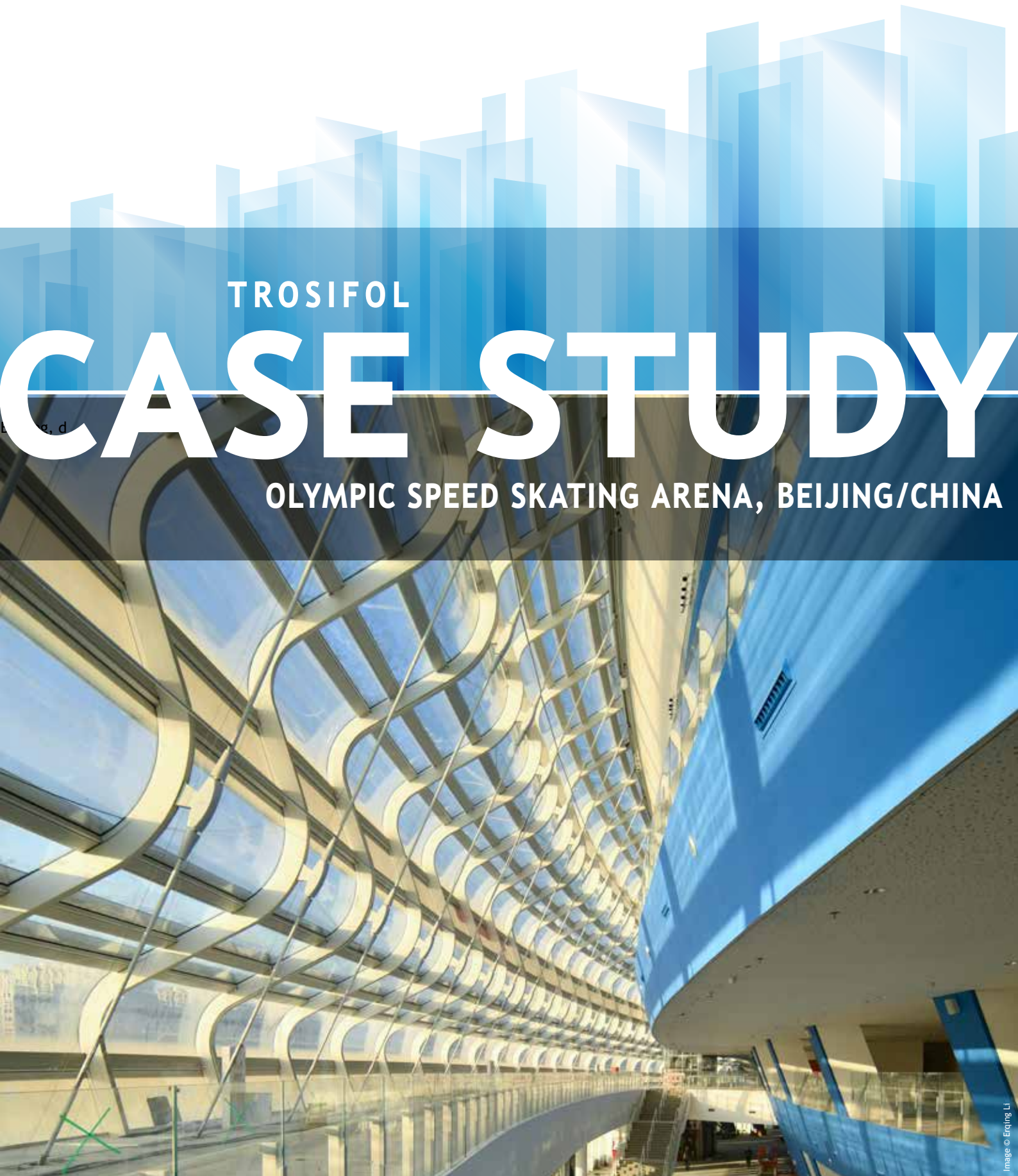


TROSIFOL

CASE STUDY

OLYMPIC SPEED SKATING ARENA, BEIJING/CHINA





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Imparting a sense of speed, the ribbons are manufactured from highly transparent low-iron glass in insulated glass units, all of which are laminated using the SentryGlas® ionoplast interlayer from Trosifol.

NEW RIBBON-WRAPPED OLYMPIC SPEED SKATING ARENA IS COOL AS ICE THANKS TO SENTRYGLAS® IONOPLAST INTERLAYER FROM TROSIFOL

Ambitious concepts often require the development of new fabrication processes. The outstanding Ice Ribbon in Beijing demonstrates what can be achieved with new fabrication techniques and advanced structural interlayers.

The Olympics has always been a festival of human endeavour, endurance, skill and athleticism, but in recent years it has also evolved in its role as a shop-window for the host city and country.

This national-level window dressing deploys a variety of means to showcase wealth, altruism, technology and society, including traditional pageantry and icons,

loveable contemporary mascots, modern mass marketing, lots of meetings, dinners & handshaking, and of course, some truly staggering architecture.

As each successive event unfolds - both winter and summer - we see designer's and architect's imaginations let loose, and structural engineers and glazing companies pushed in new and interesting directions.

Architect	Beijing Institute of Architectural Design (Group) Co., Ltd Populous
Laminator	Tianjin North Glass Industrial Technical Co.,LTD
Building Owner	Beijing National Speed Skating Pavilion Management Co. LTD

The results vary from plain, almost utilitarian cubes up to some of the world's most visually dynamic architectural structures - some of which have redefined fabrication practices.

One such structure is China's National Speed Skating Oval, in Beijing, which will host the 2021 World Single Distance Speed Skating Championships and the speed skating competitions at the 2022 Winter Olympics. As one of the 26 venues being used for the Winter Olympics and built on the location of the former site used for field hockey at the 2008 Summer Olympics, the structure has been bestowed with the same significance as the 2008 event's Bird's Nest and Water Cube.

Incorporating a 400 m (1312 ft) racing track and accommodating up to 12,000 spectators, the 240 x 180 m (787 x 590 ft) Oval is cocooned or wrapped in 22 glass ribbons, which swoops around its external envelope from ground level up to its 34 m (111 ft) high roof. Designed to look like ice and to impart a sense of speed, the ribbons are manufactured from highly transparent low-iron glass in insulating glass units (IGU), all of which are laminated using the SentryGlas® ionoplast interlayer from Trosifol. The wrap effect is particularly striking at night, where the optically clear ribbons become almost dynamic thanks to an array of lighting effects.



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China's National Speed Skating Oval, in Beijing, will host the speed skating competitions at the 2022 Winter Olympics.

The façade totals some 30,000 m² (322,917 ft²) and is formed of 3,484 different glass panels. The panels vary in their composition depending on their form. The flat IGUs comprise an outside lite made from 8 mm (0.3 in) glass + 1.52 mm (60 mil) SentryGlas® + 8 mm glass with a low-E coating on surface 4, a 12 mm (0.5 in) Argon-filled air gap separates this from the inside lite, which comprises 8 mm glass + 1.52 mm SentryGlas® + 8 mm glass. All glass is low iron. The curved IGUs have the same layered format but differ by their use of 2.28 mm (90 mil) SentryGlas®. The maximum panel length is around 4,100 mm (161 in), the maximum arc length is 2,400 mm (94.5 in) and the minimum bend radius is 1,500 mm (59 in).

According to Mr. Li Chun Chao, Sales Director at Tianjin North Glass Industrial Technical Co., Ltd: "There were several difficulties in the processing of the glass in accordance with the drawings. In the early stages, we considered creating a transparent curved surface with structural glass, but this was complicated by the small radii and potential glass distortion. The aim then became how to minimize glass distortion and maximize the safety of the 4 m-long (13 ft) curved arc glass panels. Considering the installation distortion and the lower safety of hot-curved glass, it was difficult for us to improve the safety by tempering the glass; so, to solve this, we developed, tested and trial-produced

curved tempering equipment, which could produce a small radius. After continuous debugging and testing we completed the equipment transformation and upgrade before the official order was placed and, as a result, we are now able to apply the heat strengthening process on small-radius glass forms, exceeding the imagination of the building's designers and owners."

"SentryGlas® enables us to achieve ultimate clarity and vision using low-iron safety glass," explains Dr. Zhen Fang, Deputy Chief Architect, at Beijing Institute of Architectural Design (Group) Co., Ltd. "It eliminates the undesirable yellow or greenish tint that affects safety glass produced with other conventional interlayers. It was recommended by the façade engineer after multiple calculations. As architects, we have to pay attention to the strength and visual effects of films, and the use of high-strength film such as SentryGlas® as an inevitable choice for large-scale glass units of this type. In addition to its excellent high-clarity partnership with low-iron glass, SentryGlas® was also selected for its high strength and longevity, coupled to its outstanding post-breakage performance."

Kuraray and North Glass have worked together on some astounding large-glass structures, including various Apple Stores and Shanghai's new library to name but a few. This combination of class-leading structural inter-



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Trosifol is the global leader in PVB and ionoplast interlayers for laminated safety glass in the architectural segment. With the broadest product portfolio Trosifol offers outstanding solutions:

- **Structural:** Trosifol® Extra Stiff PVB and SentryGlas® ionoplast interlayer
- **Acoustic:** Trosifol® SC Monolayer and Multilayer for sound insulation
- **UV Control:** from full UV protection to natural UV transmission
- **UltraClear:** lowest Yellowness Index in industry
- **Decorative & Design:** black & white & colored interlayers

layer performance coupled to larger and larger glass-processing capabilities is steadily opening up the potential for structural and aesthetic glazing in a wider array of projects.

Events such as the Olympics tend to push the envelope in terms of building designs and concepts, often acting as a proving ground for new ideas. Following these successful implementations, somewhat overly cautious architects start to become more receptive to what can be achieved with glazing and interlayers and we are starting to see the new concepts drip-feed into other projects around the globe.



North Glass is now able to apply the heat strengthening process on small-radius glass forms.

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trosifol@kuraray.com
www.trosifol.com

Kuraray America, Inc.
 PVB Division
 Wells Fargo Tower
 2200 Concord Pike, Ste. 1101
 Wilmington, DE 19803, USA
 + 1 800 635 3182

Kuraray Europe GmbH
 PVB Division
 Muelheimer Str. 26
 53840 Troisdorf
 Germany
 +49 2241 2555 220

Kuraray Co., Ltd
 PVB Division
 1-1-3, Otemachi
 Chiyoda-Ku, Tokyo, 100-8115
 Japan
 + 81 3 6701 1508