The European flexible PU foam market report for 2018

According to data collated by Labyrinth Research & Markets Ltd, on behalf of Europur, and presented at this year’s General Assembly of Europur and Euro-Moulders in Lisbon (11–13 June 2019), the total production of flexible polyurethane foam in the 28 EU member states, Norway, Switzerland, Albania, Bulgaria, Bosnia, Kazakhstan, Kosovo, Serbia, Macedonia, Ukraine, and Turkey reached 1.7 million t in 2018, of which 388,000 t was moulded, down from 410,000 t in the previous year and 1,318,400 t was slabstock, a decrease of 4% from 2017. Of the total flexible polyurethane slabstock foam produced, 1.24 million t was polyether slabstock foam and 75,217 t was polyester slabstock foam. Overall, slabstock production in 2018 decreased by 4.0% across the entire region. Over 65 organisations were interviewed to supplement production data provided by Europur member companies, who now represent 70% of total EU slabstock production.

1 Introduction

The decrease in production appeared to be due to a number of factors, but the most consistent reason reported by foamers was the switch from high quality HR and VSE grades to lower density foams by end-users in the mattress and upholstered furniture industry. The high level of price volatility of isocyanates appears to have resulted in a shift towards the commoditisation of polyurethane foam as a comfort material. For example, a small decrease in density of only 1 kg/m³ would account for a considerable part of the 51,700 t decrease in polyether slabstock production. Several foam plants closed in 2018, removing an estimated 30,000 t of capacity, and there was some replacement of foam with springs, polyester fibres and other materials.

Production of upholstered furniture industry, mattresses and vehicles was more or less stable across the EU as a whole, but there were some strong variations by region, despite a lack of seasonality in the market caused by a variety of factors including the long, warm summer, growth in e-commerce and lack of consumer confidence. Further volatility in the price of isocyanates was evident, with high prices persisting throughout the first half of 2018, followed by a sharp fall in the second half of the year due to weaker demand and lengthening supplies. Although

foamers feared a loss in business due to the widespread replacement of high-priced polyurethane foams with lower cost alternatives, this could not be determined from end-use market data. Many foamers have successfully adapted to changes in the market structure by exporting product, developing higher value products, engaging with e-commerce suppliers and creating new products such as acoustic insulation for the construction industry.

2 Raw materials supply and demand

One of the major challenges facing the European flexible foam industry during 2018 was the volatility of raw material prices, mainly isocyanates due to a global imbalance of supply and demand.

Throughout 2018 customers waited for Sadara, BASF and Wanhua to supply products from their new facilities, but these hopes were not fulfilled, with BASF installing the new reactor in June, then starting testing and production in July, only to pause production in August and again in November due to low water levels in the Rhine. Sadara was reported to be shipping good volumes from the second half of last year, mainly into Asia, but volumes were not fully ramped up. Finally, in December, Wanhua announced the startup of its 300 kt plant in China. Borsod-Chem-Wanhua was reported to have started the new TDI crystallisation plant for TDI 65.

Tab. 1: Estimated demand for raw materials used in 2018 for the production of flexible PU foams in 28 EU member countries, Norway, Switzerland, Albania, Belarus, Bosnia, Kazakhstan, Kosovo, Macedonia, Serbia, Ukraine, Russia and Turkey

<table>
<thead>
<tr>
<th>Type</th>
<th>MDI in t</th>
<th>TDI in t</th>
<th>Polyols in t</th>
<th>Additives in t</th>
<th>Total in t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slabstock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conventional polyether foam &amp; CME</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR &amp; CHF</td>
<td>12,250</td>
<td>49,010</td>
<td>146,595</td>
<td>10,945</td>
<td>218,800</td>
</tr>
<tr>
<td>VSE, CMYSE &amp; others</td>
<td>37,280</td>
<td>4,142</td>
<td>97,639</td>
<td>8,877</td>
<td>147,938</td>
</tr>
<tr>
<td>Polyester foam</td>
<td>1,000</td>
<td>22,865</td>
<td>47,617</td>
<td>3,735</td>
<td>75,217</td>
</tr>
<tr>
<td>Total slabstock 2018</td>
<td>50,530</td>
<td>338,952</td>
<td>852,776</td>
<td>76,142</td>
<td>1,318,400</td>
</tr>
<tr>
<td>Moulded foam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furniture &amp; bedding</td>
<td>12,000</td>
<td>4,200</td>
<td>28,000</td>
<td>1,800</td>
<td>46,000</td>
</tr>
<tr>
<td>Automotive</td>
<td>107,500</td>
<td>17,200</td>
<td>203,800</td>
<td>13,500</td>
<td>342,000</td>
</tr>
<tr>
<td>Total moulded foam</td>
<td>119,500</td>
<td>21,400</td>
<td>231,800</td>
<td>15,300</td>
<td>388,000</td>
</tr>
<tr>
<td>Total flexible foam 2018</td>
<td>170,030</td>
<td>360,352</td>
<td>1,084,576</td>
<td>91,442</td>
<td>1,706,400</td>
</tr>
</tbody>
</table>

Source: LRM
but have faced technical issues. Covestro successfully debottlenecked Caojing by 25 kt and plan to debottleneck Dormagen to 250 kt by the end of 2019.

US demand was strong throughout most of 2018 due to high employment and a reasonably buoyant housing market the market remained tight in terms of TDI supply, although automotive production slowed slightly. However, severe winter weather restricted supplies placing more strain on the supply situation.

While demand for TDI in Europe remained steady during the first half of the year, the long hot summer, waning consumer confidence and some product substitution created much weaker demand. Weaker demand coincided with better product availability from the manufacturers causing the supply to be long and prices started to fall quickly. In addition, more material was available in Asia due to weaker than expected demand from the Chinese furniture and mattress industry. Unlike in previous years, downstream furniture and mattress makers in China have been “cautious” due to concerns about how their export markets may be squeezed due to the ongoing trade disputes between China and the USA and the EU and USA.

Demand in China was also capped because operations and warehousing at the downstream factories were restricted by strict government controls for environmental protection and safety following several explosions at ports and warehouse facilities.

In summary, by the end of 2018–2019 global TDI nameplate capacity should be around 2.6–2.7 million t, demand is around 2.1 million t. New capacity slated for China could bring the total to 3.4 million t by 2022. TDI manufacturers are forecasting demand to grow annually by 2% in EMEA, but with most of the growth in Africa and the Middle East, 2% NAFTA, 1% LATAM, 3% APAC over the next 3-4 years.

By the end of 2018 and start of 2019, demand had not fully recovered and prices for TDI remained much lower than in the previous two years.

European crude MDI prices also started to decline in the spring of 2018, in spite of capacity at Dow’s Stade plant being off-line and product remained long throughout most of the summer, despite the main construction season. Several endusers are reported to have switched to alternative insulation products due to high prices and shortages in 2017. European demand for MDI in flexible foams depends upon production of HR and viscoelastic grades and automotive production. Production of HR and viscoelastic foams fell slightly during 2018 as endusers shifted to lower density foams. Globally, demand for MDI is forecast to grow annually between 4–7% reaching more than 8 million t/y by 2022 with demand from Europe growing at around 3–4% per year.

European demand for flexible polyol declined during 2018 in line with slabstock production. Suppliers reported that demand in Western Europe was depressed while demand from foamers in Eastern European markets was more or less flat. The market is structurally long, with weak demand depressing prices and demand throughout 2018.

Propylene oxide prices have been more volatile, due to the large number of plant turnarounds which forced prices to a two-year high, making production of some polyols unprofitable at some points during the year. Weak downstream demand resulting from high TDI prices also depressed demand and prices in 2018.

Table 1 illustrates the estimated demand for raw materials in 2019. The demand for automotive moulded foam includes seat foam, headrests and arm rests as well as carpet cushioning used for NVH. Moulded foam used in furniture and bedding includes pillows and seat pads for recliners.
Overall, raw material prices for isocyanates fell sharply in the second half of 2018 to lower levels than those of early 2016 (fig. 1).

3 Flexible slabstock production

The total production of flexible polyurethane slabstock foam in the 28 EU member states, Norway, Switzerland, Albania, Belarus, Bosnia, Kazakhstan, Kosovo, Serbia, Macedonia, Ukraine, Russia and Turkey fell slightly from 1,376 million t in 2017 to 1,318 million t, a decline of 57,600 t in total. Polyester production accounted for 75,217 t in 2018 declining from 81,922 t in 2017 and polyether production was 1,243 million t in 2018 down from 1,295 million t in 2017 (tab. 2). Since 2009, data analysis suggests that an additional 320,000 t of capacity has been added across the region, this includes new lines and block storage.

The foam was produced at 158 locations compared to 171 in 2017. Plant closures were reported in Croatia, Norway, France, Germany, Spain, Turkey, and Russia.

Foam production in Austria, Germany & Switzerland experienced nearly a 9 % fall in production. Foamers in the region that invested early in ecommerce have, in general, outperformed the industry. Consumer demand in the region was weak in the second half of 2018, and a growth in ecommerce has created a move towards lower priced products. According to data from the German Federal Statistical Office for the first ten months of 2018, mattress sales fell by 11 %, sales of upholstered furniture made in Germany fell by 5.7 %, but for manufacturers operating outside of the country the effect was a 1.7 % increase in sales. The automotive industry also reported a 9 % fall in production due to weak domestic demand and much lower exports, especially to China, resulting in reduced demand for foams.

Benelux foamers experienced pressure from imports of competitively priced foams and products from Germany and Eastern Europe. According to Fedustria, upholstered furniture production was down 5.5 % while mattress production only fell by 0.9 % during 2018. The long summer diverted customers from the stores and consumer confidence deteriorated from the summer onwards. Exports to EU neighbouring markets remained relatively stable, while imports from leading suppliers in China and Germany fell by 2.5 %, while those from Poland increased by 3.8 %. On a positive note, Fedustria reported that the industry experienced a 182 % increase in investments which bodes well for the coming years.

Foam production in UK & Ireland only fell by 1.2 % during 2018. This is surprising because overall demand for new furniture was depressed by lack of consumer interest during the hot summer, and an "exceptional downturn" in consumer confidence due to uncertainty over Brexit. The fall in the pound and concerns over jobs led consumers to cut back on spending but also seek out better valued products online. One explanation is that the ecommerce sector has compensated for the lack of sales in retail premises, with internet sales of mattresses accounting for 11 % of the market. The automotive industry suffered a sharp fall in production of nearly 10 %.

Scandinavia, Lithuania and Estonia – this region experienced a decrease of nearly 6 % in production. The decline was not felt across all countries as production shifted from Scandinavia to Eastern European countries. Demand for high-end mattresses was muted in Europe and China as consumers evaluated cheaper online offerings.

Polish foamers reported zero growth in 2018. Polish furniture production is mainly driven by exports, so reduced demand from markets in Northern Europe and a swing to overcapacity stalled growth in production. This is not surprising after several years of exceptionally strong growth. The high prices of TDI in the first half of the year stalled growth. The markets supplied by Polish foamers were highly competitive, leading to production of lower density foams, less viscoelastic and HR foams, despite foamers attempting to improve margins. Production of furniture has also started to move further east into countries such as Belarus. Future growth in the foam and furniture industry will depend upon the industry adopting greater automation, creating innovative designs and developing a strong brand image for "Made in Poland".

Iberia – here foam production declined by 2.5 % in 2018. The region still suffers from overcapacity, which creates strong competition and the need for foamers to focus on export markets. The growth in production capacity in Portugal has led to these manufacturers exporting to Spain as well as market across Europe. In spite of challenging conditions, Iberian foamers remain innovative and very reactive in responding to market needs, whilst also engaging new technology and creating value added products such as mattress cores, sofa bed in a box and

![Fig. 2: Polyether foam production by type in all regions](image-url)
acoustic insulation for buildings. Some foamers have also found success in export markets in North Africa and even the Americas.

**France** – Foam production fell by more than 20% in 2018, this was largely due to a plant closure, combined with a general decrease of around 5% in production of furniture and mattress. The upholstery furniture segment will also have been hit in 2018 by heavy falls in the number of high-end, middle-of-the-range furniture and salon specialists who remain important players in this market, however, the excellent summer resulted in a 4% growth in garden furniture according to the national furniture manufacturers association.

**Italy** – APEF members declared a 4% fall in foam production in 2018 but anticipate a greater fall in 2019. The market was very competitive due to a growth in imports, while the industry continues to struggle with over-capacity. Foam is entering the Italian market from all sides, Hungary, Portugal and Germany and now the Balkans states along the Adriatic coasts see the markets. The trend towards lower foam density continued as end users looked to reduce costs. This is a worrying trend, as it severely reduces the durability and quality of products associated with the "Made in Italy" brand. Most mattress manufacturers offer hybrid mattresses and some have returned to promoting spring mattresses. For the time being e-commerce is not so popular in Italy, but some mattress companies have recently invested in dedicated lines for e-commerce products. In terms of furniture trends, designers are reported to be doing more with less foam.

**Greece, Balkans & Cyprus** – this region reported a huge 33% increase in production, due entirely to increased production in the Balkans, where there has been new equipment installed to meet the latent demand of consumers in the region, as well as exporting across Europe. Greek and Cypriot production remained stable, with Greece still experiencing lower priced imports from neighbouring countries.

**Romania & Bulgaria** – here production fell by just over 5%, but most of the decrease was felt in Bulgaria as smaller foamers felt the effect of high raw material prices and reverted to buying foams. Romania is the fourth largest exporter of upholstered furniture and the fifth largest producer in Europe. France, Germany and Italy account for nearly 50% of its furniture and mattress exports. Growth has been driven almost exclusively by exports and foreign investment from major manufacturers including Polipol, Natuzzi, Parisot and Ada. However, a shortage of local skilled labour is stalling growth and increasing production costs.

**Russia, Kazakhstan, Ukraine & Belarus** – this region, as a whole, experienced a decrease in production of nearly 3%. Russian foamers have also experienced the substitution of foam with pocket springs in both the mattress and upholstered furniture industries. Foam customers have also opted for lower densities. After many years of low levels of investment, Russian foamers are starting the process of optimising production, increasing capacity, improving quality and standardising production, but foam production decreased by 6.5% here due to difficulties in raw material supplies. The weak domestic growth in furniture sales has led to manufacturers looking to export markets. **Kazakhstan** is a leading importer of Russian goods, however, foam production grew by 15%, as newly installed capacity ramped up. The furniture market in Kazakhstan remains undersupplied in terms of number of domestic and foreign enterprises, however, there is a growing consumer base and increase willingness to purchase furniture, typically of Italian or German design.

End users in the **Ukraine** continued to substitute foam with cheaper alternatives. The market is very price sensitive, forcing end-users to switch to springs and polyester fibre. A memory foam pillow has become a luxury item. The furniture industry is showing signs of recovery due to relative political stability, but hopes of replacing low cost products with those of higher value have not been achieved. Foam production in **Belarus** increased by 15% in 2018, but remains small. However, the country has an abundance of forest, relatively low labour costs and proximity to central European markets, making it ripe for development.

**Turkish** foamers reported that foam production was down, but the market was difficult to assess because the impact of high TDI prices and poor domestic demand affected each company differently. Most companies reported similar production volumes in 2018 to those of 2017. In 2018, the Lira currency lost 40% of its value, inflation exceeded 20% and consumer spending nose-dived, vehicle production fell sharply, with some OEMs closing production. TDI import statistics showed a fall of 11%. Whils tonnage may be down, volume may be less affected due to constant reduction in foam density.

**4 Production by foam type**

Data from Europom members illustrates the production of foam by type (Fig. 2). The breakdown into foam families is made according to the foam families used by the CertiPUR certification label. Any foam that does not fit into these categories is included in the "other" types. Other types may include super soft foams, white foams, antistatic foams and other technical foams. The changes show a slight shift from HR and viscoelastic (VE) foams to conventional polyether foams.

**5 North Africa**

Following a decision by Europom members to admit associate members from countries in the CIS, Middle East and Africa, data was collected for foam production in five North African countries. In total, 52 foamers using continuous lines were found to be producing around 140 kt of foam last year.

These five North African countries account for some 35% of the total USD 9.8 billion African furniture market. Even though the average household income < EUR 2,000/year (except Algeria), some investors are expecting growing demand for furniture and bedding from the growing middle classes. Saudi Arabian and Kuwaiti investors are active in the Moroccan
and Egyptian markets as well as Sudan, Senegal, Ghana and Côte d'Ivoire. However, the conditions are challenging for foamers. In most countries the government controls raw material imports, foreign exchange required for payment is heavily controlled, and there is a lack of industrial and transport infrastructure, reduced tourism as well as political instability. However, some foamers produce for internal consumption and produce high quality furniture and bedding for export markets in the Middle East as well as Europe and the USA for whom some are importing CertiPUR foam grades from Europe.

6 Summary and conclusions

Due to the volatility of some raw material price and availability, many end-users report that price has been the main business driver, with customers having only limited interest in innovation. Each foamer has devised a strategy to deal with this situation, resulting in significant shifts of market shares. Widescale substitution of PU foam is not yet fully apparent, but HR and VSE foams are being replaced with lower density foams as foam becomes commoditised.

The technology that allows compression of spring mattresses has increased competition in an already overcrowded market. Hybrid mattresses comprising of foams and pocket springs were much in evidence and furniture fairs, but it remains too soon to tell if this is just a passing trend and a means of product differentiation.

The growing e-commerce business has resulted in a lowering of price points and taken some market share from high end, high quality mattresses. Website from e-commerce retailers have convinced consumers that they do not need to spend a lot of money on a mattress to guarantee a good night's sleep. Supply chains are also being shortened by e-commerce retailers who require orders to be processed and shipped within hours. This supply route has led to innovation in the foam industry in terms of faster turnarounds, and the development of foams that are suitable for compression while recovering quickly. According to CSIL, 9% of mattress sales are made through e-commerce, with the major markets found in the UK, Germany and France.

Looking ahead, the slabstock foam industry needs to reverse the trend to lower densities to preserve market share against alternative materials. Foamers need to adapt to their customers' needs by shortening the supply chain and whilst moving towards more integration. There are some strong moves towards finding end-of-life solutions for foam but more needs to be done before future generations decide to buy less or no foam in consumer products.