

prioritizing SAFETY in the stone industry

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breton white paper

Crystalline silica is a compound widely found in the Earth's crust and is contained in many materials commonly used in the construction industry.

The dangers of crystalline silica are well known, especially its link to respiratory diseases like silicosis. The risks are most apparent during the material processing and transformation stages when respirable dust is generated.

This document delves into the significance of implementing appropriate protective measures in the stone industry, in addition to utilizing machinery and materials that are both highly safe and efficient, in order to reduce potential health risks for operators.

Crystalline silica
in nature

[Page 4](#)

1

Prevention
matters

[Page 7](#)

2

Regulations
in the United
States, European
Union, and
United Kingdom

[Page 10](#)

3

Regulations in
Australia

[Page 12](#)


4

Breton solutions
for a safer stone
industry

[Page 14](#)

5



A microscopic image of artificial stone, showing a complex, swirling pattern of purple and black. The purple areas are dense and granular, while the black areas are more fibrous and layered. The overall appearance is highly textured and organic.

"The tragedy
is that silicosis
is entirely
preventable and
yet it still affects
hundreds of
workers every
year."¹

¹ V. Leso, L. Fontana, R. Romano, P. Gervetti, I. Iavicoli, 2019, Artificial Stone Associated Silicosis: A Systematic Review

crystalline silica in nature

Introducing types of silica, specific presence by material, and potential health impacts.



CRYSTALLINE SILICA IN NATURE

Silica, also known as silicon dioxide (SiO₂), is a widely distributed compound in the Earth's crust, existing primarily in two forms: amorphous and crystalline.

Amorphous silica is relatively rare and generally considered to be merely an irritant, posing no significant health risk. In contrast, crystalline silica is well recognized for its potential dangers, particularly its association with respiratory diseases such as silicosis².

Crystalline silica is found in varying amounts in most stone-like materials commonly used in the construction industry, including ceramics, stoneware, granite, engineered quartz, slate, sandstone, concrete products, and more.

A detailed classification by Australia's Worksafe Victoria highlights the weight percentages of crystalline silica contained in various materials:

- **Quartzite:** up to 95%
- **Engineered quartz:** up to 95%
- **Ceramic tiles:** up to 45%
- **Granite:** up to 45%
- **Concrete:** up to 30%

It is important to note that these materials are entirely safe in their commonly used solid form³.



² Michael R. Cooper, P. Susi, D. Rempel, 2012, Evaluation and control of respirable silica exposure during lateral drilling of concrete

³ Worksafe Victoria, Construction: Preventing exposure to crystalline silica dust

"EVERY EMPLOYER
SHALL ENSURE THAT
HIS WORKERS ARE
PROVIDED WITH SUCH
HEALTH SURVEILLANCE
AS IS APPROPRIATE
HAVING REGARD TO
THE RISKS TO THEIR
HEALTH..."

UK GOVERNMENT

why prevention matters

Why prevention can make the difference



why prevention matters

As specified previously, Worksafe Victoria considers the above materials completely safe in their solid form.

The **risks are manifested** by the generation of respirable **dust during the processing and transformation** of the slabs or blocks into finished products, in the absence of preventive and control measures instrumental in safeguarding operators' health:

- Use of Wet Processing Methods

Using water during cutting, grinding, and other operations is crucial to reduce the release of crystalline silica dust into the air.

- Control of Silica Dust Exposure

The use of dust removal systems in the workplace can drastically reduce the amount of airborne dust.

- Workplace Environment Monitoring

Conduct regular checks to assess silica levels in the air and ensure they are below recommended exposure limits.

- Personal Protective Equipment

Operators should use personal protective equipment, such as masks with filters suitable for silica, to reduce the inhalation of dust.

- Regular Medical Examinations

Perform periodic medical checks on workers to detect early signs of silicosis.

- Worker Training and Awareness

It is important that workers are informed about the risks associated with silica exposure and the available prevention measures.

If properly implemented, these measures can eliminate the risk of developing silicosis among workers in the stone industry.



why prevention matters



⁴ M. Kramer, P. Blanc, E. Fireman, A. Amital, A. Guber, Nader Abdul Rhahman, D. Shitrit, 2012, Artificial stone silicosis: disease resurgence among artificial stone workers

REGULATIONS IN THE UNITED STATES, EU, AND UK

Understanding world's leading countries policies regarding crystalline silica exposure and related diseases.



REGULATIONS IN THE USA, EU, AND UK

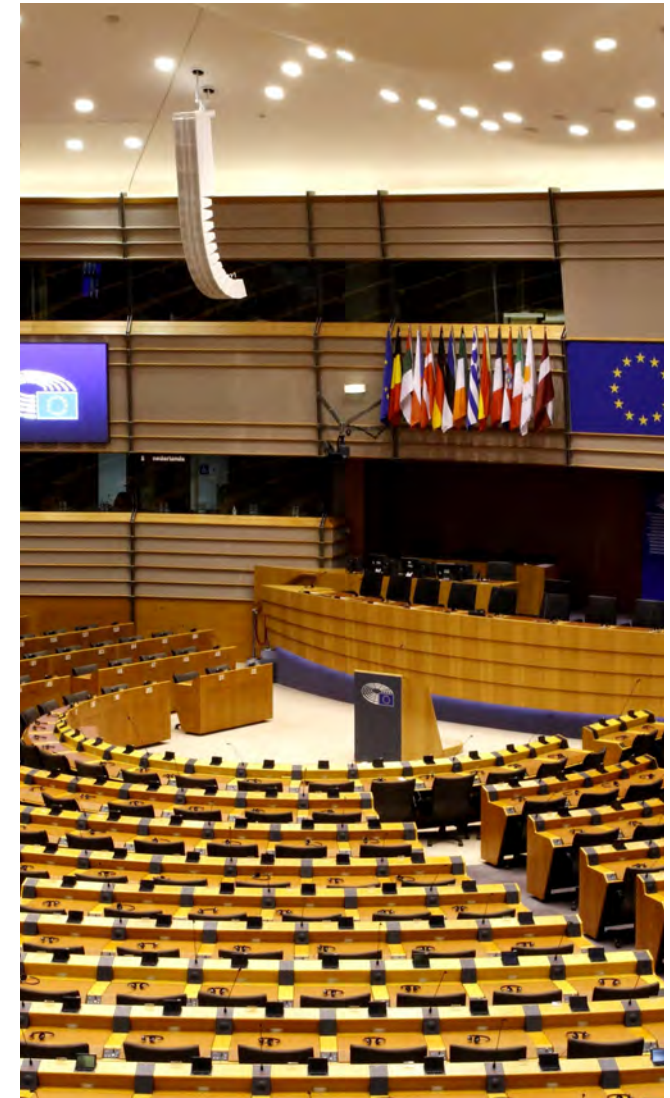
Many countries have implemented strict regulations to protect workers from illnesses caused by prolonged exposure to fine dust containing crystalline silica.

In the **United States**, the Occupational Safety & Health Administration (OSHA) has intensified efforts to address the risks associated with crystalline silica through new enforcement and compliance assistance initiatives.

OSHA aims to enhance the **inspection and regulation** of industries that work with engineered stone, where workers, in the absence of adequate precautions, could be exposed to crystalline silica dust. Employers must ensure that no employee is exposed to an airborne concentration of respirable crystalline silica exceeding 50 mg/m³, averaged over 8 hours⁵.

In the **European Union**, regulatory measures are generally framed within broader directives and local regulations concerning occupational health and safety, particularly regarding crystalline silica. The EU mandates guidelines to **control exposure** to crystalline silica in the workplace, including **mandatory health surveillance** and setting exposure limits depending on the specific Member State⁶.

The **United Kingdom** adheres to the Control of Substances Hazardous to Health Regulations (COSHH), which requires the risk assessment and control arising from crystalline silica dust. The workplace exposure limit (WEL) for silica dust is 0.1 mg/m³, expressed as an 8-hour time-weighted average (TWA). Additionally, proposals have been made to classify silicosis as a reportable disease to enable more effective prevention⁷.



⁵ Occupational Safety & Health Administration, Occupational Safety and Health Standards - 1910.1053, Respirable crystalline silica.

⁶ European Union, Occupational Exposure Limits in mg/m³ 8 hours TWA – Respirable dust.

⁷ HASpod, Silica Dust Exposure Limits, Regulations And The Law.

REGULATIONS IN AUSTRALIA

Are bans an effective solution?



REGULATIONS IN AUSTRALIA

In **Australia**, the government has adopted a different approach compared to the United States, the European Union, and the United Kingdom. Effective from July 1st, 2024, although exemptions may still be possible, the **supply and production of engineered stone containing crystalline silica are expected to be banned in most Australian jurisdictions**. Other commonly used materials containing crystalline silica are currently not addressed by the regulation.

The Australian regulatory framework might be strengthened by introducing regulations to manage the risks associated with other materials containing crystalline silica.

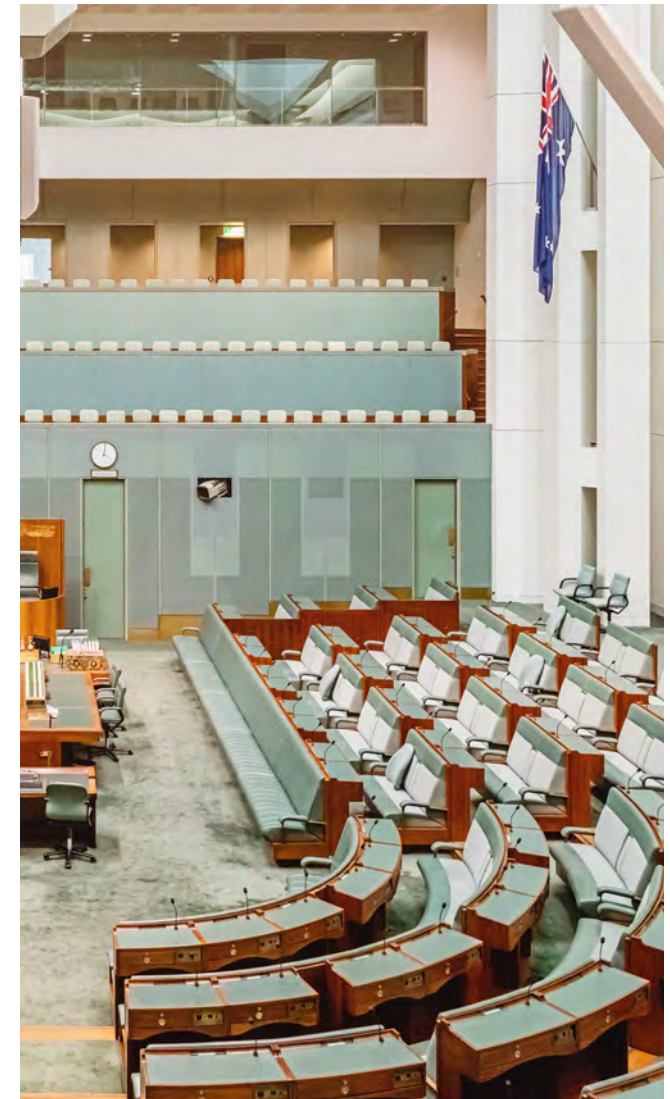
The Australian government specifies that “engineered stone” refers to artificial materials, created by combining natural stone aggregates with other chemical constituents, containing crystalline silica and obtained through a dedicated curing process.

Additionally, it is noted that modern measuring instruments cannot detect crystalline silica content below 0.1%. Therefore, any crystalline silica content below this threshold is considered negligible.

Regulations adopted by the **United States**, the **European Union**, and the **United Kingdom** aim to make working environments involving stone materials safe and manageable through **preventive and monitoring measures, ensuring that production processes can continue in a manner that protects human health**.

Enhancing prevention and control measures is a respectful solution that contributes to sustainable progress and economic growth.

Conversely, adopting drastic measures like banning the production and trade of specific materials does not seem to be an effective solution, considering the significant trade-offs in terms of economic growth.



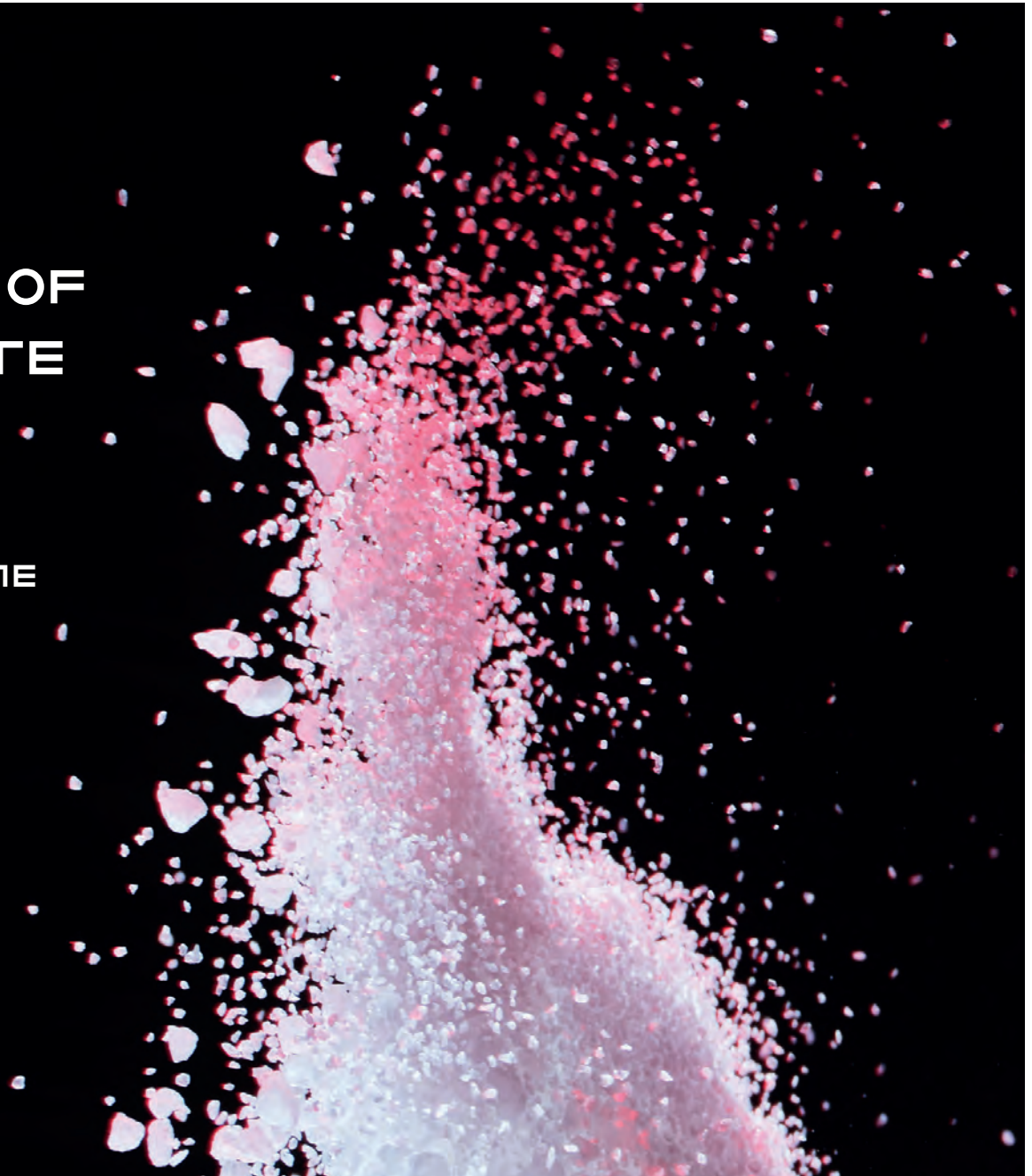
breton solutions FOR A SAFER STONE industry

How to overcome silicosis concerns through Breton machinery, technologies, and industrial materials.



"GOOD DESIGN IS
THE CORNERSTONE OF
REDUCING EXPOSURE
TO SILICA DUST."

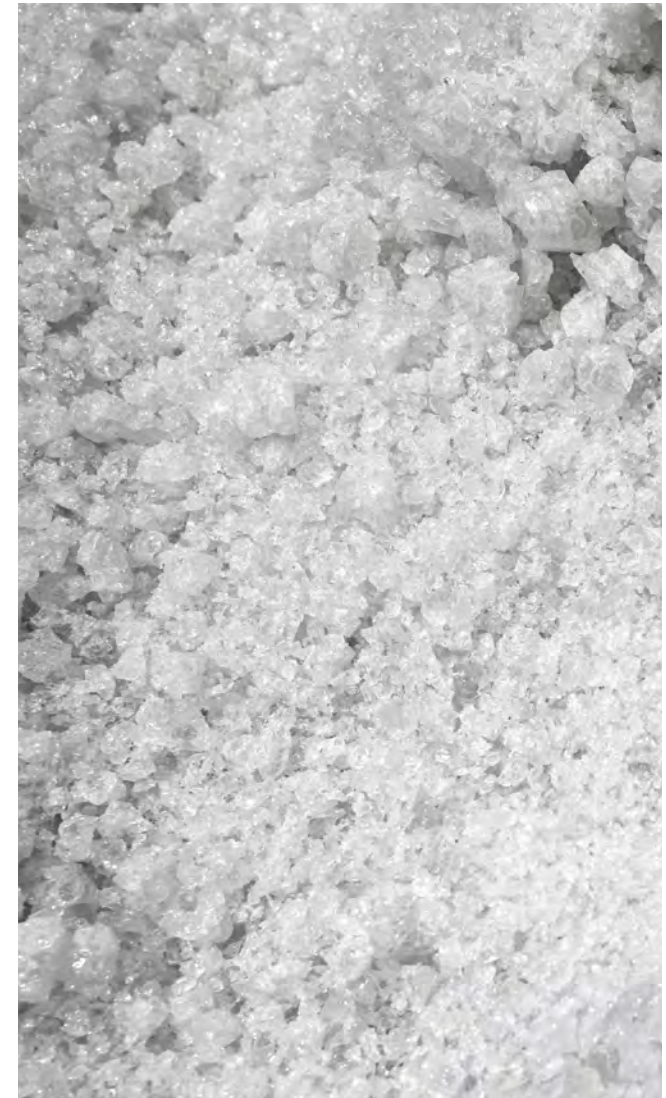
BRITISH OCCUPATIONAL HYGIENE
SOCIETY



breton solutions for a safer stone industry

Breton is at the forefront of ensuring completely safe stone processing procedures.

In addition to plants and machinery that prioritize the health of operators and environmental respect, the company has developed Bioquartz®, an innovative mineral entirely free of crystalline silica for engineered silica-free slab manufacturing.



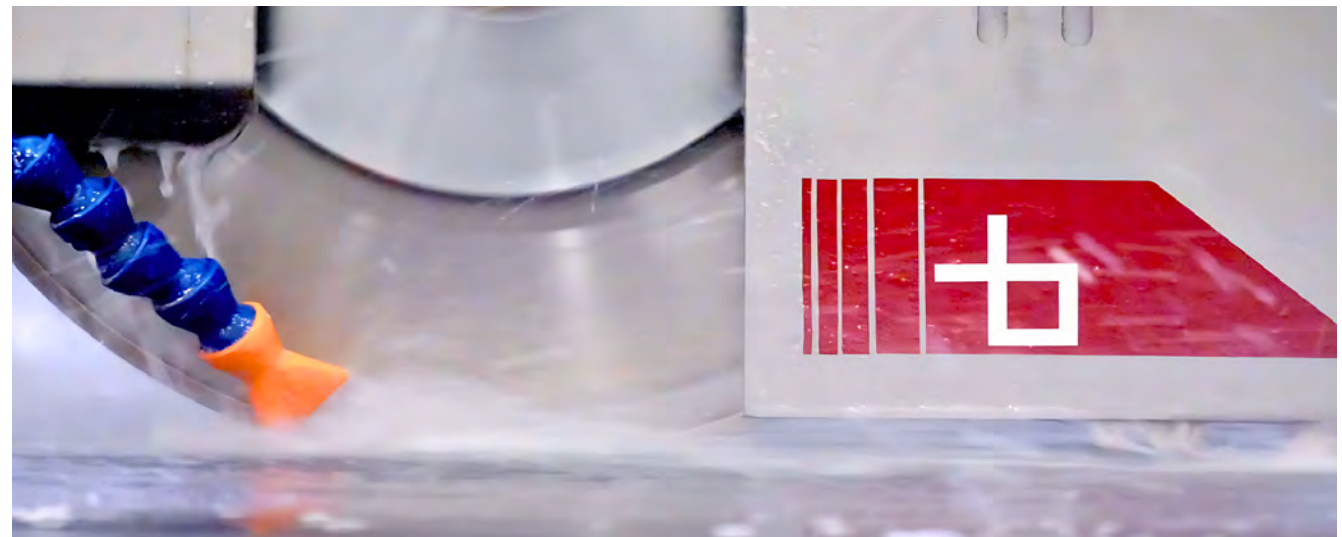
breton solutions for a safer stone industry

Breton machinery

Each Breton machine is specifically designed to meet the needs of the stone industry processing: from primary processing of natural stone, to resin lines and fabrication shop solutions.

In the context of stone processing, Breton stands out for its use of **advanced wet processing technologies**, which involve the use of specific water flows on tools during the production process.

Additionally, Breton integrates its machines with **specialized dust containment enclosures** designed to effectively capture solid residues generated during processing.



breton solutions FOR A SAFER STONE industry

BretonStone® plants

The BretonStone® plants, used by leading global manufacturers of engineered stone slabs, are equipped with advanced **systems for capturing dust** in phases of the process where there are health risks to operators:

- 1) *Transport of raw materials*, with containment through localized suction and segregation.
- 2) *Smoothing*, with wet suppression.
- 3) *Calibration*, with wet suppression and containment through segregation.

In addition to engineered quartz or silica-free, Breton's technologies enable the **production of slabs and blocks using calcareous aggregates, thereby recycling quarry waste and minimizing it.**



breton solutions for a safer stone industry

Bioquartz®

For manufacturers interested in replacing quartz aggregates in their slabs, Breton has developed Bioquartz®: an amorphous calcium and aluminum meta-silicate for producing **silica-free surfaces** with exceptional physical and mechanical properties!

Bioquartz® slabs are completely safe to process and showcase high durability, ease of fabrication, and a range of aesthetic solutions equivalent to engineered quartz surfaces.

This exclusive material is obtained through a pyrolytic transformation process at very high temperatures, allowing for the reuse of sludge residues from conventional slab production processes. This contributes to **waste reduction** and promotes the adoption of circular economy principles.

Compared to alternatives such as recycled glass or feldspar, Bioquartz® stands out for **superior resistance features** and offers greater aesthetic options.

The slabs, produced using a vacuum vibrocompression process with calcium and aluminum metasilicate, are protected by patents exclusively owned by Breton.

Bioquartz® is available for purchase in big-bag format directly from Breton, or it can be produced independently by investing in the company's production equipment and expertise.



An aerial photograph showing a winding river that flows through a dense forest. The river is a deep blue color, contrasting with the green and brown tones of the trees. The forest appears to be a mix of deciduous and coniferous trees, with some trees showing autumnal colors. The river meanders through the landscape, creating a central path that divides the forest into two main sections.

"AN OUNCE OF
PREVENTION IS
WORTH A POUND
OF CURE."

benjamin franklin

Breton, founded in 1963, has established itself on the global market thanks to its philosophy aimed at research and innovation; in its history, Breton has filed over 1700 patents.

It is the world leader in the design and production of systems for mineral surfaces and natural stone. It is a reference player in the design and production of machine tools for working metals and composite fibers in the automotive, energy, and aerospace sectors. It is a technological leader in the design and production of machines for 3D large-format "Additive Manufacturing".

Breton has its headquarters in Italy, has seven foreign branches, and on average allocates the equivalent of around 5% of its turnover to research and development every year.

