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Investigation into the durability of 'Signa' type façade panels

Client:

NV Vandersanden, Spouwen
Attn: Mr. J. Wouters
Riemsterweg 300
B-3740 SPOUWEN BILZEN
BELGIUM



Author: ir. J.H. van Wijck, Director

Postadres: Postbus 27, NL-6880 AA Velp (Gld.)

Bezoekadres: Bedrijventerrein De Beemd, Florijnweg 6, Velp/Arnhem

T +31 (0)26 3845600, *F* +31 (0)26 3845601, *E* info@tcki.nl, *I* www.tcki.nl, *K.v.K.* Arnhem 41047499

Materials

'Rockpanel' panels of the SIGNA type, with a yellow-grey strip made of hand-shaped bricks

Methodology

One panel was used as a reference panel, and the second panel was successively subjected to a *thermal shock test* in accordance with EN ISO 10545-9, a *frost resistance test* in accordance with CEN/TS 772-22 and a *UV resistance test* in accordance with DIN 51094.

For the thermal shock test, the entire system was heated to 105°C and then immediately cooled down in water to 15°C. This procedure was repeated 10 x. It should be noted that the standard maximum temperature under EN ISO 10545-9 is 145°C, and that the maximum temperature of 105°C used here applies specifically to façade type applications.

For the frost resistance test, the panel was first saturated with water at 80°C and then subjected to 100 cycles of freezing and thawing. During each freezing cycle, the system was frozen at a temperature of -15°C. During each thawing phase, the system was thawed using air at a temperature of 20°C in combination with water flowing over the panel at a temperature of 20°C.

UV resistance was tested by exposing the panel to UV radiation at a level of 300 to 400 W for a period of 28 days.

After the above tests, the reference panel and the test panel were subjected to additional testing to determine the *bonding strength* of the brick strips to the base material in accordance with EN 1015-12. To that end, a 'pulling cap' with a diameter of 50 mm was attached to each strip.

Results and discussion

After completion of the tests, no damage was visible and none of the strips had come loose.

The results of the bonding strength determinations are presented below in Table 1.

Table 1: Overview of bonding strengths, in N/mm², of the brick strips in a SIGNA system

	Average value	Lowest value	Highest value	Standard deviation	Additional information
Reference panel	1.3	0.80	1.95	0.4	Breakage of base material or brick
Test panel after thermal shock and freezing/thawing test	1.2	0.60	1.50	0.3	Breakage of base material or brick
Test panel after thermal shock, freezing/thawing, and UV tests	1.0	0.70	1.60	0.3	Breakage of base material

The values determined for the bonding strength after the panel was subjected to the various tests did not differ significantly from the values determined for the bonding strength in the untested reference panel. The strength of the system is determined by the strength of the brick or the base layer material, and no breakage was found to occur in the bonded surfaces or the adhesive layer.

Conclusion

We can conclude that the bonding of the brick strips to the rock panel can be characterized as being durable.