Applications and markets of Technical Textiles:

Actual situation and trends

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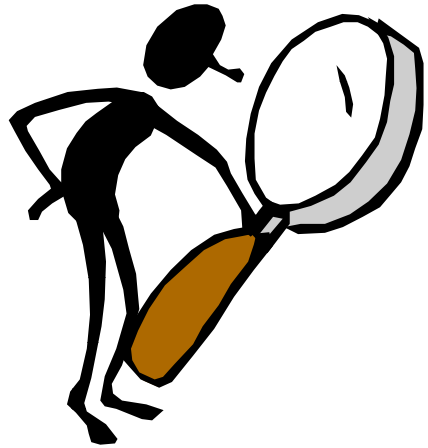
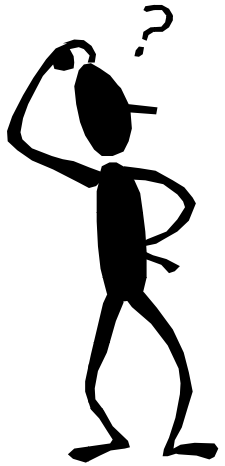
Answer by looking to different lists



- Producers of technical textile
- Producers of final parts
- Textile fabrics
- Markets

.... So! Many items!

The more simple answer is:



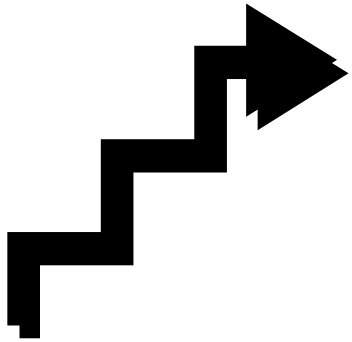
To look at the function definition of the material to find the best fit

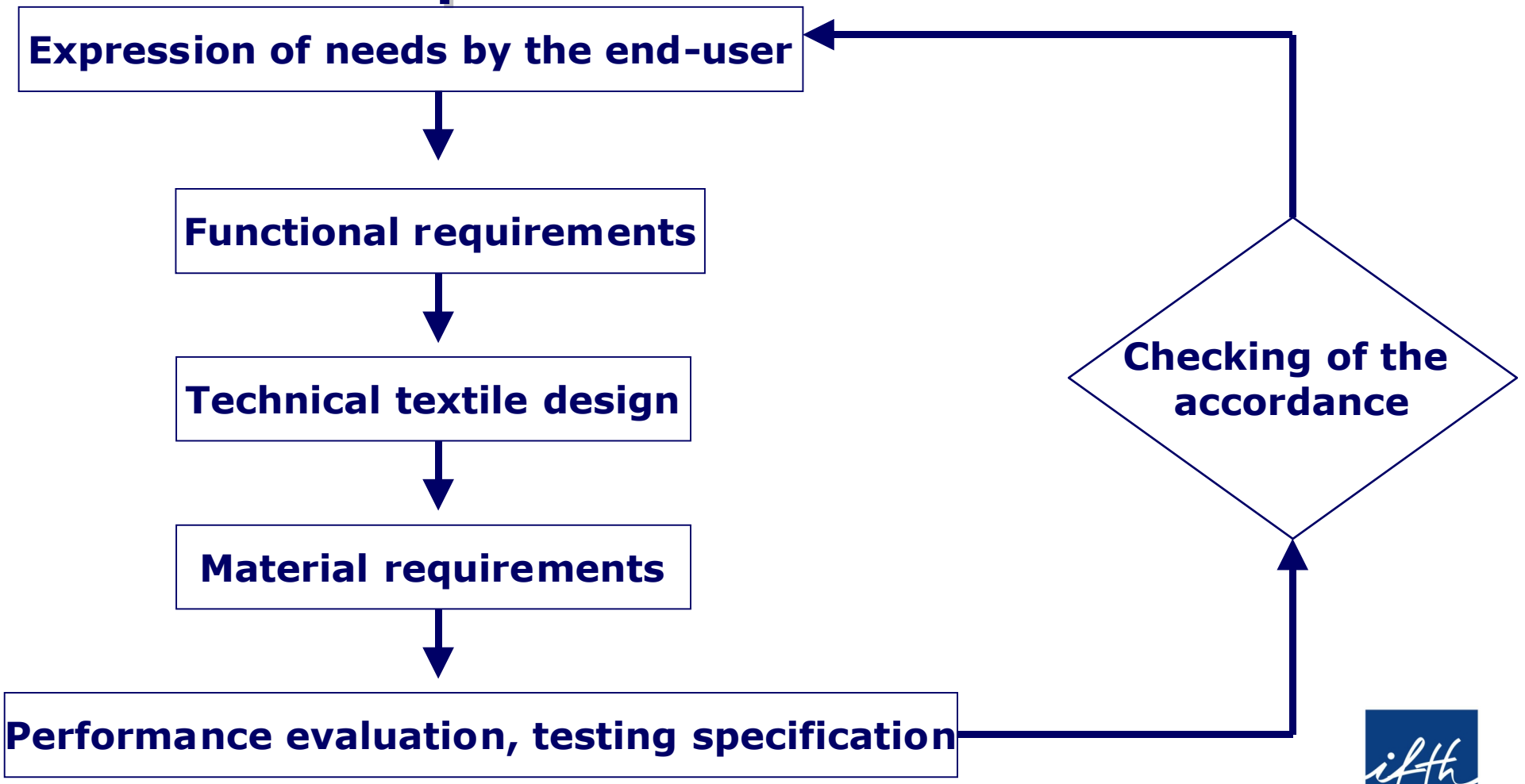
Definition

Technical textiles are **materials** meeting high technical and quality requirements (mechanical, thermal, electrical, durability...) giving them the abitliy to offer technical **functions**

[H. Laurent, G. Némoz, Encyclopaedia Universalis, Universalia 1995, PP 184-188]

Steps of designing of a technical textile product





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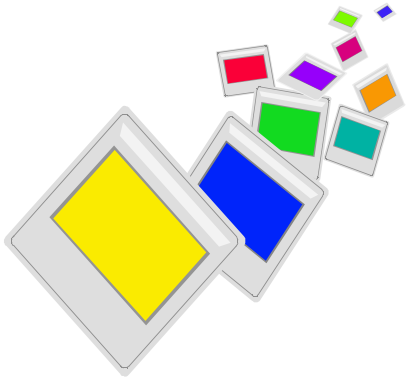
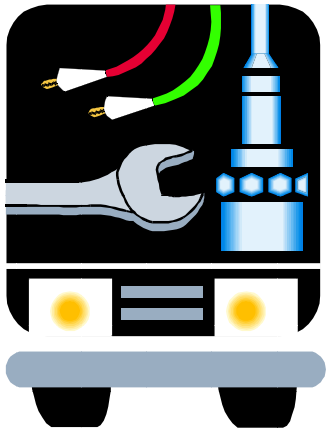
4 main classes of functions for technical textile



- Mechanical functions
- Exchange functions
- Functionalities for living beings
- Protective functions

Mechanical functions

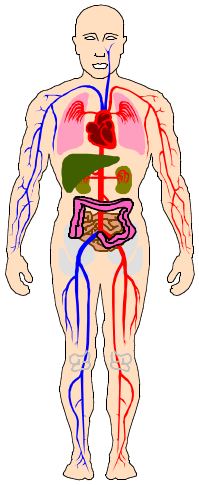


- Mechanical resistance
- Reinforcement of materials
- Elasticity

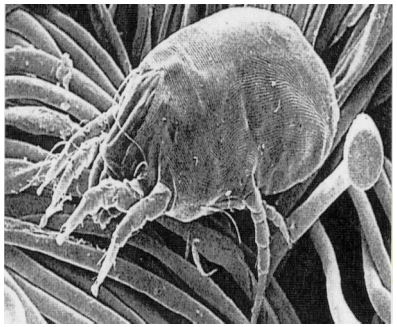
Exchange functions

- Filtration
- Insulation and conductivity
- Drainage
- Impermeability
- Absorption

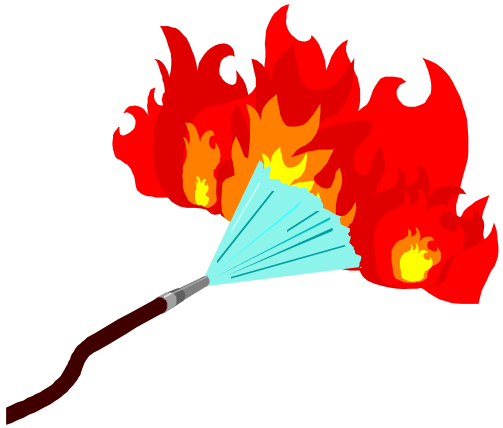
Functions of living being



- Antibacteria
- Antidust mites
- Biocompatibility
- Biodegradability/bioresorption



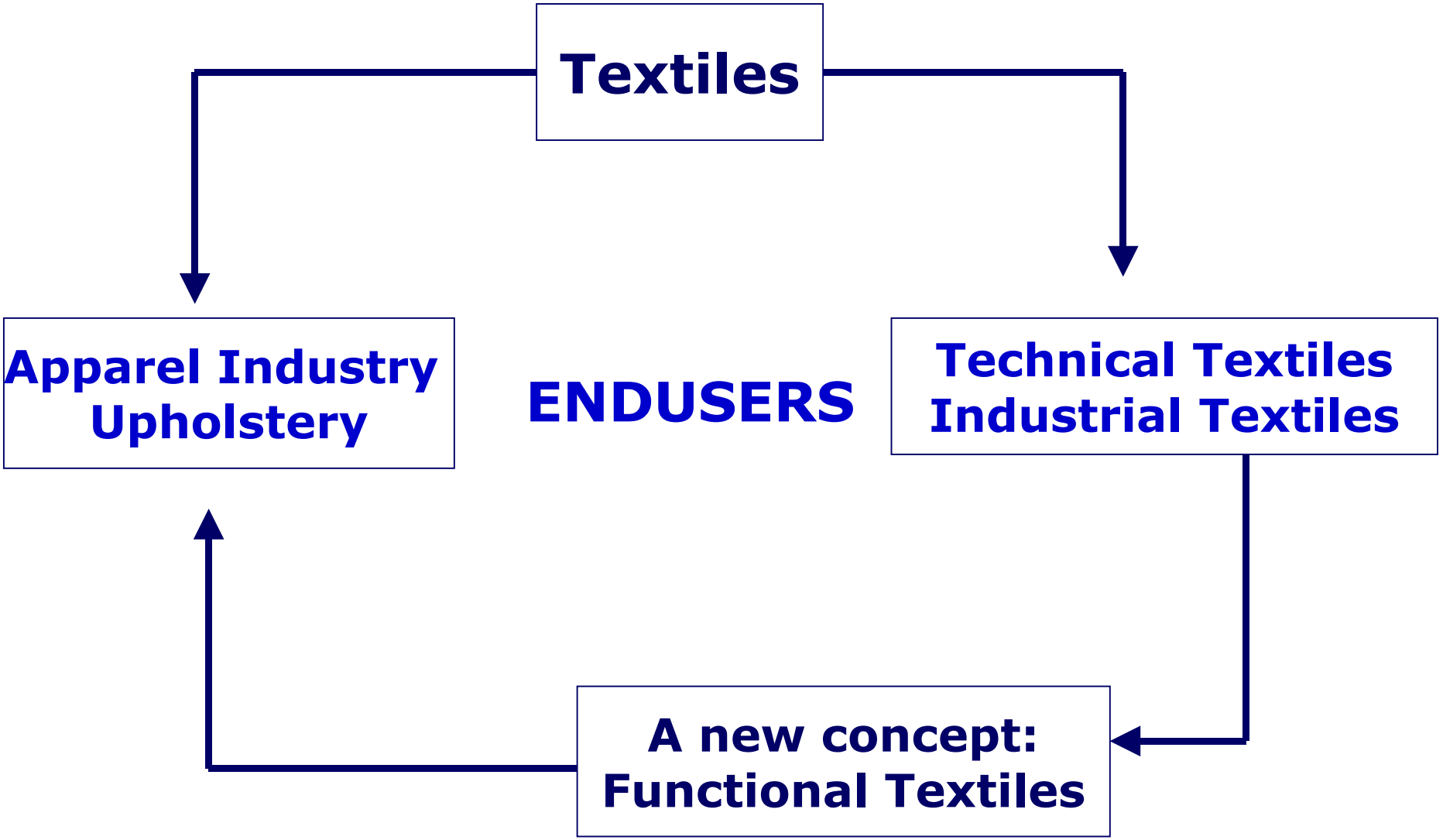
Protective functions



- Thermal
- Fire
- Mechanical
- Chemicals
- Impermeable - Breathable
- Antistatic
- Particles antirelease

Protective functions

- Others :
  - Electrical insulation,
  - IR and UV rays,
  - NBC
  - High visibility
  - Electromagnetic fields .....

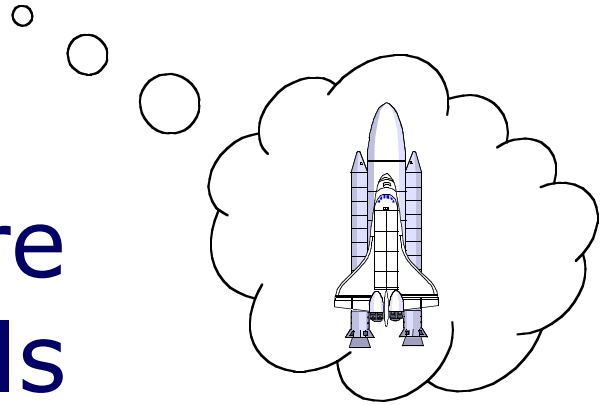

Textiles
Apparel Industry
Upholstery
ENDUSERS
Technical Textiles
Industrial Textiles
A new concept:
Functional Textiles

Functional or Functionalized Textiles = Textile + something for adding value

By chemical or physical modifications to create new functions such as:

- ion exchange properties
- antidustmites
- adaptative or smart functions
- compatibility with environment or other materials

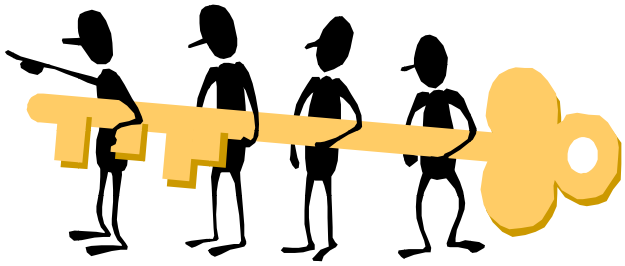
... And so on...



Some of our clients are dreaming to the materials of the future.

But, we, producers of Technical Textiles already offer the "best material of the world": lightest, strongest, biocompatible, smart, even intelligent ...

Some keys for the future of Technical Textiles



- **Driving forces: SHE (security, health, environment)**
  - **Certification**
  - **Regulation**

[M. Sotton, Techtextil Symposium 1997]

- **Building the most powerful supply chain**

[D. Rigby, Techtextil Symposium 1999]

- **Transfering the knowledge at all levels**
  - **Media, press**
  - **Schools and universities**

Dissemination of the Technical Textile Knowledge implies a multidisciplinary approach

- **For all future engineers: textile has to be used as a material comparatively with iron, wood, glass, ceramics, plastics ...**

- **For all future textile technicians, engineers or managers: textile has to be used as a multifunctional material having high level of physical, mechanical, thermal, chemical properties**

Textiles use by final markets
Europe 1999

	Market share	Annual growth planned
Industry	21%	3.9%
Transport	20%	2.8%
Medical	16%	1.5%
Construction	10%	2.9%
Agriculture	8%	1.2%
Civil engineering	3%	5.7%
Sports and Leisures	2%	3.3%
Protection	2%	5.7%

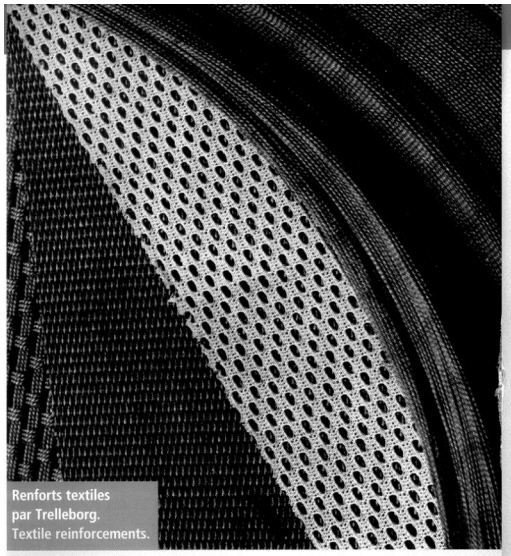
FIBRES CONSUMPTION IN 1998 IN THE EUROPEAN UNION OF THE 15 FOR THE WHOLE TEXTILE FIELD

6 200 000 tons ventelating as follows:

- Technical textiles 2 400 000 T
- Clothing 2 100 000 T
- Furnishing 1 000 000 T
- Carpet 700 000 T

The technical textiles represent 38% of the whole textile market (all fibres together).

Same order of magnitude in the USA and in Japan for the technical textiles.



Renforts textiles par Trelleborg.
Textile reinforcements.

TRENDS

Ten years of technical textiles in Western Europe

■ Technical textiles are now a global industry, and no longer the preserve of a few industrialised countries. All regions and all industries in the world make use of technical textiles, even if there is no local manufacturing. Europe remains a major supplier of these textiles, and consume one third of the total of them.

Jean-Jacques CONROUX
IFTH (F).

A first review of trends in technical usage textiles during the last ten years can now been drawn. The subject is vast and so we shall therefore concentrate on the trends noted for fibres consumption, types and quantities by the whole technical textiles chain, and we shall demonstrate the real explosion in certain fibre categories during this same period.
The trends in world production of fibres during this decade (the full textile chain) is given in figure 1. This period was thus characterized by:
– stagnating cotton production;
– a big fall in wool production;
– a considerable fall in cellulose production; and
– an explosion in production of synthetic fibres.
One can compare the European situations in 1990 and 2000 in terms of fibre consumption by the full textile chain, and more particularly by the following groups: clothing, furnishings and home textiles, carpeting and technical textiles (figure 2).
Several comments can be made, notably:

– strong growth in the «technical usage textiles» sector, which rose from 22 % to 36 % of the total weighting of the sector;
– all the other sectors declined in a more or less significant way : the clothing sector which lost practically ten points. Furnishings and home textiles lost more than two points, and carpets lost just one point;
– at present the technical textiles are «chasing» clothing types in terms of relative importance within the sector, with 36 % against 37.5 %, and they thus truly represent the future for the European textile industry;
– we should also associate with the technical textiles, the functional textiles (anti-bacterians, anti-acarians, anti-UV, waterproof-breathable, conductive types, etc.), which as a whole will allow the European textile industry to maintain its role.
Types and quantities of fibres used in developing the technical usage textiles, by also comparing the 1990 and 2000 situations (consumption at the European level), are shown in table 3.
Among the fibres which played a significant part in the manufacture of technical usage textiles in 1990 – i.e. the polyolefins, polyamide, polyester, the cellulosic fibres, cotton and the glass fibres – the most spectacular growth was enjoyed by the polyolefins, cotton, and the cellulosic and glass fibres.
The fibres specific to technical usage textiles such as the aramids and carbon types, also saw spectacular growth rates, but still remain marginal in tonnage terms compared with the «leader» fibres.
The spectacular growth of the technical usage textiles in Western Europe in the last decade is quite clear. The polyolefins, mainly the polypropylenes, now represent almost 50% of fibres consumed by technical usage textiles. Polyester takes more than 17%, followed by the cellulosic fibres with some 11%, and cotton with about 8%. These four main categories account for more than 85% of all fibres used in technical usage textiles. During the decade in progress the polyolefins should continue their penetration, but more slowly, while in like manner polyester should remain the second most used fibre in technical usage textiles – and this to the detriment of the cellulosics, and to a lesser degree, of cotton. ◆

The most spectacular growth was enjoyed by the polyolefins, cotton, the cellulosic and glass fibres ■

1 Trends in world production of fibres in 1990's.

x 1,000 tonnes	Cotton	Wool	Cellulosics	Synthetics	TOTAL
1990 (estimate)	19,000	1,900	3,100	15,000	40,000
2000 (estimate)	19,000	1,400	2,600	27,500	50,000
Change	– 1.8%	– 27.3%	– 16%	+ 78.9%	+ 27.2%

2 Consumption by the full textile chain: evolution of technical textiles compared to other sectors.

	1990		2000		Change
	x 1,000 t.	%	x 1,000 t.	%	
Clothing	2,250	47.3%	2,500	37.5%	+ 11.1%
Furnishing/home textiles	850	17.9%	980	14.7%	+ 15.3%
Carpeting	610	12.8	790	11.8%	+ 29.5%
Technical textiles	**1,050**	**22.0%**	**2,400**	**36.0%**	**+ 128.6%**
TOTAL	4,760	100%	6,670	100%	+ 40.1%

3 Types and quantities of fibres used in developing the technical textiles.

x 1,000 tonnes	1990	2000	Change
Polypropylene	325	1,145	+ 252%
Polyethylene	10.5	55	+ 423%
Polyamide	97	142	+ 46%
Polyester	235	415	+ 77%
Polyacrylonitrile	2	26	+ 1,200%
Glass	67	115	+ 72%
Carbon	0.5	3	+ 500%
Meta-aramid	1	3.5	+ 250%
Para-aramid	1	15	+ 1,400%
Cellulosic	93	260	+ 180%
Cotton	47	185	+ 294%
Wool	2	5.5	+ 175%
Others (jute, sisal...)	169	30	– 82%
TOTAL	1,050	2,400	+ 129%

4 Technical textiles world production: 2005 projections by David Rigby Associates (survey realised for Messe Frankfurt).

		x 1,000 tonnes
TOTAL PRODUCTION		13,688
Breakdown by end-uses	Agrotextiles	1,021
	Construction	1,266
	Apparel	824
	Geotextiles	574
	Home Textiles	2,259
	Industry	2,344
	Medical	1,652
	Transportation	2,483
	Environment	305
	Package	658
	Protection	215
	Sports	390
Breakdown by products	Fabrics and knits	4,096
	Nonwovens	4,300
	Composites	2,581
	Other textiles	2,711