Termoplam Ltd.
Testing laboratory

Republic of Bulgaria, Sofia,
http://www.termoplam.eu, e-mail: termoplam2011@abv.bg, GSM 0885 449 216

Test Report

№ 238
10.08.2022

I. NAME AND SIGNATURE OF THE TESTED SAMPLE:

Production series (range)-ECONOMIC S: "ECONOMIC S 26", "ECONOMIC S 33", "ECONOMIC S 40" , "ECONOMIC S 55 and ECONOMIC S 65" ;

II. NAME AND DESCRIPTION OF THE TESTED SAMPLE(S):

Series of wood heating boilers (range) "ECONOMIC S": with a rated thermal output of 26 kW to 65 kW, one unit per test.

III. LEGAL DOCUMENT:

EN 303-5:2021, EN 304:2017, EN 45001 and EN ISO/IEC 17025:2018.

Picture of the sample

IV. QUANTITY OF THE TESTED SAMPLES: The samples from the product range ECONOMIC S. One boiler for each sample of the product range.

V. MANUFACTURER: ABC PROIZVOD d.o.o; Miloša Obrenovića 2; 31000 Užice, Serbia.

VI TEST APPLICANT: ABC PROIZVOD d.o.o; Miloša Obrenovića 2; 31000 Užice, Serbia.

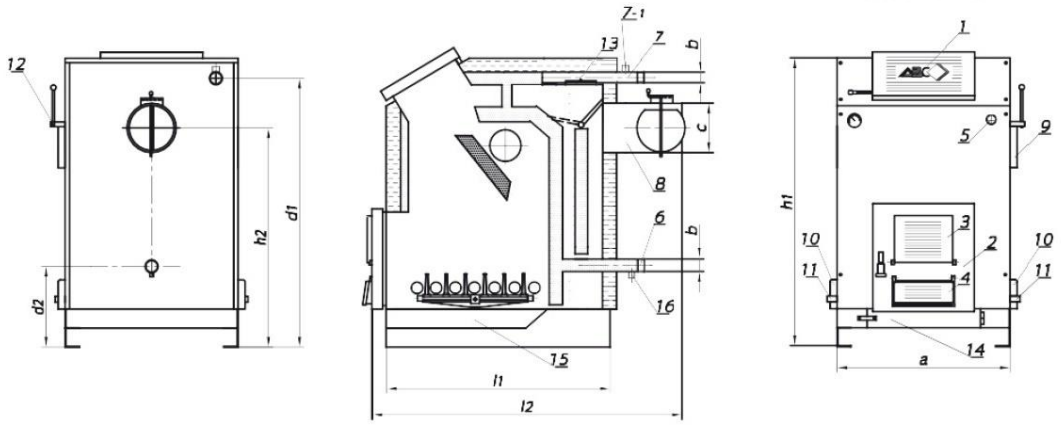
VII. PURPOSE AND OBJECT OF THE TEST:

Heating boiler thermal test for defining of:
7.1. Nominal heat output;
7.2. Test for determining heating boiler efficiency.
7.3. Determining emissions from the heating boiler.
7.4. Pressure test of the boiler plumbing parts.
7.5. Calculation of the seasonal space heating emissions.
7.6. Calculation of the seasonal space heating energy efficiency.
7.7. Calculation of the energy efficiency index (EEI).

VIII. TECHNICAL FEATURES

economic s

Picture number 2



TECHNICAL DETAILS	* TYPE OF BOILER							
	ABC26	ABC33	ABC40	ABC55	ABC65	ABC75	ABC100	ABC130
Power(kw)	26	33	40	55	65	75	100	130
Amount of water(l)	59	68	84	93	108	120	145	188
Mass (kg)	241	254	305	325	369	414	489	550
a (mm)	595	595	605	605	680	710	745	800
b (co)	R5/4	R5/4	R5/4	R5/4	R6/4	R6/4	R2	R2
c (mm)	ø160	ø160	ø160	ø180	ø180	ø180	ø200	ø200
d1 (mm)	985	985	1110	1150	1220	1310	1455	1480
d2 (mm)	350	350	365	390	390	390	395	400
l1 (mm)	690	690	780	818	828	881	885	985
l2 (mm)	975	975	1055	1055	1095	1140	1140	1255
h1 (mm)	1060	1060	1190	1275	1280	1380	1525	1545
h2 (mm)	820	820	940	1005	1045	1110	1275	1290
Necessary draft	22	22	24	26	27	29	33	35

1. Top door
2. Lower door
3. Door for burner
4. Hole cover of the secondary draft
5. Connector for draft regulator R ¾
6. Tube connector for return water
7. Tube connector for circulating water
7'. Connector for heat exchanger
8. Chimney tube
9. Hole for cleaning and hole for gas burner
10. Hole for cleaning
11. Ash shaker
12. Valve regulating flue of gases
13. Hole for cleaning from top side
14. Ashtray's door
15. Ashtray
16. Connector for filling and empting R ½

Scheme (drawing of the boiler)

8.1. Heat input $Q_в$ - according to section 3.13 from EN 303-5:2021;

8.2. Thermal capacity P - according to section 3.6 from EN 303-5:2021;

8.3. Efficiency $η_к = P/Q_в$ - according to section 4.4.2 and 5.9.3 from EN 303-5:2021.

8.4. Boiler weight – without water/ volume of the water jacket:
8.4.1. ECONOMIC S 26 kW – 241 kg./ 59 l.;
8.4.2. ECONOMIC S 33 kW – 254 kg./ 68 l.;
8.4.3. ECONOMIC S 40 kW – 305 kg./ 84 l.;
8.4.4. ECONOMIC S 55 kW – 325 kg./ 93 l.;
8.4.5. ECONOMIC S 65 kW – 369 kg./ 108 l;

IX. TEST CONDITIONS:

9.1. Executor: Termoplam Ltd. Sofia
9.2. Weather conditions: Ambient temperature t_L: 19/19°C ÷ 22/23°C (from 15°C to 30°C according to section 5.6.1 от EN 303-5:2021).
9.3. Starting Date: 05.08.2022 y. Date of completion: 10.08.2022 y.
9.4. Weight of the pilot fuel:
9.4.1. B_n =6,15 ÷ 15,25 kg/h (wood at rated heating output for two semi periods of 2 hour with continuous combustion according according to 5.6.4.1 and 4.4.5 from EN 303-5:2021).
9.4.2. B_{red} = 2,05 ÷ 4,62 kg/h (wood at reduced heating output for two semi periods of 2 hour with continuous combustion according according to 5.6.4.1 and 4.4.5 from EN 303-5:2021).
9.5. Draft (low pressure in the flue pipe) ≤ 0,15÷0,28 mbar (see section 4.4.4 from EN 303-5:2021).
9.6. Fuel type:
9.6.1. Wood with calorific value Hu = 18320±60 kJ/kg according to test report № 9298/30.05.2022 issued by the EUROTEST - Control SA (see section 5.3 and table 9 from EN 303-5:2021 and specified in the maintenance book).
9.7. Temperature of outgoing water 85,2/84,6°C ÷ 91.1/88,5°C (see section 5.7.2 from EN 303-5:2021).
9.8. Other conditions :
9.8.1. The test is made under the conditions quoted above and observing the following additional ones:
9.8.1.1. Complied with the safety measures according to EN 303-5:2021 and EN 304;

9.8.1.2. The tested samples meets the instruction for installation and operation according to EN 303-5:2021 and EN 304.
9.9. Used equipment - according to section 5.2 from EN 303-5:2021.
9.10. Recording devices:
9.10.1. Auxiliary devices: PC with software application package.

X. RESULTS FROM THE TEST:

10. Parametres**.**
10.1. Rated heating output of the boiler P_N according to section 3.7 from EN 303-5:2021.
10.2. Duration of the test rated heating output (two semi periods):
10.2.1. Wood duration of the test ≥ 2 h according to section 5.6.4.1 and 4.4.5 from EN 303-5:2021.
10.3. Maximum temperatures of the elements:
10.3.1 For heating boiler service:
10.3.1.1. Handle of the upper door ≤ 59,4/58,2 °C – according to 4.3.7 from EN 303-5:2021;
10.3.1.2. Handle of the lower door ≤ 56,0/57,6 °C – according to 4.3.7 from EN 303-5:2021.
10.4. Real values of the thickness measurement, etc. with additional certificates enclosed.
10.5. After the test of the plumbing parts at pressure p_{outg}=2xPS=2x3=6 [bar] there are no leaks and visible deformations (elastic and plastic) in accordance with section 5.4.1 from EN 303-5:2021.
10.6. Temperature control and limiting divices according to section 4.3.9 from EN 303-5:2021:
The operating instructions state that a safety valve must be installed in the boiler.
In section 5, page 8 of the installation and operation instruction show and give detailed descriptions of connecting the boiler to open system type and to closed system type.
On page 8 picture 10 of the installation and operating instructions there is a description of how to connect a boiler to the open system using a safety valve. A connection diagram and the necessary elements are shown.
In page 8 picture 11 of the installation and operating instructions, a description is provided on how to connect the boiler to the closed system using a safety valve. The scheme shown is for connection to these elements.
10.7. For calculation of the values of Q_B, P and η_K are used formulas from items 5.9.1, item 5.9.2 and item 5.9.3.2 from EN 303-5:2021.
* Values before the slash refer to the test at nominal power, and after it are for minimum power.

Table 1

Measurement	ECONOMIC S 26		ECONOMIC S 33		ECONOMIC S 40		ECONOMIC S 55		ECONOMIC S 65		Limit
Regime	nom	min	nom	min	nom	min	nom	min	nom	min	-
t_A °C	195	184	214	189	218	197	229	209	236	215	
t_L °C	≤19	≤19	≤19	≤20	≤21	≤21	≤22	≤23	≤22	≤23	15÷30
$t_{1\ upper\ surface}$ (average value)	≤50.0	≤49.3	≤55.5	≤52.1	≤57.1	≤52.4	≤61.7	≤57.6	≤63.7	≤57.8	≤60+t_L*= 83
$t_{2\ left\ wall}$ (average value)	≤50.5	≤45.7	≤51.8	≤48.9	≤54.2	≤49.2	≤56.6	≤52.2	≤58.9	≤53.8	≤60+t_L*= 83
$t_{3\ right\ wall}$ (average value)	≤51.6	≤47.2	≤52.3	≤51.0	≤52.6	≤51.2	≤58.9	≤51.9	≤60.3	≤54.4	≤60+t_L*= 83
$t_{floor\ max}$	≤36.5	≤35.1	≤38.9	≤38.6	≤39.9	≤38.7	≤41.5	≤41.6	≤42.2	≤41.0	≤ 80 *
$t_{upper\ handle}$	≤54.4	≤51.0	≤55.1	≤52.6	≤57.2	≤53.1	≤58.8	≤58.2	≤59.4	≤57.2	≤60+t_L*= 83
$t_{lower\ handle}$	≤53.1	≤51.1	≤53.7	≤52.7	≤54.4	≤52.0	≤55.7	≤53.8	≤56.0	≤57.6	≤60+t_L*= 83
$P_{outg.}$ =2xPS bar	6	6	6	6	6	6	6	6	6	6	= 6 bar
W_1 m³/h	1105	360	1420	429	1750	580	2200	740	2450	760	-
t_V °C	85.2	84.6	86.5	85.5	86.5	85.7	91.1	89.1	90.1	88.5	-
t_R °C	65.0	64.2	66.5	65.5	66.8	66.0	69.5	68.0	67.2	66.4	70 ÷ 90
Bn kg/h	6.15	2.05	7.80	2.60	9.46	3.14	13.00	4.29	15.25	4.62	-
P kW	26.04	8.57	33.13	10.01	40.22	13.33	55.44	18.22	65.46	19.60	
Q_B kW	31.30	10.43	39.69	11.96	48.14	15.98	66.16	21.83	77.61	23.51	
$\acute{\eta}_K$= P/Q_B [%]	83.19	82.16	83.47	83.69	83.55	83.41	83.79	83.46	84.34	83.37	class 4
CO mg/m³ ** at 10% O_2	501.4	478.2	516.3	509.9	537.5	533.3	574.5	554.8	640.7	578.2	≤700
CO_2 % vol. part.	9.09	7.44	9.18	7.06	8.89	6.86	8.5	6.8	7.73	6.57	-
OGC mg/m³ at 10% O_2***	21.1	22.7	24.5	24.8	22.6	25.4	27.3	27.0	26.9	27.5	≤ 30
Dust mg/m³ at 10% O_2*****	44.1	40.6	45.4	43.3	47.3	45.3	50.6	47.2	56.4	49.1	≤60
W % ****	≤30	≤30	≤30	≤30	≤30	≤30	≤30	≤30	≤30	≤30	-
O_2 % vol. part.	11.6	13.3	11.5	13.7	11.8	13.9	12.2	14.0	13.0	14.2	10
NOx mg/m³ at 10% O_2	162.4	147.0	167.2	156.8	174.1	164.0	186.1	170.6	189.1	177.8	
PN kW	26	-	33	-	40	-	55	-	60	-	-

* According to section 4.3.7 from EN 303-5:2021.

** Emission class 5 for the boiler using biogenic fuel with manual charging according to section 4.4.7 and table 7 from EN 303-5:2021.

*** Emission class 5 for the boiler using biogenic fuel with manual charging according to section 4.4.7 and table 7 from EN 303-5:2021.

**** Fuel – wood according to section 5.3, table 9 from EN 303-5:2021.

***** Emission class 5 for the boiler using biogenic fuel with manual charging according to section 4.4.7 and table 7 from EN 303-5:2021.

XI. Seasonal space heating emissions: acc. to table 8, Annex F from EN 303-5:2021, Annex II and Annex III of the REGULATION (EU) 2015/1189:

Table 2

Results	Model boiler					In accordance REGULATION (EU) 2015/1189.
	ECONOMIC S 26	ECONOMIC S 33	ECONOMIC S 40	ECONOMIC S 55	ECONOMIC S 65	[mg/Nm^3]
Dust [mg/Nm^3]	41.1	43.6	45.6	47.7	50.2	[PM] $^1 \leq 60$
CO [mg/Nm^3]	481.7	510.8	533.9	557.7	587.6	[CO] $^2 \leq 700$
OGC [mg/Nm^3]	22.5	24.7	24.9	27.0	27.4	[OGC] $^3 \leq 30$
NO_x [mg/Nm^3]	149.3	158.4	165.5	172.9	179.5	[NO_x] $^4 \leq 200$

Dust content of exhaust gases [PM] $^1 \leq 60$ mg/Nm^3 for manual stoked boilers in accordance with point 1 (c), of Annex II of the REGULATION (EU) 2015/1189.

CO of exhaust gases [CO] $^2 \leq 700$ mg/Nm^3 for manual stoked boilers in accordance with point 1 (e), of Annex II of the REGULATION (EU) 2015/1189.

OGC of exhaust gases [OGC] $^3 \leq 30$ mg/Nm^3 for manual stoked boilers in accordance with point 1 (d), of Annex II of the REGULATION (EU) 2015/1189.

NO_x of exhaust gases [NO_x] $^4 \leq 200$ mg/Nm^3 for biomass boilers in accordance with point 1 (f), of Annex II of the REGULATION (EU) 2015/1189.

XII. Seasonal space heating energy efficiency: acc. to Annex F from EN 303-5:2021, Annex II and Annex III of the REGULATION (EU) 2015/1189:

Table 3

Model boiler	Seasonal space heating energy efficiency η_s %	In accordance REGULATION (EU) 2015/1189 [η_s] [%]
ECONOMIC S 26	80.2	[η_s] $^1 \geq 75$
ECONOMIC S 33	80.5	[η_s] $^2 \geq 77$
ECONOMIC S 40	80.5	[η_s] $^2 \geq 77$
ECONOMIC S 55	80.8	[η_s] $^2 \geq 77$
ECONOMIC S 65	81.3	[η_s] $^2 \geq 77$

Where:

- η_s % - the seasonal space heating energy efficiency:

[η_s] $^1 \geq 77$ % for boilers with a rated heat output of more than 20 kW in accordance with point 1 (b), of Annex II of the REGULATION (EU) 2015/1189.

XII. Energy efficiency index (EEI): acc. to Annex F from EN 303-5:2021, Annex II and Annex VIII of the REGULATION (EU) 2015/1187:

Table 3

Model boiler	Energy efficiency index EEI	Energy efficiency class
ECONOMIC S 26	117	A+
ECONOMIC S 33	118	A+
ECONOMIC S 40	118	A+
ECONOMIC S 55	118	A+
ECONOMIC S 65	119	A+

The energy efficiency index is calculated according to:

12.1. The requirements and the formulas of ANNEX VIII of REGULATION (EU) 2015/1187;

12.2. The energy efficiency index is calculated on the database provided by manufacturer for boilers burning wood series (range) ECONOMIC S ;

12.3. The energy efficiency index is set for preferred fuel: wood according section 5.6.4.1 and section 5.3 from EN 303-5:2021.

12.4. Energy efficiency class is determined based on the energy efficiency index EEI according to Table 1 of ANNEX II of REGULATION (EU) 2015/1187.

XIII. ENCLOSURES:

13.1. Prints of the results from page 5.
13.2. Instruction for installation and operation - Yes.
13.3. Assembly drawing of the sample - 1.
13.4. Certificates (annexs A, B, C, D, and E): 5.

MANAGER: .....
(eng. Pl. Iliev)

NOTE:
The test results relate only to the tested samples.
Extracts from the test report can't be reproduced without written agreement of the testing laboratory.
This document is only informative.

Annex A

Declaration of conformity of steel sheet with a thickness of 5 mm

ISD DUNAFERR

ISO 9001

CONFORMITY STATEMENT OF PRODUCER

Page 1 (2)

				A07 Purch contract nr.: ORDER FOR JANUARY 2013		Modification: 0
A01 Producer's Plant: ISD DUNAFERR ZRT. 2400 DUNAÚJVÁROS, VASMŰ TÉR 1-3.	A02 Type of statement: 2.2-EN 10204-2004	B15 Validity: 2023.02.19	A10 Delivery date: 2013.02.19	A11 Date of issue: 2013.02.20	A08.1 Order No./Item: 0004209750/000002	A03 Statement No.: 0027171052/000005
					A08.2 Contract No.: 0004209750/000005	B02 Quality marking: P265GH Quality standard: DIN EN 10028-93 2. RÉSZ
	A06.1 Name of customer: DAK COMERC DOO				B01.1 Name of product: Hot rolled coil (Plain)	
	Address of customer: Serbia,21000,NOVI SAD,21. TEMERINSKI PUT					
A04 Metal stamp:	A06.2 Place of destination: Luka Beograd,Serbia,11000,BEOGRAD,Žorža Klemansija,37				B01.2 Dimension standard: EN 10051+A1	
					B01.3 Class: I,	
	B05 Reference (heat)treatment of samples:				C05 Place of inspection: The testings were performed by the laboratory accredited byNAT under NAT-1-1037/2008 number.	
B03 Supplementary requirements:					B04 Delivery terms of the product: Normalised	

IDENTIFICATION OF THE PRODUCT

B07.1 Charge No.	C70 Steel prod. Procedure	C00 Sample No.	B07.2 Coil/Bundle No.	B08 Pieces (pc):	B12 Theoretical mass (t):	B13 Actual mass (t):	D52 Coiling temp.		B09 Width (mm):	B10 Thickness (mm):	B11 Length (mm):	B14 Total mass (t):
545568	LD	90000314757	671366000			22.230			1500/+20	5		45.010
545753	LD	90000314758	671367000			22.780						

B06 Marking of the product: (Z04)

Annex B

Certificate of the welding electrode

ESAB

INSPECTION CERTIFICATE (3.1) - Chemical analysis
TEST REPORT (2.2) - Mechanical properties

Date: 2015-02-27

Certificate number: EC23783239 rev. 0

Our order:	028412	Your order:	03-2402-1
Our reference:	Miroslav Abraham	Your reference:	
Customer number:	HUE00047	Your fax number:	
Customer order date:	20150216	Your e-mail:	

Invoice address
ESAB KFT. (6703)
TEREZ KRT. 55-57
BUDAPEST
HU-1062 HUNGARY
Hungary

Receiver of certificate

Delivery address
TEHNOALAT D.O.O
SLOBODE BB
SERBIA 34000
34000 KRAGUJEVAC
Serbia

DELIVERY Lot number: PV506024817B Quantity: 4 CT

PRODUCT

Brand:	ESAB
Description:	OK AristoRod 12.50 1.0mm 250kg
Item number:	1A50109320

CLASSIFICATIONS

EN ISO 14341-A	G 3Si1
EN ISO 14341-A	G 38 3 C1 3Si1
EN ISO 14341-A	G 42 4 M21 3Si1
SFA/AWS A5.18	ER70S-6
CAN/CSA-ISO 14341	B-G 49A 3 C G6
JIS Z 3312	YGW 12 (C1), (items ending with H)

MECHANICAL PROPERTIES

Typical data
acc to EN 10204 - 2.2

Standard:	EN
Auxiliary:	M21
Condition:	

TENSILE

ReL	Rm	A4-A5
470 MPa	560 MPa	26 %

IMPACT

Temp	KV
-30 °C	70 J

CHEMICAL COMPOSITION

Actual results
acc to EN 10204 - 3.1

Wire/strip
Auxiliary:

C	0.07%
Si	0.89%
Mn	1.51%
P	0.012%
S	0.012%
Cr	0.07%
Ni	0.04%
Mo <	0.01%
Cu	0.06%
V <	0.01%
Al	0.001%
Ti+Zr	0.01%

COMMENTS

Product supplied under a QA Programme fulfilling the EN ISO 9001 standard.
This certificate is produced electronically and is valid without signature.
Please refer any queries to:
ESAB Kft, Terez krt. 55-57/C, H-1062, Budapest, +36 1 20 44 182

Annex C

Certificate of Quality requirements for fusion welding of metallic materials

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Industrie Service

ZERTIFIKAT

TUV SUD-W-1281.2021.001

Hersteller:	**ABC PROIZVOD DOO UŽICE** **Miloša Obrenovića 2** **RS – 31000 Užice**
Fertigungsstätte(n)	**Miloša Obrenovića 2** **RS – 31000 Užice**

Der oben genannte Hersteller erfüllt die

umfassenden Qualitätsanforderungen für das Schmelzschweißen von metallischen Werkstoffen

nach

EN ISO 3834-2

Auftragsnummer:	3425689
gültig bis:	April 2024

München, 27. April 2021

Zertifizierungsstelle
Werkstoff- und Schweißtechnik

Klaus Schlotterer

TÜV SÜD Industrie Service GmbH

EQ3106888 TÜV SÜD Industrie Service GmbH, Westendstraße 199, 80 686 München, Deutschland

Annex D

Certificate of Environmental management system

KVALITET
joint stock company for quality testing "KVALITET" NIŠ
Blvd. Svetog cara Konstantina 83-85
18000 NIŠ, Republic of Serbia

Certificate

No
19024

declaring that enterprise

Milosa Obrenovica 2, Uzice, Republic of Serbia

has established ENVIRONMENTAL MANAGEMENT SYSTEM in accordance with the requirements of the standard:
SRPS ISO 14001:2015

which is identical with:
ISO 14001:2015

The scope of certification:
Factory for heating boilers, thermo technical equipment and machine metal treatment.

Valid until:
21-Aug-2022

Place and date of issue:
Nis, 22-Aug-2019 v1.0 e

KVALITET ISO 14001

General manager:
Vladimir Vukašinović, M.Sc.E.E.

Annex E

Technical data sheet for the seal

TEXPACK®

TECHNICAL DATA SHEET

Rev. 03 - 30/09/2015

7225 C

Bioglass

BIOTEX® BIOTEX® BIOTEX® BIOTEX® BIOTEX® BIO

Description

Bioglass packing is a gasket made by braiding Texpack® E-type glass fibres of 9 microns. It has a blanket core made of ceramic-free ecological fibre. The combination of the technical characteristics of the glass fibres (for the external sleeve, high mechanical and heat resistance), the softness and the flexibility make this type of gasket particularly suitable where high temperature seals are required.

Applications

Kilns and furnaces for ceramics and bricks, industrial furnaces, boilers, insulation of piping and wiring, aluminium and steel industry, other types of seals.

Characteristics	
Colours	light green
Chemical stability	excellent chemical stability resisting attack from most corrosive agents. Exceptions are fluorides, phosphoric acids and concentrated alkalis.
Melting point	1260°C
Long term operating temperature:	
- reinforced with steel wire	1050°C
- reinforced with glass threads	650°C
Loss on ignition at high temperature	<20%

Characteristics of Bioglass	
Outer sleeve	glass yarn textured type E 9 µ tightly woven braid
Core	blanket of ecological material

Chemical analysis of the glass yarn		
Aluminium silicate	Al_2O_3	1 - 4 %
Silica oxide	SiO_2	62 - 57 %
Calcium oxide+ Magnesium oxide	CaO+MgO	9 -12 %
Boron oxide	B_2O_3	3 - 6 %
Alkali content	Na_2O+K_2O	15 - 17 %
Iron oxide	Fe_2O_3	0 - 1 %
Phosphorus pentoxide	P_2O_5	0 - 1 %

Standard sizes	
diameter mm	rolls m
8	100
10	100
12	50
15	50
16	50
18	50
20	50
22	50
25	50
30	25
35	25
40	25
50	25
SQUARE AND RECTANGULAR SECTIONS ARE AVAILABLE ON REQUEST	

Company with a quality management system certified by DNV - UNI EN ISO 9001. The information in this data sheet is merely indicative and as such it is not possible to check the methods and conditions of use of the product; in this regard the company cannot accept any responsibility