

At the forefront of technological innovations in glass



The stunning castle of Valbona, property of the Finind group, in the Veneto region of north-east Italy, was the setting for a meeting between Finind and members of the specialized press. The Finind group, best known for its advanced research and production of highly technological glass, is composed of five divisions, namely Isoclima, SPS, Isiglass, Iontech and lanua. A presentation of technological and industrial innovations in glazing was given by Alberto Bertolini, group general manager, and is outlined here.

Sally Meikle

This summer, Finind held an extraordinary press conference in its historic castle at Valbona, near Padua, Italy to present and display some of its latest technological achievements and international projects, and to explain the group's activities.

Presenting the group, general manager, Alberto Bertolini, said Finind has always wanted to "be at the top of research in glass technology" and "strives to maintain a leading position in its sector in Europe". Fundamental statistics of the group, such as investment levels of US\$ 28 million in the last four years, expected turnover of US\$56 million this year, and 450 employees were covered by Mr. Bertolini in his introduction. Added to these impressive statistics, it was also pointed out that Finind is presently involved in researching electrochromic glazing and photovoltaic panels. Finind therefore looks well placed to uphold its aim : to be at the forefront of glazing production.

The Finind group, with headquarters in Padua, north-East Italy, comprises five divisions namely Isoclima, SPS, Iontech, Isiglass, and Ianua. The activities of these companies ranges from the production of tempered and laminated glasses (Iontech, Isiglass, SPS), high security and other special types of glass (Isoclima), to the design and manufacture of glass processing machinery in the fields of cutting, grinding, bending, tempering, laminating and screen printing, by Ianua. The fields in which Ianua operates have already been dealt with thoroughly in our past articles. Here we move on to find out more about Finind's other divisions.

ISOCLIMA

Isoclima Spa, also based in Padova, is the largest company within the Finind group and its main activities are the production of shatterproof and bulletproof glasses for the automobile industry. Mr. Bertolini said that many of Europe's foremost car manufacturers are customers of Isoclima, for example, BMW, DaimlerChrysler, Audi, Fiat, Alfa Romeo, Lancia, Opel, Renault, Saab, Volvo, as are secu-



Alberto Bertolini, general manager of the Finind group

rity companies such as Repetti, Marazzi, Fontauto, Pavesi, Trasco, MBB, H+S, Wendler etc.

The "AEROSPACE" division of Isoclima specializes in manufacturing windscreens and canopies for the aeronautics and racing car sectors. The level of technology and productive capacity of this division is claimed to be among the highest in the world.

There is also an Isoclima plant in Mexicali, Mexico (near the border with California), where bulletproof glazing is produced for US-manufactured vehicles; the principal markets for

Electrochromic glasses used in the rear window and roof of a Pininfarina prototype



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which are Mexico, Venezuela, Brazil, Argentina etc.

Isoclima has invested a lot in terms of labour and finance in recent years. Since its foundation in 1977, it has been developing production technology and quality control tests in its own chemical laboratories as well as mechanical and optical physics testing.

Another plant of around 8,000 square metres in size has been added to the existing one. In the new plant, the manufacturing of products produced in 'series', that is to say sets of glasses for car manufacturing plants, which are ordered regularly, takes place. Their production has to be organized differently from glasses which are produced according to single requirements.

Organizing production in this way has helped to obtain greater results in terms of quality. In this plant, bending furnaces, a fully automatic screen-printing line, and a large white room (class 1,000) with three assembly lines have been installed. A new autoclave as well as the optical and dimensional control areas, make up the new plant.

RANGE OF PRODUCTS

In the aerospace department at Isoclima, special laminated transparent glass is manufactured for aircraft cockpits or for other appli-

Special
laminated
transparent
glazing



ISOCLIMA PRODUCT RANGE

OMNIARMOR®

A range of security windows, which are bullet-proof and designed to resist high energy bullet attacks. Large glass pieces for public, residential and commercial buildings and specially shaped anti-shatter glass pieces for armoured civil and military aircraft.

OMNILITE®

Security, anti-piercing glass composed of polycarbonate and glass layers, produced either

flat or curved for public, residential and commercial buildings.

OMNIGARD®

Anti-piercing glass for cars composed of glass and polycarbonate, available flat, curved, shatterproof and of limited thickness.

EMIGARD®

Transparent panning for the reduction of electromagnetic pollution with radiofrequency and micro-wave protection.

VARILITE®

Flat and curved liquid crystal panels of variable transparency, which can be doubled, also with bullet-proof panning. Heated glazing and infrared. All the glasses can be manufactured with a heating system or coating, on flat and curved sheets. The application of a special coating allows for particular infrared solar control requirements.

cations in fighter planes where the high mechanical resistance requires lightness and maximum optical quality.

In the architectural sector, the need of buildings to resist armed attack or breakage means that often armoured glass of notable thickness is required. As a result of detailed research, glass which satisfies these requirements, is also lightweight and looks pleasing architecturally has been produced by the Isoclima division.

Following experience gained in the construction of special glasses for the automobile and aeronautic sectors, Isoclima also promotes its glazing for the nautical sector. As well as satisfying the needs of high security and solar control, the new glazing system is also aesthetically pleasing.

SPS

The second largest division of Finind is SPS (Società Prodotti Speciali) Spa which encompasses *Isiglass Spa*, another group division. Its field is mainly architectural projects although some types of armoured glasses are produced. This division works closely with Pininfarina, the world famous car design company to find the best glazing solutions for major car manufacturers.

At Valbona, Paolo Garella of Pininfarina spoke about collaboration with SPS and emphasized that the quality and motivation of the companies' personnel was crucial. SPS and Pininfarina share the same work philosophy: a strong desire to achieve the very best in terms of innovation, excellence, customer satisfaction and technological achievement.

Mr. Garella mentioned the Nautilus project which involved close cooperation with SPS in order to find the best glazing solutions for its car designs. The side of the car, innovative grills, headlamps and above all, the wish for passenger comfort, were all taken into consideration in providing the best glazing solutions for Pininfarina's sporty car designs.

Projects

SPS operates in diverse sectors but has seen particular growth in the rail and tram industries. Professor Francesco Angrilli, head of the centre for interdepartmental studies and activities on space at the University of Padua, spoke about the demands and requirements of high resistance glass. His presentation included some of SPS's applications of high resistance glass which are now looked at.



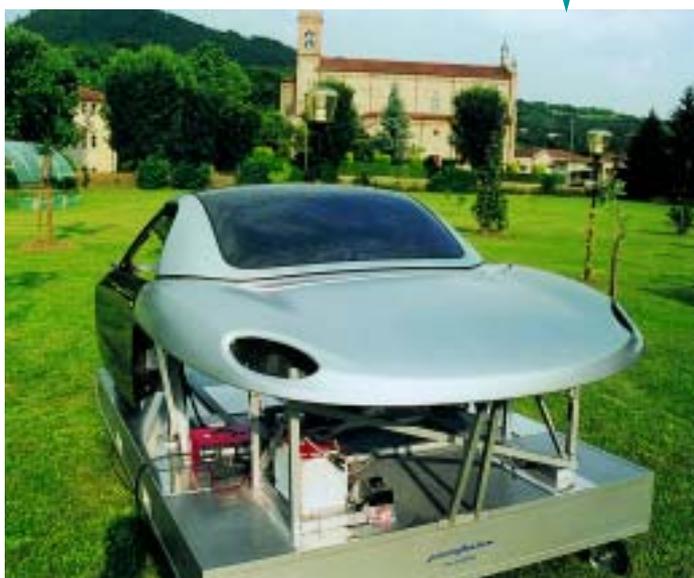
Spherical windscreen of underground trains in Strasbourg, France

SPS has been involved in some particularly challenging projects, for example the construction of the windscreen of underground trains in Strasbourg, France. The windscreens of these trains are huge and have a spherical shape, with a height of almost 3,000 mm covering an angle of 90°. The base, meanwhile, is elliptical in shape and 2,250 mm long. The windscreen, constructed out of a glass panel is able to resist the impact of a 2 kg object thrown at the speed of 100 km/h and is composed of a stratified layer 12 mm thick with a microfibre control.

Pininfarina - SPS, car glazing prototype as shown at Valbona

The windscreen of the Oslo (Norway) high speed train is another example of a complex geometric shape. This train travels between Oslo airport and the city centre at high speed. Its' windscreen is made up of laminated glass/polyvinyl of 24 mm thickness with sheets of chemically tempered glass and a microfibre antifreeze system, the inside of which is equipped with a shatterproof film. The outstanding characteristic of this windscreen is its ability to resist high energy impact, even at low temperatures.

The new Pendolino train (ETR 480) windscreen is yet another example of SPS' technological innovation. According to the Italian state railways company, the resistance of a windscreen for a high-speed train has to be such as to withstand the impact of a concrete block, weighing 1 kg and hurled at a speed of (combining the throwing speed and air speed) 460 km/h. The windscreen for this high speed train was planned and produced by SPS in polycarbonate and both thermally and chemically tempered glass with a conductive deposit and reheating/anti-condensation system, as well as a special anti-splinter film. The glass pan-



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el has a total thickness of 22 mm and comes mounted on a special aluminium frame.

Quality certification

Early this summer SPS received quality certification in recognition of its widened product range and penetration of different markets. This strategy (to expand product range and go into different markets) is in line with that of the group as a whole.

Apart from manufacturing laminated glass, SPS now also has suitable manufacturing equipment for the production of bent tempered glass and for chemical tempering. These facilities allow the group's product range to be fully integrated. SPS's specialized production has allowed it to find a market in particular applications such as high speed trains, in the testing carried out by some of Europe's most prestigious vehicle manufacturers and in aeronautics.

Iontech

The Iontech plant, based in Este near Padua, for the chemical tempering of glass products is one of the transformation lines with a thermochemical cycle which is among the biggest and technologically advanced in the world. At Iontech, flat and curved glass pieces of maximum size 3,200 x 2,000 mm can be tempered and resist flexion up to 600 Mpa.



Prototype cockpit on show at Valbona

R & D PROJECTS

CGR

In this instance, Isoclima works in collaboration with the CGR (Center for Glass Research) of the department of Material Ceramics at the University of New York, Penn State University of Pennsylvania and the Sierracin Sylmar Corporation. The aim of the project is the optimization of glass surfaces through a process of chemical tempering to improve mechanical resistance.

CNR

In collaboration with the CNR (National Research Centre) and ENEA (National Society for Alternative Energy), this project is aimed at the development of special materials for advanced technologies, in

particular at electrochromic materials for use in optics and photo-optics.

ENEA

The purpose of this project in collaboration with ENEA is the deposition by RF Sputtering and optical characterization of thin films for the development of electrochromic negatives.

ALTSET

In collaboration with international groups, this project seeks to develop a European norm to govern test procedures for the determination of total energy transmittance at variable angles and of light transmittance for complex glazing with

integrated screen device.

R&D ISOCLIMA

A project financed by the Italian government. The aim of the project is the development of new manufacturing procedures for polyfunctional multilayers to use in glazing in the building and transport industries.

MURST

This project is financed by MURST (Ministry of the University and of Scientific and Technological Research) in collaboration with the University of Calabria, the CNR of Messina and the Valle d'Aosta region. Its aim is the realization of glazing with innovative materials for civil and industrial applications.

Iontech is a joint-venture with a Los-Angeles company, *Sierracin*, one of the market leaders in the glass for aeronautics sector. At Iontech, where the largest chemical tempering plant is claimed to have been installed, glasses which are transformed into finished products or sent to Los Angeles to be used as windscreens in aircraft are processed.

ISIGLASS

Isiglass produces thermally-toughened flat and curved glass. A new tempering plant, built as a joint venture with some of the major Italian companies in this field, allows the firm to manufacture reliable products that comply with international quality standards. An example of Isiglass's activity is the Leipzig exhibi-

tion centre in Germany, where cylindrical tempered glass forms the cover which links the various pavilions. The glasses, supported by 35 metre long tubes, form a large tiling surface about 2 metres wide. Each of these tiles can turn on itself in order to ventilate the building.

Isiglass is also present in the naval sector, where it employs high technology; that is to say it produces large curved glasses, uses the chemical tempering plant of Iontech and has the possibility to laminate in large autoclaves. Along with various glass workshops, new mounting systems, including that of glueing directly onto the bodywork, decreasing weight, improving water resistance and new aesthetic ideas have been developed.

SIVIS

Sivis with its headquarters in Conza, near Avellino, southern Italy, is equipped with one of the most modern plants for the production of large sheets of laminated glass (6 x 3.2 m) and a plant for tempering flat glass. Given the proximity with the *Glaverbel* float glass plant in Salerno, a collaboration agreement was made whereby Sivis produces the laminated glass which Glaverbel then distributes onto the market.

WIDENING OF THE MARKET

Not only cars with very heavily armoured protection are produced (following B6 and B7 standards according to European norm CEN 129) but there is also a market for cars with lighter armoured protection (B4) and anti-shatter and anti-theft glazing.

The credit for the development of this sector is due to the automobile manufacturers, particularly the German ones (BMW, Daimler-Chrysler and Audi) who have picked up on new trends in the market and have inserted glazing of this type in their standard production lines and in their product range.

Today it is possible to purchase a vehicle with reinforced glazing from any of the above mentioned manufacturers. In Italy, the pool of cars of the police force and of the military police are gradually being replaced in order to guarantee greater protection to officers: the fact that cars have greater security means that there is need for less personnel.



Example of large curved glass on display at Valbona

NEW TECHNOLOGY

In the automobile, naval, architectural and railway sectors, there have been great advances. Certainly, research has been directed at bettering the 'comfort' aspect of glazing and for this reason glass which filters infrared rays has been developed without overheating the inside of the vehicles. The 'thermal load' is reduced and so the air conditioning load is reduced.

In auto glazing it is becoming more and more common to incorporate functions which were previously part of other machines. According to Mr. Bertolini, it is now possible to incorporate two demisting and defrosting functions, two radio aerials, AM and FM, one aerial for a mobile phone, and an aerial for GPS navigation system in a rear window. By now the rear window of a car seems more like a huge electronic circuit rather than the traditional rear window to which we have become used.