Building research Institute
Group of Testing Laboratories

TEST REPORT
LZK05-00862/23/Z00NZK

Client:	TPP Thermoplastics Polska Sp. z o.o. ul. Unii Europejskiej 6 86-050 Solec Kujawski
Product name:	Geogrid reinforcement module Inovgreen IG 50
Date of issue:	24.05.2023

Building Structures, Geotechnics and Concrete Laboratory
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1. Information on the tests

Producer: TPP Thermoplastics Polska Sp. z o.o. ul. Unii Europejskiej 6 86-050 Solec Kujawski

Test start date: 29.03.2023

Test completion date: 19.04.2023

Test location:
In the laboratory, in the following location:

Building Structures, Geotechnics and Concrete Laboratory, 1 Filtrowa St, Warsaw, Poland.

2. Product

2.1. Information provided by the Client

Product: Geogrid reinforcement module Inovgreen IG 50

Declared range of aplication: Geogrid reinforcement module aplied to stabilise soil, including roads, parks and airfields.

3. Test item, sample

3.1. Information provided by the Client

Manufacturing plant:
The samples were manufactured in facility owned by manufacturer located in:

TPP Thermoplastics Polska Sp. z o.o.
Unii Europejskiej 6
86-050 Solec Kujawski
Material declared by the client: compound of recycled plastic.

3.2. Information obtained based on visual inspection in the Laboratory

Acceptance of the test object into the laboratory:

Date:	27.02.2023
Acceptance protocol:	LZK00-00862/23/Z00NZK

Condition of the test object:
A sample was provided in a condition and quantity suitable for testing.

Description of the test object:
The test object was packed on euro platform. After dispatching no damages were noticed.

Photo.1. Test objects

4. Load bearing capacity and deformability under compressive load.

4.1. Test Method

Test outside the scope of accreditation. Resistance test to concentrated load were carried out by simulating load from road vehicles. According to Eurocode 1, the concentrate load was applied by steel test block 200x200mm. The steel test block simultes a single vehicle wheel. Each sample was a single grid module. The test sample was placed on the steel plate of the testing machine. Between the steel plate and the sample, a 12mm thick soft fibreboard 12 mm thick was applied. The sample was filled with sand with a bulk density of 1650 kg / m^3. The test method is based on Eurocode 1 PN-EN 1991-1-1. The principle of the test is shown in photo 2 and picture 1.

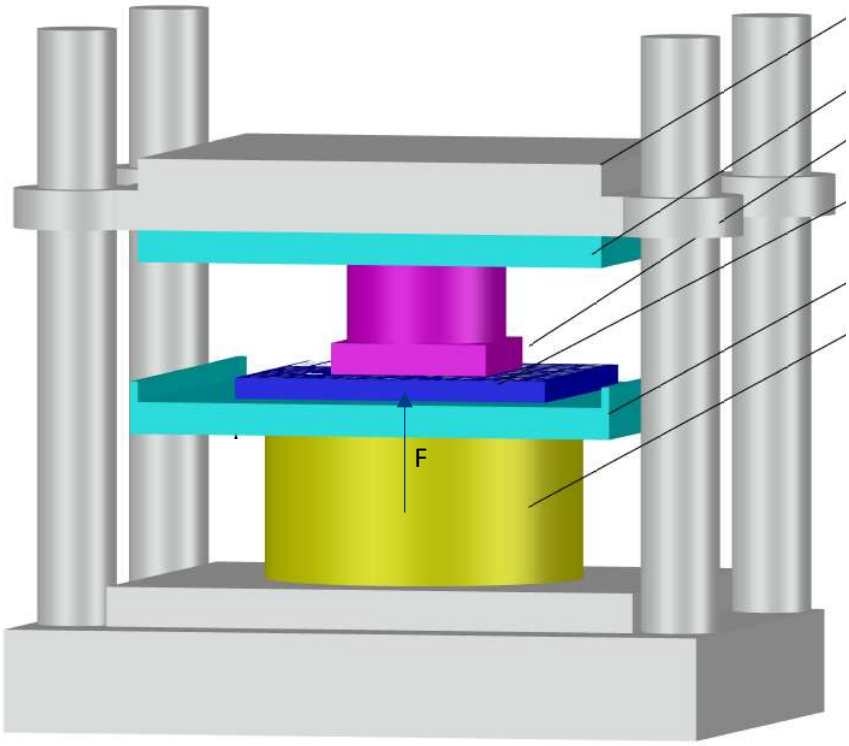
The primary goal was to test if whether samples comply with requirements of Journal of Laws of the Republic of Poland (DzU.2016.2022 DzII par.5). The mentioned requirement accurately specifies the maximum accepted load carried by a single vehicle axle, which equals 115 kN or 57,5 kN carried by a single wheel. The second step was to check if the samples are capable of withstand the G class traffic load according to Eurocode 1 PN-EN 1991-1-1. Maximum accepted load of single vehicle axle aproximately 160kN. The load divided on the sigle wheel (simulated by a steel test block) approximately 80 kN In addition, the samples were subjected to higher load levels to determine the load capacity.

The assumed test loads were as follows: 57,5 , 80, 200, 400 and 800 kN. The loading speed was (1 x 5) kN/s. The test load was maintained for 60 s. After the testing load, macroscopic assessment of the damage sample was made. The tests were carried out on an Amsler Class 1 testing machine.

The test result is positive when:

- Acceptable permanent deflection of grid do not exceed 2mm
- The sample after the test test has no visible damage.

Photo. 2



- Testing machine

- Resistance block of testing machine
- Testing block 200x200

- Testing sample
- Compression block of testing machine
- Testing machine force actuator

Pic. 1

4.2. Results

Table. 1. Test result IG50

Test sample	Test load [kN]	Pressure [t/m²]	Test results	**Assumed characteristic load capacity based on the test results**
IG 50	(800 ±10) kN	(2000±25) t/m²	Local damages were caused to the local walls under the stamp. Permanent set (2,5 ±0,0,5) mm	Surface load 400kN
	(400 ±5) kN	(1000±13) t/m²	No damage to the local walls under the stamp. Permanent set (1,7 ±0,05) mm	
	(200 ±3) kN	(500±8) t/m²	No damage to the local walls under the stamp. Permanent set (1,4 ±0,05) mm	
	(80kN±1)kN	(200±3) t/m²	No damage to the local walls under the stamp. Permanent set (0,0 ±0,05) mm	
	(57,5kN±1)kN	(144±2) t/m²	No damage to the local walls under the stamp. Permanent set (0,0 ±0,05) mm	

Photo.3. IG 50 after the test at 57,5 kN

Photo.4. IG 50 after the test at 80kN

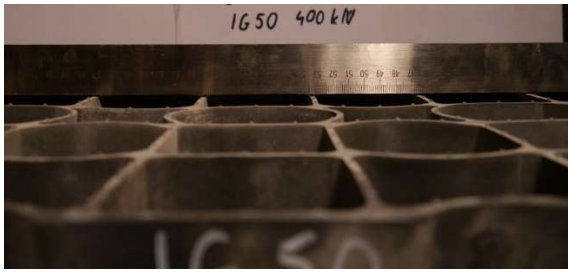


Photo.5. IG 50 after the test at 200 kN

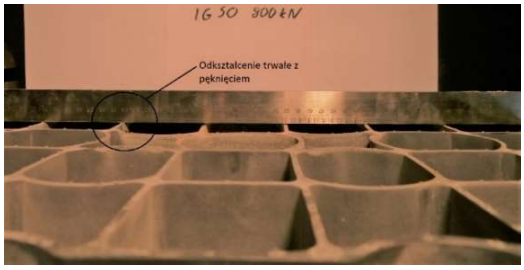


Photo.6. IG 50 after the test at 400kN

Photo.7. IG 50 after the test at 800kN

5. Assessment of the conformity of other test results with the criteria

Table. 2. Results of the assessment

Tested property	Test result	Assumed criterion	Dokument odniesienia	Assessment of the conformity of the result with the criterion
IG 50	Permament deflection (d) [mm] after release of testing load(F) [kN]	d< 2mm, no visible damage after release of testing load (F) [kN]	Dz.U.2016.2022 Dz.II par.5 F ≥57,5 kN	Confirmed
			PN-EN 1991-1-1:2004 F ≥80kN	Confirmed
The parties agreed that in assessing the conformity of the results with the criteria, according to standard PN-EN 1991-1-1:2004 andz Dz.U.2016.2022 Dz.II par.5 , the simple acceptance rule is applied. This means that the acceptance limits are equal to the tolerance limits shown in the above-mentioned document.				

6. Disclaimers

The Testing Laboratory declares that the test results relate only to the sample received.

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The Test Report does not replace the documents required to bring construction products on the market or make them available.

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Person responsible for tests:
MSc Eng. Łukasz Pietrzykowski

Signature Not Verified
Dokument podpisany przez Łukasz Pietrzykowski; ITB
Data: 2023.06.06 09:14:23 CEST

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Person responsible for performance assessment
MSc Eng. Zbigniew Fedorczyk

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Head of the Labolatory LZK:
Assoc. Prof. Artur Piekarczuk

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