturer, which needs to be corrected. If an independent manufacturer imports yarn and manufactures fabric, *such fabric may be exempt from excise duty* provided the same is supplied to bullet-proof jacket manufacturers who supply to army and police. **Currently the excise duty exemption is available only to bullet-proof jacket manufacturers who captively manufacture and consume the fabric towards making of bullet-proof vests.**

c. Removal of customs anomalies

7.4.17. It is recommended that the current customs duty anomaly existing for aramid yarn may be removed.

***The customs duty exemption may be allowed even to an independent manufacturer of aramid fabric*, which will be used for production of bullet-proof jackets for defence and police personnel.**

d. Removal of VAT anomalies

7.4.18. ***VAT rates should be uniform for technical textiles products irrespective of the base fibre used and irrespective of the source of origin of the product, whether from domestic market or from imports.***

Exemption from GST

7.4.19. The textile industry has concerns with respect to the GST, which is likely to be introduced from next year.

***Technical Textiles should be exempted from GST for a period of at least two years*.**

Increase in capital subsidy under TUFS for SMEs

7.4.20. At present, TUFS is applicable to manufacturers of Technical textile products.

To provide incentives to encourage development of technical textiles industry, 25% capital subsidy should be provided in lieu of 10% capital subsidy and 5% interest rate subsidy to small & medium entrepreneurs (upto capital investment of Rs 2 crores) engaged in manufacture of technical textile products.

7.4.21. The existing TUFS provisions can however continue for large manufacturers.

A suggested list of machines that can be eligible under this scheme is provided in the annexure 7.A.5.

NON – FISCAL MEASURES: FOR IDENTIFIED SPECIALITY FIBRES

Establishment of a Centre for Fundamental Research

7.4.22. Present research activities in the area of textile fibres across the world reveal that significant research is being done on the development of fibres for technical applications. These new developments are

based on polymer modifications, fibre modification and modifications of fibre surface***. In order to remain competitive and make major inroad into the technical textiles, it is essential to develop our R&D*** base in the area of fibres so that development can be done in the areas such as:

- Biodegradable Fibres
- Functional Fibres – those intended for specific applications like moisture absorption, anti-bacterial, electrically conductive, anti-static, anti-odour, etc
- High Performance Fibres – characterized by high strength, high modulus, resistance to wear, deformation, chemicals & high temperature
- Smart Fibres – those responsive to different conditions of stimuli like PH, temperature, moisture, etc
- Nano fibres

7.4.23. This is going to be an interdisciplinary activity involving chemists, chemical engineers, polymer scientist and textile professional.

An R&D centre with a funding of at least Rs 50 crores is recommended at either NCL Pune, one of the IITs or UICT Mumbai.

7.4.24. Of the focused 23 speciality fibres, it is found that **fibres like High Tenacity Flame retardant, Carbon, Glass Fibre and Modacrylic Fibres have a huge demand in our country and currently there are only a handful of manufacturers producing these fibres**. Hence, development of these fibres on priority basis may be initiated in India on a Public-Private-Partnership basis over the next 5 - 10 years.

7.4.25. **A high level of funding is sought from the government** for research and development of these fibres. For this, a joint venture amongst Institutions like IIT, ICT or Textile Research Associations with the Industry participation could be considered. Technology for manufacturing of these fibres may be worked out and Pilot scale units can be set up for development of these fibres.

Set up Incubation centres

7.4.26. It is recommended that incubation centres should be set-up for transfer of technology and acceptance of innovative technologies by the industry.

Creation of world-class laboratories in Centres of Excellence

7.4.27. ***Well-equipped laboratories should be set-up in the four Centres of Excellence to extend support of the industry in fields of testing and development, as per the requirements.***

Technology transfer through Joint Ventures

7.4.28. At present, there is very limited indigenous commercial production of speciality fibres due to lack of appropriate technology, which is highly expensive and proprietary (for several speciality fibres). To manufacture speciality fibres in India in the future, technology can be bought by Indian players from abroad, developed indigenously in the country, or brought in by foreign players through FDI or through Joint Ventures. *Joint ventures are a preferred route and may be encouraged as this would enable the Indian partners to get best and appropriate technology, get maximum experience at least cost and time, learn best practices, and get global business knowledge. It would also facilitate knowledge of standards and regulatory framework.*

Identification of HS Codes for Focus Speciality fibres

7.4.29. As discussed in the earlier chapter, *data analysis and fiscal policy recommendations for speciality fibres can materialise once specific HS codes are assigned to them*. **The sub-group has identified HS codes for the speciality fibres and proposed new HS codes (based on USITC codes) at 8 or 10 digit levels, wherever these were not identifiable. Recommendations for individual fibre's HS code have been presented in a table below:**

Exhibit 7.4.1: Recommendations for HS codes for Speciality fibres

Identified Fibre	Current HS code	Remarks	Proposed HS codes
Super high/ High tenacity polyester	54022010/ 54022090	This is fine for filament.	For Staple fibre: 55022001
Super high/ High tenacity nylon	54021910/90	This is fine for filament.	For Staple fibre: 550319001
Super high/ High tenacity polypropylene	55034000	Clubbed with regular polypropylene	55034020/30
FR polyester	55032000	Create sub-categories within PSF	5503200015/25/45/65
FR Viscose	55020010/20/90	Create sub categories within viscose rayon tow	5502000010/90
FR Modacrylic	55033000	This is clubbed with acrylic; can create sub-category at 10 dgt for modacrylic separately	5503300010/90

Exhibit 7.4.1: Recommendations for HS codes for Speciality fibres			
Identified Fibre	Current HS code	Remarks	Proposed HS codes
Meta aramid	55031900, 54021110	Includes all aramids; can create sub category at 10 digit	5503190010/90, 5402111010/90
Para aramid	55031900, 54021110	Includes all aramids; can create sub category at 10 digit	5503190010/90, 5402111010/90
HMPE/ HDPE/ UHMWPE	55039090	Included in Others	Need to create separate code at 8 dgt (55039070/80)
Carbon fibre	55039090	Included in Others	Need to create separate code at 8 dgt (55039070/80)
PTFE	54026950	This is fine	
Glass fibre	70199010	This is fine	
Superabsorbent fibre (acrylic)	55033000	Falls under acrylic/ modacrylic; need to create 10 digit code	5503300000/10
PPS	55039090	Included in Others; need to create 10 digit code	5503901000/5503909000
Conductive fibre	No code defined	55069000 (Processed synthetic staple fibres of polyester)	Can create 10 dgt sub codes within this
Phenolic fibre	No code defined	Create separate HS codes for Phenolic, PBO/ PAN/ PBT/ PTT fibres	55090010/ 20/30/40
PBO	No code defined		
Ceramic fibre	69039030	This is fine	This is fine
Antimicrobial/ antibacterial fibre (polyester, polypropylene, viscose)	No code defined		54022021/54060011/55032010
Alginate fibre	No code defined		
Fibres for concrete re-inforcement	No code defined	Clubbed under normal staple fibres	55034010, 55032030 for polypropylene and polyester

Source: Sub-group recommendations, D&B India

7.4.30. As discussed in the previous chapter, another HSN classification issue is with respect to **converted products of nonwovens** especially with respect to wet wipes consumer packs, nonwoven gauze and bandages, and nonwoven drapes, gowns, sheets and masks. Due to the reasons cited in earlier chapter.

It is recommended that these products be classified under ITC codes 5603, under the category - Nonwovens, whether or not impregnated, coated, covered or laminated.

NON FISCAL MEASURES: FOR TECHNICAL TEXTILES PRODUCTS

Creation of standards

7.4.31. The usage of Technical Textiles products without any knowledge about their quality and proper installation may do more harm than good. Also, the risk of subsequent damage and its consequence due to wrong selection of material may be substantially higher. There is a need to evaluate and compare existing and new products on same standards. This move will result in product improvement and greater cost savings. Therefore**, standard quality Technical Textiles are needed for maximum benefits and their installation should be carried out as per standard guidelines and procedures.** Some of the benefits of standardization of Technical Textiles include:

- Considerable reduction in cost of projects (materials, design, installation and evaluation)
- Minimum subsequent repairs / maintenance
- Prevention of environmental pollution thus leading to sustainable development
- Most efficient utilization of resources
- Better designs and longer project service life
- Increased safety of life and property
- Alternate and best technological applications for a specific end use

7.4.32. Specific segments of Technical Textiles where standardization is required on a priority basis include:

- *Geotech:* Geotech prevents accidents, increases efficiency, leads to efficient usage of natural resources, minimizes pollution, protects environment, gives improved performance and provides new solutions to civil engineering problems. Geotech not only lead to savings in running projects but minimize the regular repair and maintenance costs directly. Some of the specific products of Geotech requiring standardization are:
    - Geotextiles and geogrids for reinforcement of base and subbase layers in pavement structures

- Geotextiles for subsurface drainage applications
- Geotextiles for subgrade separation in pavement structures
- Geotextiles for subgrade stabilization in pavement structures
- Geotextiles used as protection (cushioning) materials for protecting geomembranes
- Geotextiles for permanent erosion control in hard armor systems
- Silt fence geotextiles and turbidityt curtains for sediment control
- Geotextiles used in pavement overlays
- Geotextiles for filtration
- Geotextiles for slope protection
- Bedding geotextiles
- Geosynthetic clay liners
- HDPE, LLDPE, flexible PP, EPDM geomembranes
- High dtrength geotextile tubes
- Gabions for bridges and coastal areas for prevention of soil erosion
- Geogrids (uniaxial and biaxial) for mechanical stabilization of earth(MSE) systems such as MSE walls, reinforced embankment over soft foundation (RSES) and steepened soil slopes (RSS)
- Geosynthetic mats
- Biplanar geonets and geocomposites for waste containment
- Drainage geocomposites
- Geomembranes for waterproofing of reservoirs, ponds
- Geocells
- Geofoams
- Prefabricated geosynthetic edge and vertical drains
- Geosynthetics for waste containment
- Codes of practices for storage, handling, installation and repair of geosynthetics

- *Buildtech:* Buildtech provides durability and safety to buildings and infrastructure, increases energy efficiency of buildings, minimizes leakages and cracks in buildings, help in moisture management of buildings, improve disaster resistance of buildings, etc. Some of the critical areas where standardization is required include:

- Geo-membranes for waterproofing of flat concrete roof
- Controlled permeability textiles to be used in concrete formwork lining
- Fibres for reinforceed concrete in construction uses
- Synthetic fibre insulation blanket for use in building applications
- Reflective vapour breathable textile substrate as radiant barrier in building envelope
- Technical textiles to be used as house wraps
- Vapour breathable textile substrate as mineral wool insulation facing for building applications
- Technical textiles as root and weed controls for landscaping
- Technical textiles as honeycombs for landscaping
- Architectural fabric/ tensile structures (temporary and permanent)
- Hoardings for buildings and other applications

- *Protech:* Protech products are very essential for safety of human beings and they minimize losses to human lives and property due to disasters such as fire, explosions, warfare, etc. Important products of Protech requiring standardization include:
  - Fire retardant textiles
  - Bullet proof fabric/jacket (ballistic limit test)
  - Protective clothing for agricultural workers (insecticides penetration, toxicity and durability)
  - Protective clothing for mechanical /chemical / nuclear / biological protection (liquid penetration test, microbial resistance, toxicity, radiation dose, tear test, molten metal splash, acid/alkali resistance)
  - Hi-visibility / high altitude clothing (refractive index)
  - Protective clothing for dust protection (soil resistance)
  - Protective clothing for acoustic protection (audio test)
  - Protective clothing for biological protection
  - Protective clothing for electric arc welding

- *Meditech:* Meditech products are essentially needed to protect infections; save human lives; provide hygienic conditions and health care, etc. Areas of Meditech where standardization is required include:
    - Extracorporeal devices
    - Non-implantable materials
    - Implantable textile materials
    - Healthcare and hygiene products

- *Agrotech:* Agrotech products requiring standardization include:
    - Crop covers
    - Greenhouse covers
    - Row covers
    - Poly-house films/membranes
    - Shade-nets
    - Mulch mats
    - Baler twines
    - Polyester/PP/HDPE nets for fishing
    - Waterproof lining

Mandatory guidelines by different ministries

7.4.33. Some Ministries could issue guidelines which would **increase the level of adoption and awareness** levels of Technical Textile products and aid in creation of a large market for these products in India. Some specific initiatives and support required from other ministries include:

i. *Mandatory usage of fire retardant fabrics* in exhibition centres, cinema halls and other public places
ii. Mandatory usage of fire retardant apparel for fire-fighting personnel
iii. Increased usage of geo-synthetics in infrastructure development projects
iv. Increased usage of nonwoven disposable Meditech products in medical institutions and hospitals

Increasing awareness

7.4.34. In order to boost the consumption of Technical Textile in India, it is recommended the government increases awareness about the usage and benefits of these products. Following measures can be undertaken by concerned Ministries to increase the level of awareness of Technical Textiles:

i. **Participation in medical fairs** to promote the usage of Meditech products (especially nonwoven single use products)

ii. **Organization of symposiums, road shows** in different parts of India so as to familiarize people with the application and benefits of products

iii. **Creation of framework for partnership in rural areas**

iv. **Creation of specific programs for end use application** to educate users about benefits of the products.

- Agro sector for crop protection
- Renewable energy for rural areas
- Usage of geotextiles for benefits like long lasting roads, protection of coastal and cyclone prone areas, etc
- Use of hygiene products & sanitary napkins

v. **Incorporation of new generation medical textiles manufactured from MMFs and their blends** in Indian Pharmacopoeia and change in Schedule F-2 of Indian Drugs & Cosmetics Act. New Generation medical textiles like antibacterial, anti allergic bandages, absorbent gauges, swabs, wipes, sponges, sanitary napkins, incontinence diapers, surgical gowns, etc which are manufactured from MMFs are currently not included in the scope of Indian Pharmacopeia and Indian Drugs & Cosmetics Act. Hence, it is important to include these products in relevant Acts as these products are also hygienic, technically superior, reduce chances of infection and therefore are widely preferred for medical applications.

vi. **Infrastructure projects could be modified to DBOT** from BOT to emphasize more on initial design so as to enhance usage of latest material and technology relating to geotextiles.

vii. Various Ministries could make amendments in certain existing Policies/Acts/Guidelines to directly/indirectly boost the growth of Technical Textiles in India. Some suggestions are listed below:

- Ministry of Roads & Highways and Ministry of Rural Development can consider issuing guidelines to increase the usage of geosynthetics in construction of roads where sub soil CBR is less than 3 so as to prevent air/land/water pollution due to road accidents and provide safety to people.
- Ministry of Environment could issue guidelines to increase the usage of geotextiles in landfill projects so as to prevent environmental pollution. Also, geosynthetics are useful in times of

growing land scarcity, increasing awareness of seismic hazards and stringent environmental regulations.

- Ministry of Surface Transport and Ministry of Railways could encourage the usage of fire retardant textiles in all public transports.
- Ministry of Urban Development could encourage the usage of fire retardant textiles in all new constructions through fire safety guidelines for safety of masses in view of increasing incidents of loss of lives and properties due to fire.
- Ministry of Transport could issue guidelines to encourage use of airbags in all new vehicles manufactured.
- Ministry of Health & Family Welfare could issue the guidelines to increase the usage of nonwoven single use products in hospitals as these products have qualities like anti-viral, bacteriostatic, fungistatic, non-toxic, high absorbent, non-allergic, breathable, biocompatible and haemostatic.

Thrust on Technical Textile Parks under SITP

7.4.35. For boosting the domestic production and thereby exports of Technical Textile products, it is recommended that specific Technical Textile parks/ clusters are developed in the country.

Under the Scheme for Integrated Textile Parks (SITP), at least 10% of textile parks should be dedicated technical textile parks.

Implementation of Technology Mission on Technical Textiles

7.4.36. The Ministry announced the launch of Technology Mission on Technical Textiles in the XI Five Year Plan, with a **view to identify and address major constraints affecting the production and consumption** of Technical Textiles. This mission was further segregated into four mini missions depending upon their end objective and a sum of money was proposed for fulfillment of these mini missions, details of which are as follows:

Exhibit 7.4.2:		
Mini Mission	**Objective**	**Fund requirement**
Mini Mission - I	*Capacity building of raw material, machinery, infrastructure and manufacturing units of technical textiles.*	Rs 2 billion
Mini Mission - II	*Standardisation, product development and common testing facilities with international accreditation.*	Rs 3 billion
Mini Mission - III	*Domestic and export market development of technical textiles*	Rs 1 billion
Mini Mission - IV	*Human resource development for technical textiles.*	Rs 0.8 billion

7.4.37. However, since the time the mission was announced (2007), no progress has been made in the implementation of the mission, due to inadequate availability of finance from the Planning Commission for this purpose.

This mission should be initiated at the earliest as it will boost domestic production as well as consumption of Technical Textiles in the country.

Creation of world-class testing facilities

7.4.38. In order to meet the stringent and critical performance related requirements of Technical Textile products in the international markets, it is recommended that *world class testing facilities* should be set-up in India. These facilities will assist in accurately evaluating the products to meet international requirements.

Measures to ensure availability of skilled manpower

7.4.39. Manufacture of speciality fibres requires high level of technology for which highly skilled labourers are required. In order, to ensure a steady supply of skilled and trained manpower to the fibre industry, it is recommended that the government sets up centres of excellence in partnership with technical institutes and industries in different regions to *impart training*.

7.4.40. ***Technical textiles need to be included in the syllabus and curriculum of educational institutions at B.Tech/B.E. and higher levels in all related branches of engineering and technology, architecture and medicine to ensure availability of skilled manpower over the long-term.***

7.A. ANNEXURE

7.A.1. BRIEF SNAPSHOT OF VARIOUS SEGMENTS OF TECHNICAL TEXTILES

7.A.1. **Agrotech:** This segment comprises of all Technical Textiles products which find usage in agriculture, horticulture, fisheries and forestry. Some of the products in Agrotech include fishing nets, crop-covers, shade-nets, mulch-mats, among others. The market size of this segment in India has grown at a CAGR of 11.3% from Rs 2.6 billion in FY02 to Rs 5.5 billion in FY08. In India, National Horticulture Mission (NHM) has been promoting the usage of Agrotech products through subsidies and annual plans for states. The demand for products under this segment is directly linked to the performance of the agriculture sector and level of awareness and acceptance by farmers. Major fibres used in the manufacture of Agrotech products include cotton, jute, nylon, polypropylene, HDPE and LDPE/LLDPE.

7.A.2. **Buildtech:** Products in this segment comprise of composite or textiles materials which find usage in construction of permanent/temporary buildings and structures. Products in Buildtech include hoardings and signages, tarpaulins, awnings and canopies, floor and wall coverings, architectural membranes among others. This segment is estimated to provide employment to around 63,000 people, of which number of technical people stands at 33,000. The market size of this segment has grown steadily from Rs 10.5 billion in FY02 to Rs 21.6 billion in FY08 registering a CAGR of 10.8%. Textile material used in this segment have grown popular over the years due to characteristics like lightness, strength, resilience and resistance to factors like creep, defamation and degradation due to chemicals/pollutants in the air, rain and exposure to sunlight and acid.Some of the fibres used in manufacture of Buildtech include cotton, polyester, nylon and HDPE. Mafatlal Industries Ltd, Binny Ltd, Birla Corporation Ltd, SRF Ltd are some of the leading manufacturers of Buildtech products in India.

7.A.3. **Clothtech:** This segment of Technical Textiles comprise of textile components used in manufacture of garments. Products in this segment comprise of shoe laces, labels, interlinings, sewing threads, among others. This segment has grown at a CAGR of 3.6% from Rs 54 billion in FY02 to Rs 69.1 billion in FY08. Cheap imports from China and other South Asian countries is one of the major factor affecting the growth of this segment in India. Key fibres used in the manufacture of products under this segment include cotton, viscose, polyester and nylon. Bombay Dyeing & Manufacturing Company Ltd, Shri Lakshmi Cotysn Ltd, Sky Industries Ltd, among others are some of the leading manufacturers of Clothtech products in India.

7.A.4. **Geotech:** This segment of Technical Textiles comprise of products which find usage in Geotechnical applications related to soil, earth, rock, among others. The term "Geotextile" refers to fabric or synthetic material which may be woven or nonwoven used with geotechnical engineering material. Application areas of products under these segment include civil engineering, marine engineering and environmental engineering. Market size of this segment in India has grown at a CAGR of 13.8% from Rs 1.1 billion in FY02 to Rs 2.7 billion. Garware-Wall Ropes Ltd, Kusumgar Corporates, Rishi Packers Ltd, Ashapura Volclay Ltd, Tech Fab India and Strata Geosystems India and Techfab India Industries Limited are some of the leading manufacturers of Geotech products in India. Jute, polyester, nylon, polypropylene and LDPE/LLDPE are some of the major fibres used in the manufacture of Geotech products.

7.A.5. **Hometech:** Products in this segment comprise of textiles components used in household applications. Some of the products in this segment are mattress and pillow components, stuff toys, blinds, HVAC filters, mosquito nets, furniture fabrics, nonwoven wipes among others. Market size of this segment has grown steadily from Rs 7.6 billion in FY02 to Rs 50.3 billion in FY08 registering a CAGR of 31%. Cotton, viscose, polyester and polypropylene are some of the key fibre used in the manufacture of products under this segment. Domestic manufacturing caters to most of the demand while imports cater to a demand for products like blinds, nonwoven wipes and HVAC filters as the fabric of desired quality is not available in India. Birla Corporation, Ginni Filaments, Hanung Toys & Textiles Ltd, Shri Dinesh Mills Ltd are some of the leading manufacturers of Hometech products in India.

7.A.6. **Indutech:** This segment of Technical Textiles comprise of products used in the manufacturing sector. Some of the products in this segment include conveyor belts, drive belts, ropes & cordages, printed circuit boards, paper making fabrics, filteration products, among others. Major fibres used in the manufacture of Indutech products include cotton, viscose, polyester, nylon, polypropylene, HDPE, aramid and glass. This segment has grown at a CAGR of 2.9% from Rs 26.2 billion in FY02 to Rs 32.1 billion in FY08. SRF Ltd, Garware-Wall Ropes Ltd, MRF Ltd, Nirlon Ltd, Goodyear India Ltd are some of the leading manufacturers of Indutech products in India.

7.A.7. **Meditech:** Meditech products find usage in hygiene, health and personal care and surgical applications. Based on the end-use many meditech products are disposable and made of nonwoven fabrics. Recent advances in the medical field have permitted the use of textiles as extracorporeal devices in the form of artificial kidney/liver, mechanical lungs among others. Some of the products of this segment include baby diapers, sanitary napkins, contact lens, artificial implants, surgical sutures, among others. The market size of this segment in India has steadily grown at a CAGR of 4.9% from Rs 11.9 billion in FY02 to Rs 16.7 billion in FY08. Cotton, Polypropylene and polyester are the major fibres used in the manufacture of Meditech products. Lately, synthetic fibres are increasingly replacing natural fibres in manufacture of Meditech products. Eastman Industries Ltd, Gufic Biosciences Ltd,

Procter & Gamble Hygeine & Health Care Ltd are some of the leading manufacturers of Meditech products in India.

7.A.8. **Mobiltech:** This segment of Technical Textiles comprise of products finding application in automotive and automotive components. Products under the components category can be segregated into two sub-categories – visible components (seat upholstery, seat belts, etc) and concealed components (tyre cords, liners, etc). Overall market size of this segment in India has grown at a CAGR of 13.9% from Rs 12.8 billion in FY02 to Rs 31.8 billion in FY08. Cotton, viscose, polyester, Polypropylene and nylon are the major fibres used in the manufacture of Mobiltech products. SRF LTD, Century Enka Ltd, Faze Three Ltd, Fenoplast Ltd are some of the major producers of Mobiltech products in India.

7.A.9. **Oekotech:** Products of this segment find usage in environmental protection, waste disposal and recyling. Landfill waste management is the major segment of Oekotech. This segment is expected to grow in tandem with growth in expenditure on municipal waste disposal and increase in awareness and government activity on Hazardous waste. The market size of this segment stood at Rs 680 million in FY08. Major fibres used in the manufacture of products of this segment include jute, polyester, nylon, polypropylene, HDPE and LDPE/LLDPE. Ashapura Group is the leading manufacturer of Oekotech products in India.

7.A.10. **Packtech:** This segment comprises of all textile packing material used for industrial and agricultural purposes. FIBCs, leno bags, polyolefin woven sacks, tea-bags, etc are some of the products under this segment. Market size of this segment has grown steadily at a CAGR of 22.2% from Rs 35.9 billion in FY02 to Rs 146.3 billion in FY08. Major fibres used in the manufacture of Packtech products include jute, polyester, nylon, polypropylene, HDPE and LDPE/LLDPE. Some of the major companies in this segment include Texplast Industries Limited, Jumbo Bags Limited and Alliance Jute Mills, Birla Corporation, Auckland Jute Ltd., Champdany Industries Ltd., VIP Industries Ltd, Samsonite South Asia Pvt Ltd, Aristocrat Luggage Ltd, among others.

7.A.11. **Protech:** Protech segment comprises of all textile materials/products used in the manufacture of protective clothing (includes garments and accessories intended to protect people from hazardous materials, processes or events encountered during their normal course of work or during leisure activities). Products in this segment include bullet proof jackets, NBC suits, high altitude clothing and fire retardant apparels. Defence is one of the leading consumers of Protech products in India. Market size of this segment in India has grown steadily from Rs 3.5 billion in FY02 to Rs 13 billion in FY08 registering a CAGR of 20.8%. Polyester and nylon are major fibres used in the manufacture of Protech products. Tata Advanced Materials Ltd, M K U Pvt Ltd, and Kusumgar Corporates are the key manufacturers of Protech products in India.

7.A.12. **Sporttech:** This segment comprises of products which find usage in sports and leisure. Artificial turfs, sail cloth, sleeping bags, sports nets, shoe components are some of the products of this segment. Market size of this segment currently stands at Rs 28.5 billion. Fibres used in the manufacture of

Sporttech products include cotton, polyester, nylon, polypropylene, HDPE and LDPE/LLDPE. Mayor & Company, Cosco (India) Ltd., Premier Enterprises, Beat All Sports, Hans Raj Mahajan & Sons, Kusumgar Corporates are some of the major manufacturers of Sporttech products in India.

7.A.2. EXISTING REGULATORY FRAMEWORK FOR TECHNICAL TEXTILES

7.A.13. The government has played a vital role in promotion of usage of Technical Textile products in India. The government has not only assisted in creation of demand for Technical Textiles products but has also facilitated the supply of these products to the end user industries. The government, to promote the growth of Technical Textiles products in India, announced various schemes/policies which are discussed in detail as follows:

- **Excise duties**: Technical Textiles products are mainly manufactured from MMFs. To boost the indigenous production of Technical Textiles in the country, the government reduced the excise duty charged on various MMFs to 8.24% from 16.32% in FY06. Also the government corrected the anomaly in duty rates wherein duty on fibres was payable at 16.32% while duty of 8.16% was levied on fabrics.
- **Customs duty**: The manufacture of Technical Textile products involves the usage of latest and hi-tech machinery which is currently not manufactured in India. The government, recognizing this need, covered major machineries required in the manufacture of Technical Textiles products under the concessional list of 5% basic customs duties.
- **TUFS**: The textiles policy of 2000 included the introduction of Technology Upgradation Fund Scheme (TUFS) wherein textile manufacturing units are given loans for expansion and technological upgradation at subsidized rates. When TUFS was modified (on April 1, 2007) a provision was made for specific technical textiles machinery to be procured at an additional benefit in the form of 10% capital subsidy and a 5% interest reimbursement.
- **Centres of Excellence**: The main rationale behind the creation of COE by the government was the provision of support/infrastructure to the manufacturers of technical textiles at one place. The government has earmarked Rs 110 million for each of the following 4 agencies towards the setting up of COEs. While the capital expenditure shall be borne by the government, recurring expenditure will borne by the COEs. The government has, so far, disbursed an amount of Rs 31.8 million to each of the 4 agencies. Details of agencies and segment covered are as follows:

Exhibit 7.A.1:		
Sr. no.	**Name of agency**	**Segment**
1	The Bombay Textile Research Association (BTRA) & Ahmedabad Textile Industry's Research Association (ATIRA)	Geotech
2	Synthetic & Art Silk Mills Research Association (SASMIRA) & Man-made Textile Research Association (MANTRA) & Navsari Agriculture University with Indian Institute of Technology (IIT), Delhi	Agrotech
3	Northern India Textile Research Association (NITRA) & Indian Institute of Technology (IIT), Delhi	Protech
4	South India Textile Research Association (SITRA) and AC College of Technology	Meditech

- **Focus Products Scheme**: The government announced this scheme to incentivize export of Technical Textiles products having high employment potential and export intensity so as to offset infrastructure inefficiencies and other costs associated with marketing of these products. Under this scheme, exports of identified products, to all countries, would be entitled for Duty Credit scrip equivalent to 2% of FOB value of exports.
- **Institutional mechanism**: The government, in order to monitor, review and take measures to promote Technical Textiles, has created institutional mechanisms in terms of Inter-Ministerial Committee (IMC) and Steering Committee for Growth and Development of Technical Textiles.
- **De-reservation**: The government have de-reserved some products which were initially reserved from the SSI sector which hampered the entry of large players in these segments. For instance, the government removed reservations sanitary napkins/baby diapers which were initially reserved for SSI sector.
- **Technology Mission on Technical Textiles**: The government, in 2007, announced the launch of Technology Mission on Technical Textiles in XIth Five Year Plan with the aim of identification of constraints and improving production and consumption of Technical Textiles in India. The mission was divided into four mini missions, the details of which are as follows:

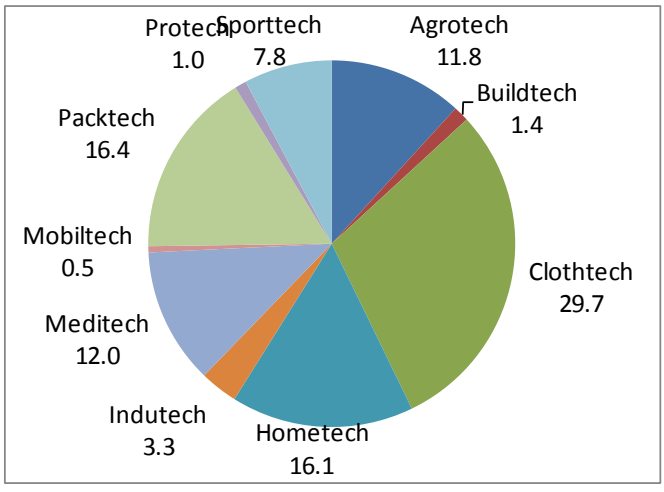
Exhibit 7.A.2:		
Mini Mission	**Objectives**	**Fund requirements**
I	Capacity building of raw material, machinery, infrastructure and manufacturing units of technical textiles.	Rs 2 billion
II	Standardisation, product development and common testing facilities with international accreditation.	Rs 3 billion
III	Domestic and export market development of technical textiles	Rs 1 billion
IV	Human resource development for technical textiles.	Rs 0.8 billion

However, the mission has yet not been initialised by the government as yet.

7.A.2. OVERVIEW OF FIBRES USED IN TECHNICAL TEXTILES

7.A.14. **Cotton:** This fibre is one of the key raw materials for India's textiles industry. India is one of the world's largest producers of cotton and is widely used in the manufacture of Indian Technical Textiles. Cotton is majorly used in the manufacture of Clothtech, Hometech, Packtech and Meditech products.

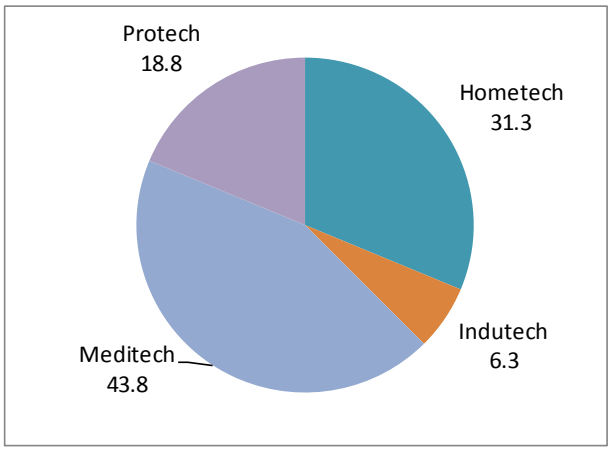
Exhibit 7.A.3: Segmental fibre usage – Cotton



Source: DRA

7.A.15. **Wool:** This fibre is widely used in the manufacture of Protech products due to its inherent characteristic of being fire retardant. Wool also finds application in manufacture of Meditech, Hometech and Indutech products.

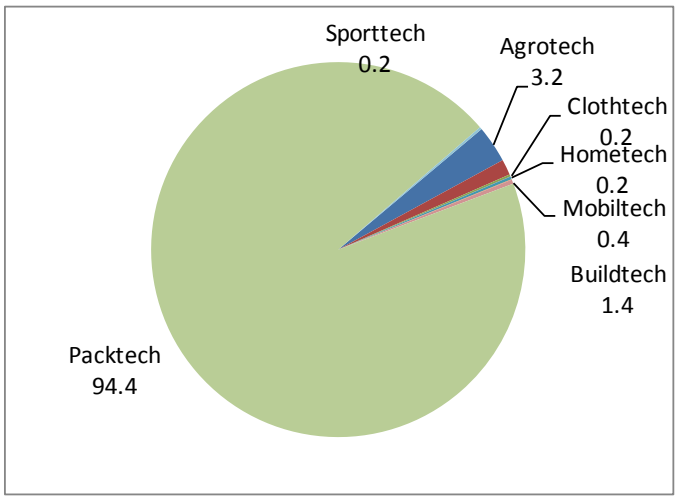
Exhibit 7.A.4: Segmental fibre usage – Wool



Source: DRA

7.A.16. **Jute:** India is one of the largest producers of raw jute. This fibre is mainly used in the manufacture of packaging sacks. Jute fabrics are widely used in the manufacture of Buildtech, Sporttech and Agrotech.

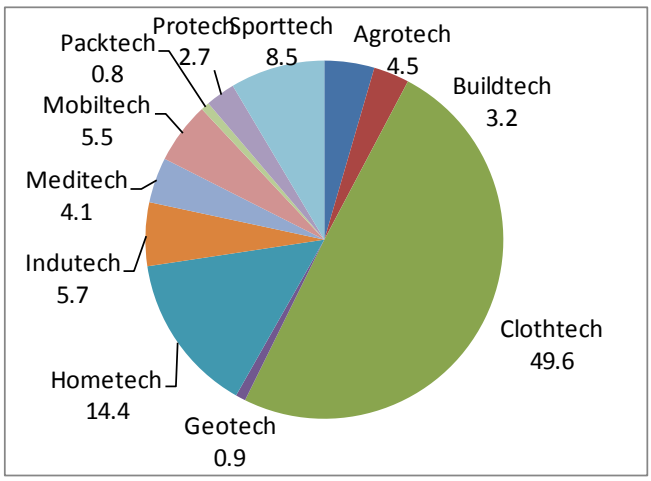
Exhibit 7.A.5: Segmental fibre usage – Jute and \others



Source: DRA

7.A.17. **Polyester**: Polyester has a variety of applications but around 40-50% of the fibre produced is used in the manufacture of Technical Textile products. Shrinkage resistance, wrinkle resistance, mildew and abrasion resistance are some of the features of this fibre which makes it a popular fibre in the manufacture of Technical Textiles. Polyester is majorly used in the manufacture of Clothtech products.

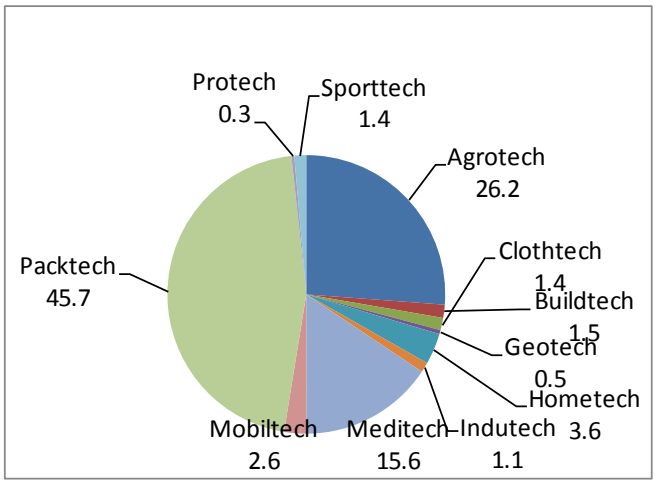
Exhibit 7.A.6: Segmental fibre usage – Polyester



Source: DRA

7.A.18. **Polypropylene:** This fibre finds wide usage in the manufacture of Technical Textiles due to its special properties. The domestic demand for this fibre is majorly met through domestic production though a small quantity is also imported. Polypropylene is widely used in the manufacture of Packtech and Agrotech products.

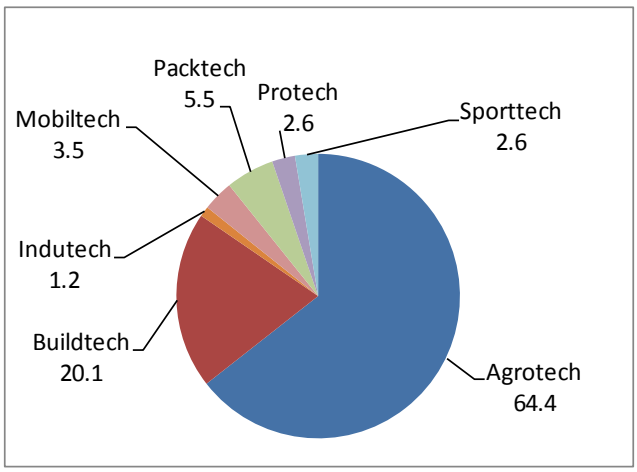
Exhibit 7.A.7: Segmental fibre usage – Polypropylene



Source: DRA

7.A.19. **Polyethylene**: These fibres majorly find application in the manufacture of Agrotech and Buildtech products. High Density Polyethylene (HDPE)/Low Density Polyethylene (LDPE) tapes find usage in the manufacture of variety of Technical Textiles products. HDPE is consumed in significant quantities by the packaging industry.

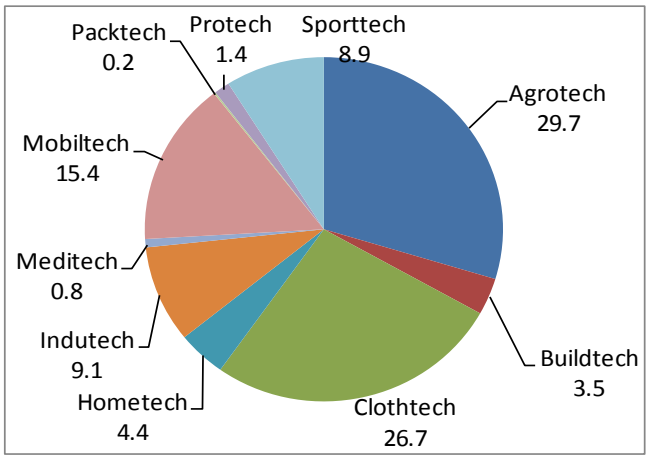
Exhibit 7.A.8: Segmental fibre usage – Polyethylene



Source: DRA

7.A.20. **Polyamide:** Nylon (Polyamide) is used in a wide variety of Technical Textiles products and are majorly used in the manufacture of Clothtech, Agrotech and Mobiltech products.

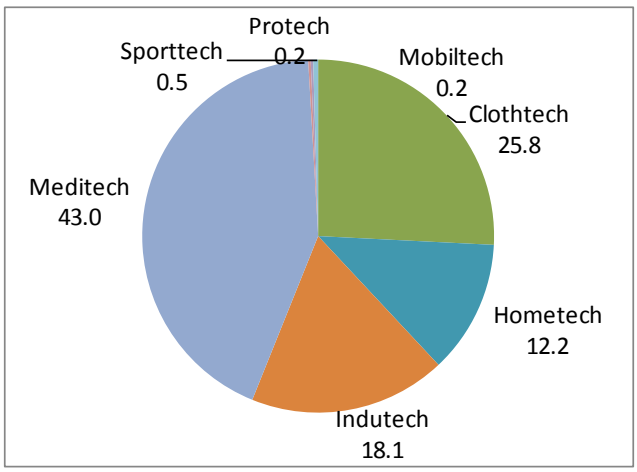
Exhibit 7.A.9: Segmental fibre usage – Polyamide



Source: DRA

7.A.21. **Viscose:** This fibre is widely used in the manufacture of Technical Textiles. It is a key raw material for manufacture of Clothtech products. Viscose, because of its high absorbent properties, is used in the manufacture of Hometech products especially wipes. Viscose High Tenacity Filament Yarn, a special variety of Viscose, finds usage in manufacturing of Mobiltech products.

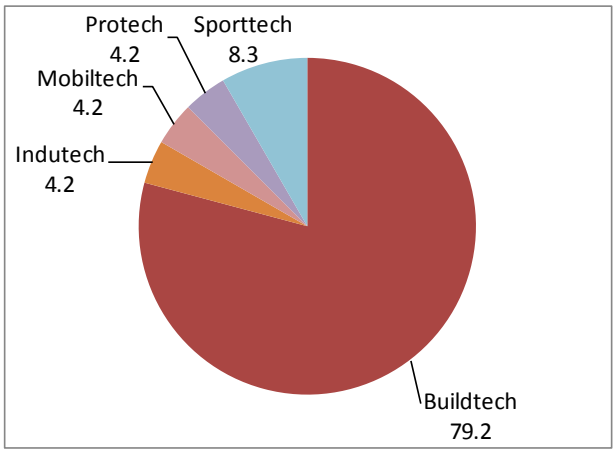
Exhibit 7.A.10: Segmental fibre usage – Viscose



Source: DRA

7.A.22. **Acrylic:** Acrylic fibre are widely used in the manufacture of blinds and stuff toys (Hometech) and Buildtech products.

Exhibit 7.A.11: Segmental fibre usage – Acrylic



Source: DRA

7.A.3. FOCUS SPECIALITY FIBRES

Exhibit 7.A.12: Focus Speciality Fibres: Brief Snapshot

Sr No	Name of the Fibre	Properties	Applications	Import value (Rs mn)	CAGR (FY07-FY09)	Major import sources
1	Meta Aramids	Meta-aramid fibres are the heat resistant synthetic fibre, having high strength	Flame resistance clothing, helmets, protective vests, bullet proof jackets, body armor, ropes and cables, sporting goods, ballistic body armor, etc.	271.0	-	EU, China, USA
2	Para Aramids	It is known for its high strength to weight ratio, high modulus, and excellent chemical and thermal stability.	Defence and protective clothing like helmets, bullet proof vests, protective hand gloves, fire resistant equipments, etc. Recently it has also been used in manufacturing of tyres.			
3	FR Modacrylic	High resilience, easy to dye to bright shades, abrasion resistant, flame resistant, quick drying, resistant to acid and alkaline, shape retentive, etc.	Manufacturing of apparels such as children wear, wigs, simulated fur, trims and linings, and deep pile coats, blankets, curtains, carpets, etc. Recently this fibre has found its application in manufacturing of flame retardant clothing due to its high heat resistance properties.	741.9	-2.9%	Japan, EU, Thailand, China, USA
4	Superabsorbant Fibre	Super-absorbent fibre absorbs moisture to several thousand times its original weight, undergoing significant expansion, and eventually becoming a gel	Diapers, adult incontinence products, feminine hygiene products,			
5.1	High Density Polyethylene (HDPE)	HDPE is a polyethylene thermoplastic made from petroleum. HDPE structure has a little branching, which helps it in giving stronger intermolecular force and high tensile strength.	Wood plastic composites and composite wood, manufacturing of tubes, chemical-resistant barrier			
5.2	High Modulus Polyethylene (HMPE)	High impact strength compared to any other thermoplastic. HMPE is highly resistant to corrosive chemicals and has extremely low moisture absorption. It has very low degree of friction and is self-lubricating.	Medical application for manufacturing biometric implants for hip, knee and spine. It is also used in manufacturing of bullet proof vests and industrial applications such as manufacturing of PVC (vinyl) windows and doors.			

Exhibit 7.A.12: Focus Speciality Fibres: Brief Snapshot						
Sr No	**Name of the Fibre**	**Properties**	**Applications**	**Import value (Rs mn)**	**CAGR (FY07-FY09)**	**Major import sources**
6	Carbon Fibre	Carbon fibres are extremely thin fibres composed from carbon atoms bonded together in microscopic crystals. Carbon fibre has many different weave patterns and can be combined with plastic resin and can be moulded to form composite materials.	The inherent strength and light weight, carbon fibres are majorly used in racing cars, aero planes, wind energy equipments and infrastructure industry.	270.3	43.7%	China, USA, Japan, S Korea, EU, etc
7	Polyphenylene sulfide Fibres (PPS)	PPS polymer is formed by reaction of sodium sulfide with pdichlorobenzene. Polyphenylene sulfide is like a high-performance thermoplastic. PPS can be moulded, extruded, or machined to high tolerances.	PPS fibre is used in manufacturing heat resistance application, bag filter, dryer canvas, liquid filtration cloth, parts for electric products, etc, on the basis of its excellent heat and chemical resistance.			
8	Glass Fibre	Glass fibres are extremely thin fibres of glass which are used as a reinforcing agent for many polymer products. It is formed when thin strands of silica-based or other formulation glass is extruded into many fibres with small diameters suitable for textile processing. It also has good properties of thermal insulator.	Glass fibre is majorly used in thermal insulation, electrical insulation, reinforcement of various materials, tent poles, sound absorption, heat- and corrosion-resistant fabrics, high-strength fabrics, automobile bodies, surfboards, etc.	604.0	3.20%	China, USA, EU, South Korea
9	Flame Retardant (FR) Viscose	FR Viscose is a flame retardant cellulose based fibre which gives high wearing comfort as well as optimum protection.	Protective garments like fire fighting clothing, defence clothing, automotive seat fabrics, construction, upholstery, fire resistant barriers and mattress.	1,639.3	32.6%	USA, EU, Japan
10	Flame Retardant (FR) Polyester	Flame retardant agent is added during polymerization process Hence it is able to withstand very high temperature.	Indoor decoration, automobile upholstery, seat covers, curtains, carpet, tents with hemming-stitch and auxiliary materials, sleeping bags, special working clothes, flame resistance curtains, mattresses used in commercial complexes such as offices, shopping complexes, etc.	922.1	16.90 %	South Korea, China, Indonesia, etc.
11	High Tenacity Nylon	It is a multi-filament polyamide yarns characterized by high tenacity and low shrinkage.	High tenacity nylon filament yarn is used for manufacturing ropes, twines, seat belt webbing, automobile airbags, watch and bag straps, etc.	1,526.9	- 14.9%	China, Taiwan, Indonesia, EU, etc.

Exhibit 7.A.12: Focus Speciality Fibres: Brief Snapshot						
Sr No	**Name of the Fibre**	**Properties**	**Applications**	**Import value (Rs mn)**	**CAGR (FY07-FY09)**	**Major import sources**
12	High Tenacity Polyester	Strong, resistant to stretching and shrinking, resistant to most chemicals, quick drying, crisp or resilient when wet or dry, wrinkle resistant, mildew resistant, abrasion resistant.	High tenacity polyester filament yarns used for the manufacture of ropes, twines, seat belt webbing, geo-textiles, etc.	1,457.3	5.3%	China, Taiwan, Indonesia, EU, etc.
13	High Tenacity Polypropylene	High tenacity polypropylene is high strength fibre having greater stability	Ropes used in different industrial and construction activities.	12.8	-39.6%	USA, EU, S Korea, etc.
14	High Tenacity Viscose	Viscose fibre is made from lumber, bulrush, linter or cellolose through a chemical process. Viscose fibre consists of flament and short fibre. Flament is also called rayon or tenasco.	High tenacity viscose fibre in cord thread and ropes used in different industrial and construction applications.	64.3	55.9%	China, EU, S Korea, etc
15	Ceramic Fibre	It is manufactured from alumina silicate glass which has high heat resistance properties.	Manufacturing of domestic heating appliances, furnace, insulation for steam and gas turbines. Recently these fibres were observed to be used in aerospace industry due to its inherent strength and light weight.	60.2	83.20 %	China, USA, EU.
16	Polytetrafluoro ethylene (PTFE)	PTFE has an excellent dielectric property, it has a high melting point	It is used in manufacturing of electrical applications. Recently it has been used in manufacturing of home appliances	4.7	-39%	USA, EU and Nepal
17	PBI Fibres	PBI (Polybenzimidazole) stable fibre is an organic fibre that provides thermal stability. PBI fibre does not burn in air, it does not melt or drip, and it will retain its strength and flexibility after exposure to flame.	PBI finds applications in aerospace, bearings, bushings, electrical parts, general purpose high temperature applications, insulation, insulation shield, sealing devices, seals, semiconductor moulding compounds.	HS code not found in DGCIS		
18	PBO Fibres	PBO – Fibre Zylon is said to be the strongest fibre that is commercially available. The tensile strength of this fibre is higher than para-aramids like Kevlar and Twaron and high performance polyethylene (Dyneema and Spectra).	Manufacturing of protective clothing such as bullet proof vests, body armour, clothing used for fire fighting, ballistic jackets, etc.	HS code not found in DGCIS		
19	Anti-microbial/Anti-fungal/Anti-bacterial Fibres	An anti-microbial and/or anti-fungal and/or anti-bacterial fibre comprises of various thermoplastic polymers and additives in a mono-component or bi-component form. The active	These fibres are majorly used in manufacturing of protective clothing for doctors, nurses, care staff, employees in food manufacturing and food processing, etc.	HS code not found in DGCIS		

Exhibit 7.A.12: Focus Speciality Fibres: Brief Snapshot						
Sr No	**Name of the Fibre**	**Properties**	**Applications**	**Import value (Rs mn)**	**CAGR (FY07-FY09)**	**Major import sources**
		agent, incorporated into the fibre, prevents and limits the growth of bacteria/ fungi/ microbes.				
20	Phenolic Fibre	These fibres are manufactured by using compression moulding followed by hand lay-up technique. It has tensile and flexural properties of coir based hybrid composites were investigated as a function of fibre content and fibre volume fraction.	Phenolic fibres are used in manufacturing of automotive and electrical components.	HS code not found in DGCIS		
21	Conductive Fibre	These fibres have good properties of carrying electrical signal.	It is used in manufacturing of electromagnetic shielding	HS code not found in DGCIS		
22	Fibre for concrete re-enforcement	These fibres can be generally polyester or polypropylene, which have high tensile strength and good heat resistance. Hence it is preferred in concrete re-enforcement.	These fibres are used in concrete re-enforcement, as it prevents premature cracks, prolongs life span, increase impact resistance, etc.	HS code not found in DGCIS		
23	Alginate Fibre	Calcium alginate fibres are manufactured from alginate extracted from seaweed. Calcium alginate is used worldwide in the production of wound dressings.	Medical bandages used for wound dressing, food processing industry, etc	HS code not found in DGCIS		

Source: D&B India, CMIE

7.A.4. LIST OF MACHINERY ELIGIBLE FOR CAPITAL SUBSIDY UNDER TUFS

Exhibit 7.A.13: LIST OF MACHINERY / EQUIPMENT ELIGIBLE FOR 10% CAPITAL SUBSIDY UNDER TUF SCHEME FOR TECHNICAL TEXTILES INCLUDING NONWOVEN	
a. Spinning	1) Friction spinning 2) Doubling or twisting machine for industrial yarn
b. Weaving Preparatory	1) High speed computerized warping / sectional warping machine 2) Filament winding machine for textile position
c. Weaving	1) Heavy duty shuttleless weaving machine for production of technical textiles 2) Heavy duty tape weaving 3) Bi- axial & Multi-axial weaving machinery. 4) Multi-phase weaving machine. 5) 3-D and Block weaving machine. 6) Needle looms for narrow woven fabrics. 7) Circular looms
d. Knitting	1) Weft Inserted Warp Knitting machine (WIWK). 2) Knitting machine for spacer fabrics 3) Bi- axial & Multi axial knitting machine 4) Tricot machinery 5) Rachel double needle bar Machine 6) Rachel machine for netting 7) Net making machine by warp knotting system 8) Circular warp knitting machine for compression garments 9) Stitch bonding machine

Exhibit 7.A.13: LIST OF MACHINERY / EQUIPMENT ELIGIBLE FOR 10% CAPITAL SUBSIDY UNDER TUF SCHEME FOR TECHNICAL TEXTILES INCLUDING NONWOVEN	
e. Processing	1) Mechanical foamer with Crush calender. 2) Pultrusion machine and equipment. 3) Spattering machine and equipment. 4) FRP processing machine & equipment. 5) RTM (Reinforced Textile Material) machine and equipment. 6) Lab scale production /processing equipment for technical textile product development. 7) Calendering machine 8) Finishing machinery for impregnating yam or fabrics 9) Dipping machine for tyre cord / industrial fabrics / belting ducks 10) Dipping machine for single end or cord for reinforcement of v-belts / hoses / hosetires 11) Printing machine for coated / laminated fabric 12) Coagulated PU or PVC dip coating machine / PU or PVC coating line or coating dipping / knife machine with infrared dryer
f. Madeup Technical Textile (TT) Store	1) RF (Radio Frequency) welding equipment 2) Ultrasonic cutting and sealing equipment. 3) Laser cutting and sealing equipment. 4) Printing equipment for Signage. 5) Heat setting machine and stretching (for heat setting table). 6) Back Coating Lines 7) Braiding machinery 8) Machinery for manufacture of clay liner 9) Machinery for manufacture of prefabricated vertical drains / prefabricated wick drains
g. Nonwoven textile manufacturing machines:	Complete production lines or the component / parts forming the production line for the manufacture of following nonwovens upto rolledgoods preparation and packing, viz., (a) Chemically bonded nonwoven (b) Stitch bonded nonwoven (c) Spun bonded nonwoven (d) Melt blown nonwoven (e) Spun bond melt blown nonwoven (SMS nonwovens) (f) Needle punch nonwoven (g) Thermal bond nonwoven (h) Spun lace nonwoven

Exhibit 7.A.13: LIST OF MACHINERY / EQUIPMENT ELIGIBLE FOR 10% CAPITAL SUBSIDY UNDER TUF SCHEME FOR TECHNICAL TEXTILES INCLUDING NONWOVEN	
h. Finishing machines:	1.Hot melt cold glue applicators for coating 2.Ultrasonic slitting machines/edge sealer 3.Brazing machine with torch(for hot air) 4.PLC operated system with servo drives for measurement/control of tension and temperature 5.Film calendering machine 6.Automatic packing and inspection machines 7.Heatset oven with stenter facility 8.Pilot/lab coating line 9.High pressure pump for water jet cutting system 10.Robotic waterjet cutting system 11. Robot for water jet cutting system 12. Water softening/purification system for water jet cutting 13. Machines for powder scattering/paste dot/powder dot 14. Coating for fusible interlinings 15. Padding mangle (fulard) 16. Padding mangle (fulard) 17. Sheet extruders and lamination machine 18. Singeing machine 19. Clip/pin stenter for heat setting 20. Flame lamination machine 21. Dust collectors 22. Jacquard machines for joining two edges by inter weaving. 23. Turret winder and unwinder 24. High speed precision mixers for plastisols/ organosols. 25. Gunning and cutting machine. 26. Grommet fixing machine. 27. PU tumbling machine and drying machine. 28. DMF recovery plant and distillation plant. 29. Printing machine for coated textiles. 30. All types of coaters such as knife over roll, kiss roll coater, screen coater, etc. 31. coater, screen coater, etc.

Exhibit 7.A.13: LIST OF MACHINERY / EQUIPMENT ELIGIBLE FOR 10% CAPITAL SUBSIDY UNDER TUF SCHEME FOR TECHNICAL TEXTILES INCLUDING NONWOVEN	
i. Nonwoven converting machinery:	1. Complete thermomoulding lines 2. Complete thermosetting lines 3. Machinery of carpet/NVH moulding lines oven/ press 4. Conveyor/thermopack for heating/chiller forcooling 5. Machinery for moulded roofliners 6. Machinery for conversion of nonwovens into face masks / dust masks / duck bill masks / earloop mask sealing / tieon mask sealing / blank mask making machine 7. Machinery for conversion of nonwovens into bouffont caps / surgical caps / medicap making machine 8. Machinery for conversion of nonwovens into gowns / pillowslip / shoe covers / ice pack body / ice pack band sealing and cutting / hand bags / filter pocket /head rest cover / CD / DVD cover and other such items 9. Machinery for conversion of nonwovens into sanitary napkins / baby diapers / adult diapers 10. Machinery for conversion of nonwovens into dry and wet wipes 11. Machinery for slitting and rewinding of nonwoven roll 12. Surgical gauze machine making 13. Combined dressing making machine 14. Bandage Roll making machine 15. Machine to compress 16. Abdominal sponge making machine 17. Automatic packing machines
Note: The above machinery is only eligible for nonwovens and convertors of nonwovensinto finished products.	

Exhibit 7.A.13: LIST OF MACHINERY / EQUIPMENT ELIGIBLE FOR 10% CAPITAL SUBSIDY UNDER TUF SCHEME FOR TECHNICAL TEXTILES INCLUDING NONWOVEN	
j. Testing and Evaluation machinery :	1. Speciality testing equipments and rigs for T.T. (Technical Textiles) and T.T.P. (Technical Textile Products) 2. Universal textile testing machine 10 tonnes/20 tonnes 3. Index puncture resistance tester 4. Co-efficient of friction apparatus 5. Particle size determination apparatus 6. Gradient ratio test apparatus 7. Long time flow apparatus 8. Feltperm 9. Point paper design system with EWE 10. Weatherometer 11. Yam shrinkage and shrinkage force testing machine 12. Viscometers 13. Data loggers for machine monitoring and flex resistance tester 14. Tear testing machine 15. Cold crack resistance testing 16. Thickness gauge 17. Water repellency testing machine 18. Waterproofing testing machine 19. Fire resistance testing equipments 20. Accelerated ageing testing oven 21. Rainwater tests equipment continuous water spray test and I.R. spectrometer etc. 22. Abrasion testers 23. Colour matching cabinets 24. Colour fastness testers 25. Accelerated creep tester 26. Air permeability tester 27. Hydro static puncture test for geo membrane 28. Hydraulic grip 29. Projection microscope

Exhibit 7.A.13: LIST OF MACHINERY / EQUIPMENT ELIGIBLE FOR 10% CAPITAL SUBSIDY UNDER TUF SCHEME FOR TECHNICAL TEXTILES INCLUDING NONWOVEN
k. Any other machine considered appropriate by the Technical Advisory-cum-Monitoring Committee (TAMC). Note: Since some of the machinery eligible for technical textiles can also be used by the other segments of the industry, the technical textile entrepreneurs intending to avail of 10% capital subsidy under TUFS will have to get themselves registered with Office of the Textile Commissioner and obtain a registration number. In other words, the registration with Office of the Textile Commissioner will be the pre-requisite for availing of 10% capital subsidy by technical textile units.

7.A.5. COMPOSITION OF THE SUB-GROUP ON SPECIALITY FIBRE (TECHNICAL TEXTILES) TO FORMULATE NATIONAL FIBRE POLICY

S. No	Name	Designation
1.	Smt. Monika S. Garg, Joint Secretary, Ministry of Textiles	Convenor
2.	Shri Shishir Jaipuria, Chairman, CITI	Co-convenor
3.	Shri Manohar Samuel, Sr. vice President, Grasim	Co-convenor
4.	Shri Sushil Kapur, President & CEO, SRF Ltd/Representative CII	Co-convenor
5.	Smt Neelkamal Darbari, JS, M/o Petrochemicals	Member
6.	Shri M.S. Verma, Vice President (Tech), Reliance	Member
7.	Shri Rahul Dharmadhikari, MD, Ahlstrom Fibercomosites	Member
8.	Dr. M.K. Talukdar, Vice President, Kusumgar Corporates	Member
9.	Smt Roli Jindal, Du Pont	Member
10.	Shri Chetan Bijesure, Team Leader, FICCI	Member
11.	Prof V.K. Kothari, IIT	Member
12.	Shri J.V. Rao, Director, NITRA	Member