

Protective Coatings Europe April-May 2019

Protecting an **icon**

Combining the best for the construction and protection of a complex, twisted structure. By Dr Marco Trentini, Ti.Pi.Ci.

The Generali Tower is a 44 floor 170m high concrete, carbon steel and glass skyscraper with a rhomboid plan. The geometry of the building is that of a warping shape, where both the floor dimensions and their orientation vary along the tower axis.

A great deal of attention was paid to environmental sustainability during construction with the aim of limiting energy costs, with the building being certified to LEED 2009 for Core & Shell standard with a platinum rating.

The Generali Tower is the second CityLife skyscraper to be built as part of a major urban redevelopment project in the old fair area in Milan, Italy. This very important building, which also has the names Hadid Tower and Lo Storto (twisted one), was designed by the late Zaha Hadid, the Iraqi -British architect and designer.

ENVIRONMENTAL SUSTAINABILITY

As mentioned above; as the construction paid great attention to environmental sustainability, as the customer, Yuanda Italy, required a high performance protective coating system with very low VOCs (Volatile Organic Compounds).

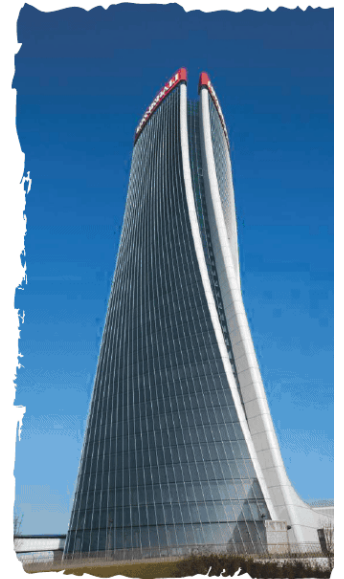
The IEQ 4.2 of LEED 2009 for Core & Shell, reports VOC limits established by the Green Seals Standard GS-11, Paints and Coatings, and by the Green Seals Standard GC-03, Anti-corrosive Paints.

Once the emission limits were defined, the second step involved the choice of a coating system with very low VOC emissions, but with extremely high-level protective features.

Yuanda Italy required a water-based protective system to meet UNI EN ISO 12944 standards for C5-M class and high durability. So Ti.Pi.Ci (Technology in Protective Coatings) proposed a high durability protective system based on three coats, which can be seen in Table 1.

This water based system was chosen in order to satisfy the following requirements from Yuanda Italy:

- low VOC (Green Seals and LEED 2009 compliant)



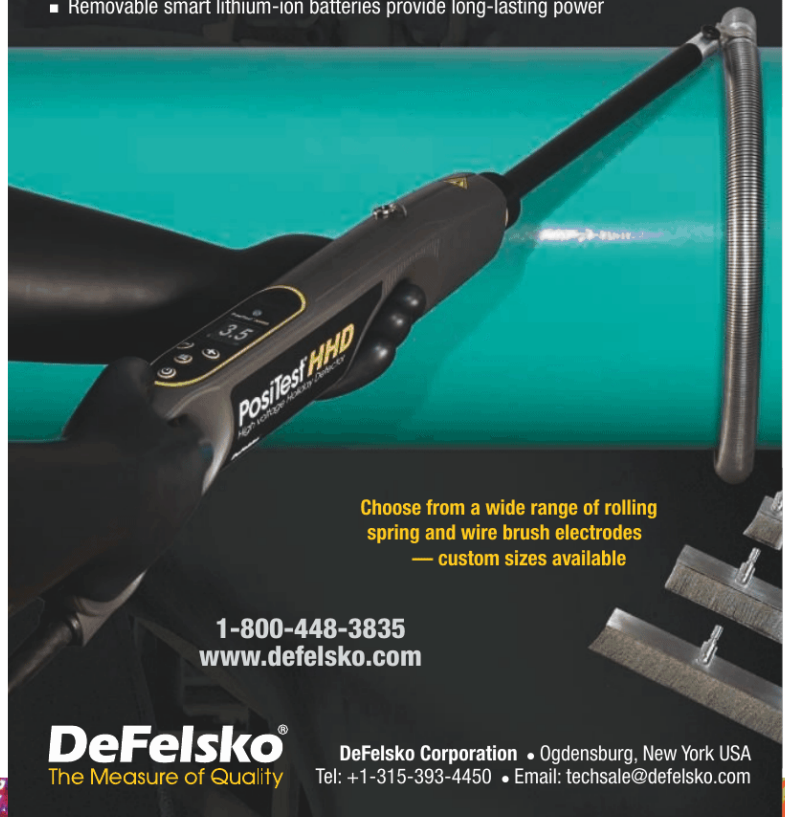
PosiTest[®] HHD

High voltage Holiday Detector

NEW

Detects holidays, pinholes and other discontinuities using pulse DC

- Lightweight, ergonomic design reduces operator fatigue
- Regulated pulse DC voltage output — ±5% accuracy
- Industry-standard connectors and adaptors for compatibility with nearly all existing electrodes
- Voltage calculator feature — choose one of 11 international standards, and input the coating thickness to automatically calculate the required test voltage
- Removable smart lithium-ion batteries provide long-lasting power



Choose from a wide range of rolling spring and wire brush electrodes — custom sizes available

1-800-448-3835
www.defelsko.com

DeFelsko[®]
The Measure of Quality

DeFelsko Corporation • Ogdensburg, New York USA
Tel: +1-315-393-4450 • Email: techsale@defelsko.com

Protective Coatings Europe April-May 2019

Table 1: Water based protective system proposed and applied on carbon steel structures

Type of coating	DFT	VOC Level	Product
Water based surface tolerant high build epoxy mastic	100Q	<60 g/l	Hydroguard HB Red Oxide
Water based Polyurethane Matt Topcoat	50Q	<132 g/l	Hydrothane Matt Ral 9004

- non-flammable
- extremely high-level protective features
- extremely high-level of zinc dust in Zinc Rich Primer (88% by weight)
- performance qualification according to international standard (UNI EN ISO 12944) @ 200 microns of total dry film thickness
- fast drying
- very fine matt appearance of topcoat

The carbon steel structures were produced and supplied by Giampi Srl, based in the north east of Italy.

All the structures were supplied direct to the paint applicator plant, which is in the same area of Italy.

The paint applicator, Eurosabbature Srl, operated in accordance with the most demanding surface preparation and paint application standards.

APPLICATION

The first step was surface cleaning to remove oil and grease according to standard SSPC PA 1. Subsequently, the panels were blast-cleaned to grade Sa 2,5, according to standard ISO 8501 Part 1, and with a medium roughness profile according to standard ISO 8503-2.

In order to control all the parameters, a 30x30 cm panel was made with the same characteristics as the protected structures.

After blast cleaning, the dust grade was checked on the panel according to standard ISO 8502 Part 3 and the grade was from 1 to 2. The last surface control before the environment condition check was for the presence of soluble salt. This control was made according to standards ISO 8502 Part 6 and Part 9 (Bresle test).

The last control check before the application of water-based zinc rich primer was for ambient conditions, after which the applicator began stripe coating the edges and the areas difficult to reach by spraying.

All the water-based paint was applied by airless equipment and, thanks to the extremely fast drying time, it was possible to apply the water-based zinc rich primer in the morning



and the water-based epoxy midcoat in the afternoon. The water-based polyurethane topcoat was able to be applied the day after.

Once the painting operations on the various parts had been completed, the carbon steel structures were shipped and assembled on site. Touch-up was then carried out on-site in order to repair any damages to the paint that had occurred during shipment.

Ti.Pi.Ci. proposed the maintenance system in Table 2.

This water-based system was chosen in order to satisfy all the on-site application requirements of Yuanda Italy, which were:

- low VOC (Green Seals and LEED 2009 compliant);
- non-flammability;
- extremely high-level protective and adhesion features;
- application of the paint by roller.

CONCLUSION

In conclusion, the Generali Tower building is an example of how it is possible to combine the best from the various sectors involved in the construction and protection of a complex structure. This is not only from the point of view of design and construction, but also from the point of view of long-term anticorrosive protection, protecting personnel and the environment.

Dr Marco Trentini is a FROSIO-Inspector Level III at Ti.Pi.Ci. (Technology in Protective Coatings) ■

Table 2: Water based protective system proposed for touch-up on site.

Type of coating	DFT	VOC Level	Product
Water based Zinc Rich Epoxy Primer	60Q	<70 g/l	Hydroguard Zinc Grey
Water based Epoxy Midcoat	90Q	<70 g/l	Hydroguard Midcoat Grey
Water based Polyurethane Matt Topcoat	50Q	<132 g/l	HydrothaneMatt Ral 9004