

**OUR
ENVIRONMENTAL
COMMITMENTS:**

Q&A



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ISO 14001

What is the ISO 14001 standard?

The ISO 14001 standard is an international standard which describes the principles of an environmental management system (EMS) based on:

- the identification and control of environmental impacts,
- the continuous improvement of the environmental performance, and
- the systematic definition of environmental objectives.

The ISO 14001 standard does not specify the levels of environmental performance. It thus does not guarantee performance but rather the knowledge of the regulations and the identification of significant environmental impacts. It also demonstrates that the employees have been trained on the procedures required to comply with local regulations and minimize impacts.

The certification is awarded after the site or company has been audited by an accredited certifying organization.

The ISO 14001 standard does not apply to a product.

Are the raw materials used by SAINT-GOBAIN GLASS produced in ISO 14001-certified sites?

All internal SAINT-GOBAIN GLASS quarries are certified ISO 14001 like, for example, SAINT-GOBAIN SAMIN (sand) in France.

Many SAINT-GOBAIN GLASS raw material suppliers are certified ISO 14001.

Our policy consists in encouraging the sourcing of raw materials extracted or made in sites certified ISO 14001 (or the equivalent).

What is the perimeter concerned for SAINT-GOBAIN?

Compagnie SAINT-GOBAIN has defined a perimeter of sites on which environmental performances are measured every year. This concerns sites withdrawing more than 10 000 m³ of water per year or consuming over 10 000 kWh of energy per year. Other sites may be added by the Sectors, on the basis of the chemicals used, the environmental impacts known or the location of the site in a sensitive natural zone. All in all, the sites included in the perimeter concerned correspond to more than 90% of the total Saint-Gobain impacts.

It is on this perimeter of sites that the environmental performances followed annually by Compagnie SAINT-GOBAIN are calculated and reported in the Sustainable Development report.

Are all SAINT-GOBAIN GLASS sites certified ISO 14001?

In 2010, 26 of the 30 sites in the perimeter concerned for SAINT-GOBAIN GLASS were certified, i.e. 86.7% (the objective being 80%). All SAINT-GOBAIN GLASS sites with a glassmaking furnace, manufacturing line producing mirrors, magnetron or pyrolyzed coated glass, lacquered or laminated glass

are certified. The only exception is the SGG Egypt site which came on stream in 2010, but which is currently being certified. All new SGG sites must be certified according to the ISO 14001 standard within 3 years of starting up.

The objective for 2013 is that 95% of the sites in the perimeter concerned are certified ISO 14001.

As for raw material suppliers SAINT-GOBAIN GLASS recommends its customers to process its products in sites certified ISO 14001. In this way, the whole glass production chain is certified ISO 14001, which is a guarantee that environmental indicators related to manufacturing stages are taken into account and optimized.

ISO 14001 are available from our sales departments.

NB. All SGG sites are also certified ISO 9001.

Are the GLASSOLUTIONS processing sites certified ISO 14001?

In 2011, 12 sites in the perimeter concerned are certified out of 20 (i.e. 60%). The objective is that in 2013, 90% of the sites in the perimeter concerned are certified.

Portugal was the first country to embark on a systematic certification process (in 2007), followed by Poland which certified all its sites in 2010 and the UK in 2011. In France, a certification project concerning 10 sites is currently being finalized.

ISO 14001 are available from our sales departments.

OHSAS 18001

What is the OHSAS 18001 certification?

Health and safety are a constant priority. All sites have to implement the Compagnie SAINT-GOBAIN Health and Safety policy which strives to achieve “zero occupational accidents” and “zero occupational illnesses” (EHS charter), and which concerns both SAINT-GOBAIN employees and temporary workers or sub-contractors working on our sites. Internal audits (called 20-step audits) are regularly conducted to assess the implementation of an effective health and safety management system based on reducing and controlling risks.

In addition to this internal Health and Safety policy, some sites have proactively embarked on certifying their management system according to the OHSAS 18001 international standard. In this way, one third of SAINT-GOBAIN GLASS sites is already certified OHSAS 18001. On the side of GLASSOLUTIONS, the sites in Portugal and Poland are all OHSAS 18001 certified, as well as some sites in Germany and Switzerland.

The OHSAS 18001 certification is recommended and should gradually continue to be implemented in our manufacturing facilities.

RAW MATERIALS

How does SAINT-GOBAIN GLASS ensure the responsible sourcing of its raw materials?

The natural raw materials used are silica sand (60%), dolomite (16%), limestone (6%) and alumina carriers (2-3%). Soda ash (16%) and sodium sulfate (0.5%) are mainly of synthetic origin.

SAINT-GOBAIN GLASS is supplied wherever possible by the local subsidiaries of global actors, their extraction or production sites often being certified ISO 14001 or in the process of being certified.

Suppliers must comply with the SAINT-GOBAIN Suppliers charter and answer a Sustainable Development questionnaire. They are also audited by the SAINT-GOBAIN technical teams and purchasers who measure both environmental management and worker health and safety management.

“Suppliers and subcontractors adopt a cautious approach to environmental issues and responsible environmental practices.

They implement policies to manage and improve their manufacturing processes in order to minimize their environmental footprint.

In particular, they strive in their respective fields to achieve

- efficient energy consumption to help reduce greenhouse gas emissions,
- efficient consumption of natural resources,
- less waste discharged and the implementation of recycling and reprocessing solutions, and
- lower emissions into natural surroundings and other forms of pollution.

Suppliers and subcontractors encourage the development and distribution of environmentally-friendly technologies supporting the achievement of the objectives listed above.”

Extract from the SAINT-GOBAIN Suppliers Charter

What is the share of recycled glass in the products (cullet)?

There are 3 types of cullet, depending on their origin:

- Internal cullet: broken glass coming from manufacturing glass, reintroduced into the original process
- “Pre-customer” cullet: broken glass coming from processing, before implementing the finished product.
- “Post-consumer” cullet: broken glass coming from the end-of-life stage, after collection, sorting and treatment.

Currently, on average 30% of the total weight of a sheet of glass made by SAINT-GOBAIN GLASS comes from recycled internal cullet and “pre-customer” cullet.

More than 1 500 000 tons of cullet are melted each year in 36 furnaces. This enables:

- A reduction of 1 800 000 tons of raw materials (natural resources) consumed,
- A reduction of at least 375 000 tons of CO₂ emitted, which results in a high limitation of the greenhouse effect caused by greenhouse gas emissions.

The certificate concerning the amount of material recycled is available from our sales services.

ENERGY

What sources of energy are used by SAINT-GOBAIN GLASS and GLASSOLUTIONS?

90% of the energy used by SAINT-GOBAIN GLASS is fossil fuel: natural gas and/or heavy fuel oil which are burned in the furnaces. The rest is electricity which is used for furnaces and processing processes (magnetron coatings, mirrors, laminated...)

The amount of renewable energy used is difficult to estimate insofar as this concerns the renewable portion of electricity which varies from one country to another.

It should be noted that some sites are equipped with systems to recover heat contained in the smoke.

What measures are taken to reduce energy consumption in SAINT-GOBAIN GLASS?

SAINT-GOBAIN GLASS strives to reduce energy consumption in its furnaces:

From design stage...

Thanks to several centuries of glass-making experience, SAINT-GOBAIN GLASS furnaces use leading-edge technologies which optimize both yields and energy consumption. To further improve the environmental performance of today's and tomorrow's furnaces, R&D projects are conducted to develop new technologies which, for instance, will save on energy or use biomass.

... To managing energy in production

The furnaces have an average life of 16 years.

The combustion is optimized so as to use the least energy possible and reduce pollutant air emissions. Using cullet also reduces furnace energy consumption by lowering the melting temperature in the furnace. In this way, between 2007 and 2010, the amount of energy consumed to melt one ton of SGG PLANILUX glass was reduced by 5.6%.

SAINT-GOBAIN GLASS pursues its efforts to reduce the quantities of energy consumed.

What measures are taken to reduce energy consumption in GLASSOLUTIONS?

GLASSOLUTIONS mainly uses electricity for processing (mounting double and triple-glazing units, tempering, laminating...) Local projects are developed at manufacturing facility level to reduce the energy needed to transform 1m² of glass. At global level, a benchmark is currently being established to fix precise performance objectives and share best practices on managing energy.

CLIMATE CHANGE

If we consider the total lifecycle of glass products, the impacts on climate change come from the CO₂ emitted when manufacturing glass products and their raw materials, as well as transport (raw materials and products). The efforts made by SAINT-GOBAIN GLASS and GLASSOLUTIONS with regard to reducing CO₂ emissions related to transporting finished products are summarized in the Transport section of this document.

What CO₂ emissions are related to transporting raw materials?

SAINT-GOBAIN GLASS tries to reduce the distances involved in supplying its raw materials. Accordingly, the sand usually comes from quarries located less than 200 kilometers from the SAINT-GOBAIN GLASS site (in Europe, less than 100 kilometers), while certain synthetic materials like soda ash or sodium sulfate may travel much greater distances, due to their non-availability locally.

SAINT-GOBAIN GLASS also tries to encourage the transporting of its raw materials by rail and river. Around 30% in weight of raw materials were supplied by such means of transport in 2010 in Europe.

SAINT-GOBAIN GLASS has set itself a goal to precisely quantify CO₂ emissions related to the transporting of raw materials by 2013.

What measures are taken by SAINT-GOBAIN GLASS to reduce the impact on climate change?

The glassmaking furnaces of SAINT-GOBAIN GLASS are at the origin of direct CO₂ emissions, due to the combustion of gas and heavy fuel oil and the decomposing of carbonated raw materials. An LCA (lifecycle assessment) of the manufacturing of SGG PLANILUX following the ISO 14040 standard (from raw materials to the site producing the glass sheet before processing) was conducted over the European perimeter of SAINT-GOBAIN GLASS. It appears that the CO₂ emissions related to producing 1 m² of SGG PLANILUX 4mm-thick flat glass are equal to 13 kilograms. Direct emissions in the SGG glassmaking furnace represent less than half this impact. The production of raw materials (and soda-ash especially) and transport also have a significant impact.

Reducing the impact on climate change involves furnace optimization actions, managing electric energy in manufacturing facilities and managing raw materials (production and transport). In this way, optimizing SAINT-GOBAIN GLASS furnaces (design, combustion control) has enabled a 5.6% reduction in the amount of CO₂ emitted during the melting of 1 ton of glass, between 2007 and 2010. Action plans to reduce CO₂ quantities are in progress in every SAINT-GOBAIN GLASS site.

What measures are taken by GLASSOLUTIONS to reduce the impact on climate change?

The processing processes implemented by GLASSOLUTIONS mainly use electric energy. Consequently, there are no direct CO₂ emissions. The impact on climate change thus corresponds to indirect emissions related to the production of electricity and to direct emissions related to the transporting of products.

Action plans aimed at reducing both the quantity of electric energy consumed and the impact of transportation are currently being implemented.

AIR EMISSIONS (excluding CO₂)

What measures are taken by SAINT-GOBAIN GLASS to reduce air emissions?

The aim is to gradually reduce air emissions, which mainly come from the glass-melting furnaces.

The primary measures (optimization of the combustion and/or glass batch) are applied as a priority by SAINT-GOBAIN GLASS. In this way, the direct emissions of NO_x nitrogen oxides released during the melting of 1 ton of SGG PLANILUX glass were reduced by 25.5% over a worldwide perimeter, between 2007 and 2010, thanks to the implementation of these primary measures.

In addition, systems for treating gas emitted at the chimney stacks have been installed to reduce dust, SO_x sulfur oxides, heavy metals and acid gas (HF and HCl) emissions. 8 new smoke filtration systems have been installed since 2007, bringing the total number of sites equipped to 19 in 2010. In this way, the amount of dust emitted during the melting of one ton of glass was reduced by 30% in 2010 compared to 2007, over a worldwide perimeter.

In 2012, all SAINT-GOBAIN GLASS floats in Europe will be equipped with filtering systems to reduce the dust contained in the smoke. 80% of the furnaces will be equipped in the same way worldwide.

The glass-making process is not the cause of VOC (volatile organic compounds) emissions due to the high temperature maintained in the melting furnaces. On the other hand, the manufacturing of mirrors or lacquered glass may cause VOC emissions, due to the solvents contained in the paint (lacquer). 95% of the facilities manufacturing mirrors and lacquered glass are equipped with thermal oxidizers enabling a drastic reduction of VOC emissions. The sites still unequipped will be by 2014.

What measures are taken by GLASSOLUTIONS to reduce air emissions?

Through the processes and energy implemented (mainly electricity), GLASSOLUTIONS has a very low impact on air emissions.

WATER WITHDRAWALS

What measures are taken by SAINT-GOBAIN GLASS to reduce water withdrawals?

The water consumed is mainly used during the production stage to cool down the glass furnaces. All cooling circuits are closed loops, making it possible to limit the volume of water rejected and pollution. The policy pursued by SAINT-GOBAIN GLASS has enabled a 12% reduction in water withdrawn between 2007 and 2010, at constant production. The objective is now to continue these improvement actions over the period 2011-2013, in order to reach a reduction of at least 6% of the quantities withdrawn at constant production.

What measures are taken by GLASSOLUTIONS to reduce water withdrawals?

The water consumed is mainly used for washing the sheets of glass before edge finishing.

Improvement objectives have been defined for the period 2011-2013, based on using the best practices available for managing water. The aim is to reduce water withdrawals by 6% between 2011 and 2013, at constant production.

WASTE

What measures are taken to manage waste?

The Waste policy of SAINT-GOBAIN GLASS and GLASSOLUTIONS consists in searching for and developing all local ways of recovering waste, in order to reduce the quantities land-filled and reach the objective of the SAINT-GOBAIN charter, namely “Zero non-recovered waste”.

In the SAINT-GOBAIN GLASS and GLASSOLUTIONS facilities, since glass-making scrap is not considered as waste but as secondary raw materials, this is sorted and managed with great care. Most is recycled internally in the form of cullet.

Do SAINT-GOBAIN GLASS and GLASSOLUTIONS generate hazardous waste?

The aim of SAINT-GOBAIN GLASS is to limit and replace hazardous substances and in this way to eliminate hazardous waste. SAINT-GOBAIN GLASS generates less than 10% in weight of hazardous waste. Hazardous waste products were reduced by 20% between 2007 and 2010, at constant production.

PACKAGING

What packaging is used for the products? Is it recyclable?

The following types of distribution packaging are used: metal, corrugated board, plastic materials (polyethylene, polystyrene and polypropylene) and timber. Timber and board are recyclable materials. Packaging is reduced as much as possible to limit the waste produced on the construction sites.

If kept in good condition, the metal racks and stands can be reused over and over again to safely store and transport glass.

SAINT-GOBAIN GLASS and GLASSOLUTIONS recommend sorting packaging waste and using the channels available to recycle or recover this waste.

TRANSPORT

What is the transport policy of SAINT-GOBAIN GLASS?

In Europe, SAINT-GOBAIN GLASS products are mainly transported using “in-loaders” (on average 22 tons of glass).

The supply chain departments optimize the means of transport to encourage wherever possible river or rail freight, or even combined transport.

SAINT-GOBAIN GLASS has its own fleet in Europe of around one hundred wagons (which represent around 200 in-loaders) which are regularly used. At the same time, a new model of rail/road compatible in-loader has been developed, which should encourage combined transport. SAINT-GOBAIN GLASS already has in Europe 36 trailers equipped for this new model, and plans to continue investing in this means of transport.

SAINT-GOBAIN GLASS has set itself an objective to quantify CO₂ emissions related to the transporting of its products in 2012 within the scope of Europe and in 2013 for the perimeter outside Europe.

In the meantime, SAINT-GOBAIN GLASS encourages those suppliers in charge of transporting its products to be certified ISO 14001, to use low CO₂-emitting tractors, and to train their drivers on responsible driving: safety and eco-driving, to reduce the quantities of fuel consumed and therefore CO₂ emissions.

Transport service providers are regularly audited, as well as garages, car-wash stations, thanks to a supplier audit which also makes it possible to evaluate environmental points. Drivers are regularly audited on road safety aspects.

What is the transport policy of GLASSOLUTIONS?

GLASSOLUTIONS has also set itself an objective to quantify CO₂ emissions related to the transporting of its products by 2013.

The lifecycle assessment (LCA) performed for SGG CLIMAPLUS double-glazing from cradle to grave (i.e. from glass raw materials up to the end of the double-glazing's life) has shown that the transporting of finished product (functional unit) by trucks represents 5% of total CO₂ emissions, 7% of total SO_x emissions and 15% of total NO_x emissions.

GLASSOLUTIONS drivers are trained to drive responsibly. Transport supplier drivers are also encouraged to follow this kind of training.

Flows are optimized to reduce the kilometers covered and optimize loading rates, which also results in a reduction of CO₂, SO_x and NO_x emissions.

GLASSOLUTIONS France embarked in 2010 on an ambitious program to renew an ageing fleet by outsourcing the management of its vehicle base; fuel consumptions are thus reduced by 30% on average for every for vehicle renewed.

TIMBER

Is the timber used for packaging certified?

The SAINT-GOBAIN GLASS Environmental Timber Policy has the following objectives:

- Protect endangered tree species, by adopting the purchasing policy;
- Provide assurance as to the legality of the timber, by obtaining from suppliers proof that the timber or wood by-products come from legal operations and by refusing to buy timber or products made of wood coming from countries contravening international conventions or good forestry practices;
- Promote certified or sustainably managed timber, the objective being to reach at least 80% of timber used coming from certified forests in 2016.

CONSTRUCTION SITES

What solutions are implemented to reduce the production of job-site waste?

There is no trim rate related to integration into joinery or onto the building since no glass needs to be cut on the construction site, the glazing being delivered cut to size.

The main action consists in reducing the quantities of packaging used.

MAINTENANCE

What are the maintenance procedures for products?

No maintenance has to be carried out on the glazing.

Caring for the product corresponds to cleaning with clear water or with commonly available non-alkaline products. The frequency essentially depends on the external environment, i.e. on the level of pollution.

SAINT-GOBAIN GLASS has developed a self-cleaning glass, SGG BIOCLEAN, which is easier to care for and requires less frequent cleaning.

INDOOR AIR QUALITY

What is indoor air quality (IAQ)?

The indoor environment offers a great diversity of pollution scenarios, with numerous physical agents and chemical or microbiological contaminants, related to the buildings, equipment, immediate external environment and behavior of the occupants. Indoor air quality determines the pollution level of a building's indoor environment.

What are the Volatile Pollutant emission levels of the products sgg PLANILUX, sgg MIRALITE, sgg DECOLAQUE and sgg MIRALITE REVOLUTION?

Glass (SGG PLANILUX, SGG DIAMANT, SGG ALBARINO) is an inert material which emits no elements.

In the same way, the products SGG MIRALITE REVOLUTION, SGG DECOLAQUE and SGG PLANILAQUE present volatile pollutant emission levels (including formaldehyde and total Volatile Organic Compounds) close to 0, which classifies them A+ according to the new French regulation. Tests have been carried out according to the requirements of the AFSSET protocol (2009) and according to the ISO 16000 standard.

SAINT-GOBAIN GLASS products thus make it possible to maintain a healthy indoor environment right throughout their lifetime.

The VOC test reports are available from our sales departments.

What are the Volatile Pollutant emission levels of the sgg CLIMAPLUS products?

According to the requirements of the AFSSET protocol (2009) and according to the ISO 16000 standard, volatile pollutant emission characterization tests (including formaldehyde and total Volatile Organic Compounds) have been carried out on sealants representative of those used by GLASSOLUTIONS in SGG CLIMAPLUS double-glazing units. The silicone, polysulfide and polyurethane used correspond to class A+ of the French regulation relative to the labeling of construction products or wall or floor coverings and paints and varnishes concerning their volatile pollutant emissions.

The VOC test reports are available from our sales departments.

Do SAINT-GOBAIN GLASS and GLASSOLUTIONS products contain hazardous substances?

Glass contains no hazardous substances; it is an inert material, essentially made from natural raw materials (c.f. raw materials paragraph).

A few hazardous substances for health or the environment are sometimes used, for example to deposit certain coatings or as dyes for certain colored glass products. The manufacturing facilities in this case apply precautionary measures to protect operators from risks of exposure to these substances during their implementation. These rules comply with both local regulations and Saint-Gobain internal standards on chemical risk management. The tests conducted on these special glass products show that, once manufactured, they present no risks for health or the environment.

The sites must regularly update their product inventory to identify where appropriate potentially hazardous substances and take the necessary prevention measures. In the case of CMR (carcinogenic, mutagenic and toxic for reproduction) or SVHC (substance of very high concern) substances according to REACH, substitution and risk reduction programs are systematically engaged.

Material Safety Data Sheets

Within the framework of the European regulation REACH, the provision of Material Safety Data Sheets is mandatory only for certain substances and preparations (mixtures of substances). In the case of REACH, flat glass is an article and therefore not subject to the obligation to provide sheets. However, to ensure that its products may be used safely, SGG has decided to provide its customers with sheets known as SUIS (Safety Use Instruction Sheet)

The SUIS (Safety Use Instruction Sheet) for SGG PLANILUX is available from our sales services.

How do SAINT-GOBAIN GLASS and GLASSOLUTIONS apply the REACH regulation?

REACH is the regulation on registering, evaluating, authorizing and restricting chemicals.

SAINT-GOBAIN GLASS and GLASSOLUTIONS must check REACH compliance as:

- manufacturer of substances (glass),
- downstream user (other raw materials and products employed in the manufacturing process) and
- as manufacturer of articles.

As a manufacturer of substances:

- glass is a substance exempt from registration in REACH, on condition that it complies with the precise conditions concerning the release of certain hazardous substances for the environment. This is the case for all glass products by SAINT-GOBAIN GLASS.

As a downstream user:

- ensuring that all raw materials and other substances/mixes employed in the manufacturing process are REACH compliant and
- introducing risk reduction systems included in master safety data sheets.

As a manufacturer of articles:

- SAINT-GOBAIN GLASS and GLASSOLUTIONS products contain no SVHC substances under the terms of REACH appearing on the list of candidate substances or subject to authorization, in concentrations higher than 0.1% in weight, similar to their packaging.

The REACH certificate is available from our sales services.

END-OF-LIFE (PRODUCTS)

Are SAINT-GOBAIN GLASS and GLASSOLUTIONS products recyclable?

Glass is an inert material which is not biodegradable.

Cullet's ability to be recyclable in a float or patterned glass furnace depends on its chemical composition (for example, colored glass cannot be recycled in a furnace producing clear glass) and the presence of additional elements such as metallic, organic materials... The presence of vitroc ceramic glass, even in very low quantity, is prohibitive for recycling in a float furnace.

The glass produced by SAINT-GOBAIN GLASS is recyclable in a float furnace or in a patterned glass furnace. The presence of a stack of thin film coatings deposited on the sheet of glass does not change its ability to be recycled like an uncoated sheet of glass, thanks to the low quantities of additional materials deposited. For example, products in the SGG PLANITHERM, SGG COOL-LITE, SGG BIOCLEAR, SGG ANTELIO ranges are recyclable, just like SGG PLANILUX, SGG DIAMANT. To optimize the quantities recycled, the broken glass must be carefully sorted and separated from any pollution (metals, plastics, paper).

Cullet from SGG MIRALITE REVOLUTION mirrors, SGG PLANILAQUE and SGG DECOLAQUE lacquered glass is recyclable in a float furnace, in small quantities.

Laminated glass from the SGG STADIP range is recyclable after treatment to remove the residue of the PVB interlayer. In the same way, glass from SGG CLIMAPLUS double-glazing can be recycled once the unit has been dismantled and treated to separate the glass not polluted by the sealant.

SGG EMALIT enameled glass is not recyclable in a float furnace but may be integrated in a furnace producing glass wool for example.

SAINT-GOBAIN GLASS has set up in various countries cullet-collecting circuits generated by its processor customers ("pre-customer" cullet), to be able to recycle in its furnaces with its internal cullet. In this way at least 90% of the cullet generated by processing may be recycled. The cullet of inadequate quality to be recycled in a float furnace may however be recycled in another glassmaking furnace, for example in the production of glass yarn, or reprocessed in other applications (for example road paints).

What are the solutions to address product waste life?

Once they have been implemented, during the renovation or demolition of a building, SAINT-GOBAIN GLASS products may be partly recycled. Indeed, after disassembling and sorting the various products, it is possible to separate the glass from the additional elements (fasteners, glues ...) and to treat the cullet so that it can be recycled in a float furnace or in another glassmaking furnace.

Today, the channels for recovering glass coming from the demolition or deconstruction of buildings (tertiary or residential) are virtually-inexistent. The consequence is that less than 5% of the glass available is effectively recovered (figure calculated in France by an internal survey, and which may be extrapolated to the European perimeter). If efficient glass-collecting channels were set up to recover the glass from building renovation or demolition sites, "post-customer" cullet would then be available and make it possible to

increase the share of recycled material. SAINT-GOBAIN GLASS is ready to make its expertise available for the different stakeholders on the market, in order to encourage the development of this type of industry.

LCA and EPD

What is a lifecycle assessment (LCA)?

The lifecycle assessment (LCA) is a comprehensive and multi-criteria assessment used to evaluate the environmental footprint of a product, service or process. The approach consists in quantifying the impacts right along the lifecycle, from the extraction of raw materials through to end-of-life processing. The purpose may be to compare different products having the same function in order to define the one which has the lowest environmental footprint. Internally, the LCA process helps identify at which stages the most important impacts occur. An impact reduction (including raw materials) and eco-design approach may then be carried out.

The lifecycle assessment is split into 5 main stages: production, transport, implementation, service life and end-of-life.

NB.:

- Production includes raw materials.
- Transport concerns the finished product before implementation. Intermediary transport is included in the other stages.

The assessment is broken down into 4 phases, according to the ISO 14044 standard:

- definition of objectives and field of study;
- inventory (LCI = inventory of incoming and outgoing data compared to the system studied);
- impact evaluation;
- interpretation.

The standards of the ISO 14040 series (“Environmental management – Lifecycle assessment – Principles and framework”) provide documentation for each step of the LCA.

Have SAINT-GOBAIN GLASS and GLASSOLUTIONS projects been the subject of an LCA?

The 2011–2013 objective for SAINT-GOBAIN is for every large family of products related to the building (construction products) and solar markets to have a generic or specific LCA. For every new family of habitat-related products, put on the market and not possible to attach to an already existing LCA, a new LCA will be made.

SAINT-GOBAIN’s commitment to an LCA approach to construction products began in 2007.

SAINT-GOBAIN GLASS and GLASSOLUTIONS have embarked on LCA approaches for the following products:

- SGG PLANILUX
- SGG DIAMANT
- SGG ALBARINO
- SGG CLIMAPLUS
- SGG CLIMAPLUS PROTECT
- SGG CLIMAPLUS SOLAR CONTROL
- SGG CLIMAPLUS 4S
- SGG CLIMATOP
- SGG STADIP PROTECT or SILENCE
- SGG MIRALITE REVOLUTION

- SGG DECORGLASS or MASTERGLASS

At the same time, SAINT-GOBAIN GLASS has been involved in LCA measures taken at European level by GLASS for EUROPE for a sheet of clear glass. GLASSOLUTIONS also participates in generic LCA procedures conducted by trade associations in France and Germany.

What is an Environmental Product Declaration (EPD)?

There are 3 types of Environmental Product Declaration:

Type I

Voluntary program based on multiple criteria and engaging a third party, consisting in granting a license which authorizes the use of environmental labels on products, indicating that a particular product is preferable for the environment, within the context of a given product category, of environmental criteria defined for the product, and according to considerations related to the lifecycle.

(Definition of the standard ISO 14024 “Environmental labels and declarations –Type I environmental labeling -- Principles and methods”).

- Examples: CE, Blue Angel, Nordic Swan, LEED, BREEAM

Type II

Self-declared environmental claims

(Definition of the standard ISO 14021 “Environmental labels and declarations – Self-declared environmental claims (Type II environmental labeling”).

- Examples: “paraben-free”, “recyclable” symbol, Eco2 by Renault

Type III

The purpose of this type of environmental declarations consists in:

- providing LCA-based information and information relative to the environmental aspects of the products,
- helping purchasers and users to make referenced comparisons between products
- encouraging environmental performance improvements,
- providing information to analyze the environmental aspects of products throughout their lifecycle.

(Definition of the standard ISO 14025 “Environmental labels and declarations –Type III environmental declarations – Principles and operating processes”).

- Examples: FDES in France (*Fiche de Déclaration Environnementale et Sanitaire*), ...

What is the use of an EPD?

The aim of Environmental Product Declarations is to provide environmental information in order to encourage and respond to calls for products and services that make fewer demands on the environment and on this account, stimulate the potential for continuous environmental improvement commissioned by the market. Among nine principles, Environmental Product Declarations must notably meet the following criteria:

- They must take into account all relevant aspects of the product lifecycle.
- They must be based on scientific methodology.
- They must be precise, verifiable and relevant and not be of a misleading nature.
- They must not have as an objective or consequence the creation of pointless barriers to international trade.
- Basic information must be available and able to be disclosed at the request of any party interested.

(cf. full definition of the standard ISO 14020 “Environmental labels and declarations – Guiding principles”).

What is the French FDES declaration?

FDES are type III Environmental Product Declarations. They comply with the French standard NF P 01-010, which corresponds to the adaptation of the European standard ISO 14025 relative to type III Environmental Product Declarations. This declaration also takes account of health impacts and impacts on comfort.

FDES are declarations established by construction product manufacturers making it possible to have a technical evaluation technique of these products according to the standard NF P01-010. To draft these FDES, an environmental assessment of the products is made through a product LCA.

They are made by following the method described in the standard NF P01-010 "Environmental quality of construction products – Construction products environmental and health declaration".

For general public declarations, ISO 14025 requires verification by an independent third party whose competent authority has been established. AFNOR Certification, independent certifying organization, certifies the competencies of FDES Verifiers, under the AFAQ COMPETENCES® trademark.

What is the difference between an LCA and an EPD?

LCA is the methodology enabling environmental impacts to be studied throughout the product’s lifecycle. The results obtained in the LCA are presented in the EPD.

Have SAINT-GOBAIN GLASS and GLASSOLUTIONS products been the subject of an EPD?

SAINT-GOBAIN has been involved in a type III EPD process since 2007, presented in an FDES format in France.

The EPDs available for SAINT-GOBAIN GLASS and GLASSOLUTIONS products are:

- SGG CLIMAPLUS
- SGG CLIMAPLUS PROTECT
- SGG CLIMAPLUS SOLAR CONTROL
- SGG CLIMAPLUS 4S
- SGG CLIMATOP
- SGG STADIP PROTECT or SILENCE
- SGG MIRALITE REVOLUTION
- SGG DECORGLASS or MASTERGLASS

At the same time, SAINT-GOBAIN GLASS has taken part in initiatives to draft generic EPDs organized at national by trade associations (for example in France, Germany...) for double-glazing, laminated glass, triple glazing....

Product EPDs are available from our sales departments.

ECO-LABELS

How do SAINT-GOBAIN GLASS and GLASSOLUTIONS products benefit the obtaining of a building label (HQE, LEED, BREEAM...)?

Using SGG and GLASSOLUTIONS products is a way to achieve the energy performance targets set by certain building labels. Moreover, the ISO 14001 certifications of manufacturing facilities, raw material suppliers and the availability of EPDs are major assets. SGG and GLASSOLUTIONS products are in this way the only glass products in Europe to have an Environmental Product Declaration complying with the French standard NF P 01-010, verified according to the AFNOR program by an approved external verifier.

The SGG LEED brochure is available from our sales services.

Are there any environmental labels for glass or glazing (Type I Environmental Product Declaration)?

To date, there is no environmental label for glass. However, “furniture” labels do exist some of which, like the Nordic furniture label (Nordic Swan Ecolabel), take account of criteria on glass or mirrors (e.g.. the laminated glass has to be recyclable...)

Some private labels, like C2C (Cradle to Cradle), are emerging in Europe. These labels are not based on standardized frames of reference, and are not more demanding than the Environment and Health policy deployed in SAINT-GOBAIN GLASS and GLASSOLUTIONS sites on the basis of internal standards and Compagnie SAINT-GOBAIN policy. On the contrary, they are even sometimes less demanding, especially with regard to the substitution or reduction of the most hazardous as well as the provision to customers of verified Environmental Products Declarations.

PRODUCTS

How much CO₂ can be saved thanks to SGG CLIMAPLUS 4-16-4 mm?

During its lifecycle, SGG CLIMAPLUS double-glazing emits 31.4kg equivalent of CO₂. These can be attributed 95% to the manufacturing stage, notably due to the combustion in the glassmaking furnace and glass raw materials (fabrication then decarbonising in the furnace). Around 5% of the emissions are due to the stage of transporting the functional unit considered.

However, due to its thermal insulation properties, the impact on climate change of SGG CLIMAPLUS is offset after 4 months of implementation (compared to single-pane glazing). In the same way, after 1 month of use, the energy savings generated by the SGG CLIMAPLUS double-glazing compared to single-pane glazing offset the energy consumed in producing and transporting the double-glazing (compared to single-pane glazing).