Yamatoslate Co., Ltd.

Natoco Co., Ltd. Exterior Material Coatings Team



Bambino Tegola Freezing and Thawing Test Results (Board Coatings of September 12, 2014)

Dear Sir/Madam, I trust your business is thriving. Thank you for your continuous patronage and support. A report of the matter listed in the subject line follows. Please contact us with any questions or concerns. Thank you.

1. Purpose

The rating determined by the freezing and thawing test (ASTM - B Method) will be checked to verify the quality of coating on boards from the lot of black Bambino Tegola roofing material your company provided.

2. Physical properties results

A freezing and thawing test (ASTM - B Method = Rapid Freezing in Air and Thawing in Water) conducted at 500 cycles and 1000 cycles showed no delamination or defect in external appearance. No quality issues in your company's "Libre" coating products were found.

[Test Results]

Test item	Number of freeze-thaw cycles	Evaluation
Freeze-thaw	500 cycles	No defects
resistance		
(ASTM - B	1000 cycles	No defects
Method)		

3. Physical Test Methods

Test item	Test method	Evaluation procedure
Freeze-thaw resistance (ASTM - B Method)	This test was based on Japan Industrial Standard JIS A1435-3.3. Test pieces were immersed in 5°C to 35°C fresh water for approximately 24 hours, and then placed in tanks inside the freezing and thawing test equipment. The pieces were frozen in air samples at -20°C \pm 2° for approximately 2 hours, and then allowed to melt in 20°C \pm 2° water for approximately one hour. One cycle comprised approximately 3 hours of the freezing and thawing procedure carried out in the prescribed number of cycles, and inspectors visually inspected the test piece surface to detect any delamination and changes in appearance.	Lack of defects (such as separation or cracks) in external appearance