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Advanced Glass Market – Global Industry Size, Share, Trends, Opportunity, and Forecast Segmented By Function (Safety & Security, Solar Control, Optics & Lighting and High Performance), By Product Type (Coated Glass, Laminated Glass, Toughened Glass and Ceramic Glass), By End Use Industry (Building & Construction, Aerospace & Defense, Automotive, Electronics and Others), By Region, By Competition Forecast & Opportunities, 2018-2028

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Abstracts

The Global Advanced Glass Market was valued at USD 68.57 billion in 2022 and is growing at a CAGR of 6.02% during the forecast period. The rapid expansion of the construction industry has led to a surge in demand for advanced glass, consequently driving global market growth. Moreover, the thriving automotive sector is expected to further propel market expansion. Additionally, the growing need for enhanced infrastructure due to rapid urbanization serves as a catalyst for market growth. Nonetheless, the high costs associated with installing advanced glass may impede market growth in the near future. Furthermore, stringent government regulations pertaining to energy-efficient products and the increasing preference for renewable resources offer promising opportunities for key players in this industry.

Key Market Drivers

Increasing Demand for Energy-Efficient Buildings

One of the key drivers behind the growth of the global advanced glass market is the

increasing demand for energy-efficient buildings. As concerns regarding climate change and energy conservation continue to gain momentum, there is a significant push towards constructing environmentally sustainable structures. Advanced glass plays a pivotal role in achieving this objective by enhancing the energy performance of buildings.

Energy-efficient windows and fa?ades are essential components of green building design. Advanced glass products, such as low-emissivity (low-E) glass, vacuum-insulated glass, and smart glass, are engineered to improve thermal insulation and reduce heat transfer. These features contribute to the regulation of indoor temperatures, reduction in heating and cooling costs, and minimization of the carbon footprint of buildings.

In addition to their thermal properties, advanced glass products offer daylighting benefits as well. Spectrally selective coatings allow natural light to enter while blocking harmful UV radiation and excessive heat. This not only reduces the need for artificial lighting but also creates a more comfortable and productive indoor environment.

Moreover, advanced glass products often meet or exceed energy efficiency standards and certifications like LEED (Leadership in Energy and Environmental Design). As architects, builders, and property owners aim to construct sustainable and energy-efficient buildings, the demand for advanced glass continues to rise, driving growth in the global market.

Expanding Automotive Industry and Technological Advancements

The global automotive industry plays a significant role in driving the growth of the advanced glass market. As automakers strive to enhance vehicle safety, comfort, and aesthetics, advanced glass technologies are becoming increasingly integral to modern automobiles.

One key driver within the automotive sector is the growing demand for lightweight materials to improve fuel efficiency and reduce emissions. Advanced glass products, including ultra-thin glass and chemically strengthened glass, offer the advantage of reduced weight without compromising on strength and safety. Lightweight glass contributes to improved fuel economy and overall vehicle performance.

Furthermore, the integration of advanced technologies in vehicles, such as heads-up displays (HUDs), augmented reality windshields, and advanced driver assistance

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systems (ADAS), relies on specialized advanced glass materials. These technologies enhance the driving experience, improve safety, and provide critical information to drivers, thus driving the market's growth.

Moreover, the adoption of electric and autonomous vehicles is rapidly increasing, presenting new opportunities for advanced glass. Electric vehicles often require advanced glass solutions to reduce interior noise and improve thermal management. Autonomous vehicles also benefit from advanced glass technologies for sensor integration and enhanced communication.

The ongoing technological advancements in the automotive industry, coupled with consumer demand for advanced features and aesthetics, are fueling the widespread use of advanced glass materials in vehicles worldwide.

Growing Consumer Electronics and Display Markets

The consumer electronics and display markets are experiencing robust growth, with advanced glass playing a fundamental role in these industries. This growth is primarily driven by the increasing adoption of smartphones, tablets, televisions, and other electronic devices that feature high-resolution displays and touch-sensitive screens.

A key driving factor behind the demand for advanced glass in consumer electronics is the necessity for durable and scratch-resistant surfaces. Advanced glass products, such as chemically strengthened glass and Gorilla Glass, are utilized to safeguard delicate electronic displays against scratches, impacts, and everyday wear and tear.

Furthermore, advanced glass significantly contributes to enhancing the visual quality of displays. The preference for ultra-thin glass with high optical transparency and reduced reflection is evident in touchscreens and high-definition displays. These characteristics greatly contribute to improved user experiences and the representation of more vibrant and lifelike images.

Moreover, the increasing trend towards larger, curved, and flexible displays in smartphones and televisions has necessitated the use of advanced glass materials that can bend without compromising structural integrity or display quality.

As the consumer electronics and display markets continue to grow, particularly with the emergence of new technologies like foldable screens and augmented reality devices, the demand for advanced glass is poised to further expand. This makes it a significant

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driver in the global advanced glass market.

Key Market Challenges

High Production Costs and Technological Barriers

One of the significant challenges faced by the global advanced glass market is the high production costs associated with manufacturing advanced glass products. The production of advanced glass often necessitates specialized materials and complex manufacturing processes, resulting in increased expenses. Additionally, the incorporation of advanced features such as coatings, smart functionalities, and energy-efficient properties further contributes to the production cost.

For instance, the manufacturing of high-performance architectural glass with low emissivity (low-E) coatings and insulating properties involves vacuum deposition or sputtering processes, which require costly equipment and materials. Similarly, the production of advanced automotive glass with features like HUD (Head-Up Display) technology or integrated sensors demands advanced manufacturing techniques and materials, thus increasing the overall cost.

Furthermore, the development of advanced glass products faces technological barriers. Extensive research and development efforts are crucial to create new materials and technologies that meet the evolving market demands. Companies must make significant investments in cutting-edge research to stay competitive, which can be resource-intensive.

To address this challenge, companies in the advanced glass industry need to explore cost-effective manufacturing processes, optimize material sourcing, and invest in research and development to drive innovation and reduce production costs. Collaboration with research institutions and government initiatives can also play a vital role in mitigating these challenges.

Environmental Concerns and Sustainability

With the growing global environmental awareness, the advanced glass industry is compelled to tackle environmental concerns and align with sustainability goals. The production of advanced glass entails energy-intensive processes, and certain materials used in coatings and functionalities may have environmental implications.

One significant concern revolves around the carbon footprint associated with manufacturing advanced glass products. The energy-intensive nature of glass production, particularly for high-performance coatings and smart glass technologies, can result in substantial greenhouse gas emissions. This raises inquiries about the sustainability of advanced glass products, particularly in the context of green building practices and eco-friendly automotive trends.

Another environmental challenge lies in the disposal of advanced glass products at the end of their lifecycle. Some advanced glass products contain intricate materials, coatings, or embedded electronics, thereby rendering recycling or disposal more challenging compared to traditional glass.

To address these challenges, the advanced glass industry must prioritize sustainability in both production and disposal processes. This entails investing in cleaner and more energy-efficient manufacturing techniques, reducing waste generation, and exploring recycling methods for advanced glass products. Collaborating with environmental organizations and adhering to emerging environmental regulations remains crucial in this endeavor.

Market Fragmentation and Competitive Pressure

The global advanced glass market is characterized by a significant degree of market fragmentation and fierce competition. A multitude of manufacturers, ranging from large corporations to small enterprises, operate in this sector, offering a diverse array of advanced glass products for various applications, such as construction, automotive, electronics, and aerospace.

This market fragmentation poses challenges in terms of pricing pressure and product differentiation. Consequently, manufacturers often encounter intense competition, resulting in narrower profit margins. Moreover, consumers may find it daunting to navigate through the extensive product offerings, leading to confusion and potential market inefficiencies.

Furthermore, the advanced glass market experiences rapid technological advancements and product innovations. To outperform competitors, companies must engage in continuous research and development efforts, which may be particularly demanding for smaller players with limited resources.

To address these challenges, companies in the advanced glass industry should

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distinguish their products through innovation, quality, and unique features. Strategic partnerships, mergers, and acquisitions can also aid in consolidating market share and enhancing competitiveness. Additionally, focusing on specific niche markets or applications can be a viable strategy to avoid direct competition with larger players and cultivate a loyal customer base.

Key Market Trends

Increasing Emphasis on Sustainable and Energy-Efficient Solutions

One of the prominent trends in the global advanced glass market is the increasing emphasis on sustainability and energy efficiency. This trend is driven by growing environmental concerns, stringent regulations, and a desire to reduce energy consumption in buildings and vehicles.

In the construction sector, advanced glass products are being developed to meet the demand for green and energy-efficient buildings. Low-emissivity (low-E) glass, vacuum-insulated glass, and dynamic or smart glass are gaining popularity due to their ability to enhance thermal insulation, reduce solar heat gain, and optimize natural lighting. These features contribute to reduced heating and cooling costs, lower carbon emissions, and improved indoor comfort. As sustainability certifications like LEED become more prevalent, architects and builders are specifying advanced glass solutions to meet these requirements.

Similarly, in the automotive industry, there is a growing focus on lightweighting to improve fuel efficiency in traditional vehicles and extend the range of electric vehicles. Advanced glass materials, such as thin and lightweight glass, are being used to reduce the overall weight of vehicles while maintaining safety and durability. This trend aligns with the broader goal of reducing the environmental impact of transportation.

Furthermore, advanced glass technologies are being applied to energy-efficient displays and electronics. The use of chemically strengthened glass in smartphones and tablets, for example, not only provides durability but also contributes to sustainability by extending the lifespan of devices and reducing the need for replacements.

To capitalize on this trend, manufacturers in the advanced glass market are investing in research and development to create more sustainable and energy-efficient solutions. They are also working on recycling and disposal methods for advanced glass products to minimize environmental impact throughout their lifecycle.

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Integration of Smart Glass and Advanced Technologies

The integration of smart glass and advanced technologies represents a significant trend reshaping the global advanced glass market. Smart glass, also known as switchable or dynamic glass, possesses the unique capability to adjust its transparency or color in response to external stimuli, such as electricity, heat, or light.

Within the construction industry, smart glass is increasingly employed in architectural applications, including windows, partitions, and facades. It enables convenient control of privacy, glare, and heat gain. For instance, electrochromic windows can automatically tint in response to sunlight, reducing the need for blinds or curtains and optimizing natural light.

In the automotive sector, the integration of smart glass into sunroofs and windows enhances passenger comfort and energy efficiency. Additionally, advanced glass technologies are utilized in augmented reality windshields and heads-up displays (HUDs) to project information directly onto the glass, thereby enhancing driver safety and navigation.

Consumer electronics are also witnessing the transformational impact of advanced glass materials through the development of flexible and foldable displays. These displays utilize flexible glass substrates that can withstand bending without compromising performance. This trend is revolutionizing the design of smartphones, tablets, and wearable devices.

Furthermore, as the Internet of Things (IoT) continues to expand, smart glass is finding its way into connected homes and smart cities, enabling windows to function as information displays or interact with other IoT devices.

To maintain competitiveness in this evolving landscape, manufacturers are investing in research and development, focusing on creating innovative smart glass solutions. Collaborations with technology companies are becoming increasingly prevalent to integrate advanced functionalities into glass products.

Segmental Insights

Function Insights

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The Safety & Security segment holds a significant market share in the Global Advanced Glass Market. The safety and security segment plays a vital role in the global advanced glass market by offering specialized products that enhance protection against various threats. These threats include break-ins, natural disasters, and even ballistic attacks.

The increasing concerns about safety and security, both in commercial and residential settings, have resulted in a growing demand for advanced glass solutions that provide enhanced protection against forced entry, vandalism, and natural disasters. The rapid urbanization and concentration of high-value assets in urban areas have further intensified the need for safety and security solutions. Commercial buildings, financial institutions, government facilities, and luxury residences necessitate the use of advanced glass to ensure the safety of occupants and assets.

The implementation of stringent building codes and regulations, particularly in regions prone to earthquakes, hurricanes, or terrorism threats, has made safety and security glass a mandatory requirement for specific applications. This regulatory environment drives the demand for advanced glass products that comply with or exceed safety standards.

Laminated glass, which consists of multiple layers of glass bonded together with an interlayer, typically composed of polyvinyl butyral (PVB), is a fundamental product in the safety and security segment. Laminated glass is highly regarded for its ability to maintain its structural integrity even when shattered, thus minimizing the risk of injuries and providing effective protection against forced entry.

Product Type Insights

The Toughened Glass segment holds a significant market share in the Global Advanced Glass Market. Also known as tempered glass, toughened glass is extensively utilized across various applications due to its enhanced strength, safety features, and resistance to thermal stress. Its ability to shatter into small, harmless fragments instead of sharp shards when broken significantly reduces the risk of injury, making it a preferred choice in architectural and automotive applications.

The construction industry, in particular, drives the demand for toughened glass, which finds widespread use in windows, doors, partitions, railings, and facades. With its optical clarity, it is commonly employed in situations where transparency is vital.

Moreover, toughened glass is being integrated with smart glass technologies, allowing

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for dynamic, switchable glass products that offer enhanced privacy and sun control options.

Regional Insights

The Asia Pacific region is expected to dominate the market during the forecast period. The region is currently witnessing an unprecedented wave of urbanization and construction activities. The rapid growth in population, urban migration, and the rise of mega-cities have resulted in a significant surge in the demand for residential, commercial, and infrastructure projects.

Architectural applications extensively employ advanced glass products, including energy-efficient windows, facades, and smart glass systems. This growing trend is primarily driven by the increasing need for sustainable and eco-friendly buildings that offer enhanced thermal insulation and aesthetic appeal. Notably, countries such as China and India are playing a pivotal role in this construction boom, contributing significantly to the demand for advanced glass solutions.

The Asia-Pacific region has gained recognition for its remarkable technological advancements and innovations, which are also reflected in the development of advanced glass products. Extensive research and development efforts in countries like Japan and South Korea have led to the creation of cutting-edge glass technologies, including smart glass, ultra-thin glass, and high-performance coatings. These innovative solutions cater to the evolving requirements of the construction, automotive, electronics, and display industries, thereby driving the widespread adoption of advanced glass.

Manufacturers in the Asia-Pacific region play a crucial role in the global supply chain for advanced glass products. Many multinational glass companies have established production facilities and research centers in this region, facilitating efficient production and distribution of advanced glass solutions to global markets.

Key Market Players

AGC Inc.

Compagnie de Saint-Gobain S.A.

Corning Incorporated

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Fuyao Glass Industry Group Co. Ltd.

Gentex Corporation, Koch Industries Inc.

Nippon Sheet Glass Co. Ltd.

Schott AG

Xinyi Glass Holdings Limited

Murata Manufacturing Co., Ltd

American Precision Glass Corp.

Report Scope:

In this report, the Global Advanced Glass Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Global Advanced Glass Market, By Function:

Safety & Security

Solar Control

Optics & Lighting

High Performance

Global Advanced Glass Market, By Product Type:

Coated Glass

Laminated Glass

Toughened Glass

Ceramic Glass

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Global Advanced Glass Market, By End Use Industry:

Building & Construction

Aerospace & Defense

Automotive

Electronics

Others

Global Hazard Control Market, By Region:

North America

United States

Canada

Mexico

Europe

France

United Kingdom

Italy

Germany

Spain

Asia-Pacific

China

India

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Japan

Australia

South Korea

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Advanced Glass Market.

Available Customizations:

Global Advanced Glass Market report with the given market data, Tech Sci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

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