

Stainless steel sparkles in NYC

The iconic New York City skyline is celebrated in movies and photos. But as a global financial, cultural and business center, it is also constantly changing – particularly now. Buildings are rising at a breathtaking pace and many feature sustainable designs. Molybdenum-containing stainless steel is often key to making them not only beautiful, but also resilient and durable, thus reducing their carbon footprint.

Already home to many architectural tourist destinations, the City's list of notable stainless steel projects is expanding rapidly. Residential construction was 65% higher in 2015 than during the previous boom in 2008. The spending on other construction sectors is also substantial, putting NYC in the midst of the largest private construction boom in its history.



Type 316 diamonds sparkle on the new International Gem Tower. © Catherine Houska

Sustainability drives change

Sustainability is an important design factor in new construction projects as well as in major renovations. New York City has one of the densest concentrations of buildings in the world. There are almost one million in an area of about 800 square kilometers and their operation accounts for about 70% of the City's energy consumption. In 2009, New York became the first US city to mandate monitoring and reduction of building energy use. It has consistently ranked in first place for the number of US Green Building Council (USGBC) LEED¹ certified projects. The Mayor's office has encouraged building code changes, which are focused on reducing carbon footprint and water conservation.

Being coastal and largely built on islands, both the city government and its residents are aware of the potential adverse impact of climate change, particularly after the flooding and damage caused by Hurricane Sandy. This encouraged new initiatives for improving building and infrastructure resiliency in NYC. Now both public and private decision makers expect sustainable and resilient design in new construction and renovation projects.

Longevity a necessity

Truly sustainable construction requires exterior materials capable of withstanding New York's corrosive environment, because repeated material replacement or major maintenance is expensive

and dramatically increases a building's carbon footprint. The city and the surrounding area are exposed to both coastal and deicing salt. To make things worse, the use of deicing salt has increased and the products employed are increasingly corrosive. So, it must be assumed that all buildings in the city will have some salt exposure with the highest deposits at the lower building levels.

In the first city that used stainless steel in substantial quantities for high profile buildings – the Chrysler and Empire State are now both USGBC LEED[®] Gold for Existing Buildings – the material's inherent durability and timeless beauty are well known. However, the Type 302 and 304 stainless steels used on many older buildings are not sufficiently corrosion resistant for the current environment. These alloys require regular maintenance cleaning; even then, staining may occur between cleaning intervals.²

Durable stainless construction

For these reasons, molybdenum-containing Type 316L has become the preferred stainless steel for exterior uses, whether the application is a new façade or anchoring masonry during renovation (as in the Empire State and Chrysler Buildings). In the most aggressive applications, where higher corrosion resistance is required, 2205 duplex stainless steel and other more corrosion resistant alloys are increasingly used. ➤

¹ Leadership in Energy and Environmental Design

² The highest floors of very tall buildings like the Chrysler and Empire State are well washed during storms with wind levels that approximate power washing. However, lower levels are not uniformly washed and deicing salt deposits can be found at quite high levels on some buildings.

The table below lists some notable recent and current projects with façade and other visible Type 316L stainless steel exterior applications.

Residential leads the way

Some of the residential buildings use relatively small amounts of stainless steel as jewelry-like design accents. The Jahn-designed 50 West Street, which is nearing completion, uses Type 316L to accent remarkable curved glass panels. A mirror polished Anish Kapoor “mercury drop”-like sculpture will appear to support the new residential >



Three different Type 316 finishes add visual interest to Javits Convention Center. © Nicole Kinsman

Some recent and current Type 316/316L projects by primary application

Building	Year	Architect	Application	Finish	Metric tons
Primarily residential					
245 10th Ave	2010	Della Valle Bernheimer	Façade	Embossed ⁷	
HL23	2011	Neil M Denari Architects	Façade	Embossed ⁷	
New York by Gehry at 8 Spruce Street	2011	Gehry Partners	Façade	Vibration	270
Via (625 West 57th St)	2016	BIG/SLCE	Façade, structural	Invarimat ⁹	196
50 West Street ²	2016	Jahn	Façade	Scotch brite™ ¹⁰	35
56 Leonard	2016	Anish Kapoor	Sculpture	Mirror	40
Primarily office					
7 World Trade Center	2006	SOM	Façade, grating	Embossed ⁵	
Goldman Sachs World Headquarters ¹	2010	PCF	Façade	2M Linen ⁴	430
250 West 55th St ¹	2013	SOM	Façade	Raindrop ⁸	127
International Gem Tower	2013	SOM	Façade	Starlight ⁸	132
1 World Trade Center ¹	2014	SOM	Accent panels, structural, spire	2M Laser ⁴	>181
7 Bryant Park ¹	2015	PCF	Façade	2M Linen ⁴	120
3 World Trade Center ¹	2018	RSHP	Façade	2M Linen ⁴	550
Other building types					
National September 11 Memorial Museum Entry pavilion	2011	SNØHETTA	Façade	#3 & #4 with glass bead ⁷	64
Jacob K. Javits Convention Center ³	2013	FXFowle/Epstein Global	Façade	No. 4 and 2 FL ⁶ and 6 ON ⁶	118.2

1 USGBC Gold LEED

2 Applied for USGBC LEED Gold

3 USGBC LEED Silver

4 Outokumpu

5 Rimex

6 Rigidized Metals

7 Zahner

8 Tsukiboshi Art

9 Contrarian Metal Resources (CMR)

10 Scotch Brite is a registered trademark of 3M



Goldman Sachs World Headquarters



56 Leonard Street



7 World Trade Center



New York by Gehry at 8 Spruce Street



1 World Trade Center



50 West Street



National September 11 Memorial Museum entry pavilion



3 World Trade Center (2018)



Whitehall Ferry station

Stainless steel reconstruction and redevelopment in Southern Manhattan Island New York.

skyscraper by Herzog & de Meuron at 56 Leonard Street. When completed, SHoP's twin American Copper Buildings will have a three-story glass and stainless steel clad bridge suspended 91 meters (300 feet) off the ground. It will be joining the copper-clad buildings creating a design focal point, while emphasizing the beauty of combining natural uncoated metals.

The other high-profile residential buildings on the list use Type 316L stainless steel as a key design element and range from small intimate buildings adjoining the Highline to very large projects. VIA 57 WEST (625 West 57th St) is the first building designed by the Danish Architecture firm BIG – Bjarke Ingels Group in North America. It has been shortlisted for the 2016 World Architecture Festival Awards in the Completed Buildings – Housing category. The 709 unit building faces the Hudson River and is nearing completion. Its developer carefully vetted the materials and all aspects of construction with consideration of their impact on the environment. Type 316L stainless steel was selected for both the façade and the custom structural sections that will support the cleaning system. This choice was based on the building's combined coastal and deicing salt exposure adjoining the Joe DiMaggio Highway.

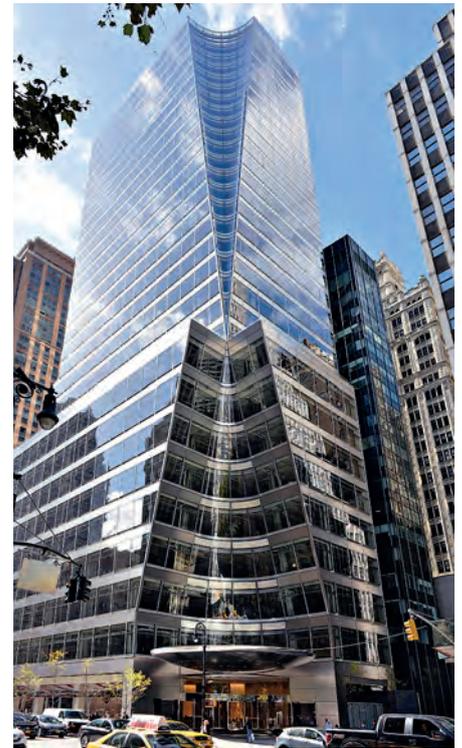
A glimmering new skyline

The International Gem Tower and 7 Bryant Park are captivating new office buildings, but the largest concentration of stainless steel façades will be around the World Trade Center. As can be seen on the map, Type 316L will visually connect a large concentration of buildings with diverse design styles while making them more sustainable and resilient. They range in size from the small elegant National September 11 Memorial Museum entry pavilion to One World Trade Center, which opened in 2014 and is the tallest building in the Western Hemisphere. Duplex stainless steel was used as a structural design element in the sweeping form of the Calatrava World Trade Center

Transportation Hub and Type 316 was used extensively in the station.

Other high profile residential and office projects featuring stainless steel are under development, including 30 Hudson Yards and Central Park Tower, which will become the tallest building in the Western Hemisphere by roof height in 2019.

Type 316 stainless steel also welcomes visitors to Manhattan Island. It is most visible at Whitehall Ferry station, which was completed in 2005, and on the exterior of the newly-renovated Jacob K. Javits Convention Center. It is an obvious choice for other categories of buildings designed for longevity like the new David H. Koch Center for Cancer Care, museum entrances, municipal service and educational buildings. The new notable projects list is not exhaustive and there are many smaller and existing projects within the city that illustrate the durable beauty of molybdenum-containing stainless steel. (Catherine Houska)



7 Bryant Park's elegant exterior features Type 316 stainless steel. © Outokumpu



The innovative VIA 57 WEST was designed to be the world's most sustainable residential building. © Contrarian Metal Resources/Gabby Pignanelli