

*Pharmaceutical packaging  
technology – focus on Italy*

## Packaging *the Italian way*



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In 2007 the Italian pharmaceutical industry showed a positive growth trend with a 1.9% increase in output, corroborating the positive evolution of the last few years (2003–2006) when the average annual growth rate was 1.4%. This result was obtained with a balance between exports (+7.1%) and imports (+7.0%) and an increase in internal demand (+2.2%).

These figures are reported in a recent study by an Italian institute on the pharmaceutical sector and the related packaging branches. The recorded growth is all the more satisfactory because it is higher than the average growth rates of other segments of the Italian manufacturing industry. In 2007, the pharmaceutical sector achieved a turnover of around €24 billion, confirming Italy's ranking as third in Europe, closely following France and Germany and on a par with the UK.

In terms of worldwide production, Italy ranks amongst the leading nations, coming third after the USA and Japan, the world's top producers. The same study forecasts that, in the next few years, production in Italy will maintain its growth rate, benefiting from internal demand. Given this positive trend, it can be contended that the Italian pharmaceutical sector is one of

the segments where Italy manifests high capacities and impressive innovation.

A valid evaluation of the pharmaceutical industry entails taking into consideration the allied activities, representing all industries with close economic and technological links to the pharmaceutical segment. In this respect, in 2008 the first report on "Osservatorio Pharmintech", the Italian pharmaceutical trade fair, presented the results of the upstream industries of the pharmaceutical sector. According to this report, in 2007 the allied industries, which have a value added of €3.5 billion and over 60 thousand employees, achieved a turnover of €11 billion.

The most important segments of these industries are represented by:

- the chemical industry;
- packaging materials suppliers (glass, plastic, aluminium, cardboard);
- packaging machine producers;
- producers of handling machinery.

With regard to packaging materials, it should be borne in mind that the choice of suitable packaging strongly depends on the physical property of the product (liquid, solid, spray, etc.) and on the substances it contains. Primary packaging must ensure product safety, avoid the risk of its contamination, be easy to open yet at the same time childproof.

In 2007, the total amount of packaging for pharmaceutical products in Italy was estimated to be around 108,000 tons, distributed among the following materials:

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- glass 26% (primary packaging);
- plastics (rigid and flexible multilayer films) 17% (primary packaging);
- aluminium 2.5% (primary packaging);
- cardboard 35% (primary packaging);
- corrugated cardboard 18%;
- others 2%.

Considering the most important pharmaceutical products, the application of the different types of packaging materials is quite apparent, for example:

- injectable liquid products – 100% are packed in glass;
- non-drinkable liquid products – more than 90% in plastic;
- solid products for oral use, more than 90% in blisters made of aluminium or plastic laminated with aluminium;
- spray products, 70% are packed in metal cans, 30% in plastic containers.

### Future trends for packaging materials

Future trends for pharmaceutical packaging materials are governed by three key factors: functional capacity, product safety and eco-sustainability. The first factor reflects the need to increase the level of service to the customer in terms of handling and utilization. The pharmaceutical industry is affected by demographic changes because the percentage of people over 65 years is constantly increasing. Hence, easy-to-open packaging is a must and it is important to offer mono-dose products since they are simpler for older people to use.

In order to combine the right product with the best packaging solution, intensive research is underway to reduce the weight of packaging materials. The tendency is to produce more sophisticated packaging on the one hand, and to reduce the amount of raw materials for packaging to the minimum on the other hand.

The second driver of future trends is product safety, which means that it is becoming increasingly indispensable to ensure product integrity. This explains the importance attributed to strategic cooperation between the pharmaceutical industry and the packaging industry: packaging producers are developing new materials and new solutions with better performance, based on the requirements of the pharma industry.

However, innovation means high investments, long terms for testing and approval and also suitable machines for packaging. In this context, it is vital for packaging companies to have a clear understanding of the pharmaceutical industry's needs and to maintain good R&D departments in order to minimize the number of tests to achieve optimum results. To cite just one example, in the last few months a novel, highly innovative type of packaging has appeared on the European market which will also be available in

Italy in the next few months: a traditional blister packed in a plastic box instead of the conventional cardboard folding box. This solution accomplishes various goals: it reduces the risk of damage to the box and thus ensures more effective product safety and simpler handling.

Research is strongly engaged in the field of blisters with active barriers: drying or adsorber additives are well known for bottles, but are not used for blister structures. Many studies target developing plastic blisters with an active barrier to oxygen and vapour.

Last but not least, the important factor of eco-sustainability: many pharmaceutical companies are working with their suppliers to reduce the weight of packaging, which mainly concerns secondary packaging. This need stems from a problem experienced worldwide: the increase in the amount of goods circulating generates an increase in the amount of packaging to be disposed of at the end of the life cycle of the product. Reducing the weight is one means of reducing the problem, while at the same time reducing costs for pharmaceutical companies.

It is safe to say that packaging is steadily assuming an important role in the chain of pharma products and is now one of the key issues in new product development. Italy is one of the leading manufacturers of packaging machines for pharmaceutical products. According to data from UCIMA (Italian association of packaging machine producers) and the US Department of Commerce, Italy is the world's second biggest producer of packaging machines, following Germany and ahead of the USA. Efficiency and flexibility are the two main drivers for Italian machine producers.

### From versatile machines to specialized machines

Currently the market trend is moving from versatile machines that can work with different structures and different conditions to very specialized, high-speed production machines designed for rapid set-up-changes. High technology is a special case: huge investments have been made in robotic solutions, but they have paid off. One example is high-speed picking robots with carbon-fibre arms and an integrated vision system that are able to pick bulk items from a conveyor belt and package them with impressive production efficiency (100 items per minute). Another example of a high-tech solution is a machine for filling and closing bottles in a sterile environment, which also achieves a high production output.

In conclusion, there is no question that Italy is a country whose integrated packaging culture (from technology suppliers to materials suppliers to the pharmaceutical industry) has produced outstanding efficiency in pharmaceutical production and packaging. ■