

University of Chemical Technology and Metallurgy

Central Research Laboratory

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Translation from Bulgarian

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Certificate of Chemical Analysis

1. Name of product: 3 samples of vermiculite concentrates;
2. Date of receiving the samples for chemical analysis in the laboratory: 18 March 2014.

04 April 2014
Sofia

Head of Central Research Laboratory: ... *(signature illegible)* ...
/Dr.Eng. S. Parvanov/

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Laboratory: Silicate Analysis, AAS, ICP-OES
Certificate of Chemical Analysis

By request / 18 March 2014

Client Details: HELIX EOOD, Mr. Julian Nenov, President

Object of analysis: 3 samples of vermiculite concentrates – 3 grades for silicate analysis

Methods of analysis: weight analysis, AAS, ICP-OES

The results are given below:

Indicators	Value (%)		
	TC 2	TC 3	TC 4
SiO ₂	40.60	41.14	41.30
Al ₂ O ₃	11.07	11.62	10.49
CaO	3.27	2.56	3.93
MgO	27.71	27.79	27.13
K ₂ O	0.99	0.92	0.92
Fe ₂ O ₃	8.26	8.34	8.82
TiO ₂	0.33	0.35	0.37
Na ₂ O	0.32	0.23	0.35
Losses at tempering	6.77	6.37	6.03
pH	5.15	6.26	6.78
MnO		0.10	
ZnO		0.14	
CuO		0.01	
NiO		0.15	
Cr ₂ O ₃		0.20	

1. The obtained results refer only to the samples as received.
2. For analyses purposes, average samples were prepared from the received vermiculite samples, which were comminuted and homogenized.
3. Drying was not performed.
4. The above-mentioned values of each indicator are an average result of three parallel determinations.

The analysis was performed by:

1. ... *(signature illegible)* ...

/Chief Assistant M.Eng. L. Varadinova/

2. ... *(signature illegible)* ...

/Assitant Dr. D. Ilieva/

3. ... *(signature illegible)* ...

/M.Eng. Kamenarova/

Date: 04.04.2014