

Case Study:

Princess Elisabeth Research Station, Antarctica



The Project

The Princess Elisabeth is the first ever research station to be constructed in the Antarctic, entirely sustainable by running on renewable energy. The station was designed at conception to be highly energy-efficient incorporating an energy control system, the use of energy efficient-appliances and sound insulation techniques. Wind turbines and solar panels provide the station's energy source. The International Polar Foundation (IPF) and its technical partners have taken a pioneering step forward in the domain of sustainable development and in doing so, will prove that if it is possible to construct such a building in a region as cold and harsh as the Antarctic, it is possible to do the same anywhere in the world.

Research conducted at this Antarctic base will help identify key environmental and climate changes and advance the understanding of the Earth's ecosystem, whilst testing building designs aimed to reduce environmental impact and building products suitable for use in a hostile environment.

Following the royal inauguration in Brussels on September 5th 2007, where the station was unveiled in its pre-assembled form, it has now been dismantled and shipped to its final destination of Utsteinen Nunatak in the Dronning Maud Land of Antarctica for re-build. The station will become operational from austral summer 2008.

The Challenge

With the most extreme meteorological conditions known to man, with an air temperature of between -50°C to -5°C, maximum wind speeds of 125 km/h and maximum gusts of up to 250 km/h, the IPF faced monumental challenges in choosing appropriate materials for construction and in particular for the windows. The window system is designed as a double skin of insulating glass units with a 400 mm space in between. The insulating glass units are composed of a triple insulating and laminated glass system that use Heat Mirror™ technology and Dow Corning 3362 Silicone Insulating Glass Sealant.

Location:	71°57' South and 23°20' East on the north ridge of Utsteinen Nunatak in the Dronning Maud Land, Antarctica
Product:	Dow Corning® 3362 Silicone Insulating Glass Sealant
Commissioned by:	The Belgian Government in February 2004
Design and Constructor:	International Polar Foundation
Glass Supplier:	AGC

- Commissioned to commemorate the International Polar Year 2007-2008, the Princess Elisabeth is designed to be the first ever 'zero emission' research station designed and run entirely on renewable energy. 500 km from the nearest base, the station has a maximum capacity for 20 people and total usable space of 700 m².
- It is the first Belgian Antarctic station to be constructed in over 40 years and is unique due to the fact that it is a joint public-private venture. The projected cost of the entire Princess Elisabeth Station Project is 11.5 million Euro.
- Dow Corning are both corporate sponsors of this project and suppliers of silicone bonding solutions, which are uniquely suited to enable the station to withstand the harsh conditions of the Antarctic environment.
- Dow Corning 3362 Silicone Insulating Glass Sealant has been specified for installation in this station, which will be fully operational by the end of 2008.

Dow Corning 3362 Silicone Insulating Glass Sealant

A two-component, neutral curing silicone sealant specifically formulated for use as a secondary seal in the manufacture of high performance insulating glass units. With outstanding adhesion to a wide range of substrates including coated, enamelled and reflective glass, Dow Corning 3362 has excellent temperature stability and is resistant to ozone and ultra-violet radiation.

The Solution

Silicones, by nature, are characterized by their high tensile and tear strength, long-term flexibility, resistance to harsh weather, temperature extremes and ultra-violet light and excellent adhesion building materials. They became a perfect fit for helping the station reduce its ecological footprint through energy savings in Antarctica's fragile environment. Dow Corning's technical experts worked closely with the IPF providing the necessary tools and transferring critical expertise to enable

scientists to undertake an exacting and comprehensive testing regime which included outside sample preparation and medium-term exposure, all conducted in the Antarctic.

Dow Corning's close co-operation and knowledge transfer with the IPF and the long term, proven performance of their products, (which was a mandatory requirement for product selection), has culminated in the specification of Dow Corning 3362 Silicone Insulating Glass Sealant.

The IPF encourages the adoption of innovative solutions that enable people and companies to respond in a sustainable manner to the challenges of climate change and Dow Corning were thrilled to step up to this challenge whilst welcoming the opportunity to further test its products in the most extreme of environments.

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