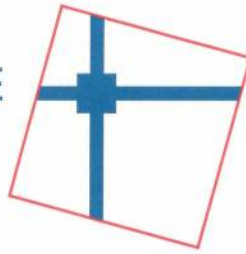


REPORT 3253:

MAGOXX® - BOARD, EMBEDMENT TESTS WITH NAIL-SCREWS

Project number: 3253
Author: drs. H. Schinkel
Date: October 19, 2020

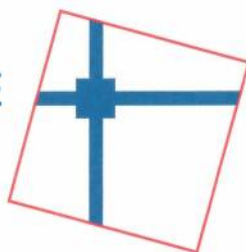
Number of pages: 6



CONTENTS

page

1. PROJECT DATA	1
2. INTRODUCTION.....	2
3. ANCILLARY MATERIALS.....	2
4. DESCRIPTION.....	4
4.1 MAXIMUM EXPECTED FORCE	4
4.2 STRAIGHTNESS TESTING.....	5
5. CONCLUSION.....	6



1. PROJECT DATA

Commissioner : SINH Building Solutions B.V.

Address : Saturnusstraat 60, unit 67
NL - 2216 AH Den Haag

Contact person : Mr. J. Engels

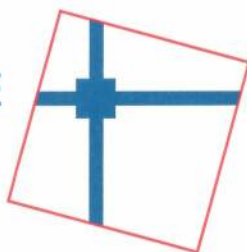
Project : Embedment of nail-screws in MAGOXX®-Board

Project number : 3253

Project manager : drs. H. Schinkel

Date of examination: October 2020

Date of report : October 19, 2020



2. INTRODUCTION

BouwTechnologie RDA B.V. was commissioned by SINH Building Solutions BV to test MAGOXX®-board as commercialized by SINH Building Solutions at Den Haag (NL). The maximum expected force of nail-screws in the board shall be determined in accordance with EN 383 on five board specimens, cut with it longest size parallel to the longest dimension of the board and five board specimens, perpendicular to the longest dimension of the board.

The 29th of May 2020 SINH Building Solutions B.V. supplied five boards with a thickness of 9 mm. The width of all boards was 1200 mm and the length of the boards was 3000 mm. The sheets were marked on their surface:

MAGOXX-CE-ETA 15/0634 NLY01-9mm-09/03/20

BouwTechnologie cut the test pieces for the tests in accordance with EN 383, dimensions 35 x 140 mm.

3. ANCILLARY MATERIALS

Th 6th of October 2020 SINH Building Solutions supplied us with two rolls of

Tape Collated nail-screws, 15° Tx15

Dimension: 2.8/3.0x40

Shank: Screw

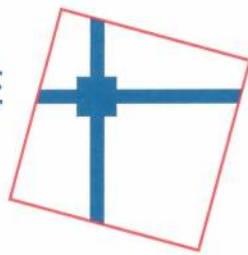
Protection: Yellow Galvanised

Content: 8.400/box

Service class 2 Outdoor protected

Brand: no mention, but a CE-mark under EN 14592 is applied on the label

See photo packaging label below.



Tape collated nail-screws 15° Tx15

Dimension: 2.8/3.0x40

Shank: Screw

Protection: Yellow Galvanised

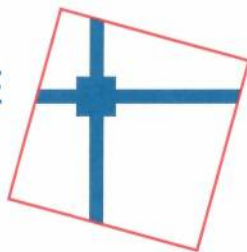
Angle: 15°

Content: 8.400/box



SERVICE CLASS 2
Outdoors, protected

Art.code: 1222840



4. DESCRIPTION

The work comes as a supplement to the work reported in our report 3244-3.

The samples were sawn by BouwTechnologie RDA from board pieces from this work and conditioned for months in the laboratory indoor climate. These pieces were obtained following the cutting plan, at random over the board surface. The samples sawn for this series of tests therefore were also taken at random over the boards. Edge material was not used, however.

The samples were coded as follows:

Sheet number (1 through 5)

Direction of cutting (P = parallel, L = perpendicular)

Parallel: the longest edge of the sample (140 mm) is parallel to the longest dimension of the sheet. Thus L means that the 140 mm side has been cut perpendicular to the longest dimension of the sheet.

From each board four P and four L specimens were taken.

The load equipment for the test methods A, B en D is Zwick 1484, latest calibration on July 23, 2020 with report numbers 119840 and 119839.

4.1 Maximum expected force

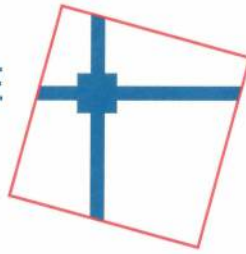
The specimen to be tested was mounted in the steel testframe. A nail-screw 2.8/3.0 x40 was perpendicularly led into the frame, holes 3,6 mm and through the sheet. It appeared impossible to introduce the nail-screw by machine-turning alone. Therefore the place of fixing was predrilled at the desired place with a 2,0 mm drill.

After bringing in the screw it was tested by hand that the sheet remained free from the frame. Rotating the sheet around the screw remained possible by slight touching with the fingertip. As becomes evident, to maximally prevent bending of the nail the frame was just in contact with the nail. A gap of about 0,2 mm to protect the specimen from friction against the frame was not maintained.

At both top sides of the specimens measuring gauges (0,01 mm) were mounted, resting on a plate at the level of the screw.

Load was applied to the screws through the frame, displacement was measured from the gauges. During loading the displacement rate was kept constant at 0,1 mm/min. Test was stopped when the displacement no longer was linked tot increase of load. The maximum expected force was identified as the end of the horizontal level of force in the load-displacement curve.

It was observed that the nail-screw in this test was bended severely. One primary objective of the standard being that the screw is prevented from any bending the investigations were redirected. The level of failure was, similarly to report 3244-3, dependent on the interaction with the net, without the net a level of force of about



1150 N could be reached, with the net forces of over 1400 N could be carried. But always with intensive bending of the screws. Visually the bending was observed at about 700 N. From the curves this type of failure by bending could not be observed.

4.2 **Straightness testing**

For the objective of the test a glass plate 8 mm of 1 m length was positioned at a tilt by placing on one end a support of 24 mm. A nail screw was placed with its head in unbalance position on the glass plate. By bringing the head out of equilibrium the nail would reposition itself by turning through the opposite equilibrium point, and back to it to come on rest.

Three out of ten virgin nail-screws did not pass this straightness test.

For the determination of the force at which the screw starts bending only nail-screws were used which passed this straightness test.

The approved nail-screws were mounted in the frame as described above, the rate of loading was at constant deformation of 0,2 mm/min.

First a test was run up to a maximum force of 500 N. The nail-screw passed the straightness test.

At a next test, with a new and approved nail-screw, force was mounted to 600 N. The nail-screw passed the straightness test.

All further tests were carried out, each test having its own nail-screw which first passed the straightness test.

At 700 N, the nail screw was slightly bended visually, it did not pass the straightness test.

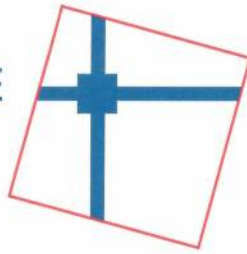
At 625 N no bending occurred.

At 675 N 3 out of 4 screws did not pass the test.

At 650 N 1 out of 4 screws did not pass the test.

At 640 N 4 out of 4 screws did pass the test.

It is therefore concluded that embedment of these nail-screws is conserved up to 640 N.



5. CONCLUSION

The maximum force nail-screws 2.8/3.0x40 of unknown brand can carry without bending in 9 mm thick MAGOXX®-board 1080 kg/m³ is:

$$F_{\text{max,est}} = 640 \text{ N}$$