

# Automotive Nonwovens

Driving the need for lighter, fuel-efficient vehicles



Adrian Wilson

From the publishers of  
**mobileTex**

# Automotive Nonwovens

Driving the need for  
lighter, fuel-efficient vehicles

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By Adrian Wilson

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# Introduction

## THE AUTOMOTIVE MARKET

Leading car manufacturers reported record sales in 2011 and 2012, and despite the prospect of another economic slowdown in parts of the world – most notably in Europe owing to the ongoing euro crisis – there are no signs of the overall automotive market declining.

Between 2007 and 2009, automotive industry production in North America and Europe experienced the steepest peak-to-trough declines in history. In North America, vehicle production fell by more than 40% – from a high of 15m units in 2007 to a low of 8.6m units in 2009. In Europe, production also declined by more than 20%, from 20.2m vehicles in 2007 to 15.6m in 2009.

As a consequence, the industry has undergone major restructuring and consolidation in response to overcapacity, narrow profit margins, excess debt and the necessary realignment of resources from mature markets to emerging ones.

This restructuring and consolidation continues, but at the same time 84.1m vehicles were produced globally during 2012, up 5.1% from 80m in 2011, and perhaps surprisingly, growth is not currently all in China by any means. There was a 70% surge in car production in Thailand in 2012, for example, and more than 27% in Indonesia, too. In Eastern Europe, Slovakia registered a sales surge of over 40%, while US production, perhaps surprisingly, also increased by 19.3%.

### US market

In the US, for example, double-digit sales during 2012 were reported by Chrysler, General Motors and Ford, coupled with even stronger North American growth by Toyota and Honda. This follows a resurgence in the US in 2011, with growth of 11.5% achieved in the production of more than 8.6m vehicles, according to the Organisation Internationale des Constructeurs d'Automobiles (OICA), the international organisation of motor vehicles. In 2012, the US produced 10.3m cars and other light vehicles, having previously reached a peak of 15m units in 2007.

### European market

The significance of the EU as an automotive trading block is also often overlooked, but currently under question. With a population of well under half that of China, the EU as a whole, led by Germany, still produces a comparable amount of cars and commercial vehicles as China – just over 18m in 2011.

However, the current problems faced by the EU resulted in lower production of 16.6m vehicles in 2012, according to IHS Automotive, with a further 2-3% decline forecast for 2013.

The level of 2011 is not expected to be matched again until at least 2015, while even allowing for average 2.8% growth, European production is not expected to

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Introduction

The market for frontal airbags will grow at a lower rate of 3% to a value of US\$5.8bn. by 2014, and that for seatbelts also at an annual rate of 3% to a value of US\$5.7bn. in 2014.

**Filtration**

Textile filter media also play an important role in today’s vehicles, as can be seen in Donaldson’s (page 73) breakdown of the market in Table 5.

**Table 5: Global filtration market, 2013**

Segment	Value (US\$bn)
Water filtration	10
Heavy-duty engine and mobility	8
Food and beverage	5
Heating, ventilation and air-conditioning (HVAC)	5
Medical and pharmaceutical	5
Industrial air	4
Automotive	3
Aerospace and defence	1
Electronics	1
Industrial hydraulic	1
Gas turbine	0.8
Special applications	0.5
Other	6
<b>Total</b>	<b>50.3</b>

Source: Donaldson

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Filter media is another important sector for many of the companies featured in this report.

**AUTOMOTIVE NONWOVENS**

Nonwovens are expanding rapidly in the automotive sector as consumers demand greater comfort and safety, and automakers and their component suppliers seek to decrease costs by reducing the weight of vehicles as well as lowering fuel consumption and CO<sub>2</sub> emissions.

Although woven and knitted fabrics continue to dominate the total amount of textiles used within the automotive sector, nonwovens are becoming increasingly attractive to designers owing to their low weight and lower cost, as well as other key advantages, such as sound insulation.

For example, Johnson Controls (page 43), which makes automotive seating, overhead systems, door and instrument panels and interior electronics, is incorporating more nonwovens into its automotive components owing to their

Introduction

# Sandler

**Sandler AG, PO Box 1144, D-95120 Schwarzenbach/Saale, Germany.  
Tel: +49 9284 600. Fax: +49 9284 60205. Email: info@sandler.de  
Web: www.sandler.de**

Founded in Bavaria as a manufacturer of shredded waddings in 1879, Sandler, based in Schwarzenbach/Saale, Germany, is one of Europe's leading nonwovens manufacturers and more than 40 automotive models worldwide are now equipped with its special nonwovens.

The company's first six fibre carding machines were installed back in 1900 and by 1965 it was the largest producer of shredded wadding in Germany.

In the 1960s, Sandler began the production of voluminous nonwovens for upholstered furniture, garments and household filtration, and 20 years later started production of thermobonded carded nonwovens for the hygiene, automotive and filtration sectors.

In 1993, it commissioned Europe's largest air-through line for voluminous nonwovens for upholstered furniture, quilts, automotive components and filters, and in 1999 added lamination lines for hygiene and a meltblown line for filtration, automotive products and hygiene.

In 2003, spunlace (hydroentanglement) manufacturing equipment was added at the Schwarzenbach/ Saale plant at a cost of €15m. The company then announced a plan to invest a further €25m at its German plant during 2006 that would put the company's emphasis on new technical and differentiated products.

Some €18m of this capital was ploughed into new buildings and a 90-m long manufacturing line requiring a total floor space of 2,700 m<sup>2</sup> and dedicated to new products for the automotive, filtration, construction and furniture markets. This was inaugurated in 2006 and the company has subsequently installed additional printing equipment.

In 2007, the company concluded a €33m investment programme for further increasing plant capacities and optimising in-house logistics, including investing in a second high-performance hydroentanglement production line for substrates, which will mainly be converted into wet wipes. The hydroentanglement manufacturing line represented a total investment of €20m.

Subsequently, the company has invested a further €60m, primarily in new lines, and early in 2011 opened its Plant 4 to become the largest nonwovens manufacturing site in Europe. Extensive excavation work for this facility commenced in 2009 and involved the construction of a new access road and bridge to accommodate the increase in transport volumes, as well as enhancing intra-company logistics.

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Sandler

## Key Americas-headquartered Tier 2 suppliers

Carpets, insulation, filtration and other

# Hollingsworth & Vose

**Hollingsworth & Vose, 112 Washington Street, East Walpole, MA 02032, USA. Tel: +1 508 850 2000. Web: [www.hollingsworth-vose.com](http://www.hollingsworth-vose.com)**

Hollingsworth & Vose (H&V), headquartered in East Walpole, Massachusetts, USA, was established in 1843 to commercialise a patent on extracting papermaking fibre from Manila rope. The company developed the first insulating paper in 1890, entering the gasket market in the 1920s, and subsequently developing special media for the US military during the Second World War. Subsequently, filtration became a cornerstone of its business.

The company's nonwoven technologies include wetlaid, drylaid, meltblown and composite technologies, and like many companies in this report, it seeks to differentiate itself through both new product innovation and key customer relationships, with a high level of technical and logistical support.

H&V now divides its business into six key product groups:

- Engine and Industrial Filtration;
- High Efficiency Air and Liquid Filtration;
- Battery Separator and Additive Materials;
- Engineered Composite Materials (ECM);
- Industrial Specialities;
- Advanced Fibre Nonwovens (AFN).

### Engine and Industrial Filtration

This division supplies products for engine filtration including air, lubrication, oil, diesel, fuel and hydraulic applications. It is particularly adept at creating filter media for use in harsh environments.

Filter products are made from the wetlaid, drylaid and meltblown processes. Cellulosic synthetic media and glass fibres are combined with a variety of resin bonding agents to produce materials with precisely controlled pore structures and physical properties for high-performance filter media that improve the efficiency and longevity of passenger and commercial engines.

Government and market forces are placing new challenges on filter manufacturers requiring new approaches; the reduction of phenol and formaldehyde, for instance, has been a critical issue in recent years. As a result, filter producers want

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Hollingsworth & Vose



# Toyobo

**Toyobo Co Ltd, 2-8, Dojima Hama 2-chome, Kita-ku, Osaka  
530-8230, Japan. Tel: +81 6 6348 3111. Fax: +81 6 6348 3206.  
Web: www.toyobo-global.com**

Toyobo is another multi-faceted Japanese corporation that began with viscose fibre production in the 1920s and expanded through synthetic fibres into films, industrial materials and life sciences over the decades. Its overall sales in the year to 31 March 2013 were ¥339.0bn (US\$3.6bn).

As of 31 March 2005, the former Fibers and Textiles Division of Toyobo had 3,597 registered trademarks and 554 registered patents. However, this division's share of overall turnover continued to fall significantly, and following restructuring during 2006, the company now divides its many activities into five key businesses: Films and Functional Polymers, Industrial Materials, Life Science, Textiles and Others.

**Table 70: Toyobo: net sales by business, 2008-2013**

(¥bn)	2008	2009	2010	2011	2012	2013
Films and Functional Polymers	135.0	122.6	115.6	127.6	138.9	137.4
Industrial Materials	76.2	74.7	63.2	71.7	71.3	72.1
Life Science	34.2	33.5	32.6	31.5	26.6	24.9
Textiles	142.7	112.0	88.7	87.8	89.2	79.4
Real Estate	n.a.	6.1	6.0	5.1	5.1	5.0

Year ended 31 March

Source: Toyobo

It is the Industrial Materials business, rather than Textiles, which is now particularly of relevance within the context of this report, since following the 2006 restructuring it now not only contains the valuable Dyneema and Zylon high-performance fibre operations, but also the company's airbag fabrics business and those of automotive filtration products, tyre cord fabrics and nonwovens.

Toyobo has a 50% share of the Japanese market for airbag fabrics based on its proprietary polyamide (PA) 6.6 fibre manufacturing. In 2005, it expanded PA 6.6 yarn production at its Tsuruga plant in Japan from an annual 10,000 tonnes to 14,000 tonnes. In 2007, it added a further 2,000 tonnes of capacity at the Tsuruga plant.

Toyobo Industrial Materials (Thailand) is the subsidiary in charge of distributing base fabrics for automotive airbags established in 2001. Production of airbag base cloth was increased in 2008 from an annual 10.8m metres to 21.6m metres, increasing Toyobo's total airbag fabric production (including that in Japan) to 36m metres.

# Glossary

## **3D**

three-dimensional

## **AA&E**

Aunde Achter & Ebels

## **A-B-C pillar**

The A-pillar is a name applied by car stylists and enthusiasts to the shaft of material that supports the windshield (windscreen) on either of the windshield frame sides. By denoting this structural member as the A-pillar, and each successive vertical support after a successive letter in the alphabet (B-pillar, C-pillar, etc.), this naming scheme allows those interested in car design to have points of reference when discussing design elements. In the most usual configuration, the C-pillar supports the rear window.

## **ABL**

active buckle lifter

## **ABS**

anti-lock braking system

## **ACC**

Advanced Composite Center (Toray Industries)

## **ACR**

active control retractor

## **ACRS**

air cushion restraint system

## **ACU**

airbag control unit

## **AE**

Automotive Experience (Johnson Controls)

## **AFBG**

Aramid Fibres Business Group (Teijin)

## **AFN**

Advanced Fiber Nonwovens (Hollingsworth & Vose)

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