
TECHNICAL TEXTILES AND NONWOVENS: WORLD MARKET FORECASTS TO 2010

By David Rigby Associates¹

SUMMARY

Technical textiles and nonwovens account for over one-quarter of all textile consumption in weight terms. Despite slackening growth rates since the start of the millennium, technical applications have a far more positive outlook than most other fibre, textile and clothing markets. Volume growth in developing countries will average between 4% and 5% per annum to 2010.

Within the total, some application areas will grow faster than others. Although forecasts have been downgraded from earlier studies, world demand for geotextiles is forecast to grow at a compound annual growth rate of 5.3% between 2005 and 2010, with China a major source of both consumption and production. Construction applications are also forecast to grow strongly, at a compound annual growth rate of 5.0%, over the same period, driven by new products and the increasing textile content of building.

In contrast, textile components for shoes, clothing, furniture, carpets and interior textiles exhibit annualised growth rates of less than 3% on average through the current decade. This is in response to relatively modest forecast growth in demand for apparel and household goods, but also a switch in many products to lighter weight nonwoven materials.

INTRODUCTION

This article is based on a recent in-depth study of the world technical textiles and nonwovens market performed by David Rigby Associates (DRA). It represents a comprehensive update of an earlier study performed in 1997 for Messe Frankfurt, organisers of the Techtexil trade fairs.

DRA has published the findings of its study in a series of eight reports. These analyse in table form the technical textiles and nonwovens market to 2010 from different points of view – by major fibre type, by major fabric type and by individual product.

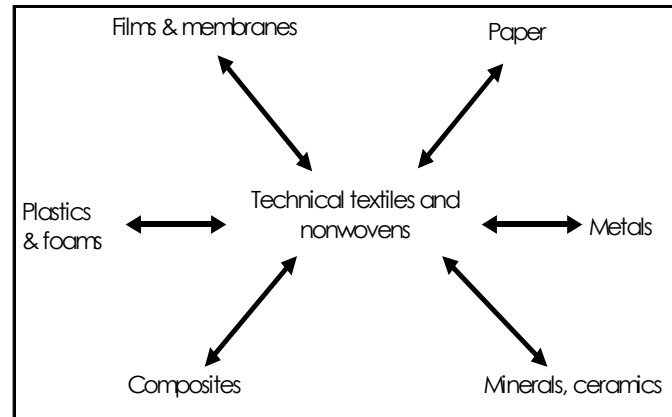
The product detail and market forecasts in these reports are based on DRA's proprietary system for describing and forecasting world end-use markets for textile products. The databases and the model included in this consumption forecasting system have been set up to handle a high level of product and market detail. The physical make-up of some 150 individual end-use technical textiles products is analysed across 210 individual country markets into:

- **19 individual fibre type (e.g. cotton, viscose, etc)
- **8 fibre forms or yarn types (e.g. unspun staple fibre, monofilament yarns)
- **19 final textile product types (e.g. narrow woven fabrics, warp knits)
- **4 coating types (plus uncoated)

¹ David Rigby Associates is a consultancy specialising in the fibre, textiles and clothing industry, based in Manchester UK. For more information, see its website, www.davidrigbyassociates.com

There are already many overlaps and interfaces with other material technologies which contribute to the richness and complexity of the technical textiles industry and of its capabilities, as shown in Figure 2. Indeed, technical textiles and nonwovens are increasingly being seen as just one part of a wider discipline of the “engineering of flexible materials” including foams, films, powders, resins and plastics and metals.

Figure 2: Technical textiles interfaces



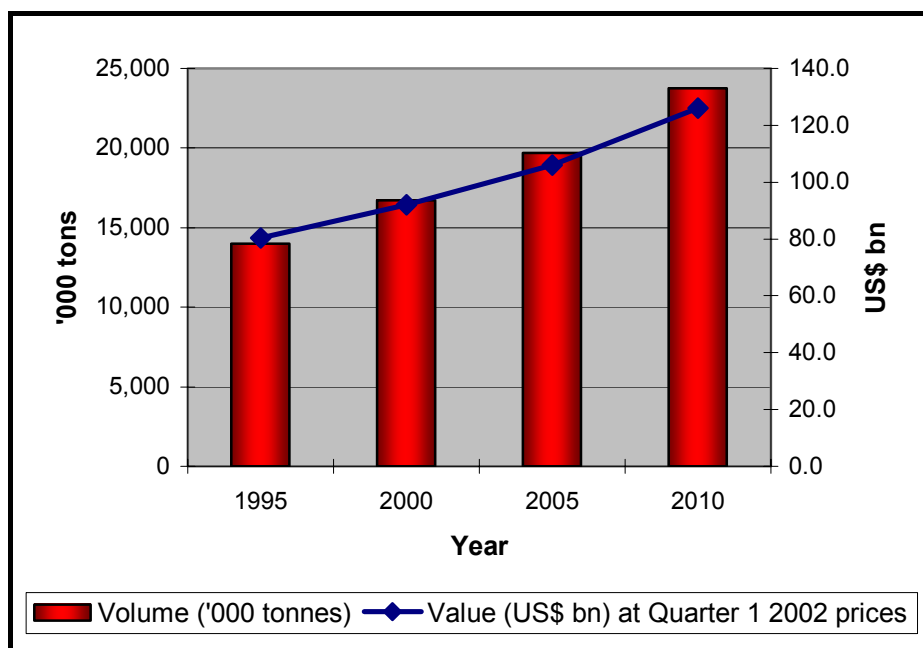
Source: David Rigby Associates

SUMMARY MARKET FORECASTS

Technical textiles and nonwovens (from this point referred to collectively as technical textiles) play a much more important role worldwide than is commonly acknowledged. According to DRA’s estimates, world consumption of technical textiles in 2000 amounted to just over 16.7 mn tons of fibre and polymer with a finished textile product value of US\$92.9 bn. In weight terms, this represents over one-quarter of the estimated 62.2 mn tons of fibres consumed across all end-uses in that year.

There are continuing signs that overall growth rates in technical textiles consumption are slackening. Figure 3, which summarises the world forecasts from 1995 to 2010, indicates a rather higher growth rate over the second half of the current decade than for the first. However, this largely reflects an anticipated upturn in global economic activity after a period of slow growth (and in many countries actual recession) around the turn of the century. Forecast average growth rates (in volume terms) of 3.5% per annum between 1995 and 2005, and 3.8% per annum from 2005 to 2010 remain relatively attractive, especially in comparison with most other, non-technical, textile markets.

Figure 3: World end-use consumption of technical textiles, 1995-2010, in volume and value terms



Source: David Rigby Associates

Forecast growth rates in value terms (constant 2002 prices) are lower than those for volumes. Technical textiles consumption is forecast to grow on average by only 2.8% per annum, in value terms over the period 1995-2005. Rates are forecast to recover, but only to 3.6% per annum, between 2005 and 2010. These slower growth rates in value terms are the result of three main factors:

**There is a move to lower priced fibres: for example polyester is replacing higher priced nylon in applications such as protective clothing and soft luggage

**Low cost nonwovens are growing faster than higher priced wovens and knits, especially in medical and furniture applications

**Many faster growing products (such as fibre-reinforced composites) have low textile value per unit weight, while many slow growth products (such as tyre cord) have a high unit price.

SPLIT BY REGION

Table 1 reveals the impact on technical textiles consumption of sluggish economic growth rates and maturing markets in the developed world during the early years of the century. Between 2000 and 2005, consumption is expected to grow by only 2.8% per annum on average in both Europe and the Americas. Asia, however, remains an engine of growth, with annualised consumption growth rates forecast to increase across each of the 5 year periods between 1995 and 2010, reaching 4.6% per annum over the five years to 2010.

Table 1: World end-use consumption of technical textiles by broad region, 1995-2010 (000 tons)

| Region | Years | | | | CAGR% | | |
|---------------|---------------|---------------|---------------|---------------|-------------|-------------|-------------|
| | 1995 | 2000 | 2005 | 2010 | 95-00 | 00-05 | 05-10 |
| Americas | 4,288 | 5,031 | 5,777 | 6,821 | 3.2% | 2.8% | 3.4% |
| Europe | 3,494 | 4,162 | 4,773 | 5,577 | 3.6% | 2.8% | 3.2% |
| Asia | 5,716 | 6,963 | 8,504 | 10,645 | 4.0% | 4.1% | 4.6% |
| ROW | 473 | 558 | 628 | 730 | 3.3% | 2.4% | 3.1% |
| Totals | 13,971 | 16,714 | 19,683 | 23,774 | 3.7% | 3.3% | 3.8% |

Source: David Rigby Associates

SPLIT BY APPLICATION AREA

In this article, the 150 technical textile end-use products quantified separately in the DRA forecasting system are grouped into the 12 Application Areas as defined by Messe Frankfurt:

Agrotech: agriculture, horticulture, forestry and fishing

Buildtech: building and construction

Clothtech: functional components of shoes and clothing

Geotech: geotextiles and civil engineering

Homotech: products used in the home; components of furniture and floorcoverings

Indutech: filtration and other products used in industry

Medtech: hygiene and medical

Mobiltech: transportation construction, equipment and furnishing

Oekotech: environmental protection

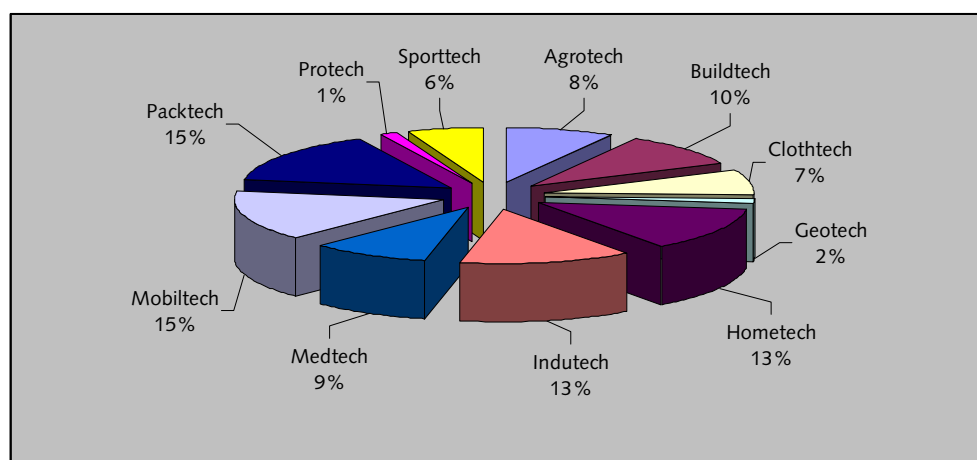
Packtech: packaging and storage

Protech: personal and property protection

Sporttech: sports and leisure technical components

Figure 4 shows the split of the world technical textiles market in volume terms in 2000 by these application areas.

Figure 4: World end-use consumption of technical textiles in 2000 by Application Area (volume terms)



Source: David Rigby Associates

Packtech, including sacking, is the largest sector in tonnage terms. However, its unit values are low and it ranks one of the smallest in value terms. Its growth rates are in line with the overall average for technical textiles. Large maturing product segments offset rapidly growing, but as yet largely embryonic, new product developments.

Mobiltech markets are also forecast to grow relatively slowly, reflecting increased maturity in the sector. However, the area remains the second largest in volume terms. Despite a downward trend in unit values it also remains by far the largest in value terms across the forecast period.

The third largest application area in both volume and value terms is **Indutech**. Growth rates remain above average as further opportunities are taken to introduce textile products into industrial processes, especially in developing countries.

Homotech ranks fourth largest in both volume and value terms. Growth rates here, however, are the lowest of all. This reflects generally low forecasts for final demand for household goods, the limited opportunities for further textile penetration and a steady switch from woven to lighter and lower priced nonwoven components.

In contrast, **Buildtech**, fifth largest in volume terms is one of the fastest growing sectors. This is partly as a result of a rapid growth in the use of composites, for example in wind turbines, and in fibre-reinforced concrete. High growth also results from textile products replacing more traditional building materials in the form of both hidden components and end-products in their own right.

Of a similar size in both volume and value terms is **Medtech**, where growth rates are also above average. These are forecast to decrease as some product segments mature, especially in the West. Nonetheless this sector arguably offers the greatest scope for the development of the most sophisticated and highest value textiles for niche applications.

Agrotech and Clothtech are similarly sized application areas. **Agrotech**, which has only low unit values on average, is expected to grow broadly in line with technical textiles overall. This is happening as new land-based applications, often in the form of nonwovens, offset a general downturn in fishing-based end-uses such as nets and lines. In contrast, only slow growth is forecast for clothing components (**Clothtech**). There is limited further opportunity for increased textile usage per garment. Demand for garments themselves is also forecast to continue to grow at a slower rate than real incomes.

Sporttech is one of the smallest areas in volume terms, but due to its high unit values and use of expensive fibres and coatings is the second largest in value terms. Growth rates, however, are only modest since the sector is dominated by mature end-use segments such as soft luggage. In contrast, forecast growth rates for **Geotech** are the highest of all (except for Oekotech); however, these are now lower than previously forecast. Moreover, volumes are very small and with low unit values this sector is, by a large margin, the smallest in value terms.

Protech is marginally the smallest application area in volume terms (other than Oekotech), but has high unit values. Here, growth rates are above average as a result of increases in consumption in developing countries offsetting a downturn in growth rates in Western markets.

Volumes for **Oekotech** are included within the totals for other application areas. The sector is close to being the smallest in both value and volume terms. In view of the increased interest worldwide in environmental and ecological issues, it is not surprising that Oekotech shows by far the fastest growth rates of between 6% and 7% per annum. to 2010.

Table 2 summarises the forecasts for world technical textiles consumption 1995-2010 in volume terms, split by application area.

Table 2: Forecast World Technical Textiles Consumption, 1995-2010, Volume (000 tons)

| Application Area | Years | | | | Compound Annual Growth Rate % | | |
|--------------------------|---------------|---------------|---------------|---------------|-------------------------------|-------------|-------------|
| | 1995 | 2000 | 2005 | 2010 | 95-00 | 00-05 | 05-10 |
| Agrotech | 1,173 | 1,381 | 1,615 | 1,958 | 3.3% | 3.2% | 3.9% |
| Buildtech | 1,261 | 1,648 | 2,033 | 2,591 | 5.5% | 4.3% | 5.0% |
| Clothtech | 1,072 | 1,238 | 1,413 | 1,656 | 2.9% | 2.7% | 3.2% |
| Geotech | 196 | 255 | 319 | 413 | 5.4% | 4.6% | 5.3% |
| Homotech | 1,864 | 2,186 | 2,499 | 2,853 | 3.2% | 2.7% | 2.7% |
| Indutech | 1,846 | 2,205 | 2,624 | 3,257 | 3.6% | 3.5% | 4.4% |
| Medtech | 1,228 | 1,543 | 1,928 | 2,380 | 4.7% | 4.6% | 4.3% |
| Mobiltech | 2,117 | 2,479 | 2,828 | 3,338 | 3.2% | 2.7% | 3.4% |
| Packtech | 2,189 | 2,552 | 2,990 | 3,606 | 3.1% | 3.2% | 3.8% |
| Protech | 184 | 238 | 279 | 340 | 5.3% | 3.3% | 4.0% |
| Sporttech | 841 | 989 | 1,153 | 1,382 | 3.3% | 3.1% | 3.7% |
| Totals | 13,971 | 16,714 | 19,683 | 23,774 | 3.7% | 3.3% | 3.8% |
| Of which Oekotech | <i>161</i> | <i>214</i> | <i>287</i> | <i>400</i> | <i>5.9%</i> | <i>6.0%</i> | <i>6.9%</i> |

Source: David Rigby Associates

Table 3 provides a further analysis of end-use consumption by application area. This shows rankings by volume and value in 2000 and 2010 as well as by growth rates between the two dates. This confirms that many of the largest sectors, in volume terms at least (for example Packtech and Mobiltech), are also the slowest growing. In contrast, most growth occurs in smaller sectors such as Geotech and Protech.

The discrepancy between volume and value ratings is greatest for Packtech (large volumes but very low unit values) and Sporttech (low volumes but very high unit values).

Table 3: World technical textiles consumption by application area, showing rank by size in 2000 and 2010 and growth rates, 2000 to 2010, in volume and value terms

| Application Area | Volume | | | Value | | |
|------------------|-------------|-------------|--------------------------|-------------|-------------|--------------------------|
| | Rank - 2000 | Rank - 2010 | Rank - growth, 2000-2010 | Rank – 2000 | Rank – 2010 | Rank – growth, 2000-2010 |
| Packtech | 1 | 1 | 8 | 10 | 10 | 6 |
| Mobiltech | 2 | 2 | 10 | 1 | 1 | 12 |
| Indutech | 3 | 3 | 4 | 3 | 2 | 3 |
| Hometech | 4 | 4 | 12 | 4 | 5 | 11 |
| Buildtech | 5 | 5 | 3 | 6 | 4 | 4 |
| Medtech | 6 | 6 | 5 | 8 | 7 | 5 |
| Agrotech | 7 | 7 | 7 | 7 | 8 | 7 |
| Clothtech | 8 | 8 | 11 | 5 | 6 | 9 |
| Sporttech | 9 | 9 | 9 | 2 | 3 | 8 |
| Geotech | 10 | 10 | 2 | 12 | 12 | 2 |
| Protech | 11 | 11 | 6 | 9 | 9 | 10 |
| Oekotech | 12 | 12 | 1 | 11 | 11 | 1 |

Source: David Rigby Associates

ANALYSIS BY REGION AND APPLICATION AREA

Table 4 shows the consumption of technical textiles by application area and region in 2000 in volume terms. Over 50% of consumption in the Americas in 2000 was found in the top three application areas, Mobiltech, Buildtech and Hometech. Main applications included transport composites, roofing shingles, fibrefill and carpet backing. The top three application areas in Europe also accounted for over 50% of total consumption, but in this case the areas were Mobiltech, Hometech and Indutech. In contrast, consumption in Asia was dominated by Packtech products, such as sacks, which took over 25% of all consumption in the region in 2000. Agrotech, Clothtech and Sporttech also show large consumption volumes in Asia. This is due to the greater relative importance of the agricultural industry and the high levels of clothing, sports and luggage production in the region.

Table 4: End-use consumption of technical textiles by region and application area, 2000, (000 tons)

| Application Area | Americas | Europe | Asia | ROW | TOTAL |
|--------------------------|---------------|---------------|---------------|--------------|----------------|
| Agrotech | 255.5 | 304.1 | 727.9 | 93.9 | 1381.3 |
| Buildtech | 789.9 | 399.0 | 437.4 | 21.8 | 1648.0 |
| Clothtech | 226.9 | 219.1 | 705.3 | 86.5 | 1237.8 |
| Geotech | 101.6 | 88.9 | 61.8 | 2.8 | 255.1 |
| Hometech | 969.6 | 716.4 | 445.0 | 55.0 | 2185.9 |
| Indutech | 643.9 | 639.3 | 874.1 | 47.6 | 2204.9 |
| Medtech | 526.0 | 548.4 | 415.7 | 53.4 | 1543.5 |
| Mobiltech | 939.0 | 734.0 | 785.8 | 20.1 | 2478.9 |
| Packtech | 309.5 | 325.9 | 1771.7 | 144.7 | 2551.8 |
| Protech | 91.3 | 78.2 | 61.3 | 7.2 | 238.0 |
| Sporttech | 177.8 | 109.1 | 677.3 | 24.9 | 989.1 |
| <i>Of which Oekotech</i> | <i>67.7</i> | <i>89.9</i> | <i>53.7</i> | <i>3.2</i> | <i>214.5</i> |
| TOTAL | 5030.8 | 4162.4 | 6963.3 | 557.9 | 16714.4 |

Source: David Rigby Associates

ANALYSIS BY FIBRE TYPE, FIBRE FORM AND FINAL TEXTILE PRODUCT TYPE

At a high level of aggregation, the technical textiles market is seen to use mostly synthetic, regenerated or inorganic fibres polymers as a result of their general strength and versatility. Their share is forecast to rise from 78% in 1995 to over 81% in 2010. Natural fibres, mostly in the form of cotton, jute and to a lesser extent sisal, still accounted for 21% of the market in 2000, in less demanding applications such as sacking, twine and carpet backing. However, this is a far smaller share than in day-to-day apparel and household textiles (see Table 5).

Table 5: World end-use consumption of technical textiles by broad fibre type, 1995-2010 (000 tons)

| Polymer/ Fibre Type | Years | | | | CAGR% | | |
|------------------------|---------------|---------------|---------------|---------------|-------------|-------------|-------------|
| | 1995 | 2000 | 2005 | 2010 | 95-00 | 00-05 | 05-10 |
| Natural | 3,125 | 3,462 | 3,839 | 4,447 | 2.1% | 2.1% | 3.0% |
| Man-made/ inorganic | 10,846 | 13,252 | 15,843 | 19,327 | 4.1% | 3.6% | 4.1% |
| Totals | 13,971 | 16,714 | 19,683 | 23,774 | 3.7% | 3.3% | 3.8% |

Source: David Rigby Associates

In terms of fibre form or yarn type used, the technical textiles market is dominated by filament and tape yarns, polymer (for extruded nonwovens) and unspun fibre (for carded nonwovens, fibrefill and composites). These are technologies and end products largely associated with man-made or inorganic materials. The use of polymer and unspun fibre is forecast to grow by far the most rapidly to 2010 at rates

well in excess of 4% per annum. Spun yarns have a significant share of the market, but far smaller than for apparel or household textiles. This reflects both the generally lower strength of spun yarns and the growing importance of nonwovens in technical applications (see Table 6).

Table 6: World end-use consumption of technical textiles by broad fibre form, 1995-2010 (000 tons)

| Polymer/ Fibre Form | Years | | | | CAGR% | | |
|------------------------|---------------|---------------|---------------|---------------|-------------|-------------|-------------|
| | 1995 | 2000 | 2005 | 2010 | 95-00 | 00-05 | 05-10 |
| Polymer/ fibre | 6,186 | 7,855 | 9,647 | 12,027 | 4.9% | 4.2% | 4.5% |
| Spun yarn | 3,112 | 3,401 | 3,631 | 4,039 | 1.8% | 1.3% | 2.2% |
| Filament/ tape yarn | 4,673 | 5,458 | 6,404 | 7,708 | 3.2% | 3.2% | 3.8% |
| Totals | 13,971 | 16,714 | 19,683 | 23,774 | 3.7% | 3.3% | 3.8% |

Source: David Rigby Associates

The growing importance of nonwovens is reflected in their two-thirds share of the technical textiles market for fabrics overall, as shown in Table 7. However, unspun fibre represents almost one-quarter of the market in terms of final textile product. This is as a result of the importance of composites (still mostly using unprocessed fibre) and loose fibre applications such as fibrefill. Yarn-type products have a small but significant share through products such as thread, rope, fishing line and twine.

Table 7: World end-use consumption of technical textiles by broad final product type, 1995-2010 (000 tons)

| Final Textile Product Type | Years | | | | CAGR% | | |
|----------------------------------|---------------|---------------|---------------|---------------|-------------|-------------|-------------|
| | 1995 | 2000 | 2005 | 2010 | 95-00 | 00-05 | 05-10 |
| Unspun fibre | 3,289 | 4,004 | 4,774 | 5,763 | 4.0% | 3.6% | 3.8% |
| Yarn-type products | 1,382 | 1,570 | 1,776 | 2,079 | 2.6% | 2.5% | 3.2% |
| Fabrics | 9,300 | 11,140 | 13,133 | 15,932 | 3.7% | 3.3% | 3.9% |
| Totals | 13,971 | 16,714 | 19,683 | 23,774 | 3.7% | 3.3% | 3.8% |

Source: David Rigby Associates

ANALYSIS BY APPLICATION AREA

AGROTECH

Applications for technical textiles in the Agrotech sector include all activities concerned with the growing and harvesting of crops and animals. End-uses range from crop production, through forestry and horticulture, to animal and poultry rearing and fishing.

The agricultural sector accounted for 8% of total consumption of technical textiles in 2000 in volume terms, but only 6% in value terms. Consumption is set to increase from almost 1.4 mn tons to just under 2.0 mn tons between 2000 and 2010 at a compound annual growth rate of 3.5%.

The fishing segment is a large consumer of textile materials. However, growth is limited in many parts of the world by declining fish stocks and contracting fishing fleets. Fishing methods are becoming more industrialised, replacing older, small net and line fishing techniques. However, environmental concern is building up over the indiscriminate use of very large nets and this pressure may stall this trend.

Wherever conditions allow, growth in fresh- and sea-water fish farming is likely to assume much greater long term importance. These industries require different performance characteristics from net and rope products. This is due to factors including the extended length of time that the textiles remain immersed and reduced exposure to abrasion.

Prospects for land-based Agrotech products are rather better, especially for nonwoven materials. The main uncertainty is the rate at which new techniques will be adopted by the industry. Agricultural traditions, practices and levels of intensification vary considerably, even within developed regions. Patterns of consumption growth by product and region are therefore likely to be very uneven.

In many developed countries the area of land dedicated to agriculture and horticulture is declining. This is leading to a more intensive use of land and the search for higher and more frequent yields. Agrotech textiles can contribute towards this goal, for example by artificially controlling the climate for plants and animals. However, the use of textiles in agricultural end uses is limited by their cost.

BUILDTECH

Textiles are increasing their market share in construction and architectural applications, where their mechanical properties are equal, or often superior, to traditional materials. They offer desired characteristics such as lightness, strength and resilience as well as resistance to many factors such as creep and degradation by chemicals and pollutants in the air.

Buildtech consumed around 1.65 mn tons of technical textiles in 2000 with an estimated value of US\$5.9 bn. This volume is forecast to reach 2.6 mn tons in 2010, with one of the fastest growth rates of all application areas.

The use of textiles in all types of construction is closely related to the economic cycle in general and the fluctuations in fortunes of the building sector in particular. The sector is both highly cyclical and seasonal and this is clearly reflected in its demand

for textile products. However, the construction industry in its broadest sense is forecast to grow more quickly than economic output overall. This is partly as a result of more rapid population growth and the reduction in average family size in many western markets, resulting in the expansion of housing construction. Shop and office construction will also continue to benefit from the development of new shopping complexes and a growth in the service industries.

Consumption of architectural tensile fabrics is even more variable than for construction textiles in total, with a large proportion of business derived from occasional events ranging such as Olympic Games and the soccer World Cup. The more general development of tensile fabrics in construction, however, is currently restrained by a lack of experience with these products and controls placed over their use in some countries.

The increasing textile content in buildings, and new uses for textiles as complete structures, will provide further boosts to the overall growth rate for the Buildtech sector, especially in developing regions. The increased use of fibre in composite applications such as wind turbines and as concrete re-inforcement will provide a major boost to fibre consumption in volume terms.

CLOTHTECH

The Clothtech sector covers those textile products which represent functional (and largely hidden) components of clothing and footwear such as interlinings, sewing thread, insulating fibrefill and waddings. The level of component sophistication is steadily increasing, driven by new, 'high performance' garment fabrics and the development of better performing products by fibrefill companies.

Clothtech is a medium-sized application area with one of the slowest growth rates. The sector consumed around 1.2 mn tons of technical textiles and industrial nonwovens with a value of US\$5.2 bn in 2000. Consumption is forecast to grow slowly to around 1.7 mn tons in 2010 with a value of US\$8.3 bn

Clothing and footwear production are the most important drivers of demand for Clothtech textiles, combined with the rate of usage per unit of end product. Final demand for clothing and footwear per head is expected to continue its historical pattern of growing less rapidly than real incomes per head -- as countries become wealthier they spend a smaller proportion of their incomes on clothing and footwear. In addition, there is a move towards lighter weight nonwoven interlinings from wovens and knits.

As a result the Clothtech sector is forecast to grow only slowly in the long term. Consumption will become increasingly focused in low cost garment assembly location in China and South East Asia as well as areas serving the US market including Mexico, Central America and the Caribbean.

GEOTECH

Geotextiles are defined as all woven, nonwoven and knitted textile materials used to provide a range of functions such as support, drainage and separation at or below ground level. Geotextiles are used in a wide range of applications including the construction of buildings, bridges, dams, roads, railways and paths as well as embankments and sub-sea coastal engineering projects.

Geotextiles is forecast to have the highest growth rates of any of the eleven technical textile application areas. A rate of 4.6% per annum between 2000 and 2005 is set to increase to 5.3% p.a. during the five years up to 2010.

Whilst the geotextile market is a high growth sector, however, it remains a relatively small end-user of textiles compared with other application areas. In volume terms geotextiles accounted for little more than 250,000 tons in 2000, just 1.5% of the overall technical textile market. In value terms (US\$0.75 bn) the segment represents the smallest application area by a considerable margin.

The geotextile market is highly susceptible to changes in economic growth. National and regional governments back the majority of large-scale infrastructural projects. Over the past decade governments in buoyant Western economies have invested heavily in capital projects. As North American and Western European economies have slowed, governments are shifting back to the approach of “fixing as little as possible”.

Asia and other developing regions of the world are much more likely to see a sustained programme of infrastructure projects over the next decade and beyond. The Chinese ‘Three Gorges Project’ is one such example which has given a considerable stimulus to the use and local manufacture of geotextiles.

HOMETECH

Technical textiles play an essential role in the construction of many household textiles, furnishings and floorcoverings. Applications include carpet backings, curtain tapes, fibrefill and waddings for furniture and mattresses.

Almost 2.2 mn tons of textile products were consumed in this sector in 2000. This is set to increase modestly to nearly 2.9 mn tons by 2010 with a value of US\$ 8.8 bn.

The markets for most traditional Hometech products such as carpets, furnishing fabrics and mattresses are fairly mature in Western economies. However, as disposable incomes increase and the relatively wealthy middle classes grow in number in many developing countries, the growth in the market for home textiles in these areas is expected to accelerate. This will in turn promote the expansion of local manufacturing both for the finished products and for the supporting Hometech supply chains.

India and China have demonstrated the highest growth rates of Hometech technical textiles over recent years and are forecast to continue to grow at about 5% per annum in the short term. This trend will be further boosted by the increasing globalisation of the industry as standards and styles begin to conform more internationally.

This will lead to increased trade opportunities for low cost suppliers into the more developed markets, but also opportunities for established manufacturers in the West to expand their export business into the developing markets.

The demand for many products in the Hometech application area fluctuates broadly in line with the economic cycle, but with more severe peaks and troughs. Firstly, many end products in this sector (such as beds, upholstered furniture and carpets) represent ‘big ticket’ consumer purchases that are easily deferrable. As a result, end product demand is more highly variable than most other end-use segments. Secondly,

purchases of household textiles are closely related to the highly cyclical housing market. Thirdly, contract (i.e. non-domestic) demand is closely linked with the fluctuating level of activity in infrastructure development, construction and capital spending.

INDUTECH

Technical textiles keep the wheels of industry turning in many different ways, separating and purifying industrial products, cleaning gases and effluents, transporting materials between processes and acting as substrates for abrasive sheets and other coated products.

Indutech is an extremely diverse application sector in terms of products, functions and end-uses ranging from lightweight nonwoven filters, knitted nets and brushes to heavyweight coated conveyor belting. It is also one of the largest end-use application areas, particularly in value terms, consuming over 2.2 mn tons of technical textiles in 2000 with an estimated finished product value of US\$13.4 bn. Future growth rates are forecast to be above the average for technical textiles overall with a market of 3.25 mn tons forecast for 2010.

Many industrial textiles are consumable products which have to be replaced on a regular basis as they wear out. Consequently demand tends to grow (and decline) directly in proportion with industrial activity. Industrial booms and slumps clearly have their impact upon the Indutech market, but fluctuations tend to be less severe than often seen in construction, civil engineering or capital goods sectors.

In broad terms, increases in demand for Indutech products are associated with:

- **increased materials handling and process automation
- **increased levels of protection of the environment.

Their use in any region is therefore closely related to the level and rate of industrialisation, the level of local labour costs, and the extent of pressures for cleaner and safer manufacturing processes.

As a result, the greatest potential of this sector lies in the developing regions of the world. Here industrial growth will not only be faster than in the Western world, but accelerating labour costs, automation and increased environmental concern will also contribute to increased use of technical textiles in industry. Asia, especially India and China, is expected to show the highest growth.

MEDTECH

The scope of Medtech embraces all those textile materials used in health and hygiene applications in both consumer and medical markets. As such it comprises a group of products with considerable variations in terms of product performance and unit value. Because of the nature of their application, many medical products are disposable (or 'single use') items. Nonwovens account for a high proportion of the sector overall in terms of tons of fibre used.

In total, over 1.5 mn tons of textile materials, with a value of US\$5.4 bn, were consumed worldwide in the manufacture of medical and hygiene products in 2000. This is forecast to increase in volume terms by over 4% per annum to 2010 to reach 2.4 mn tons with a value of US\$8.2 bn.

In developed countries, the medical textiles sector offers strong growth potential based on an ageing, longer-living and more affluent population that has an increased interest in healthcare issues. Incontinence goods will generate the strongest gains amongst medical/hygiene disposables.

In developing countries, demand for medical textiles, and especially for disposable absorbent product is also expected to rise significantly as a result of a fast-growing, increasingly urbanised, young, brand-conscious population. Feminine hygiene products are rapidly becoming accepted in these regions. The uptake of disposable bed sheets and surgical drapes, gowns and caps is also increasing gradually and these are now widely used in hospital wards in countries such as China

However, baby diapers and adult incontinence pads are yet to see full market penetration, especially in relatively poor countries.

MOBILTECH

The transportation sector represents the single most valuable world market for technical textiles at US\$25.6 bn in 2000. Although only modest volume growth and even slower value growth are forecast in the longer term, Mobiltech will remain the most valuable segment reaching US\$29.3 bn by 2010.

Textile consumption per car is declining in a number of functional end-uses, mostly in the area of mechanical rubber goods such as tyres and hoses. However, there are still plenty of opportunities for growth in automotive end-uses including: new airbag applications, foam replacement by nonwovens, composite materials and in-vehicle cabin air filters.

Lorry covers and restraints are important textile end-uses in the transportation sector. These can range from relatively unsophisticated ropes and tarpaulins to highly engineered flexible curtain systems and webbing tie-downs.

Performance furnishing materials play an essential role in public service vehicles (buses, coaches, trams and trains). Safety considerations in more advanced markets are already leading to many public service vehicles being equipped with seat belts. Some observers see this area as eventually being an important new extension to the market for air bag technology.

Even more stringent performance and safety standards apply to those furnishing and other accessory textiles used in the field of aviation. Composite materials are widely used in the marine segment, mostly glass fibre based, for the construction of boat hulls. The marine segment is also the mainstay of the rope and cord industry.

PACKTECH

Packaging is an ideal and long established application for textiles. At one end Packtech includes heavyweight woven fabrics used for bags, sacks, Flexible Intermediate Bulk Carriers (FIBCs) and wrappings for textile bales and carpets. At the other it includes lightweight nonwovens used as durable papers, tea bags and other food and industrial product wrappings.

Packtech is the largest end-use application area, by weight, consuming around 2.6 mn tons of textiles in 2000. However, at US\$4.4 bn, the overall value of this application

is relatively low, reflecting the large volumes of low value sacking and twine included in the segment. The volume of Packtech is forecast to grow broadly in line with technical textiles overall, reaching a volume of over 3.6 mn tons in 2010 with a value of US\$6.6 bn.

The demand for tying products and bulk packaging materials is closely correlated with economic growth, industrial production and trade. New technologies have the effect of depressing demand for textile packaging products. For example, the use of synthetic materials prolongs product life. Non-textile solutions including pressure-sensitive tapes and shrink-wrap plastics, are also growing.

The use of textile materials in consumer packaging is still limited in volume and is largely confined to developed economies. However, demand is forecast to grow at an unprecedented rate over the next 10 years, driven by:

- **increased real incomes and consumer spending
- **consumer lifestyles favouring convenience and pre-packed foods
- **changing legislation to prevent food contamination.

PROTECH

Protech encompasses all those textile materials and products used in the production of protective clothing of various types. In terms of the volume of textile materials consumed, Protech was the smallest of all the application areas in 2000, accounting for just 1.4% of the total, at less than 250,000 tons. However, Protech an estimated value in 2000 of US\$5.2 bn, reflecting the high unit value of protective products.

In recent years developed economies have seen a decline in the number of people employed in primary and other traditional "smokestack" manufacturing industries. This has been accompanied by reduced exposure to danger in the workplace through the use of robots, other automation and safety devices. These trends have had a negative effect on the demand for protective clothing.

However, this has been partially offset by a general extension of protection performance to more conventional workwear used in low risk applications. In addition higher levels of protection are being afforded to those 'more valuable' workers remaining at high risk.

In developing countries demand for protective clothing is promoted not only by increased levels of industrialisation but also by increased observation of health, safety and hygiene legislation. Demand in the Far East and China has also increased as a result of the shift towards the production of microelectronics, creating a requirement for cleanroom clothing.

Much of the growth of the Protech sector globally also stems from the increased use of high performing protective fabrics (especially breathable waterproofs) in everyday consumer clothing. .

SPORTTECH

Increasing worldwide interest and participation in active sports and outdoor leisure pursuits have resulted in strong historical growth in the consumption of textile materials in sporting and related goods and equipment. Synthetic fibres and coatings have largely replaced traditional cotton fabrics and other natural fibres.

In volume terms Sporttech is small; at less than 1 mn tons in 2000. Since many Sporttech products are finished consumer goods, however, unit values are very high. This especially the case where sophisticated coatings or high performance fibres are used. As a result in 2000 Sporttech was the second largest segment in value terms, at US\$13.9 bn. Growth rates are relatively low, however, with larger segments such as textile bags and soft luggage maturing in many regions.

The strong growth in the consumption of other sporting goods is driven by a combination of demographic and sociological factors, including:

- **increased leisure time.
- **an ageing population showing interest in health-related activities
- **increased female participation in sports
- **increased accessibility and availability of sports such as skiing, golf and sailing
- **the growth of sports facilities
- **the advent of new sports such as snowboarding and roller-blading.

In many cases, the increased sports participation is also driven by higher performing, lighter, safer and ultimately cheaper, sports equipment and clothing.

Final consumption of sports goods is currently highest in developed economies such as the US where participation rates are high and mostly still growing. However, both the production and consumption of sports textiles is expected to grow most quickly in the medium to long term in developing countries where living standards and lifestyles are changing fastest.