



EMPIRE STATE BUILDING NEW YORK, NY

Owner:	Empire State Building Associates, New York, NY
Window Manufacturer:	TRACO, Inc., Cranberry Twp., PA
Coatings Supplier:	PPG Industries, Inc., Pittsburgh, PA
PPG <i>IdeaScapes</i> Products:	Duramar ® Coatings Empire Red

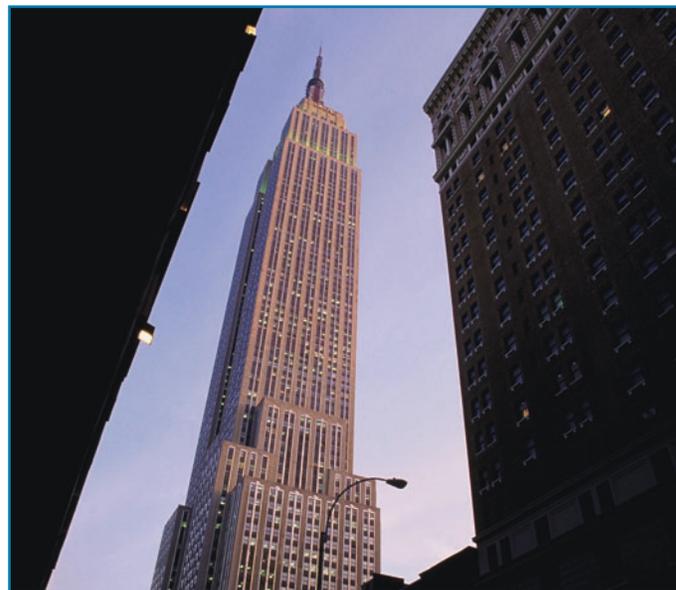
PROJECT OVERVIEW:

The *Empire State Building* in New York is arguably the world's most famous building. Soaring more than a quarter-mile into the air, the building contains 102 stories of office, commercial and retail space.

Erected in 1930 and 1931, the building was constructed with more than 60,000 tons of steel and 200,000 cubic feet of Indiana limestone. In addition to its 73 elevators, 70 miles of water pipe and 2.5 million feet of electrical wiring, the Empire State Building also contains more than 6,400 windows.

In the early 1990s, after more than six decades of service, the performance of these windows inevitably began to suffer. This was due mostly to weathering, but also to other environmental hazards associated with the building's height. As the failure of the windows became more acute, maintenance costs began to rise. Not only were the windows major sources of energy loss, they were also increasingly susceptible to damage from frost and leakage.

In 1993, TRACO, Inc., a window manufacturer located in Cranberry Township, Pa., a suburb of Pittsburgh, was commissioned, following a nationwide search, to replace all 6,400 windows on the Empire State Building. As if this task weren't challenging enough, TRACO was also required to preserve the historical appearance and integrity of the windows.



This task was complicated by the initial construction of the building in 1930, which despite its size, was erected very quickly for its time. To speed the construction process, the original architect, William Lamb of Shreve, Lamb & Harmon, ordered the stone columns to be put into place, rough-cut, directly from the quarry without any final cutting or fitting.

Consequently, to cover the stone's rough edges, the windows were fitted with metal strips, then attached to the building, between the stone columns, with metal brackets and aluminum panels above and below each floor.

Because of their experience with historic renovation, TRACO had no problems dealing with these unusual complications. However, when it came to matching the original color of the window frames and panels, the company turned to PPG. Through chemical analysis and by using its own digital color-matching system, PPG was able to replicate, in its long-lasting **Duramar** coatings, the exact color used on the building's original windows.

For more than 40 years, **Duramar** coatings have been manufactured by PPG to provide long-lasting protection and durability to extruded architectural components made from aluminum and steel. Based on a 70% fluoropolymer

PPG *IdeaScapes*™ Profiles. *Empire State Building*.

resin and a combination of proprietary resin and pigment technologies, these coatings have demonstrated exceptional resistance to surface damage caused by environmental hazards—such as sea salt, humidity, winds, sunlight and acid rain—inflicted on structures like the Empire State Building.

Recently, owners of the Empire State Building installed a new air conditioning system in the building. This rendered 400 windows, which had originally been outfitted with louvers, obsolete. TRACO was called upon to replace these windows as well.

Again, the ability to match the color of the windows installed 13 years earlier was critical. Fortunately, due to their exceptional chalk and fade resistance, the original **Duranar**® coatings had lost none of their luster. By using its **Color Harmony** system, PPG was able to replicate exactly the customized Empire Red color it had created and digitally preserved 13 years earlier. As a result, there was no discernable color difference between the 400 new windows and those installed in 1993. These windows, together with the 6,400 TRACO had replaced earlier, are expected to last the life of the building.

Even though the Empire State Building's windows are designed to look old, they are expected to perform even better than new, thanks to TRACO, with assistance from the PPG **Color Harmony** system and the company's long-lasting **Duranar** coatings. As reported in *Energy User News Magazine*, the Empire State Building's Facilities Manager reported an annual energy savings of approximately \$1 million annually following the replacement with TRACO windows.

To learn more about the **Duranar** coatings, the PPG **Color Harmony** system and the complete line of building renewal solutions available from **PPG IdeaScapes**, call 1-888-PPG-IDEA or visit www.ppgideascales.com.



*When the Empire State Building had its original windows replaced in 1993, PPG created a customized **Duranar** coating to match the color of the landmark's original window trim. When 400 more windows were replaced in 2006, PPG was able to match the window color again, even after they had endured more than 13 years of weathering. This was due to the durability and color-fastness of the original **Duranar** coating as well as the precision of company's digital color-matching system.*

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