Flat Glass in China

Industry Study with Forecasts for 2016 & 2021

Study #2930 | November 2012 | $5400 | 229 pages
Table of Contents

EXECUTIVE SUMMARY

MARKET ENVIRONMENT
General ........................................ 4
Economic Overview .......................... 5
Recent Economic Performance .......... 5
Economic Outlook .......................... 7
Demographic Overview ................... 11
Population .................................. 12
Households .................................. 14
Consumer Trends ........................... 15
Personal Income & Expenditures ........ 16
Consumer Financing ....................... 18
Currency Exchange Rates ................. 21
Building Construction Outlook .......... 24
Industrialization & Manufacturing Trends 27
Solar Industry Outlook ..................... 30
Electrical/Electronics Sector Outlook .... 32
Motor Vehicle Outlook .................... 34
Regulatory & Environmental Trends .... 36

OVERVIEW
General ....................................... 38
Pricing Patterns ............................. 41
International Environment .............. 43
Foreign Trade .............................. 44
Primary Flat Glass ......................... 44
Fabricated Flat Glass ...................... 46

PRIMARY FLAT GLASS
Supply & Demand .......................... 49
Float Glass ................................. 52
Float Glass Production Capacity ......... 55
Unfabricated Applications ............... 60
Fabricated Glass Manufacturing ...... 61
Sheet Glass .................................. 64
Unfabricated Applications ............... 67
Fabricated Glass Manufacturing ...... 68

FABRICATED FLAT GLASS
Supply & Demand .......................... 70
Safety Glass .................................. 72
Tempered .................................... 74
Laminated .................................... 76
Insulating Glass ............................ 78

MARKETS
Mirrors ........................................ 80
Silver Mirrors ............................... 81
Aluminum Mirrors ......................... 82
Advanced Fabricated Mirrors .......... 82
Other Fabricated Glass ................... 83
Photovoltaic Glass ......................... 84
Conductive Glass ......................... 85
All Other Glass ............................ 85

REGIONAL DEMAND
Southwest .................................... 148
Overview ................................... 148
Flat Glass Demand ......................... 149
Northwest ................................... 151
Overview ................................... 151
Flat Glass Demand ......................... 152

INDUSTRY STRUCTURE
General ....................................... 154
Industry Composition ..................... 155
Market Share ............................... 157
Marketing & Distribution ................. 160
Financial Issues & Requirements ..... 161
Acquisitions & Divestitures ............ 163
Cooperative Agreements ................. 164
Foreign Participation in the Chinese Market 167
Legal & Regulatory Issues .............. 167
Joint Ventures ............................. 169
Wholly Owned Foreign Enterprises ... 171
Representative Offices ................. 172

COMPANY PROFILES
Anhui Huaguang Optical-Electrical Material Technology .................. 174
Asahi Glass .................................. 175
China Glass .................................. 177
China Luoyang Float Glass Group ...... 182
CSG Holding ............................... 184
Dezhou Jinghua Group ................... 187
Farun Group ............................... 188
Fuyao Group Glass Industry .......... 189
Guangdong Fu Rui Industrial .......... 192
Guangdong Jiangmen ISN Float Glass ... 194
Hangzhou Glass Group ................. 195
Hebei Daguangming Industry Group ... 196
Hebei Jingnian Group .................... 197
Hebei Yingxin Glass Group ............ 198
Hubei Sanxia New Building Materials .. 199
Intex Glass Xiamen ....................... 200
Jiangsu Xiuxiang Glasswork .......... 201
Jinjing Group ............................. 202
Lanshi Glass Group ....................... 203
Luoyang North Glass Technology .... 205
Nanning Float Glass ....................... 206
Nippon Sheet Glass ....................... 207
Qinhuangdao Aoge Group ............ 211
Saint-Gobain ............................... 212

(continued on following page)
Table of Contents

COMPANY PROFILES
(continued from previous page)

SCHOTT AG ........................................ 214
Shanxi Lihu Glass ............................... 216
Sichuan Glass .................................... 217
Taiwan Glass Industry ......................... 218
Wuhan Changli Glass ........................... 221
Xinyi Glass ....................................... 222
Yin Tong Glass ................................... 225
Zhejiang Hehe Holding ......................... 226
Other Companies Mentioned in Study .... 228

List of Tables/Charts

EXECUTIVE SUMMARY
1 Summary Table ................................ 3

MARKET ENVIRONMENT
1 Gross Domestic Product of China ...... 11
2 Population of China ......................... 13
3 China Population of China by Age, 2001-2021 14
4 Personal Income & Expenditures in China 18
5 Interest Rates in China, 2001-2011 . 21
6 Currency Exchange Rates, 2001-2011 23
7 China Chinese Currency Exchange Rates, 2001-2021 24
8 Building Construction Expenditures in China .... 27
9 Manufacturing Value Added in China . 30
10 Electrical & Electronic Value Added in China .. 34
11 Motor Vehicle Outlook for China ..... 36

OVERVIEW
1 Flat Glass Demand in China by Product .......... 40
2 Flat Glass Pricing Patterns in China ... 42
3 Chinese Foreign Trade in Primary Flat Glass ...... 46
4 Chinese Foreign Trade in Fabricated Flat Glass .... 48

PRIMARY FLAT GLASS
1 Primary Flat Glass Supply & Demand in China .... 52
2 Float Glass Supply & Demand in China .......... 55
3 Float Glass Production Capacity in China, 2011 .... 58
4 Float Glass Demand in Unfabricated Applications in China ... 61
5 Float Glass Demand in Fabricated Manufacturing in China .... 63
6 Sheet Glass Supply & Demand in China .......... 66
7 Sheet Glass Demand in Unfabricated Applications in China .... 68
8 Sheet Glass Demand in Fabricated Manufacturing in China .... 69

FABRICATED FLAT GLASS
1 Fabricated Flat Glass Supply & Demand in China .... 72
2 Safety Glass Supply & Demand in China ......... 74
3 Tempered Safety Glass Supply & Demand in China ...... 76
4 Laminated Safety Glass Supply & Demand in China ...... 77
5 Insulating Glass Supply & Demand in China ....... 79
6 Mirror Supply & Demand in China ....... 81
7 Other Fabricated Flat Glass Supply & Demand in China .... 84

MARKETS
1 Flat Glass Demand in China by Market .......... 90
2 Flat Glass Demand in China by Market, 2011 ....... 91
3 Architectural Market for Flat Glass in China ......... 94
4 Residential Market for Flat Glass in China ......... 96
5 Nonresidential Market for Flat Glass in China .... 100
6 Motor Vehicle Market for Flat Glass in China ..... 103
7 Motor Vehicle Original Equipment Market for Flat Glass in China .... 105
9 Furniture Market for Flat Glass in China .......... 111
10 Electronic Display Market for Flat Glass in China .... 114
11 Other Markets for Flat Glass in China ..... 116

REGIONS
1 Population & Households in China by Region ...... 122
2 Gross Domestic Product of China by Region .......... 123
3 Per Capita Disposable Personal Income in China by Region ... 125
4 Building Construction Expenditures in China by Region ...... 126
5 Manufacturing Value Added in China by Region ...... 128
6 Motor Vehicle Park & Production in China by Region ........ 130
7 Flat Glass Demand in China by Region ........ 132
8 Central-North Region of China: Flat Glass Demand .......... 135
9 Central-North Region of China: Flat Glass Demand .......... 137
10 Central-East Region of China: Flat Glass Demand .......... 142
11 Other Markets for Flat Glass in China .......... 144
12 Central-South Region of China: Flat Glass Demand .......... 147
13 Central-South Region of China: Flat Glass Demand .......... 149
14 Central-South Region of China: Flat Glass Demand .......... 150
15 Southwest Region of China: Flat Glass Demand .......... 152
16 Southwest Region of China: Flat Glass Demand .......... 153

INDUSTRY STRUCTURE
1 Revenue Data: Selected Flat Glass Companies, 2011 ..... 156
2 Selected Acquisitions & Divestitures .... 164
3 Selected Cooperative Agreements ... 166
Sales of flat glass in China will be stimulated by growth in building construction expenditures, advances in the production of motor vehicles and solar panels, and increasing income levels.

Demand to grow more than 8% annually through 2016

Demand for flat glass in China is forecast to rise 8.2 percent per year through 2016 to 3.4 billion square meters. Sales of flat glass will be driven by growth in building construction expenditures and advances in motor vehicle and solar panel production. In value terms, flat glass demand is forecast to increase 13.9 percent per year to ¥250 billion in 2016. Ongoing industrialization, rising income levels, and further population and household growth will benefit flat glass sales.

Demand shifting to higher quality products

Two major trends are expected to affect the flat glass industry over the next 10 years. First, demand for float glass is forecast to increase at the expense of demand for lower quality sheet glass. Second, demand for fabricated flat glass products is forecast to continue to rise as they are more often favored over unfabricated products in building applications and as rapid growth is expected in fabricated glass markets such as solar energy and electronic displays. By 2021, fabricated flat glass will record nearly half of total flat glass demand in China.

Fabricated glass products to grow most rapidly

Unfabricated float glass will remain the largest product category through 2016, with demand rising 6.6 percent yearly to 1.5 billion square meters. Advances will be spurred by healthy growth in building construction activity, especially in rural areas, and relatively low product prices.

Demand for safety glass will advance nearly 15 percent annually through 2016, as demand benefits from rising income levels and growth in new construction, as well as from greater output of motor vehicles, solar panels, and furniture.

Demand for insulating glass is forecast to grow 15.5 percent annually through 2016, boosted by growth in construction of residential and commercial buildings, schools, and hospitals, which use vast amounts of flat glass in their designs.

Architectural market still dominant for flat glass

The architectural market accounted for just under four-fifths of flat glass demand in 2011. Advances for flat glass in the architectural market will be bolstered by rising income levels, further urbanization, and government efforts to improve living conditions for low-income earners. The solar panel market is forecast to see the fastest gains through 2016. Sales will be driven by strong increases in production of solar panels. The electronic display market will see the next fastest growth, with demand being lifted by expanding output of electronic goods in China, the presence of new glass-using products, and heightened personal income levels.
PRIMARY FLAT GLASS

Unfabricated Applications
Float glass used in unfabricated applications is defined as float glass without any deep processing after cooling from its molten state. The total unfabricated float glass demand reached 1.1 billion square meters in 2011. Demand rose 10.6% annually over the 2006-2011 period driven by rising building construction expenditures. Single pane windows in the architectural market account for most of the demand for unfabricated float glass.

Unfabricated float glass sales are expected to grow 6.6% per year through 2016 to 1.5 billion square meters. The government’s drive to provide affordable housing will fuel growth. In value terms, product sales will increase 8.2% annually through 2016 to ¥29.2 billion. Sales will be driven by increasing product quality; however, the phasing out of low-end float and sheet lines will limit growth to some extent. In addition, the rising popularity of fabricated flat glass will hinder growth as an increasing portion of float glass will be fabricated. Residential and commercial buildings that previously used unfabricated float glass will shift toward fabricated products.

Float glass can be clear or colored. It is directly used in windows and doors in many applications in China, with the architectural market accounting for more than 90% of total float glass demand in unfabricated applications in 2011. Float glass is more transparent than sheet glass. This advantage allows primary float glass to be installed in double panes in windows and doors. Float glass is widely utilized in northern China (especially in the Northeast), where double-pane windows are commonly installed in residential buildings. In addition, float glass is also used as window glass among more price-conscious consumers in urban areas. The thicknesses of float glass used in windows in China are about 3-5 millimeters. Float glass is directly used in picture frames, advertising signs, building decorations (e.g., tile backsplash), and other glass products.

<table>
<thead>
<tr>
<th>Item</th>
<th>2001</th>
<th>2006</th>
<th>2011</th>
<th>2016</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Constr Exp (bil 2010¥)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sq m fabricated/ml ¥ construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fab Glass Demand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Glass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulating Glass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mirrors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Fabricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¥/sq m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabricated Flat Glass Demand (mil ¥)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ net exports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabricated Flat Glass Shpts (mil sq m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sq m primary/sq m fabricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Flat Glass used in Fab (mil sq m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table V-1

FABRICATED FLAT GLASS SUPPLY & DEMAND IN CHINA
(million square meters)

Chart VIII-1

FLAT GLASS MARKET SHARE IN CHINA
(130.5 billion yuan, 2011)
**Nanning Float Glass Company Limited**
No. 8, Zhuangjin Road
Nanning, Guangxi
China
86-771-483-4408
http://www.nfg.com.cn

Annual Sales: ¥330 million [US$46 million] (verified by company, 8/12)
Employment: 1,000 (verified by company, 8/12)

Key Products: Float, reflective, mirror, and bending glass

Nanning Float Glass is a privately held manufacturer of float, reflective, and other types of processed glass. The Company operates a plant in Nanning, China that has two float glass production lines with a combined annual output of 225,000 metric tons. Products are sold in the Asia/Pacific region, North America, the Middle East, and Europe.

The Company participates in the Chinese flat glass industry through the manufacture of float, reflective, and other types of glass. Float glass is available in thicknesses ranging from 3 millimeters (mm) to 19 mm. In addition, Nanning Float Glass’ float glass is made in clear types and colors such as dark green, blue-gray, bronze, light gray, and European gray. Reflective glass from the Company is designed to provide energy savings in a variety of decorative, furniture, and architectural building applications. This reflective glass is offered in a range of colors, including ocean blue, light blue, silver-blue, dark green, French green, and dark gray. Other types of glass manufactured by Nanning Float Glass comprise mirror and bending glass.
**Order Information**

**Five Convenient Ways to Order**

**ONLINE:** www.freedoniagroup.com

**MAIL:** Print out and complete the order form and send to The Freedonia Group (see address at the bottom of this form)

**PHONE:** Call toll free, 800.927.5900 (US) or +1 440.684.9600

**FAX:** +1 440.646.0484 (US)

**EMAIL:** info@freedoniagroup.com

---

**Free Handling & Shipping**
There is NO charge for handling or UPS shipping in the US. Expect delivery in 3 to 5 business days. Outside the US, Freedonia provides free airmail service. Express delivery is available at cost.

**Orders Outside of the US**
Checks must be made payable in US funds, drawn against a US bank and mailed directly to The Freedonia Group. For wire transfers please contact our customer service department at info@freedoniagroup.com. Credit cards accepted.

**Save 15%**
If you order three (3) different titles at the same time, you can receive a 15% discount. If your order is accompanied by a check or wire transfer, you may take a 5% cash discount (discounts do not apply to Corporate Use Licenses).

---

**Corporate Use License**
Now every decision maker in your organization can act on the key intelligence found in all Freedonia studies. For an additional $2600, companies receive unlimited use of an electronic version (PDF) of the study. Place it on your intranet, e-mail it to coworkers around the world, or print it as many times as you like.

**Click here to learn more about the Corporate Use License**

---

**Order Form**

<table>
<thead>
<tr>
<th>Flat Glass in China</th>
<th>$5400</th>
</tr>
</thead>
</table>

- **Corporate Use License (add to study price)** *
- **Additional Print Copies @ $600 each** *
- **Enclosed is my check (5% discount)** drawn against a US bank and payable to The Freedonia Group, Inc., in US funds (Ohio residents add 7.75% sales tax)
- **Bill my company** □
- **American Express** □
- **MasterCard** □
- **Visa** □

**Name** ____________________________
**Title** ____________________________
**Company** ____________________________
**Division** ____________________________
**Street** ____________________________
**City/State/Zip** ____________________________
**Country** ____________________________
**Phone** ____________________________
**Fax** ____________________________
**Email** ____________________________

**Credit Card #**
**Signature** ____________________________

**MM** □
**YY** □

**Expiration Date**

---

- **Individual Use License Agreement**
The undersigned hereby represents that the above captioned study will be used by only ___ individual(s) who are employees of the company and that the study will not be loaded on a network for multiple users. In the event that usage of the study changes, the Company will promptly notify Freedonia of such change and pay to Freedonia the appropriate fee based on Freedonia’s standard fee schedule then in effect. Note: Entire company corporate use license, add $2600; one additional user, add $600; two additional users, add $1200; three additional users, add $1800.

**Signature** ____________________________

---

**Corporate Use License Agreement**
The above captioned study may be stored on the company’s intranet or shared directory, available to company employees. Copies of the study may be made, but the undersigned represents that distribution of the study will be limited to employees of the company.

**Signature** ____________________________

---

The Freedonia Group, Inc. 767 Beta Drive • Cleveland, OH • 44143-2326 • USA • Web site: www.freedoniagroup.com

Tel US: 800.927.5900 or +1 440.684.9600 • Fax: +1 440.646.0484 • e-mail: info@freedoniagroup.com

Page 7
About The Freedonia Group

The Freedonia Group, Inc., is a leading international industry market research company that provides its clients with information and analysis needed to make informed strategic decisions for their businesses. Studies help clients identify business opportunities, develop strategies, make investment decisions and evaluate opportunities and threats. Freedonia research is designed to deliver unbiased views and reliable outlooks to assist clients in making the right decisions. Freedonia capitalizes on the resources of its proprietary in-house research team of experienced economists, professional analysts, industry researchers and editorial groups. Freedonia covers a diverse group of industries throughout the United States, the emerging China market, and other world markets. Industries analyzed by Freedonia include:

- Chemicals • Plastics • Life Sciences • Packaging • Building Materials • Security & Electronics • Industrial Components & Equipment • Automotive & Transportation Equipment • Household Goods • Energy/Power Equipment

Freedonia Custom Research

Freedonia Custom Research delivers the same high quality, thorough and unbiased assessment of an industry or market as an industry study. Since the research initiative is based upon a company’s specific needs, companies harness Freedonia’s research capabilities and resources to answer unique questions. When you leverage the results of a Freedonia Custom Research engagement, you are able to obtain important answers to specific questions and issues associated with: mergers and acquisitions, new product launches/development, geographic expansion, entry into new markets, strategic business planning, and investment and funding decisions.

Freedonia Custom Research is ideal for companies seeking to make a strategic difference in the status quo and focus on future business growth. Working side by side with clients, Freedonia’s team is able to define a research project that is custom-tailored to answer specific questions and provide the basis from which a company can make informed business decisions.