

Hyundai Motors-KIA World Headquarters

Advanced Research Center



Location:

Seoul, Korea

Type:

Multi-towered high-rise

Existing building = 82,344m²

New building* = 60,856m²

(*21 stories, new construction)

General contractor:

Hyundai AMCO Corp. Seoul

Products used:

Warm-Light® warm-edge spacer, and pour and debridge thermal barrier by Azon, Kalamazoo, Mich.

Glass and Glazing contractor:

KCC Corporation, Seoul

Architectural firm:

Jong Hyun Engineering

Window system manufacturer:

KN Walldex Co. Ltd., Sungnam-Si, Kyungki-Do Province

Situation:

The word “hyundai” means “modernity” in Korean. Hyundai refers to a group of companies and related organizations founded in 1947 as a construction firm eventually branching into other market segments. The Hyundai organization eventually became the Hyundai Motor Company.

After purchasing Kia Motor in 1998, the Hyundai-Kia Automotive Group was formed as South Korea’s largest automobile manufacturer, the second largest automaker in Asia and one of the world’s top four automakers.

Phase I of the Hyundai-Kia Automotive Group World Headquarters building project opened in the year 2000. The fenestration products in Phase I consist of clear glass with an aluminum spacer and polyamide aluminum framing.



Figure 1 Phase I tower built in 2000 shown in the foreground, Phase II, built in 2005 appears on the left.



Figure 2 Phase II building with late-model Hyundai coupe

In 2005, the automotive giant’s growth necessitated additional facilities, and Hyundai began designing an expansion project that would more than double the headquarters’ campus.

Action plan:

Realizing advanced technology had emerged since the year 2000, the Hyundai Development Company consulted with the Azon AZO/Tec® technical services team to request a study in energy savings for the new Phase II addition. The resulting study compared the old fenestration system to modern, more advanced framing and glazing system

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components. The insulating glass units in the Phase II tower were to include low-E glass and Warm-Light® by Azon warm-edge spacer. The aluminum framing material would also utilize an Azon polyurethane polymer, the thermal barrier system with the lowest conductivity of any insulant material used for that purpose.

About the fenestration products:

Most of the curtain wall products manufactured in Korea are custom made specifically for the individual project. Typically the manufacturer produces different extrusion dies based on performance criteria. Window materials selected for the Hyundai-Kia Automotive Group Phase II were manufactured by KN Walldex Co. Ltd. KCC World, produced the low-E insulating glass with warm-edge spacer at their Yeosu plant.

To aid in verifying the success of the constituent materials used in the curtain wall system* to mitigate thermal transfer, eliminate air infiltration and to resist condensation, a mock-up of the final product was tested for air, water, structural and thermal performance. (*Shown as a project-in ventilating window and curtain wall frame in Figure 3)

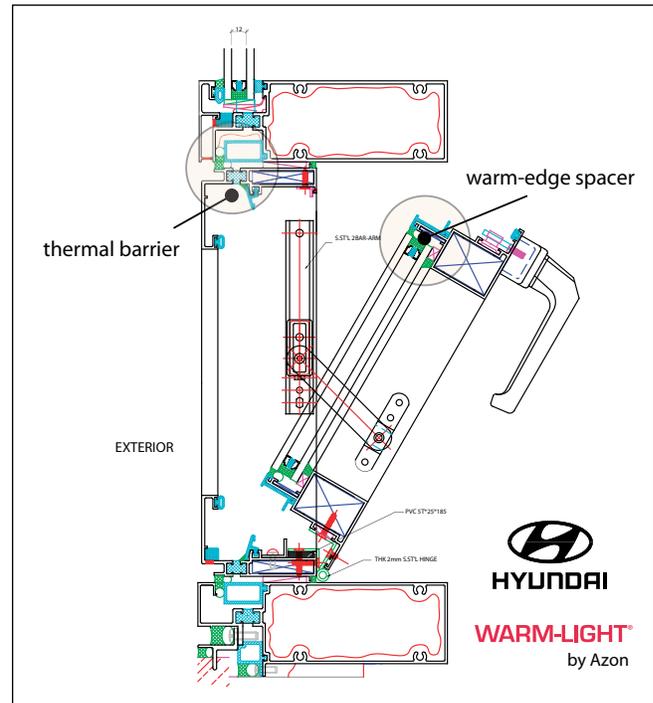


Figure 3

Outcome:

The completed comparison study resulted in a potential heating and cooling savings for the newest Hyundai-Kia Automotive Group tower in excess of \$91,000 annually. (Figure 4) Other benefits with the advanced products included saving non-renewable fossil fuels and a reduction in carbon emissions. Based on the significant energy cost savings potential demonstrated in the study, the improved fenestration system was chosen for the Phase II building project.

Sources:

Photo credits: Figure 2 ©<http://www.2-free.net/free-wallpapers/hyundai-building-view-wallpaper/21485.html>
Figure 3 and Figure 4 AZO/Tec®

Energy assessment comparison:

Benefit	Savings
cost/returns	\$91,000
energy/fuel	643,500+ kWh
carbon emissions/ environment	Twenty percent reduction CO ₂
social	natural daylighting, greater comfort, healthier indoor air, less absenteeism

Energy use outcomes during a 1-year cycle based on the Hyundai-Kia Automotive Group Phase II building structure as compared to the Phase I when using more efficient fenestration components in the facade

Figure 4