



**TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.**  
**Technical and Test Institute for Construction Prague**

Akreditovaná zkušební laboratoř, Autorizovaná osoba, Notifikovaná osoba, Oznámený subjekt, Subjekt pro technické posuzování, Certifikační orgán, Inspekční orgán / Accredited Testing Laboratory, Authorized Body, Notified Body, Technical Assessment Body, Certification Body, Inspection Body. Prosecká 811/76a, 190 00 Praha 9 - Prosek, Czech Republic

Authorized Body 204  
empowered by the Decision of COSMT No. 05/2017  
Branch 0600 – Brno

# REPORT

## of the product certification

according to the Article 5 of the Government Decree No. 163/2002 Coll., as amended by the Government Decree No. 312/2005 Coll. and by the Government Decree No. 215/2016 Coll.

No. 060-044794

Product name:

**ROCKMESH - Composite mesh made of basalt fibre reinforced polymer rods**

type / variant:

**diameter of rods 2,2 and 3 mm, mesh size 50 x 50 and 100 x 100 mm**

Importer:

**ORLIMEX CZ, s.r.o.**

INo: 25930915

Address: č.p. 50, 569 67 Osík

Manufacturer: **GALEN LLC**

INo: --

Address: 52 K.Marks street, Cheboksary, Chuvash Republic  
Russia 428000

Plant: **GALEN LLC**

Address: 52 K.Marks street, Cheboksary, Chuvash Republic  
Russia 428000

Order No: Z060170014

Number of pages including the front page: 5    Number of pages of Annexes: 18

Brno, March 24, 2017



  
Ing. Marek Sopko  
Chief Assessor

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Technical and Test Institute for Construction Prague, Branch 0600-Brno, Hněvkovského 77, 617 00 Brno, Czech Republic  
Phone: 0420 543 420 852, Internat.: +420 543 420 833, e-mail: prochazka@tzus.cz, www.tzus.cz  
Bank Name: KB Praha 1 Czech Republic, Account Number: 1501-931/0100, INo: 000 15679, VAT: CZ00015679



## 1. General

### 1.1. Information about the importer

ORLIMEX CZ, s.r.o., č.p. 50, 569 67 Osík, INo: 25930915

### 1.2. Information about the product and its intended use

Composite mesh consists of basalt fibre reinforced polymer rods with diameter 2,2 and 3 mm. The rods are placed in two directions perpendicular to each other and fixed at the intersections by special material. The meshes are supplied in the form of sheets or reeled on a disc.

The meshes are particularly used for structural reinforcement of concrete constructions (walls, boards) and a flooring to prevent a formation of shrinkage cracks situated in humid and corrosive environment (sewage plants, silage troughs, chemical, food processing and agricultural operations).

The meshes can be used for other purposes like gypsum and anhydrite floors, asphalt concrete structures, a reinforcement of slopes and an embankment.

### 1.3. List of documentation submitted by the applicant to the product certification

- Application for performance of activity of Authorized Body 204, dated 30.1.2017
- Technical data sheet Composite mesh
- Composite materials for civil engineering presentation

### 1.4. List of the other documentation used during the product certification

- Act No. 22/1997 Sb. on Technical Requirements for Products and on Amendments to Some Acts
- Government Decree No. 163/2002 Sb., on the Technical requirements for selected construction products, as amended by Government Decree No. 312/2005 Sb. and the Government Decree No. 215/2016 Coll.
- ISO 10406-1 Fibre-reinforced polymer (FRP) reinforcement of concrete – Test methods – Part 1: FRP bars and grids
- ČSN EN ISO 15630-2 Steel for the reinforcement and prestressing of concrete - Test methods - Part 2: Welded fabric
- ČSN 42 0139 Steel for the reinforcement of concrete - Weldable ribbed and plained reinforcing steel
- ČSN EN ISO 1172 Textile-glass-reinforced plastics - Prepregs, moulding compounds and laminates - Determination of the textile-glass and mineral-filler content - Calcination methods
- Methodology No. 100611-01 Determination of metals in the sample: AAS – flame
- Technical direction 01.02.c Glass or carbon or their combination reinforced polymer rods
- Technical direction 01.02.a Welded meshes made of rebar and plain rod

### 1.5. Technical specification and technical regulations relating to the product certification

- Technical Approval No. 060-044717 of 20/03/2017 issued by the Authorized Body 204 with validity up to 31/03/2020

### 1.6. Information about previous product certification

This is the first certification of the product.



## 2. Result of the review of the documentation submitted by the manufacturer

The documentation submitted by the applicant according to § 5, cl. 2 a) NV-163 as amended NV-312 a NV-215 was checked. The documentation is complying with requirements of NV.

## 3. Product assessment

### 3.1 Technical requirements

- Technical requirements for the product are specified in the technical approval No. 060-044717, issued by Technical and Test Institute for Construction Prague, s.p. – branch Brno.

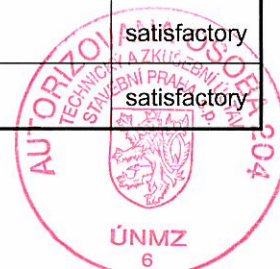
### 3.2 List of the Test Reports:

- Test report No. 060-044714, issued Technical and Test Institute for Construction Prague, s.p. – branch Brno, dated 13.03.2017
- Test report No. 060-044715, issued Technical and Test Institute for Construction Prague, s.p. – branch Brno, dated 13.03.2017
- Test report No. 060-044733, issued Technical and Test Institute for Construction Prague, s.p. – branch Brno, dated 16.03.2017
- Test report No. 060-044734, issued Technical and Test Institute for Construction Prague, s.p. – branch Brno, dated 17.03.2017
- Test report No. 100-059086, issued Technical and Test Institute for Construction Prague, s.p. – testing institute for light industry, dated 27.02.2017
- Test report No. 060-044788, issued Technical and Test Institute for Construction Prague, s.p. – branch Brno, dated 20.03.2017

### 3.3 Evaluation of the results of the product tests and assessment

Tab. 1: diameter of rod 2,2 mm, mesh size 50 x 50 mm

Characteristic	Test report	Test method	Test result	Required (R) / declared value (D)	Assessment
Tensile strength Elongation	060-044714	ISO 10406-1, cl. 6	f <sub>u1</sub> : 1330 MPa f <sub>u2</sub> : 1384 MPa f <sub>u3</sub> : 1390 MPa f <sub>u4</sub> : 1334 MPa f <sub>u5</sub> : 1318 MPa f <sub>u6</sub> : 1384 MPa f <sub>u7</sub> : 1363 MPa ε <sub>u</sub> : 4,1 %	D: f <sub>u,c</sub> : min. 1250 MPa D: ε <sub>u</sub> : 1,6 % až 5,6 %	satisfactory
Modulus of elasticity	060-044714	ISO 10406-1, cl. 6.4.4	E: min. 42,52 GPa	D: E: min. 37 GPa	satisfactory
Connection of rods strength	060-044714	ČSN EN ISO 15630-2	min. 120,3 N	D: min. 100 N	satisfactory
Alkali resistance	060-044733	ISO 10406-1, cl. 11	R <sub>et</sub> = 27,6 %	D: R <sub>et</sub> ≥ 25 %	satisfactory
Nominal diameter of rod	060-044714	ISO 10406-1, cl. 5	Wire diameter: 2,10 mm (-4,5 %)	D: tolerance -5 % / +10 %	satisfactory
Dimensional accuracy of mesh	060-044714	ČSN 42 0139	Mesh size: 49,5 x 49,7 mm (-1,0 %)	D: tolerance ±5 %	satisfactory
Content of fibres	060-044788	ČSN EN ISO 1172	75,52 %	D: min. 75 %	satisfactory
Cadmium content	100-059086	Methodology No. 100611-01	< 1 mg/kg	D: max. 0,01 %	satisfactory





Tab. 2: diameter of rod 3,0 mm, mesh size 100 x 100 mm

Characteristic	Test report	Test method	Test result	Required (R) / declared value (D)	Assessment
Tensile strength Elongation	060-044715	ISO 10406-1, cl. 6	f <sub>u1</sub> : 1367 MPa f <sub>u2</sub> : 1429 MPa f <sub>u3</sub> : 1308 MPa f <sub>u4</sub> : 1458 MPa f <sub>u5</sub> : 1429 MPa f <sub>u6</sub> : 1337 MPa f <sub>u7</sub> : 1284 MPa ε <sub>u</sub> : 3,0 %	D: f <sub>u,c</sub> : min. 1250 MPa D: ε <sub>u</sub> : 1,6 % až 5,6 %	satisfactory
Modulus of elasticity	060-044715	ISO 10406-1, cl. 6.4.4	E: min. 47,65 GPa	D: E: min. 37 GPa	satisfactory
Connection of rods strength	060-044715	ČSN EN ISO 15630-2	min. 318,3 N	D: min. 100 N	satisfactory
Alkali resistance	060-044734	ISO 10406-1, cl. 11	R <sub>et</sub> = 28,8 %	D: R <sub>et</sub> ≥ 25 %	satisfactory
Nominal diameter of rod	060-044715	ISO 10406-1, cl. 5	Wire diameter: 2,86 mm (-4,4 %)	D: tolerance -5 % / +10 %	satisfactory
Dimensional accuracy of mesh	060-044715	ČSN 42 0139	Mesh size: 99,9 x 99,8 mm (-0,2 %)	D: tolerance ±5 %	satisfactory
Content of fibres	060-044788	ČSN EN ISO 1172	81,14 %	D: min. 75 %	satisfactory
Cadmium content	100-059086	Methodology No. 100611-01	< 1 mg/kg	D: max. 0,01 %	satisfactory

## 4. Factory Production Control assessment

### 4.1 Requirements for product control of the importer

Number	Field of control management system	Specific requirements
1	Control and testing	The importer has designed procedures for product control enabling to put on the market only products corresponding to technical specifications. Product control is performed in compliance with these procedures. Staff performing the control fulfil determined qualification requirements and the applicant keeps records of it. The importer properly keeps and stores records proving that the product was controlled and tested. Further keeps record of product complaint. The importer has specified measuring instruments subjected to verification or calibration for product testing, keep records of their evidence, is very particular about their state and his measuring instruments are verified and calibrated.
2	Storage areas and handling devices	The importer disposes of necessary areas for storing a handling with products including storage device and is very particular about its right state.
3	Technical specifications	The importer has detailed description of technical product's characteristics and defined intended use of it in construction.
4	Directions for use of product	The importer has adequate directions for use and maintenance of product in Czech language.

### 4.2 Result of the assessment of the production control system

- On the basis of submitted documents, we certify that the product inspection system at the applicant guarantees that the product placed to the market will comply with the technical specification as contained in the Technical Approval No. 060-044717 issued by Technical and Test Institute for Construction Prague, s.p. – branch Brno, dated March 20, 2017



## 5. Conclusion

- The sample of product is in accordance to the requirements of the technical specification specify in the Technical Approval No. 060-044717 issued by Technical and Test Institute for Construction Prague, s.p. – branch Brno
- The way of the product control by the importer complies with technical documentation and ensures that products put on the market meet the requirements laid down in the Government Decree No. 163/2002 Coll., as amended by Government Decree No. 312/2005 Coll. and by the Government Decree No. 215/2016 Coll., and its effective function is ensured by the manufacturer
- The product meets the requirements of the Government Decree No. 163/2002 Coll., as amended by Government Decree No. 312/2005 Coll. and by the Government Decree No. 215/2016 Coll.
- Findings and conclusions mentioned in this Report are valid providing the conditions under them FPC assessment was carried out remain unchanged (e.g. technical regulations, technical specifications, production technology, incoming raw and manufacturing equipment).
- In compliance with provision of § 5 Clause 5 of the Government Decree No. 163/2002 Coll., as amended by the Government Decree No. 312/2005 Coll. and by the Government Decree No. 215/2016 Coll., the technical documentation has to be complemented with Surveillance Reports.

## 6. Annexes

- Test report No. 060-044714, issued Technical and Test Institute for Construction Prague, s.p. – branch Brno, dated 13.03.2017
- Test report No. 060-044715, issued Technical and Test Institute for Construction Prague, s.p. – branch Brno, dated 13.03.2017
- Test report No. 060-044733, issued Technical and Test Institute for Construction Prague, s.p. – branch Brno, dated 16.03.2017
- Test report No. 060-044734, issued Technical and Test Institute for Construction Prague, s.p. – branch Brno, dated 17.03.2017
- Test report No. 100-059086, issued Technical and Test Institute for Construction Prague, s.p. – testing institute for light industry, dated 27.02.2017
- Test report No. 060-044788, issued Technical and Test Institute for Construction Prague, s.p. – branch Brno, dated 20.03.2017







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**Central Laboratory - Testing Department Brno**

Hněvkovského 77, 617 00 Brno  
tel.: +420 734 432 093, e-mail: zadelak@tzus.cz, www.tzus.eu

# TEST REPORT

Issued by Testing Laboratory

**č. 060-044714**

**on test of tensile strength, modulus of elasticity, elongation, determination of the nominal cross-sectional area, determination of connection of rods**

Ordering Party: ORLIMEX CZ, s.r.o  
Address: č.p. 50, 569 67 Osík  
Company ID/IEC: 25930915

Manufacturer: GALEN LLC  
52 K. Marks street, Cheboksary, Chuvash Republic,  
Russia 428 000

Test sample: ROCKMESH – Composite mesh made of basalt fibre reinforced polymer rods  
Diameter of rod 2,2 mm, mesh size 50 x 50 mm

Order No.: Z060170014

Number of pages of the Test Report incl. title page: 4

Pages of annexes: -

Prepared by:

**Adéla Válková**  
test technician - specialist

Approved by:



**Ing. Martin Zadělak**  
head of the Testing Department

Print No.:   
Number of prints: 2

Brno, on 13.03.2017

**Declaration:** 1) The test results in this Report relate only to the tested article and they do not substitute any other documents  
2) The Test Report must be copied as a whole only otherwise a written consent of the testing laboratory is needed.

Technical and Test Institute for Construction Prague, Central laboratory

Nemanická 441, 370 00 České Budějovice, Czech Republic

Bank: Komerční banka, Praha 1

Entered in the Commercial Register maintained by Municipal Court in Prague, Section ALX, Insert 711, Comp. ID: 00015679, VAT: CZ00015679

Phone.: +420 387 023 211

Account No.: 1501-931/0100

www.tzus.eu

e-mail: pilarova@tzus.cz

## 1. Sample data

Evidence No.: VZ060170065  
Sample: ROCKMESH – Composite mesh made of basalt fibre reinforced polymer rods, diameter of rod 2,2 mm, mesh size 50 x 50 mm  
Date of sample delivery: 2.2.2017  
Sample taken over by: Ing. Marek Sopko

## 2. Test methods

Tensile strength	ISO 10406-1:2015 cl. 6	Fibre-reinforced polymer (FRP) reinforcement of concrete - Test methods - Part 1: FRP bars and grids
Nominal diameter of rod	ISO 10406-1:2015 cl. 5	Fibre-reinforced polymer (FRP) reinforcement of concrete - Test methods - Part 1: FRP bars and grids
Connection of rods strength	ČSN EN ISO 15630-2: 2011	Steel for the reinforcement and prestressing of concrete - Test methods - Part 2: Welded fabric
Dimensional accuracy of mesh	ČSN 42 0139:2011 + Z1: 2016	Steel for the reinforcement of concrete - Weldable ribbed and plained reinforcing steel

Deviations from a standard procedure or the use of non-standardized methods: were not applied.

## 3. Test results

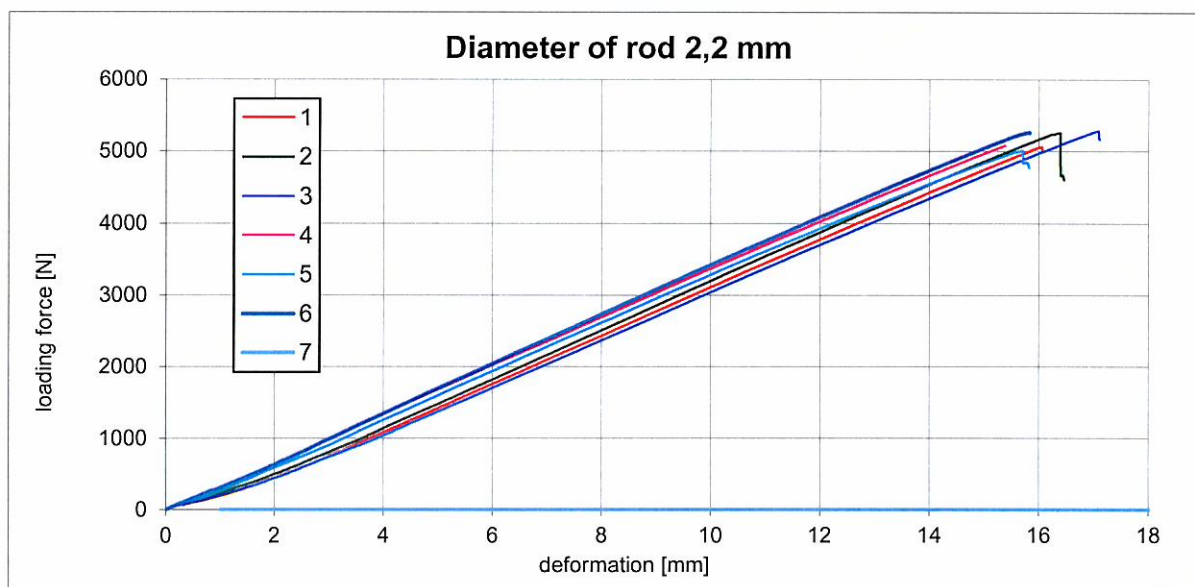
The tests were carried out on: 13.2.2017 – 13.3.2017  
The tests were performed by: Adéla Válková  
Data on the person who performed the test, test conditions and equipment used are listed in the Test Minutes. Apparatuses and measuring instruments that used have been certified pursuant to a valid plan of the Testing.



### 3.1 Determination of tensile strength, and elongation according to ISO 10406-1:2015, cl. 6

Diameter 2,2 mm, sectional area of test samples 3,8 mm<sup>2</sup>

Sample No.	Maximal loading force $F_u$ [kN]	Tensile strength $f_u$ [MPa]	Average tensile strength $f_{u,m}$ [MPa]	Elongation [%]	Standard deviation $S$ [MPa]	Characteristic value of tensile strength $f_{u,c}$ [MPa]
1	5,053	1330	1358	2,9	29,9	1301
2	5,259	1384		4,3		
3	5,281	1390		6,1		
4	5,070	1334		3,3		
5	5,009	1318		3,9		
6	5,260	1384		3,9		
7	5,181	1363		4,5		



Graphic expression of the deformation of samples to the load

### 3.2 Determination of modulus of elasticity according to ISO 10406-1:2015, cl. 6.4.4

Diameter 2,2 mm, sectional area of test samples 3,8 mm<sup>2</sup>

Sample No.	Modulus of elasticity $E$ [GPa]	Average value of modulus of elasticity $E_m$ [GPa]	Standard deviation $S$ [GPa]
1	46,15	42,52	2,7
2	43,28		
3	44,80		
4	37,88		
5	40,70		
6	42,70		
7	42,16		



### 3.3. Determination of nominal diameter according to ISO 10406-1:2015, cl. 5

Sample No.	Length [mm]	Volume of sample [mm <sup>3</sup> ]	D [mm]
1	101,45	350	2,10
2	101,44	350	2,10
3	101,39	350	2,10
<b>Average value</b>	<b>101,43</b>	<b>350</b>	<b>2,10</b>

### 3.4. Determination of connection of rods strength according to ČSN EN ISO 15630-2: 2011

Sample No.	Maximal loading force [N]	Type of failure
1	76,78	In connection
2	113,34	In connection
3	70,29	In connection
4	115,22	In connection
5	86,00	In connection
6	150,63	In connection
7	112,59	In connection
8	76,96	In connection
9	173,51	In connection
10	227,21	In connection
<b>Average value</b>	<b>120,25</b>	--

### 3.5. Determination of mesh size according to ČSN 420139:2011 + Z1: 2016

Diameter of rods 2,2 mm, mesh size 50 x 50 mm		
Mesh No.	Length [mm]	Width [mm]
1	49,65	50,17
2	49,60	49,46
3	49,75	49,53
4	49,69	49,63
5	49,80	49,58
6	50,00	49,42
7	50,07	49,68
8	49,53	50,09
9	49,80	50,04
10	49,90	49,55
<b>Average value</b>	<b>49,45</b>	<b>49,72</b>

END OF THE TEST REPORT





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**Central Laboratory - Testing Department Brno**

Hněvkovského 77, 617 00 Brno

tel.: +420 734 432 093, e-mail: zadelak@tzus.cz, www.tzus.eu

# TEST REPORT

Issued by Testing Laboratory

**č. 060-044715**

**on test of tensile strength, modulus of elasticity, elongation, determination of the nominal cross-sectional area, determination of connection of rods**

Ordering Party: ORLIMEX CZ, s.r.o  
Address: č.p. 50, 569 67 Osík  
Company ID/IEC: 25930915

Manufacturer: GALEN LLC  
52 K. Marks street, Cheboksary, Chuvash Republic,  
Russia 428 000

Test sample: ROCKMESH – Composite mesh made of basalt fibre reinforced polymer rods  
Diameter of rod 3,0 mm, mesh size 100 x 100 mm

Order No.: Z060170014

Number of pages of the Test Report incl. title page: 4

Pages of annexes: -

Prepared by:

*Váľková*

**Adéla Váľková**  
test technician - specialist

Approved by:

*Zadělák*

**Ing. Martin Zadělák**  
head of the Testing Department

Print No.: *Λ*  
Number of prints: 2



Brno, on 13.03.2017

**Declaration:** 1) The test results in this Report relate only to the tested article and they do not substitute any other documents  
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Phone.: +420 387 023 211

Account No.: 1501-931/0100

www.tzus.eu

e-mail: pilarova@tzus.cz



## 1. Sample data

Evidence No.: VZ060170065  
Sample: ROCKMESH – Composite mesh made of basalt fibre reinforced polymer rods, diameter of rod 3,0 mm, mesh size 100 x 100 mm  
Date of sample delivery: 2.2.2017  
Sample taken over by: Ing. Marek Sopko

## 2. Test methods

Tensile strength	ISO 10406-1:2015 cl. 6	Fibre-reinforced polymer (FRP) reinforcement of concrete - Test methods - Part 1: FRP bars and grids
Nominal diameter of rod	ISO 10406-1:2015 cl. 5	Fibre-reinforced polymer (FRP) reinforcement of concrete - Test methods - Part 1: FRP bars and grids
Connection of rods strength	ČSN EN ISO 15630-2: 2011	Steel for the reinforcement and prestressing of concrete - Test methods - Part 2: Welded fabric
Dimensional accuracy of mesh	ČSN 42 0139:2011 + Z1: 2016	Steel for the reinforcement of concrete - Weldable ribbed and plained reinforcing steel

Deviations from a standard procedure or the use of non-standardized methods: were not applied.

## 3. Test results

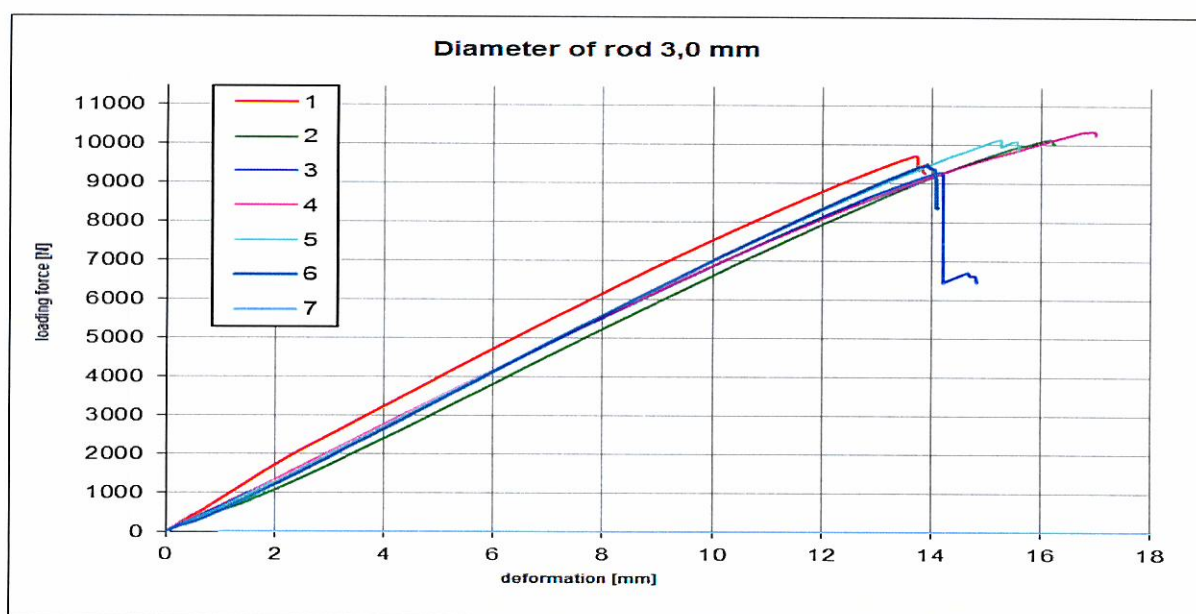
The tests were carried out on: 13.2.2017 – 13.3.2017  
The tests were performed by: Adéla Válková  
Data on the person who performed the test, test conditions and equipment used are listed in the Test Minutes. Apparatuses and measuring instruments that used have been certified pursuant to a valid plan of the Testing.



### 3.1 Determination of tensile strength, and elongation according to ISO 10406-1:2015, cl. 6

Diameter 3,0 mm, sectional area of test samples 7,1 mm<sup>2</sup>

Sample No.	Maximal loading force $F_u$ [kN]	Tensile strength $f_u$ [MPa]	Average tensile strength $f_{u,m}$ [MPa]	Elongation [%]	Standard deviation $S$ [MPa]	Characteristic value of tensile strength $f_{u,c}$ [MPa]
1	9,705	1367	1373	2,93	67,1	1246
2	10,146	1429		3,22		
3	9,287	1308		3,09		
4	10,354	1458		3,24		
5	10,149	1429		3,24		
6	9,493	1337		2,70		
7	9,116	1284		2,89		



Graphic expression of the deformation of samples to the load

### 3.2 Determination of modulus of elasticity according to ISO 10406-1:2015, cl. 6.4.4

Diameter 3.0 mm, sectional area of test samples 7,1 mm<sup>2</sup>

Sample No.	Modulus of elasticity $E$ [GPa]	Average value of modulus of elasticity $E_m$ [GPa]	Standard deviation $S$ [GPa]
1	48,29	47,65	2,0
2	46,69		
3	46,67		
4	45,00		
5	51,27		
6	48,97		
7	46,69		





### 3.3. Determination of nominal diameter according to ISO 10406-1:2015, cl. 5

Sample No.	Length [mm]	Volume of sample [mm <sup>3</sup> ]	D [mm]
1	101,90	650	2,85
2	101,85	650	2,85
3	100,76	650	2,87
<b>Average value</b>	<b>101,50</b>	<b>650</b>	<b>2,86</b>

### 3.4. Determination of connection of rods strength according to ČSN EN ISO 15630-2: 2011

Sample No.	Maximal loading force [N]	Type of failure
1	358,33	In connection
2	232,21	In connection
3	334,48	In connection
4	345,94	In connection
5	323,46	In connection
6	335,31	In connection
7	369,22	In connection
8	265,87	In connection
9	377,78	In connection
10	240,20	In connection
<b>Average value</b>	<b>318,28</b>	--

### 3.5. Determination of mesh size according to ČSN 420139:2011 + Z1: 2016

Diameter of rods 3,0 mm, mesh size 100 x 100 mm		
Mesh No.	Length [mm]	Width [mm]
1	99,71	100,01
2	99,95	99,80
3	100,08	99,85
4	99,69	99,64
5	100,05	100,02
6	100,08	99,70
7	99,65	99,73
8	99,85	99,64
9	99,84	99,68
10	99,87	100,07
<b>Average value</b>	<b>99,88</b>	<b>99,81</b>

END OF THE TEST REPORT





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**Central Laboratory - Testing Department Brno**

Hněvkovského 77, 617 00 Brno

tel.: +420 734 432 093, e-mail: zadelak@tzus.cz, www.tzus.eu

# TEST REPORT

Issued by Testing Laboratory

**č. 060-044733**

**on test of alkali resistance**

Ordering Party: ORLIMEX CZ, s.r.o  
Address: č.p. 50, 569 67 Osík  
Company ID/IEC: 25930915

Manufacturer: GALEN LLC  
52 K. Marks street, Cheboksary, Chuvash Republic,  
Russia 428 000

Test sample: ROCKMESH – Composite mesh made of basalt fibre reinforced polymer rods  
Diameter of rod 2,2 mm, mesh size 50 x 50 mm

Order No.: Z060170014

Number of pages of the Test Report incl. title page: 3

Pages of annexes: -

Prepared by:

**Adéla Válková**  
test technician - specialist

Approved by:



**Ing. Martin Zaděláč**  
head of the Testing Department

Print No.: A

Number of prints: 2

Brno, on 16.03.2017

**Declaration:** 1) The test results in this Report relate only to the tested article and they do not substitute any other documents  
2) The Test Report must be copied as a whole only otherwise a written consent of the testing laboratory is needed.

Technical and Test Institute for Construction Prague, Central laboratory

Nemanická 441, 370 00 České Budějovice, Czech Republic

Bank: Komerční banka, Praha 1

Phone.: +420 387 023 211

Account No.: 1501-931/0100

www.tzus.eu

e-mail: pilarova@tzus.cz

Entered in the Commercial Register maintained by Municipal Court in Prague, Section ALX, Insert 711, Comp. ID: 00015679, VAT: CZ00015679



**1. Sample data**

Evidence No.: VZ060170065  
Sample: ROCKMESH – Composite mesh made of basalt fibre reinforced polymer rods, diameter of rod 2,2 mm  
Date of sample delivery: 2.2.2017  
Sample taken over by: Ing. Marek Sopko

**2. Test methods**

Determination of alkali resistance	ISO 10406-1:2015 cl. 11	Fibre-reinforced polymer (FRP) reinforcement of concrete - Test methods - Part 1: FRP bars and grids
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Deviations from a standard procedure or the use of non-standardized methods: were not applied.

**3. Test results**

The tests were carried out on: 15.3.2017  
The tests were performed by: Adéla Válková

Data on the person who performed the test, test conditions and equipment used are listed in the Test Minutes. Apparatuses and measuring instruments that used have been certified pursuant to a valid plan of the Testing.

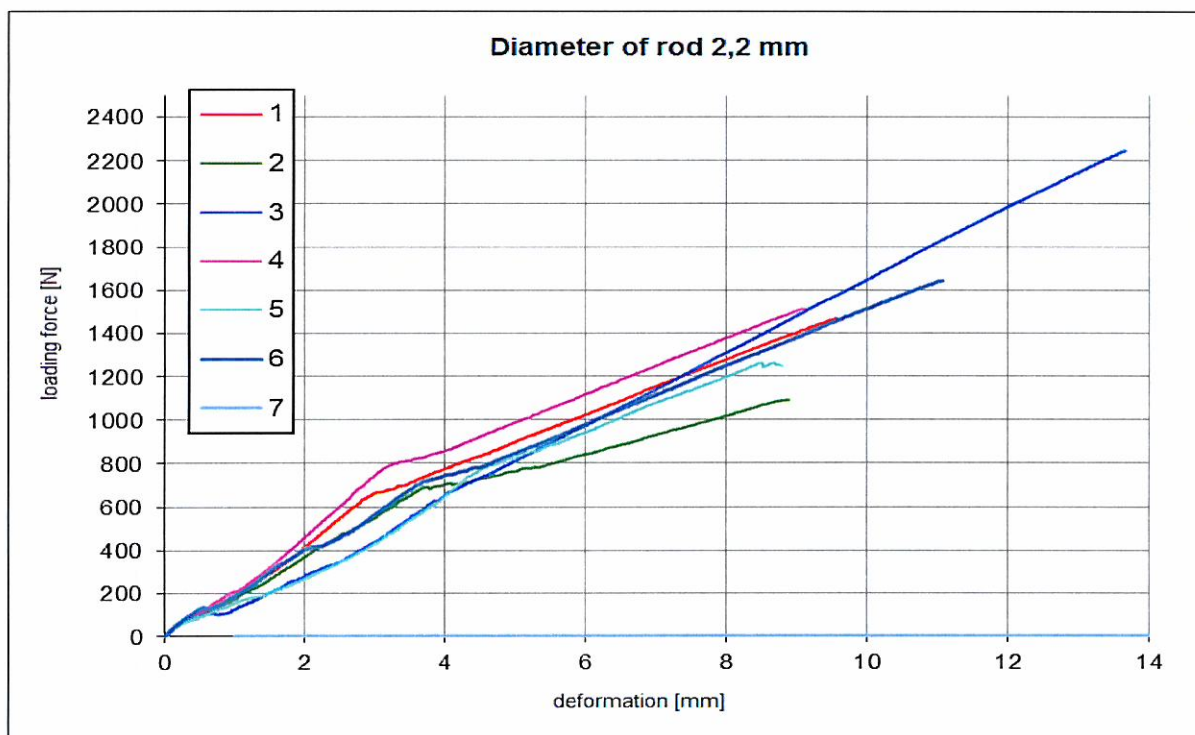
Immersion in alkaline solution was carried out on 9.2.2017 – 9.3.2017



### 3.1 Determination of alkali resistance

Diameter 2,2 mm, sectional area of test samples 3,8 mm<sup>2</sup>

Sample No.	Maximal loading force $F_u$ [kN]	Tensile strength $f_u$ [MPa]	Average tensile strength $f_{u,m}$ [MPa]	Elongation [%]	Standard deviation $S$ [MPa]	Characteristic value of tensile strength $f_{u,c}$ [MPa]
1	1,512	398	375	3,19	123	140
2	1,263	332		11,10		
3	1,642	432		7,39		
4	0,765	201		9,43		
5	1,468	386		5,60		
6	1,092	287		7,72		
7	2,247	591		6,25		



Graphic expression of the deformation of samples to the load

END OF THE TEST REPORT







**TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.**  
**Technical and Test Institute for Construction Prague**

Akreditovaná zkušební laboratoř, Autorizovaná osoba, Notifikovaná osoba, Oznamovaný subjekt, Subjekt pro technické posuzování, Certifikační orgán, Inspekční orgán / Accredited Testing Laboratory, Authorised Body, Notified Body, Technical Assessment Body, Certification Body, Inspection Body.

**Central Laboratory - Testing Department Brno**

Hněvkovského 77, 617 00 Brno

tel.: +420 734 432 093, e-mail: zadelak@tzus.cz, www.tzus.eu

# TEST REPORT

Issued by Testing Laboratory

**č. 060-044734**

**on test of alkali resistance**

Ordering Party: ORLIMEX CZ, s.r.o  
Address: č.p. 50, 569 67 Osík  
Company ID/IEC: 25930915

Manufacturer: GALEN LLC  
52 K. Marks street, Cheboksary, Chuvash Republic,  
Russia 428 000

Test sample: ROCKMESH – Composite mesh made of basalt fibre reinforced polymer rods  
Diameter of rod 3,0 mm, mesh size 100 x 100 mm

Order No.: Z060170014

Number of pages of the Test Report incl. title page: 3

Pages of annexes: -

Prepared by:

**Adéla Válková**  
test technician - specialist

Approved by:

**Ing. Martin Zadělak**  
head of the Testing Department

Print No.: A  
Number of prints: 2



Brno, on 17.03.2017

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Account No.: 1501-931/0100

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e-mail: pilarova@tzus.cz

**1. Sample data**

Evidence No.: VZ060170065  
Sample: ROCKMESH – Composite mesh made of basalt fibre reinforced polymer rods, diameter of rod 3,0 mm  
Date of sample delivery: 2.2.2017  
Sample taken over by: Ing. Marek Sopko

**2. Test methods**

Determination of alkali resistance	ISO 10406-1:2015 cl. 11	Fibre-reinforced polymer (FRP) reinforcement of concrete - Test methods - Part 1: FRP bars and grids
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Deviations from a standard procedure or the use of non-standardized methods: were not applied.

**3. Test results**

The tests were carried out on: 17.3.2017  
The tests were performed by: Adéla Váľková

Data on the person who performed the test, test conditions and equipment used are listed in the Test Minutes. Apparatuses and measuring instruments that used have been certified pursuant to a valid plan of the Testing.

Immersion in alkaline solution was carried out on 9.2.2017 – 9.3.2017

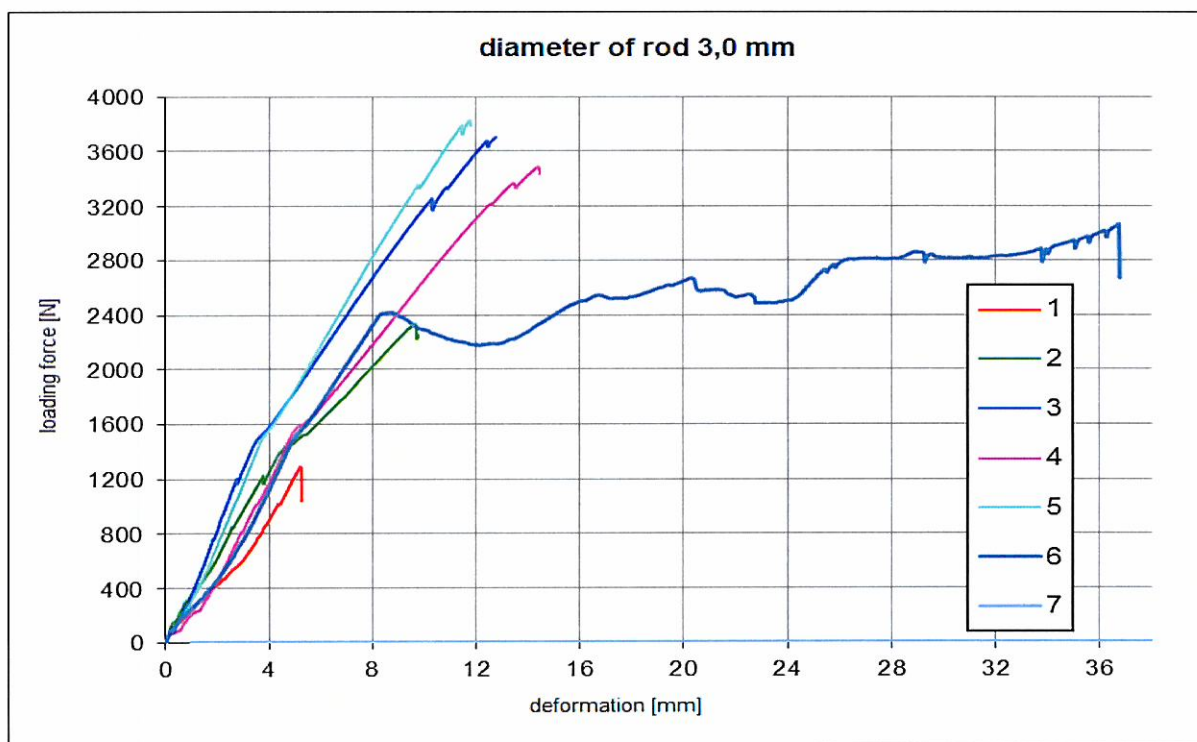




### 3.1 Determination of alkali resistance

Diameter 3,0 mm, sectional area of test samples 7,1 mm<sup>2</sup>

Sample No.	Maximal loading force $F_u$ [kN]	Tensile strength $f_u$ [MPa]	Average tensile strength $f_{u,m}$ [MPa]	Elongation [%]	Standard deviation $S$ [MPa]	Characteristic value of tensile strength $f_{u,c}$ [MPa]
1	1,290	182	395	1,23	137	133
2	2,335	329		6,83		
3	3,703	522		13,51		
4	3,488	491		11,35		
5	3,830	539		2,54		
6	3,069	432		2,88		
7	1,924	271		6,11		



Graphic expression of the deformation of samples to the load

END OF THE TEST REPORT





**TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.**  
**Technical and Test Institute for Construction Prague**

Akreditovaná zkušební laboratoř, Autorizovaná osoba, Notifikovaná osoba, Oznámený subjekt, Subjekt pro technické posuzování, Certifikační orgán, Inspekční orgán / Accredited Testing Laboratory, Authorised Body, Notified Body, Technical Assessment Body, Certification Body, Inspection Body.

**Central Laboratory - Testing Department Brno**

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tel.: +420 734 432 093, e-mail: zadelak@tzus.cz, www.tzus.eu

# TEST REPORT

Issued by Testing Laboratory

**č. 060-044788**

**on test of content of fibres**

Ordering Party: ORLIMEX CZ, s.r.o.  
Address: č.p. 50, 569 67 Osík  
Company ID/IEC: 25930915

Manufacturer: GALEN LLC  
52 K. Marks street, Cheboksary, Chuvash Republic,  
Russia 428 000

Test sample: ROCKMESH – Composite mesh made of basalt fibre reinforced polymer rods  
Diameter of rod 3,0 mm, mesh size 100 x 100 mm

Order No.: Z060170014

Number of pages of the Test Report incl. title page: 2

Pages of annexes: -

Prepared by:

**Adéla Válková**  
test technician - specialist

Approved by:



**Ing. Martin Zaděláč**  
head of the Testing Department

Print No.: A

Number of prints: 2

Brno, on 20.03.2017

**Declaration:** 1) The test results in this Report relate only to the tested article and they do not substitute any other documents  
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Technical and Test Institute for Construction Prague, Central laboratory

Nemanická 441, 370 00 České Budějovice, Czech Republic

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e-mail: pilarova@tzus.cz

Entered in the Commercial Register maintained by Municipal Court in Prague, Section ALX, Insert 711, Comp. ID: 00015679, VAT: CZ00015679



## 1. Sample data

Evidence No.: VZ060170065  
Sample: ROCKMESH – Composite mesh made of basalt fibre reinforced polymer rods, diameter of rod 2,2 mm and 3,0 mm  
Date of sample delivery: 2.2.2017  
Sample taken over by: Ing. Marek Sopko

## 2. Test methods

Determination of content of fibres	ČSN EN ISO 1172: 1999	Textile-glass-reinforced plastics - Prepregs, moulding compounds and laminates - Determination of the textile-glass and mineral-filler content - Calcination methods
------------------------------------	-----------------------	--

Deviations from a standard procedure or the use of non-standardized methods: were not applied.

## 3. Test results

The tests were carried out on: 17.3.2017 – 20.3.2017  
The tests were performed by: Adéla Válková

Data on the person who performed the test, test conditions and equipment used are listed in the Test Minutes. Apparatuses and measuring instruments that used have been certified pursuant to a valid plan of the Testing.

The samples were annealed in the whole form.

### 3.1. Determination of content of fibres according to ČSN EN ISO 1172:1999

Diameter of rod 2,2 mm

Determination at 625 °C	1.	2.	3.	Average
Content of fibres [%]	75,38	75,48	75,70	75,52

Diameter of rod 3,0 mm

Determination at 625 °C	1.	2.	3.	Average
Content of fibres [%]	81,05	81,16	81,22	81,14

END OF THE TEST REPORT



# PROTOKOL O ZKOUŠCE

číslo: 100-059086

ze dne: 27.2.2017

**Název a adresa zákazníka:** Technický a zkušební ústav stavební Praha, s.p.  
Pobočka Brno - 0600  
Hněvkovského 77  
617 00 Brno

**Název výrobku:** kompozitní výztuž Rockmesh, průměr 3 mm

**Předmět a metoda zkoušení:**

Stanovení kovů v mineralizátu vzorku:  
- AAS - plamen

metodika č. 100611-01


**Datum převzetí vzorku ke zkouškám:** 3.2.2017

**Datum vykonání zkoušek:** od: 3.2.2017 do: 27.2.2017

**Zkoušku provedla laboratoř:** oddělení analytické chemie

**Jméno a funkce osoby oprávněné k podpisu protokolu:**



  
Ing. Libuše Pražáková  
Technický vedoucí laboratoře



**Popis a identifikace vzorku:** kompozitní výztuž Rockmesh, průměr 3 mm  
Výrobce: ORLIMEX CZ, s.r.o., č.p. 50, 569 67 Osík, IČ: 25930915

**Použité přístroje:** AAS PU 9400

**Výsledky zkoušek:**

Stanovení kovů v mineralizátu vzorku:

Při měření mineralizátu vzorku metodou AAS na PU 9400 byla zjištěna tato hodnota Cd.

Číslo vzorku: 56 - kompozitní výztuž Rockmesh, průměr 3 mm			
Měřené veličiny	Jednotky	Výsledky	Rozšířená nejistota v % rel.
Cd	mg/kg	< 1	-

Zkoušky provedl: S. Kučerová  
Protokol vyhotovil: M. Pfeiferová

Poučení:

*Bez písemného souhlasu zkušební laboratoře se protokol nesmí reprodukovat jinak, než celý.*

*Výsledky zkoušek jsou platné pouze pro zkoušený vzorek a přitom tento protokol nenahrazuje jiné dokumenty.*

- KONEC PROTOKOLU O ZKOUŠCE -