Introduction

Passive fire protection materials can be subjected to various mechanical, physical and chemical conditions in practice. It is important that the fire resistance performance is not reduced over time due to these external exposure conditions. In order to objectively verify this, UL 2431 "Durability of Fire Resistive Coatings and Materials" describes a specific series of environmental exposure tests, followed by fire testing. Passing these tests will become mandatory for UL 1709 listing in the near future.

Promat FENDOLITE® MII, for contour protection in accordance with UL design XR719, is the **first cementitious fire protection spray in the world to have successfully passed the full UL 2431 test series**, including the optional exposure to chemical solvent spray.

UL 2431 "Durability of Fire Resistive Coatings and Materials"

Within the UL 2431 standard in connection with UL 1709, the following environmental exposure test conditions are defined:

- Temperature stability, UV & High humidity (12 hour cycle of UV radiation and 70°C followed by condensation at 50°C, for 7 months)
- High speed air erosion (96 km/h wind speed)
- Salt spray (90 days continuous exposure)
- Combination wet/freeze/dry cycling (3 days of rain, 1 day at -40°C, 3 days at +60°C, repeated 12 times)
- Industrial atmosphere CO_2/SO_2 (30 days of continuous exposure to CO_2 and SO_2 at 35°C)
- Solvent spray (optional) (5 days, two cycles per day of solvent application and drying)
- High impact resistance (0,5 kg steel ball falling from 6m)
- Vibration (2 hours)

The test standard offers the option of H-sections or square hollow sections. As H-sections are expected to be more relevant for practice and also more onerous, Promat FENDOLITE® MII was tested on H-sections.

Tests with Promat FENDOLITE® MII

Short H-section columns were protected with Promat FENDOLITE® MII. Conservatively, the test specimens were prepared without a topcoat and without a mesh, which represents the most onerous situation. Before applying Promat FENDOLITE® MII, PROMAT® PSK 101 was applied to the bare steel surface in accordance with the application instructions. The Promat FENDOLITE® MII cementitious fireproofing spray was then sprayed onto the substrate.

Multiple identical specimens were produced. Some served as control specimens and the others were exposed to each of the prescribed exposure conditions. The optional solvent spray test was included in the test series. After exposure to the various conditions, the fire resistance of the exposed samples was tested together with the control specimens.

Test results

The requirement defined in UL 2431 is that exposure to each of these conditions is not allowed to reduce the fire resistance (time to reach 538°C) by more than 15%. During the fire tests with Promat FENDOLITE® MII however, the maximum reduction was limited to only 3%, and on average there was no reduction of the fire resistance at all.

The test results demonstrate that Promat FENDOLITE® MII, applied in accordance with the application instructions, is resistant against a wide range of mechanical, physical and chemical environmental conditions without suffering a significant reduction of the fire resistance performance.

The information given in this Application Procedure is based on practical experience, independent and other tests and represents, in Promat's opinion, the best technical advice available. Since the products are applied under circumstances beyond our control, Promat can accept no direct or consequential liability, whether in contract or in tort, for the interpretation of such recommendations and reserves the right to modify the recommendations as necessary. Should it be unclear as to the meaning of any of the instructions given above, or if further information is required, please consult Promat.