

*This review is presented by The Ukrainian Glassworks Association "Sklo Ukrayiny" ("The Glass of Ukraine")*

**The Ukrainian Glassworks Association “Sklo Ukrayiny” (“The Glass of Ukraine”)** is a union of glass-dealing companies officially found on November 10, 1997. UGA has over fifty member companies comprised of the leading Ukrainian producers of glassware, glass containers, and technical glass as well as manufacturers of equipment and glass industry-related companies.

The Association’s goal is to coordinate the industries glass manufacturing activities by creating a favorable legal and legislative environment for glass-related companies and representing their members’ interests to state and local authorities.

The main tasks of the UGA are the following:

- Establishing and cultivating professional links between glass-related companies by engaging them in Association events
- Scientifically and technically-based improvement of glass manufacturing in order to advance the industry as a whole
- Increasing specialists’ professional competency and arranging relevant events for improving their level of qualification
- Launching research programs with corresponding specialized faculties focused on studying and solving the industry’s manufacturing and technological problems
- Separately or jointly organizing activities for programs aimed at local glass industry development and involving relevant governmental bodies in participating in the creation of normative documents
- Providing assistance in the creation and realization of investment projects

The Association receives information from state executive bodies and local authorities and responds in a timely fashion. It also arranges seminars, congresses, conferences, and exhibitions while also engaging various domestic and foreign companies and individuals in their operation.

The UGA strives for constant and mutual cooperation between the Association’s members. Cooperation results in an exchange of valuable information with the purpose of monitoring the glass market, which is essential for launching anti-dumping investigations and applying the appropriate quota for imported glassware, acknowledging the glass industry as one of the primary ones for the state’s economic development. This goal can be achieved by participating in common manufacturing programs together with industrial enterprises—members of the Industrial Policy Ministry of Ukraine as well as other ministries. It also includes the creation of a new qualified staff training system for the industry and a corresponding growth in educational institutions’ proficiency level by means of engaging them in solving actual problems of glass company methodologies and facilities.

The Association has completed a pilot project “Organization of Gathering and Recycling Glass Cullet in Kyiv and Kyiv Region”; prepared and authorized a report on the *Methodological Recommendations for Planning, Registration, and Calculation of Glass Industry Product Labor and Cost Pricing*; and also performed a glass sector forecast on the impacts of Ukraine’s accession to the WTO.

The UGA has begun working with the Ukrainian Industrial Ministry and has set up ongoing events to deal with issues concerning customs taxes and other demands

presented by WTO members. Furthermore, in accordance with paragraph 33 of the Law of Ukraine “On Protection Against Unfair Competition”, the Association has created the Unfair Competitor Project.

As an act of public recognition the President of Ukraine issued a decree which acknowledged “Glass-Maker’s Day”, a professional holiday, that is celebrated annually on November 19th.

The UGA participates in developing specialized events together with glass container consumers in order to formulate internal standards for increasing Ukrainian glass producers’ competitiveness while also taking into account Ukraine’s intention to enter the WTO and EU. In close collaboration with the Research Institute of the Ukrainian Economics and European Integration Ministry, the Association works on ensuring optimal tax legislation for the glass industry. All kinds of internal standards, such as GOSTs, OSTs, TUs, and other regulatory documents connected to glass manufacturing are adapted to the requirements of the EU and WTO. The Association contributed to creation of awards such as the “Best Glass-Maker of Ukraine” and “Honored Worker” titles in order to recognize outstanding achievements in the industry.

Currently, there are 56 companies on the Association’s roster. Among them are glass manufacturers (JSC Gostomel Glassworks, CJSC Kostopol Glassware Factory, CJSC Consumers-Sklo-Zorya, LLC Buchansky Glass Container Factory, CJSC Kyiv Glass Container Factory), research institutes (JSC Research Institute of Special Casting Methods, LLC Projecting and Technological Institute of Glass and China), refractory materials producers (JSC Krasnoarmeysk Silica Brick Plant), insurance companies (REZERV), and others. A number of foreign companies from France, Sweden, Greece, Italy, and Germany participate in the Association, giving it an international quality.

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## *Introduction*

In recent years, the manufacturing of **glass and glassware** in Ukraine has been developing dynamically, internal consumption has increased, product range improved, and there has been a considerable transformation of the institutional and competitive environment.

A steady increase in production volume is observed in most sectors of the Ukrainian glass industry. The trend is particularly obvious in the sphere of **end-product manufacturers (such as glass containers, glass fiber, various types of glassware)**. This trend can be explained by active internal demand and an increasing volume of glass products being consumed by the food industry, construction sector, and commodities producers.

According to the State Statistics Committee of Ukraine, there are over 270 companies in Ukraine which are engaged in producing glass and glass products. It's worth mentioning that this number includes both specialized enterprises with glass manufacturing being their primary activity and companies which produce glass and glass products as secondary materials for performing their major market activities.

Most members of the industry are characterized by their **high activity in investing and development** which results in plant-by-plant change or reconstruction, installing new technologies and equipment which is able to control quality of raw materials and end products. It should be pointed out here that this process progresses in an uneven flow and is defined by financial and investing abilities of both the enterprises and their owners.

## *Flat Glass in Ukraine: The Market Structure*

The flat glass market in Ukraine in 2005 has continued **developing and being segmented**. The main factors that influence the maturing of the Ukrainian flat glass market are the following:

- Increasing residential and industrial construction
- Evolving state policy in energy and construction industries
- Creating marketing conditions which will ensure the competitiveness of local flat glass producers
- Producing new types of glass

Four flat glass manufacturers in Ukraine were analyzed:

- **CJSC Lysychansk Glassworks Proletariy**
- **LLC Stroysteklo**
- **JSC Lvov Mechglassworks**
- **LLC Buchansky Glassware Factory**

**CJSC Lysychansk Glassworks Proletariy** nowadays is the only Ukrainian factory that produces high-quality flat glass using the Float Method.

The other three factories manufacture flat glass using a vertical drawing method (Fourcault's Method). JSC Lvov Mechglassworks ceased manufacturing flat glass in August, 2005. The quality of Fourcault glass is lower than that of float glass, and it cannot be applied, for instance, in double-glazing units.

**Table 1: Flat Glass Production Dynamics in Ukraine (2002-2005), mln m<sup>2</sup>**

<b>Types of flat glass</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Cast, rolled, blown, sheet, or profiled glass	23,209	13,289	9,069	8,680
Float glass or sheet glass with ground or polished surface	3,428	7,996	16,745	15,552

*Source: State Statistics Committee*

Table 2 illustrates two main tendencies:

- Production of glass manufactured using vertical drawing method continually decreases
- Production of float glass steadily increases

Starting from 2002, production of **sheet cast glass** gradually decreases and by 2005 its production rate was 8.68 mln m<sup>2</sup>, 2.7 times less than in 2002 and 4.2% less than in 2004. Meanwhile, **float glass** production expanded 4.5 times from 2002 to 2005, equal to 15,552 mln m<sup>2</sup>.

In 2005 the actual local flat glass market capacity in Ukraine continued to expand rapidly. However, the intensive expansion dynamics were ensured by the accelerated imports of the products into the Ukrainian market (see Table 2).

**Table 2: Balance Between Production and Consumption of Flat Glass in Ukraine (2002-2005)**

<b>Year</b>	<b>Production rate, mln m<sup>2</sup></b>	<b>Exports, mln m<sup>2</sup></b>	<b>Imports, mln m<sup>2</sup></b>	<b>Internal consumption rate, mln m<sup>2</sup></b>
2002	23,522	11,380	3,914	16,056
2003	21,285	7,561	4,955	18,679
2004	25,814	8,270	8,250	25,790
2005	24,230	7,822	13,947	30,355

As Table 2 shows, the dynamics of the actual local flat glass consumption rate in Ukraine are characterized by an **upward tendency**. In 2005, the calculated flat glass consumption rate made 30,355 mln m<sup>2</sup>, exceeding the 2004 rate by 18%.

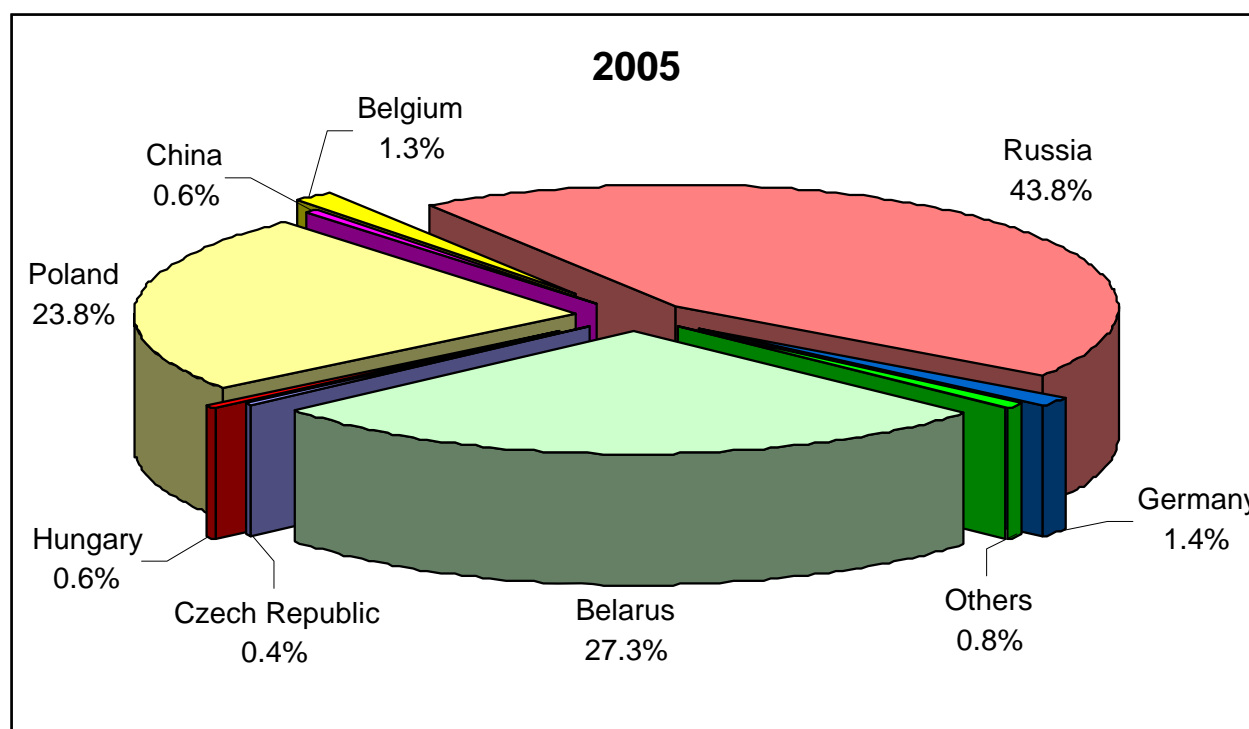
The share of imported products on the local market accounted for a 45.9% share (up from 32% in 2004). Foreign deliveries declined in comparison with 2004 at 0.448 mln m<sup>2</sup>, or 5.5%. The export-import ratio was 1:1.8. Therefore, in terms of Ukraine's external flat glass turnover, a steady negative foreign trade balance developed.

The active demand in the internal flat glass market to some extent made for a decrease in exports in Ukraine. Export deliveries of all kinds of flat glass from Ukraine in 2005 were characterized by their **downward dynamics**. Exports of cast and rolled glass in 2005 decreased by 23% compared to the previous year. Decreasing rates for drawn sheet glass and float glass were 10% and 6%, respectively. The largest share of exported flat glass belonged to float glass and polished glass (84% of overall export

deliveries). The main importers of Ukrainian glass within the analyzed period were **Russia** (52.3%), **USA** (17.6%), **Moldova** (10.5%). At present, a considerable shortage of locally-made high-quality flat glass is observed in Ukraine.

The main share of flat glass imported to Ukraine consists of high-quality glass. In the whole scope of delivered products, the largest share belonged to the products of world leading players, such as **Glaverbel** (Belgium), **Saint-Gobain** (France), **Pilkington** (Great Britain), and **Guardian** (USA). The major importing countries which supplied float glass to Ukraine in 2005 were **Belarus, Russia, Germany, Belgium, Poland, Hungary, and China** (see Figure 1).

**Figure 1: Country-By-Country Imports of Float Glass to Ukraine, %**



Ukraine exports cast and rolled glass only to Russia and Belarus. Whereas, Ukrainian export of float glass has been increasing every year. By 2005, Ukrainian float glass was supplied to eighteen countries.

**The flat glass market in Ukraine continues to build up steadily.** Experts believe that Ukrainian market potential is considerable. Its annual consumption rate is 4.5-5.5 kg of glass per capita. In comparison, the corresponding rate in Poland equals approximately 14 kg, while in Germany it exceeds 40 kg. Consequently, the experts state that in three to four years the Ukrainian flat glass market will continue to expand at a reliable 18-20% per year. It is likely that deliveries of Russian glass products to Ukraine will expand taking into account increasing flat glass production rate in Russia.

The Ukrainian flat glass market shows the following **main tendencies** in 2005:

- All the producers in the industry are characterized by their **investment activity**—plant reconstruction and equipment renewal, applying innovative technologies, installing special machines to control quality of raw materials and ready-made products

- According to the demand rating and consumption growth dynamics, the most forward-looking type of flat glass in Ukraine nowadays is **float glass**
- Noting production volumes and with special attention to the armored glass segment, the most prospective type of flat glass is **tempered glass**
- Production volumes indicate that the most perspective sort of laminated glass is **safety glass**. In the near future, **fireproof glass** will be the most demanded type of laminated glass in Ukraine

The major consumer of flat glass in Ukraine are representatives in **capital construction**. In this sphere, flat glass is applied as a construction element of a buildings' front sides, as well as the main material for glazing and shop windows.

At present in Ukraine, there are no companies producing multifunctional glazing units. This type of glass is imported from various European countries like Finland, Sweden, Poland, and the Czech Republic. Products of leading companies, such as **Pilkington, Guardian, Glaverbel, and Saint-Gobain**, are represented in the Ukrainian market in a wide assortment. The most popular types of glass in Ukraine are:

- Common **clear float**
- **Heat-saving glass** (e.g., Optitherm SN)
- **Tinted and sun glass** with selective coatings

**Double-glazing units** are represented as the main product made of flat float glass for application in capital construction. The second position in flat glass consumption in Ukraine is held by the **automotive industry**.

A large quantity of manufactured glass is used for producing automotive glass. This fact clearly reflects the growing demand at the market, as the number of small enterprises producing automotive glazing is growing steadily. The necessity of producing 1.8-2.5 mm and 4.0-4.5 mm thick float glass and developing special equipment for producing glass that would correspond to the safety demands is obliging the industry to show some flexibility and satisfy the market's requirements.

At present the quantity of glass consumed by Ukrainians is comparatively low, and all West European countries as well as the closest neighbors (Poland, Czech Republic, etc.) exceed Ukraine in this area. For instance, the quantity of double-glazing units consumed in Poland is at least four times larger than that in Ukraine, although the populations of Poland and Ukraine are roughly equal.

Therefore, **the local glass processing market continues to expand. All types of construction glass processing will undoubtedly be prospective and highly demanded in the near future.**

Except **producing double-glazing units** (the main segment in terms of consumption rate), **tempering, all kinds of glass transforming, laminating, and sagging will continue to develop.**

Nevertheless, in our opinion, in the near future, various types of glass for double-glazing units will be in a great demand. Growth in this segment will be determined by increasing industrial and residential construction as well as by replacements of old window blocks with new ones which meet modern requirements for usage in commercial and residential buildings. The activity here will supposedly peak in 2007-2009 and will correlate with the price dynamics for heat and energy supply. Local

production of Low-Emissance (Low-E) glass using magnetron equipment might also be part of this development.

Regarding the segment of **special glass (tinted, reflective, Low-E)**, imported products dominate here. The average annual consumption growth in Ukraine is estimated at 35-40%.

### *Structure of the Glass Container Market in Ukraine*

In Ukraine, the production of glass containers in 2005 was characterized by an **upward tendency** (see Table 3). During 2002-2005, a steady production growth had been observed in the glass container industry. Nevertheless, growth dynamics became less active—it slowed from 23% in 2003 down to 7% in 2005.

**Table 3: Glass Container Production in Ukraine (2002-2005)**

	<b>2002, mln pcs</b>	<b>2003, mln pcs</b>	<b>Growth ratio to 2002, %</b>	<b>2004, mln pcs</b>	<b>Growth ratio to 2003, %</b>	<b>2005, mln pcs</b>	<b>Growth ratio to 2004, %</b>
<b>Production volume of glass containers</b>	2,026.6	2,490.4	23	2,956.1	21.4	31,173.3	7

Within the analyzed period, glass container production was undertaken by the following enterprises: **LLC Artyomovsk Glassware Factory, JSC Biomedsteklo, LLC Buchansky Glass Container Factory, LLC Volnogorskoe Steklo, JSC Gostomel Glassworks, CJSC Consumers-Sklo-Zorya, LLC Perfume and Cosmetics Integrated Works Roso, JSC Poltavsky Medical Glass Factory, CJSC Costopol Glassware Factory, LLC Decor, CJSC Ukrstekloprom, and others.**

The balance of production and consumption of glass containers in Ukraine is given in Table 4.

**Table 4: Glass Container Production and Consumption  
in Ukraine (2002-2005)**

<b>Year</b>	<b>Production volume, mln pcs</b>	<b>Exports, mln pcs</b>	<b>Imports, mln pcs</b>	<b>Internal consumption, mln pcs</b>	<b>Internal market share, %</b>	
					<b>Local products</b>	<b>Imported products</b>
2002	2,026.6	499.1	809.6	2,337.1	65	35
2003	2,490.4	608.1	811.9	2,694.3	70	30
2004	2,956.1	688.7	873.6	3,141.0	72	28

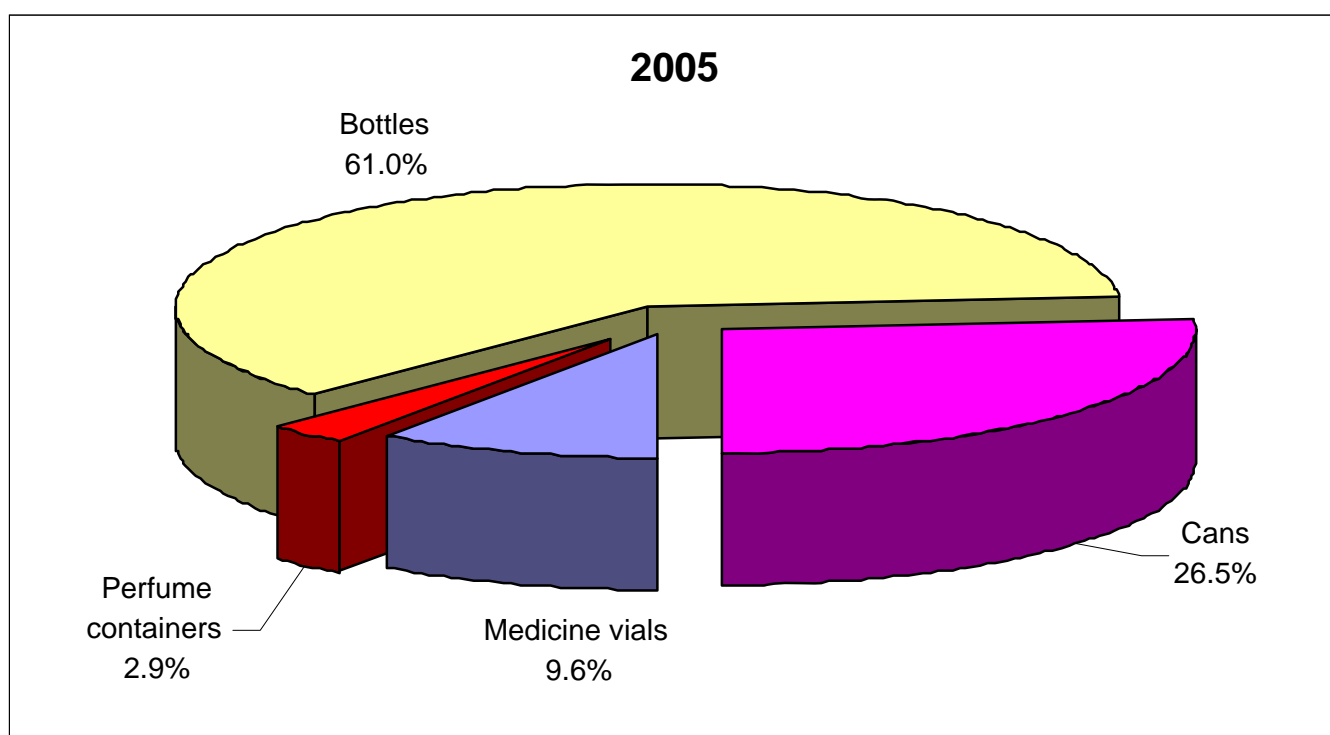
2005	3,173.3	704.9	870.3	3,338.7	74	26
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Therefore, local producers of glass containers satisfy 74% of the Ukrainian market demand for glass containers.

**The main driver for increased glass containers production is the food industry's development level as they are the primary customers for glass containers.**

From a **products range perspective**, the State Statistics Committee's of Ukraine data indicates that glass bottles are the major container produced by the industry. Figure 2 illustrates this fact (though it must be noted that perfume and medical container production data are estimates).

**Figure 2: Share of Different Glass Container Types in Ukrainian Glass Market (2005)**



In 2005, a **specialization tendency** became more evident in the glass container segment. It was followed up by increasing volumes in various segments of assortment specialization and a decreasing, if not a contracting, of manufacturing secondary attendant products. Several major tendencies in the Ukrainian glass container market in 2005 are as follows:

- **Development of exclusive containers segment. Quantity of imported exclusive bottles considerably decreased, so that 70% of the internal demand is supplied by local manufacturers**
- **A tendency of growing demand for small containers—“minions” (50-100 mL capacity).** In Europe, they have acquired a considerable popularity among international airlines, hotels, and as souvenirs
- There are some preconditions in Ukraine for a new trend development—**bottling alcohol drinks in fashionable (simple or fanciful) flasks.**

Experts project that the local market tendency for decorated glass packaging will be in great demand for up to four years

- **At present the most crucial property of a glass container is its lightness**

**Nowadays there is no competition between local and foreign glass container industries, though within the local industry, the competition will be continuously rising. Consequently, the internal Ukrainian glass container market is dynamic, structuralized and divided into segments. It is subject to influence of objective economic laws and business rules as well as unpredictable changes in the external environment. However, as any other market, this one is operated by focused influence on some of its parameters, such as its capacity, accumulating ability, sensitivity, and richness. The market is prospective and has a positive investing attraction on one hand, but on the other, it is not characterized by “fast money”—i.e., short terms of investments recoupment.**

**The external glass container sales turnover** in 2005 increased by 5% in comparison with 2004 and made **USD 52.8 mln (USD 49.9 mln in 2004)**. Overall exports deliveries of glass containers in 2005 were 704.9 mln pieces, 2.4% higher than in 2004. In terms of cost, the export deliveries in 2005 are 3% lower (USD 584,000) than those in 2004. Import deliveries by the end of 2005 accounted for 870.34 mln glass containers, 98.6% higher than in 2004. Their financial turnover was 12.3% higher than in 2004.

Therefore, a foregoing growth of cost parameters was observed in the external trade—this trend being caused by changes of the pricing at external product markets.

Ukrainian macroeconomic parameters have been improving recently. It is most observed in such branches of industry as the food, recycling, wine-making, and perfumery industries, and in a few other major glass products consumer markets. There is evidence for a growing demand in glass containers, which is predicted to increase steadily in the near future. Therefore, glass container production is highly prospective and obviously **attractive for investments**.

New technologies developed for manufacturing of glass with high light permissiveness, strength, heat and sound insulating properties, as well as a high resistance to atmospheric and chemical impacts have become essential due to the realization that glass has potential as an excellent building material.

Special types of glass such as tempered construction, laminated construction, heat-saving, and sun glass, as well as innovative ways of glazing and glass constructing are **not stipulated and standardized by state construction norms of Ukraine**. Failing to correspond to modern tendencies, these norms do not reflect the necessity of applying special and safe glazing units for various types of buildings with different structural peculiarities. It slows down the wide spread use of glass for building construction, reduces the effectiveness of special safety glass applications and optimal architectural solutions. Regulations for applying effective safety glazing solutions on the state level by stipulating special norms and standards is extremely crucial. It will minimize the consequences of damage, catastrophes, earthquakes, fires, acts of terror, especially concerning intensively inhabited areas, and reduce budget and insurance payments.

### *Structure of the Special Glass Market in Ukraine*

**Art glass** is a special type of decorative glass with repeating relief ornaments along one of its sides. It can be flinted, colored, or frosted. Selection of color and ornament is almost boundless enabling a designer to choose the type of glass that best suits the customer's preferences.

At present, glass as a material plays a leading role in the architecture and design together with stone, wood, and metal. In fact, glass exceeds other alternative materials in some operational parameters. It's quite obvious that many architects and designers want to use glass in their work, but they still face several obstacles. The **technical (architectural) glass market** has taken shape and almost completely dispelled reservations to the use of **tempered and bend glass**. However, the situation at **the art glass market** is still complicated. On one side, buyers have to pay more for the brand or the producer's popularity. On the other side, there are offers from private glass-makers whose abilities, however, are not as developed as is needed, while "masters" from abroad are certainly ready to accomplish any possible task for a comparatively low cost, but with questionable quality and few guarantees.

Major producers of art glass in Ukraine are the following factories: **JSC Zaporozhsky Factory of Welding Fluxes and Glassware, JSC Berezhansky Glassworks, LLC Decor (Pesochnoe branch), LLC Guta, Industrial Complex Popasnyansky Glassworks, and others.**

**Table 5: Production Dynamics for Several Special Types of Glass in Ukraine (2003-2005), by physical measurement**

	<b>2003</b>	<b>2004</b>	<b>2005</b>
Drinking glass, except glass ceramics (thsd pcs)	616,710	638,572	678,122
Tableware, household glass, decorative glass (thsd pcs)	46,852	48,844	40,694
Safety glass (thsd m <sup>2</sup> )	2,567	3,334	4,429
Bend glass (thsd m <sup>2</sup> )	4,423	6,283	7,623

There is an **upward dynamic** in Ukrainian art glass production through out 2003-2005. In 2005, 678 mln pieces were produced, 6.2% higher than in 2004. The leader in this segment was **JSC Zaporozhsky Factory of Welding Fluxes and Glassware**. Its share in the total 2005 production volume was 33%, however, this was decrease of 9.8% from the previous year. Similarly, **JSC Berezhansky Glassworks** accounted for 15%, but it too was a lower rate than in 2004.

An analysis of safety glass production dynamics showed that in 2005, 4,429 thsd m<sup>2</sup> of it was produced, 33% higher than in 2004. The most considerable quantities of safety glass were produced by **CJSC Lysychansk Glassworks Proletariy** (76% of Ukraine's total). Positive production rate dynamics were shown by **LLC Master-Steklo, LLC Stekloplastik Ltd, and LLC Orion-Glass.**

The largest producers of bend glass in Ukraine are **LLC Stroysteklo** and **LLC Blik** and in 2005 they accounted for 97% of this segment. The rest was produced by **CJSC Zerkalshchik, Private Plant Gefest, LLC Master-Steklo. LLC Mytos** ceased production of this glass product in 2005.

**The special glass market in Ukraine is still immature, though it has considerable growth potential.**

## *Science and Education*

Within the industry, training and raising the qualification level of glass industry specialists are of great importance. The basic institutions involved are:

- **National Technical University of Ukraine**
- **Kharkhiv Polytechnic University**
- **Lviv National Arts Academy**
- **Costopol Branch of the Technical College of Ukrainian State University for Water Resources and Nature Exploitation**
- **Lviv Polytechnic Institute**
- **Severodonetsk Technological Institute of the Vladimir Dal East Ukrainian National University**

## *Investments into the Glass Industry*

A steady trend towards active investing into the Ukrainian glass industry was observed in 2005. The industry proved to be attractive, prospective, developing, thus engaging Ukrainian and foreign investors. Within the investment structure, the largest share was invested in purchasing and installing new machines and equipment (UAH 177 mln or 66.8%). Another UAH 84 mln was invested in building new capacities.

It must be pointed out that the largest part of these investments was directed to support innovative projects. Installing up-to-date technologies and equipment allows energy costs to be minimized, energy resources to be saved and effectively distributed, increased packaging quality (less weight, more strength, better transparency), glass furnaces productivity increases, reduced costs for raw materials, diminished defects on packaging lines, etc.

Industrial investments were done according to differing arrangements and based primarily on financial capacities of the factories. Some of them are still replacing old equipment, while many factories are focused on enlarging their productive capacities and further automation.

**Due to the interest of multinational companies and major foreign investors, the players of the Ukrainian glass market became more intensely competitive and the new assortments have been introduced.**

Foreign multinational **Saint-Gobain's** acquisition of **CJSC Consumers-Sklo-Zorya** became the industry event of 2005. In January 2005, a Cypriot company, **Uglass Holding Limited**, was permitted to acquire over 50% of the statutory fund of **LLC Buchansky Glass Container Factory**. By the end of February 2006, Swiss Vetropack Group (glass container production for food and beverage industry) acquired 75% of the **JSC Gostomel Glassworks** shares. Vetropack Holding AG owns companies in Switzerland, Austria, the Czech Republic, Slovakia, and Croatia.

The investment attractiveness of the Ukrainian glass container industry is underscored by a number of acquisitions (or intensions for acquisition) of operating factories by foreign companies. In 2006, a Slovak company intends to start building a new factory with a capacity of 450 mln glass pieces per year in **Krasnoperekopsk (CJSC Krasnoperekopsk Glass Container Factory, AR Krym)**. The Slovaks (the name of the company has not been announced yet) plan to invest USD 50 mln.

Generally, the competitive landscape of the glass market is not homogeneous. There is a group of industry leaders holding near-monopoly positions in definite segments of the market and possessing **a higher level of technological, trading, and pricing competitiveness**. These factories' share in the industry structure is less than 5%, at the same time these factories produce over 75% of the total industry product volumes. This category of factories already has some advantages in terms of competitiveness on the internal market and their task lies in holding and developing these advantages within the framework of an increasingly competitive environment. The rest of the factories will probably not survive this new competitive environment. These companies largely possess only regional and temporal advantages. Only companies responsive to the developing internal market dynamics will be able to maintain and better their positions in the coming years.