

**REPORT ON THE REACTION TO ICE AND THERMAL CHANGES OF A
PREFABRICATED CLADDING PRODUCT WITH THE GENERAL COMMERCIAL
NAME
STONEPANEL**

Requestor: *CUPAMAT, S.A.*

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1. Introduction and scope of the present study.

The company Cupamat, s.a. has requested us to perform a study in order to determine the reaction to ice and to thermal changes of a number of prefabricated natural stone panel models used for coating both interior and exterior walls, all bearing the commercial name STONEPANEL.

The panels are composed of natural schist-type stone units, which are embedded in an adhesive base, reinforced with a metal armouring.

The design adopted, with its stepped units, makes installation extremely easy, both in the rapidity of assembly and the guarantee of use, constituting a factory-made product, which is therefore subject to much more rigorous quality controls than is usual in the traditional placement of the isolated stone.

2. Premises of the study.

This study has been conceived in terms of the reliability of the grip system between the mortar and the stone units, and the behaviour of the stone itself before the effect of frost and before thermal changes.

This has been done on the basis of the European standards on natural stone created by the CEN 246 committee, under the following epigraphs and names.

- UNE-EN . 12371. Determination of resistance to ice
- UNE-EN. 14066. Determination of resistance to ageing accelerated by thermal changes.

The tests have been carried out on three panels (one for each model), each one of which has been cut into two halves, so as to perform the tests of the pre-established programme of each one of them, namely: Resistance to frost and Resistance to thermal changes.

Obviously, the results and conclusions of this study correspond to the samples that have been actually analysed, which means that their extrapolation to other batches will have to be verified by means of a suitable development of the self-control system at the factory.

3. Characteristics of the tests carried out.

The specific characteristics of the tests carried out are the following.

3.1. Frost susceptibility test.

The reaction to the effect of frost is analysed performing freeze cycles at -12°C in a freezing chamber, and water thawing cycles at 20°C, all in accordance with the aforementioned reference norms.

The number of cycles to be performed obviously depends on the weather conditions of the location, the number of years of exposition to the open air and the position of the material in the building or work, which logically determines its greater or lesser risk of saturation.

In this sense, the actual test standard does not establish the number of cycles that must be done, although the standard governing natural stone cladding (UNE-EN 1469) gives the reference value of 12 cycles for this application. In the case of the present study, 50 freeze-thaw cycles were put into effect for a better guarantee of the product.

The evaluation system chosen is based on the visual inspection of the pieces after the cycles have been completed.

3.2. Ageing test with Thermal shock.

This involved 20 cycles: heater warming cycles at 110°C and water freezing cycles at 20°C, all in accordance with the specifications of the reference norm. After the test, those changes in appearance that have taken place are analysed .

4. Results obtained.

The results of the tests for each type of panel are those shown on each one of the following records: