

CORROSION RESISTANCE

Roofing screw test

The durability of the paint coating is the most important factor affecting the long-term performance of a roofing screw. The paint coating must withstand the climatic stress of the operating environment as well as the mechanical stress caused by installation.

PURPOSE OF THE TEST

The test examined the corrosion resistance of the coatings of roofing screws from different manufacturers.

TEST EQUIPMENT

The screw samples were mounted on a sample rack at an angle of approximately 35 degrees. The tests were carried out in the corrosion chamber of the research laboratory of the HAMK Sheet Metal Centre.

HOW THE TEST WAS CARRIED OUT

Seven roofing screws from 5 different screw suppliers were examined, 1 to 3 sample screws of each. The screw samples were tested with a 360-hour salt spray test and a 1000-hour prohesion test. In the 360-hour salt spray test according to standard SFS-EN ISO 9227, the screw samples were sprayed for 360 hours with a 5 % by weight sodium chloride solution at a temperature of 35 °C. In the prohesion test according to standard ASTM G 85–94, the samples were sprayed for one hour at a temperature of 25 °C with a solution containing 0.05 % by weight sodium chloride and 0.35 % by weight ammonium sulphate. The samples were then dried for one hour in an air flow at +35 degrees. The spraying and drying phases were repeated for the 1000 hours required by the test. Intermediate inspections were carried out on the samples every 250 hours. After the test, the samples were washed and photographed. The screws were then removed from the rack and photographed again.



RESULTS OF THE CORROSION TESTS

The KINGI® roofing screw and the roofing screws of manufacturers 3 and 4 came through the 360-hour salt spray test very well. White rust and/or red rust appeared on the other samples.

The KINGI® roofing screw also came through the 1000-hour prohesion test very well. One of the screws of manufacturer 3 (stainless) showed slight red rust, but the other screw was in good condition. Red rust and/or white rust appeared on the other screws. It should be noted that on a genuine stainless screw, red rust should, according to general understanding, be impossible in a test of this kind.

When the screws were fastened into and removed from the test base, the adhesion of the coating of the KINGI® roofing screw was found to be very good. On all the other screws, including those made of stainless steel, clear flaking of the paint could be seen by the end of the tests at the latest. Paint adhesion is of great importance for the durability of the screw head, because the paint has to withstand fastening even with a fastening tool in poor condition. If the paint on the screw does not withstand fastening, the corrosion resistance of the coating on the screw head is lost.

Screw type	Salt spray test			Prohesion test		After the prohesion test
Manufacturer 1/A	3	2		3	2	
Manufacturer 1/B	3	2		3	3	
Manufacturer 1/C	3			3		
Manufacturer 2	2	2		3	3	
Manufacturer 3 (stainless steel)	1	1	1	3	1	
Manufacturer 4	1	1		3	2	
KINGI®	1	1		1	1	

The results in the table are from the 360-hour salt spray test and the 1000-hour prohesion test.

1 = no visible changes
2 = white rust; the zinc corrodes
3 = red rust; the steel corrodes