



**Termoplam Ltd.  
Testing laboratory**

**Page number: 1  
Number of pages: 10**

Republic of Bulgaria, Sofia,  
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## **Test Report**

**№ 253  
11.09.2022**

### **I. NAME AND SIGNATURE OF THE TESTED SAMPLE:**

Production model: TEMY ES 10

### **II. NAME AND DESCRIPTION OF THE TESTED SAMPLE:**

Wood heating boiler with a rated thermal output of 10 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:** One test sample;

**V. MANUFACTURER:** "TERMOMONT" d.o.o , Serbia; City: Prhovacka bb, 22310 Simanovci.

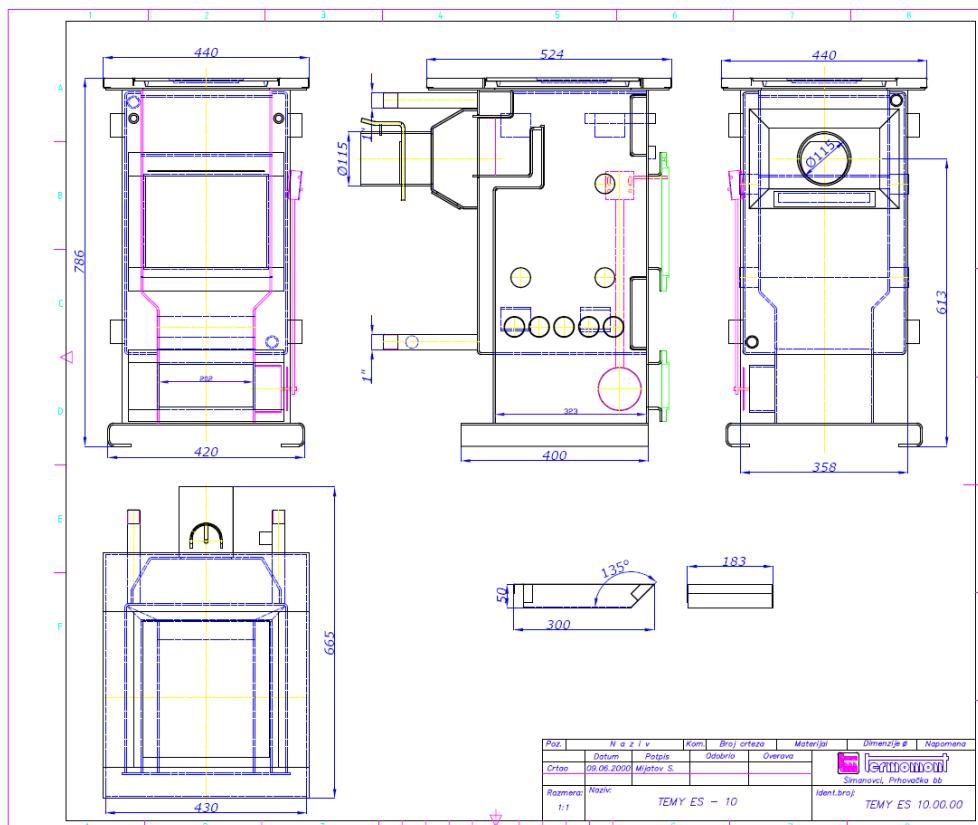
**VI TEST APPLICANT:** "TERMOMONT" d.o.o , Serbia; City: Prhovacka bb, 22310 Simanovci

**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:**



Scheme (drawing of the boiler)

- 8.1. Heat input  $Q_B$  - 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  $\eta_k = P/Q_B$  - 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. TEMY ES 10 kW – 106 kg./ 25 l.;

### **IX. TEST CONDITIONS:**

- 9.1. Executor: Termoplam Ltd. Sofia
- 9.2. Weather conditions: Ambient temperature  $t_L$ :  $\leq 21/21^\circ\text{C}$   
(from  $15^\circ\text{C}$  to  $30^\circ\text{C}$  according to section 5.6.1 or EN 303-5:2021).
- 9.3. Starting Date: 09.09.2022 y. Date of completion: 11.09.2022 y.
- 9.4. Weight of the pilot fuel:
  - 9.4.1.  $B_n = 2.41$  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.  $B_{red} = 0.8$  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)  $\leq 0,15 \div 0,28$  mbar (see section 4.4.4 from EN 303-5:2021).
- 9.6. Fuel type:
  - 9.6.1. Wood with calorific value  $H_u = 18320 \pm 60$  kJ/kg according to test report № 9298/30.05.2022 issued by the EUROTTEST - 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  $80.5/78.5^\circ\text{C}$  °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 sample 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  $\geq 2$  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. Upper door handle  $\leq 57.2$  °C – according to 4.3.7 from EN 303-5:2021;

10.3.1.2. Lower door handle  $\leq 52.3$  °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  $p_{outg}=2 \times PS=2 \times 3.0=6$  [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 devices according to section 4.3.9 from EN 303-5:2021:

In the operating instruction state that a safety valve (outside the boiler) must be installed mandatory.

On page 6 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 5 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  $\eta_K$  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	TEMY ES 10		Limit
	nom	min	
Regime	nom	min	-
$t_A$ °C	188	182	
$t_L$ °C	≤21	≤21	15÷30
$t_1$ upper surface (average value)	≤51.5	≤45.7	≤60+ $t_L$ *= 83
$t_2$ left wall (average value)	≤50.2	≤45.5	≤60+ $t_L$ *= 83
$t_3$ right wall (average value)	≤51.2	≤44.8	≤60+ $t_L$ *= 83
$t_{floor\ max}$	≤36.8	≤35.0	≤ 80 *
$t$ upper handle	≤57.2	≤55.1	≤60+ $t_L$ *= 83
$t$ lower handle	≤52.3	≤50.9	≤60+ $t_L$ *= 83
$P_{outg. = 2xPS\ bar}$	6	6	=6 bar
$W_1$ m <sup>3</sup> /h	475	165	-
$t_V$ °C	80.5	78.5	-
$t_R$ °C	62.2	61.2	70 ÷ 90
$B_n$ kg/h	2.41	0.8	-
$P$ kW	10.14	3.33	
$Q_B$ kW	12.26	4.07	
$\eta_k = P/Q_B$ [%]	82.11	80.49	class 4
CO mg/m <sup>3</sup> ** at 10% O <sub>2</sub>	612.6	528.7	≤700
CO <sub>2</sub> % vol. part.	10.44	11.31	-
OGC mg/m <sup>3</sup> at 10% O <sub>2</sub> ***	24.1	18.6	≤ 30
Dust mg/m <sup>3</sup> at 10% O <sub>2</sub> ****	48.1	40.7	≤60
W % ****	≤30	≤30	-
O <sub>2</sub> % vol. part.	10.2	9.3	10
NO <sub>x</sub> mg/m <sup>3</sup> at 10% O <sub>2</sub>	112.8	96.3	
PN kW	10	-	-

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

\*\* Emission class 5 of the boiler at rated heating output ≤50 kW according to section 4.4.7 and table 7 from EN 303-5:2021.

\*\*\* Emission class 5 of the boiler at rated heating output ≤50 kW 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 of the boiler at rated heating output ≤50 kW 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.
	TEMY ES 10	[mg/Nm <sup>3</sup> ]
Dust [mg/Nm <sup>3</sup> ]	42	[PM] <sup>1</sup> ≤ 60
CO [mg/Nm <sup>3</sup> ]	541	[CO] <sup>2</sup> ≤ 700
OGC [mg/Nm <sup>3</sup> ]	19	[OGC] <sup>3</sup> ≤ 30
NO <sub>x</sub> [mg/Nm <sup>3</sup> ]	99	[NO <sub>x</sub> ] <sup>4</sup> ≤ 200

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

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

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

NO<sub>x</sub> of exhaust gases [NO<sub>x</sub>] <sup>4</sup> ≤ 200 mg/Nm<sup>3</sup> 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 $\eta_s$ %	In accordance REGULATION (EU) 2015/1189 [ $\eta_s$ ] [%]
TEMY ES 10	79	[ $\eta_s$ ] <sup>1</sup> ≥ 75

Where:

- $\eta_s$  % - the seasonal space heating energy efficiency:

[  $\eta_s$  ] <sup>1</sup> ≥ 75 % for boilers with a rated heat output of 20 kW or less in accordance with point 1 (a), 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
TEMY ES 10	116	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 boiler burning wood;
- 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, and C): 3.



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  
Certificate of steel sheet with a thickness of 5 mm

HRS GROUP Serbia Iron & Steel in Belgrade, Bulevar Mihajla Pupina 6,  
Belgrade-New Belgrade,  
11000 Belgrade, Republic of Serbia



INSPECTION CERTIFICATE: 3.1 EN 10204:2004  
-uverenje o ispitivanju-

PAGE No: 1  
(strana br):

PURCHASER: ATENIC COMMERCE D.O.O.  
(kupac) CACAK CERTIFICATE No 75340  
BULEVAR OSLOBODILACA CACKA 91 (uverenje broj)  
TRADING CO: ATENIC COMMERCE D.O.O.  
(izvoznik) CACAK PURCHASE ORDER  
(primalac) BULEVAR OSLOBODILACA CACKA 91 ITEM:  
PRODUCT: HOT ROLLED COILS CONTRACT No. ATEN1082RS  
(proizvod) (ugovor broj)  
DIMENSIONS: 5,000 X 1500 X  
(dimenzije, mm) EN 10051/2010  
QUALITY: S235JR4AR T: HR+CE  
(kvalitet) EN 10025-2/2019 DATE OF ISSUE 26/08/2022  
Net weight (kg): 26980 (dat. izdavanja)  
DELIVERY CONDITIONS : AR  
(STANJE ISPORUKE) Transport: CA061YD

MECHANICAL PROPERTIES - MEH.TEH.OSOBINE										
COIL No.	Heat No.	PACK No.	Re	Rm	Re/RA	Impact test	Bend	Hardness	Melt	
(kotur br.)	(šarža)	(Re)	(Rm)	(Elo)	(šilavost)	(1 2 3 S)	(tvrdoća)	(furn)	(inacin)	(Proiz)
2F67012	381686	327	453	,72	28					Y
2F69018	168605	313	433	,72	35					Y

CHEMICAL COMPOSITION OF HEAT - HEMIJSKI SASTAV SARZE (%)		
	381686	168605
C	0,12	0,12
Mn	0,76	0,73
Si	0,012	0,009
P	0,011	0,014
S	0,007	0,010
Al	0,049	0,046
Cu	0,04	0,05
Cr	0,02	0,03
Ni	0,02	0,02
Mo	0,004	0,004
Ti	0,002	0,002
V	0,003	0,002
Nb	0,003	0,002
N	0,006	0,006
B	<0,0001	<0,0001
CEV	0,26	0,26

Measured values of alpha and beta/gamma surface contamination of the examined goods are for alpha emitters lower than 4 Bq/100cm2, as well as for beta/gamma emitters lower than 40 Bq/100cm2  
We hereby declare that above mentioned products were manufactured in accordance with specifications and contract requirements.

Document is valid without signature and stamp. QUALITY ASSURANCE OBEZBEDJENJE KVALITETA





Annex B  
Certificate of seal



**Firewheel Industrial Corporation**

Headquarters: RM2101, 21/F, Yaojiang International Plaza,  
No. 258 Wuxong Road, Shanghai 200082, P.R. China.  
Tel: 86-21-63096460 to 82 Fax: 86-21-63096483

- ★ High temperature resistant glass fiber and ceramic fiber textiles
- ★ Sealing packing and gasket
- ★ Engineering plastic materials
- ★ Rubber sheeting and molded parts
- ★ Thermal and acoustic insulation materials
- ★ Electrical insulation materials

**QUALITY CERTIFICATE**

MESSRS  
**TEHNIKA KB**

ISSUING DATE:  
**AUG.31,2021**

SUPPLIER: FIREWHEEL INDUSTRIAL CORPORATION

DESCRIPTION	FG103T TEXTURIZED FIBERGLASS BRAIDED SQUARE PACKING	SIZE	14MM,18MM,30M M		
INVOICE.NO.	FWG21NP05	QUANTITY	SEE INVOICE		
INSPECTION DATE	<b>AUG.24,2021</b>	PRODUCTION DATE	<b>AUG.27,2021</b>		
ITEM	SPEC. ACC. TO FIREWHEEL TDS	INSPECTION RESULT	COMMENTS		
TEMP	500C	500C	GOOD		
CONCLUSION:	QUALIFIED				
APPLICABILITY OF THE GOODS	FOR THE GOODS ON STOCK - 2 YEARS, FOR THE GOODS INSTALLED ACC. INSTRUCTIONS - 1 YEAR.OR DEPENDS				
CHECKED BY	王浩然	QUALITY MANAGER	舒菲菲	DIRECTOR	甘露泉

NOTES:

1. STORAGE OF THE GOODS: KEEP IN DRY, CLEAN AND WELL-VENTILATED PLACES AND STOCKS.
2. THE GOODS SHOULD BE KEPT AWAY FROM RAIN, HUMIDITY AND ANY OTHER UNFAVORABLE CONDITIONS.
3. HANDLE, STORAGE AND TRANSPORTATION WITH CARE TO AVOID ANY DAMAGE.

**Annex C**  
Certificate of welding electrode

voestalpine Böhler Welding Germany GmbH

voestalpine Böhler Welding Germany GmbH  
Hafenstr. 21 | D-69067 Hamm  
Postfach 2561 | D-56015 Hamm  
www.voestalpine.com/welding

voestalpine Bohler Welding Romania

**Inspection certificate 3.1**

Sos.Braila 2  
120118 Buzau  
Rumania

as per : EN 10204  
No. : 1-2022-02082022/4-014  
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PO no.	093	of	14.04.2022
Order no.			
Delivery note (pos./split)		of	
Product	GMAW wire electrode		
Trade name	<b>BÖHLER EMK 6</b>		
Standard designation	AWS A5.18: ER70S-6 EN ISO 14341 -A - G 42 4 M21 3Si1 / G 42 4 C1 3Si1		
Dimension	1,0 mm		350135
Heat no.	220081		50850
Quantity	9072,0 kg		32182152 6829

Chemical composition in % of the product

C	Si	Mn	P	S	Cr	Mo	Ni	V	Cu	Ti	Al	Zr		
0,07	0,84	1,44	0,009	0,014	0,03	< 0,01	0,01	< 0,01	0,12	< 0,01	< 0,01	< 0,01		

Mechanical properties

EN 10204 - 2.2

Tensile test							
T	ReL / Rp 0,2 MPa	Rp 1,0 MPa	Rm MPa	A (Lo = 5d) %	Z %	WBH PWHT	Remarks
20°C	≥ 420		500 - 640	≥ 20			M21
Impact test							
T	Impact energy KV / J	Average KV / J	Lateral expansion mm	Shear fracture %	WBH PWHT	Remarks	
-40°C	≥ 47					M21	

Town  
Hamm

Date  
02.08.2022

This certificate was issued by DP-equipment and does not require signature.

Authorized representative  
Stein