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INITIAL TYPE TEST REPORT

30-16333/T

Product: Fireplace stove for wood and coal briquettes
Type designation: TST2210 (TACORA)
Version: -

Customer: Cangzhou Topcastings Enterprise Co., Ltd.
No. 7 Jianshe Street
061000 Cangzhou City Hebei
CHINA

Manufacturer: Cangzhou Topcastings Enterprise Co., Ltd.
No. 7 Jianshe Street
061000 Cangzhou City Hebei
CHINA

Employee responsible: Ing. Radek Machara

Report issue date: 2023-03-06

Distribution list: 1 copy to the Customer
1 copy to the Engineering Test Institute

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SP-2021-000012_1_10

I. Description of product tested

The fireplace stove for wood and coal briquettes TST2210 (TACORA) is made mainly of cast iron. The stove is equipped with two inlet air controllers. these controls are located under the loading door and control the primary and secondary combustion air. the stove is also equipped with a tertiary air supply - this one is without a controller. The combustion chamber is lined with fireclay and in its upper part there are two deflectors - the first made of vermiculite and the second made of steel. The combustion chamber is also equipped with a grate and an ashtray. The spigot is located on the upper side of the stove with a diameter of 150 mm. The stove is placed on a cast-iron base.

Basic technical data of the fireplace stove for wood and coal briquettes (Table 1a)

Type	Main dimensions (mm)			Nominal output (kW)	Fuel consumption (kg/h)	Flue gas connector diameter (mm)	Flue draught (Pa)
	Height	Width	Depth		wood		
TST2210 (TACORA)	786	627	477	7.1	2.17	150	12

Basic technical data of the fireplace stove for wood and coal briquettes (Table 1b)

Type	Main dimensions (mm)			Nominal output (kW)	Fuel consumption (kg/h)	Flue gas connector diameter (mm)	Flue draught (Pa)
	Height	Width	Depth		coal briquettes		
TST2210 (TACORA)	786	627	477	8.9	2.05	150	12

II. Sample tested

(Table 2)

SZU reg. no.	Product name	Date of submission
0215.22.37667.001	Fireplace stove for wood and coal briquettes	2022-12-13

The visual inspection, tests and verification were carried out by Radim Řepka at the test station of SZU

The tests were performed using measuring and testing equipment with valid calibration.

(Table 3)

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IV. Measuring and test equipment:

Measuring and test equipment:

(Table 4)

No.	Name	Inventory number:	Calibration valid until:
1.	Barometer	MaR09_B	06/2023
2.	Thermometer – ambient	MaR10+11_V	06/2023
3.	Hygrometer	MaR10+11_V	06/2023
4.	Draught gauge	MaR08_Tah	07/2023
5.	Scale	022333	03/2024
6.	THERM	021763	03/2023
7.	Analytical scale	021458	04/2023
8.	Calliper	ME 543	07/2024
9.	Combustion product analyser	022317	x
10.	Elemental analyser	022305	
11.	Gravimat	ME 583	09/2023
12.	Kit of temperature measurement	022399-A_T	11/2023

Note: x... Verified using calibration standards prior to measurement
+ ... $\pm 5\%$ of the values measured

Uncertainty of measurement

(Table 5)

Parameter measured	Uncertainty of measurement
Gas analysis	
CO	$\leq 6\%$ of the limit values in Table 8
CO ₂	$\leq 2\%$
O ₂	$\leq 2\%$
Temperature	
Flue gas	$\leq 5\text{ K}$
Ambient room	$\leq 1.5\text{ K}$
Water	$\leq 0.5\text{ K}$
Surface	$\leq 2\text{ K}$
Touchable Area	$\leq 2\text{ K}$
Water flow	$\leq 0.005\text{ m}^3/\text{h}$
Static pressure	$\leq 2\text{ Pa}$
Mass	
- fuel consumption	$\pm 20\text{ g}$
- residue	$\pm 5\text{ g}$
- fuel load $\leq 7.5\text{ kg}$	$\pm 5\text{ g}$
$> 7.5\text{ kg}$	$\pm 10\text{ g}$

The following expanded measurement uncertainties have been calculated as the coefficient of measurement uncertainty and the expanded coefficient $k = 2$, which corresponds to a coverage probability of 95% for normal distribution.

If a statement of conformity is given, the decision rule pursuant to ILAC-G8: 09/2019 Art. 4.2.1 – binary statement for the simple acceptance rule shall be used.

Test title: Structural safety

Requirement specification: ČSN EN 13240/A2:2005 Art. 4.3, 4.5, 4.14

Sample tested: Fireplace stove for wood and coal briquettes TST2210 (TACORA)

Measuring equipment used: No. 8, Table 3

(Table 6)

Required product properties	Requirement specification	Test result	Note
ČSN EN 13240/A2:2005 Art.:			
Flue spigot or socket The flue spigot or socket where required for installation purposes shall be designed to enable a suitable gastight connection to be made between the flue gas connector and the appliance. The spigot or socket shall provide a good fit for the size of pipe recommended by the manufacturer. Where the flue gas connector fits over an outlet spigot the overlap shall be a length of at least 25 mm for a pipe diameter of 160 mm or less, and at least 40 mm for a pipe diameter greater than 160 mm. Where the flue gas connector fits into a socket, the insertion depth shall be a minimum of 25 mm. <i>NOTE It is recommended that provision is made for sealing internal connections with heat resistant sealing compound and/or sealing rope if required.</i>	4.3	+	150 mm diameter, up during tests
Flueways It shall be possible to clean the flueways of the appliance completely using commercially available tools or brushes, unless special cleaning tools or brushes are provided by the manufacturer. The size of the flueway in its minimum dimension shall be not less than 30 mm except that where fuels other than bituminous coal are burned it shall be permissible to reduce it to not less than 15 mm provided an access door(s) is provided for cleaning the flueway.	4.5	+	> 30 mm
Control of flue gas If a flue damper is fitted, it shall be a type which does not block the flue totally by accumulation of combustion residue. The damper shall be easy to operate and incorporate an aperture within the blade which, in a continuous area, occupies at least 20 cm ² or 3 % of the cross-sectional area of the blade if this is greater. The position of the damper shall be recognisable to the user from the setting of the device. If a draught regulator is fitted, the minimum cross sectional area requirement shall not be applicable but the device shall be easily accessible for cleaning.	4.14	+	

*) Test result:

+.... Requirement fulfilled

0.... Requirement not applicable to the product in question

Accredited test number: T 004 Tests of residential solid fuel burning appliances
T 006 Test of heat output
Test of flue gas composition

Test method: ČSN EN 13240/A2:2005 Art. A1-A6, ČSN EN 16510-1, Annex A-I, FprEN 16510-2-1 Annex A-I

Sample tested: Fireplace stove for wood and coal briquettes TST2210 (TACORA)

Measuring equipment used: Nos 1 + 11 – see Measuring and Test Equipment

Test results: TST2210 (TACORA) (Table 7)

Date of testing:	2023-01-03	t _{ok} = 24.03	°C	r.v. = 30.7	%	p _a = 99.799	kPa
Place of testing:	At SZU	☒ At the Manufacturer's premises	☐ At the Customer's premises	☐ Other:			
Values measured and calculated:	Unit	Limit acc. to:					
Nominal output		1	2	3	Average	EN 13240	DIN+ 15a-BvG I.BImSchV Stufe 2
Fuel used: Hornbeam wood	mm	330					
Combustion air setting primary/secondary-common	%	0/60					
Mass of the test fuel fired hourly	kg/h	2.24	2.19	2.08	2.17		
Input attained	kW	9.3	9.1	8.6	9.0		
Combustion air temperature	°C	22	25	25	24		
Flue draught	Pa	12	12	12	12		
Average flue gas temperature	°C	286	299	288	291		
CO ₂	%	10.95	10.79	10.67	10.80		
CO – measured	%	0.0632	0.0743	0.0382	0.0586		
CO – at O ₂ = 13 %	%	0.0406	0.0484	0.0252	0.0381		
CO – at O ₂ = 13 %	mg/Nm ³	508	605	315	476	≤1500	≤1250
CO – at O ₂ = 0 %	mg/MJ	351	418	218	329		≤1100
NO _x – measured	ppm	64	64	57	62		
NO _x – at O ₂ = 13 %	mg/Nm ³	85	85	78	83	≤200	
NO _x – at O ₂ = 0 %	mg/MJ	59	59	54	57		≤150
OGC – measured	ppm	23	51	19	31		
OGC (TOC) – at O ₂ = 13 %	mg/Nm ³	27	61	22	37	≤120	
OGC (TOC) – at O ₂ = 0 %	mg/MJ	18	42	15	25		≤50
Chimney loss	%	19.4	20.4	19.8	19.9		
Proportion of losses through latent heat	%	0.4	0.5	0.2	0.4		
Proportion of losses through combustible constituents in the residue	%	0.5	0.5	0.5	0.5		
Efficiency	%	79.7	78.7	79.5	79.3	≥75	≥80 ≥75
Total heat output attained	kW	7.4	7.1	6.9	7.1		
Heat output – uncertainty	kW	0.2	0.2	0.2	0.2		
Water heat output attained	kW	-	-	-	-		
Nominal heat output	kW	7.1					
Dry flue gases mass flow	g/s	5.9	5.9	5.7	5.8		

CO ₂	%	11.50	11.74	11.70	11.65		
Dust – measured	mg/Nm ³	24	22	32	26		
Dust (TZL) – at O ₂ = 13 %	mg/Nm ³	15	13	19	16	≤75	≤40
Dust (TZL) – at O ₂ = 0 %	mg/MJ	11	10	15	12		≤35

Test results: TST2210 (TACORA)

(Table 8)

Date of testing:		2023-02-03		t _{ok} = 18.60 °C		r.v. = 28.80 %		p _a = 98.677 kPa		
Place of testing:		At SZU		☒ At the Manufacturer's premises		☐ At the Customer's premises		Other:		
Values measured and calculated: Nominal output		Unit					Limit acc. to:			
			1	2	3	Average	EN 13240	DIN+	15a-BvG	I.BImSchV Stufe 2
Fuel used: Coal briquettes		mm	180							
Combustion air setting – primary/secondary-common		%	25/40							
Mass of the test fuel fired hourly		kg/h	1.87	2.24	2.05	2.05				
Input attained		kW	10.0	12.0	11.0	11.0				
Combustion air temperature		°C	19	18	19	19				
Flue draught		Pa	12	12	12	12				
Average flue gas temperature		°C	302	293	296	297				
CO ₂		%	12.69	10.31	12.57	11.86				
CO – measured		%	0.0818	0.0340	0.0645	0.0601				
CO – at O ₂ = 13 %		%	0.0473	0.0246	0.0377	0.0365				
CO – at O ₂ = 13 %		mg/Nm ³	592	308	471	457		≤1500	≤1250	
CO – at O ₂ = 0 %		mg/MJ	374	195	298	289			≤1100	
NO _x – measured		ppm	112	133	124	123				
NO _x – at O ₂ = 13 %		mg/Nm ³	133	198	149	160		≤200		
NO _x – at O ₂ = 0 %		mg/MJ	84	125	94	101			≤150	
OGC – measured		ppm	26	20	22	23				
OGC (TOC) – at O ₂ = 13 %		mg/Nm ³	27	26	23	25		≤120		
OGC (TOC) – at O ₂ = 0 %		mg/MJ	17	17	14	16			≤50	
Chimney loss		%	16.1	18.7	15.8	16.9				
Proportion of losses through latent heat		%	0.4	0.2	0.3	0.3				
Proportion of losses through combustible constituents in the residue		%	1.5	1.5	1.5	1.5				
Efficiency		%	82.1	79.6	82.3	81.3		≥75	≥80 ≥75	
Total heat output attained		kW	8.2	9.6	9.0	8.9				
Heat output – uncertainty		kW	0.3	0.3	0.3	0.3				
Water heat output attained		kW	-	-	-	-				
Nominal heat output		kW	8.9							
Dry flue gases mass flow		g/s	5.0	7.3	5.5	5.9				
CO ₂		%	14.09	10.77	13.73	12.86				
Dust – measured		mg/Nm ³	80	48	69	66				
Dust (TZL) – at O ₂ = 13 %		mg/Nm ³	43	34	38	38		≤75	≤40	
Dust (TZL) – at O ₂ = 0 %		mg/MJ	29	22	26	26			≤35	

Fuel analysis:

Table (9)

Type of fuel	Hornbeam wood		
Analytical indicator	Symbol	Unit	Value
Carbon	C	[% of mass]	42.19
Hydrogen	H	[% of mass]	5.59
Total water in original state	W _t	[% of mass]	14.08
Ash	A	[% of mass]	0.52
Net calorific value	Q _j	[kJ/kg]	14930

Note: Sample in original state

Fuel analysis:

(Table 10)

Type of fuel	Coal briquettes		
Analytical indicator	Symbol	Unit	Value
Carbon	C	[% of mass]	49.96
Hydrogen	H	[% of mass]	4.26
Total water in original state	W _t	[% of mass]	15.99
Ash	A	[% of mass]	3.22
Net calorific value	Q _j	[kJ/kg]	19310

Note: Sample in original state

Accredited test number: **T 004 Test of residential solid fuel burning appliances**
T 006 Flue gas temperature and surface temperature test

Test method: ČSN EN 13240/A2:2005 Art. A1-A6, ČSN EN 16510-1, Annex A-I, FprEN 16510-2-1 Annex A-I

Sample tested: Fireplace stove for wood and coal briquettes TST2210 (TACORA)

Measuring equipment used: Nos 1 ÷ 2, 6, 7, 11, 12 – see Measuring and Test Equipment

Test results: TST2210 (TACORA)

(Table 11)

Date of testing:	2023-01-03	$t_{ok} = 24.03$	°C	r.v. = 30.7	%	$p_a = 99.799$	kPa
Place of testing:	At SZU	☒	At the Manufacturer's premises	☐	At the Customer's premises	☐	Other:

Measured point	Material	Temperature rise (K)	
		Measured	Limit acc. to ČSN EN
Door handle	Metal	99*)	35
Regulation levers: prim./sec. Air		79/84*)	
Storage box		-	65

Average flue gas temperature after spigot	°C	323	-
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*) Note: It is necessary to use the supplied glove to control the handle of the front door and control of total air. The table shows the highest temperatures.

Accredited test number: **T 004** **Test of residential solid fuel burning appliances**
T 006 **Temperature safety test – Temperature rise of the surrounding flammable materials**

Test method: ČSN EN 13240/A2:2005 Art. A1-A6, ČSN EN 16510-1, Annex A-I, FprEN 16510-2-1 Annex A-I

Sample tested: Fireplace stove for wood and coal briquettes TST2210 (TACORA)

Measuring equipment used: Nos 1 + 7, 11 – see Measuring and Test Equipment

Test results: TST2210 (TACORA) (Table 12)

Date of testing:	2023-01-03	$t_{ok} = 24.03$ °C	r.v. = 30.7 %	$p_a = 99.799$ kPa
Place of testing:	At SZU ☒	At the Manufacturer's premises ☐	At the Customer's premises ☐	Other: ☐

During nominal output test (A.4.9.1)

During nominal output test (A:4.9.1)									
Test no.	Ambient temp.	Flue draught	Maximum temperature rise						Fuel quantity
			Trihedron – distance				Floor protector	Limit	
			mm						
			rear	side	front	above			
			400 *)	400 *)	1200 *)	-			
-	°C	Pa	K						kg/h
1	24.03	12	49	50	55	-	42	65	2.17

During thermal overload test (A.4.9.2)

During thermal overload test (A.4.5.2)									
Test no.	Ambient temp.	Flue draught	Maximum temperature rise						Fuel quantity
			Trihedron – distance				Floor protector	Limit	
			mm						
			rear	side	front	above			
			400 *)	400 *)	1200 *)	-			
-	°C	Pa	K						kg
1	24.68	15	58	55	63	-	47	65	2.51

Note: Trihedron placed 400 mm away from the appliance rear wall.
Trihedron placed 300 mm away from the appliance side wall
Trihedron placed 1200 mm away from the appliance front wall.

The tables show the highest measured values.

After the thermal overload test, no permanent distortion or damage to the appliance was detected.

Tested by: Radim Řepka
Reviewed and approved by: Ing. Radek Machara

Date: 2023-03-06 Signed: 
Date: 2023-03-06 Signed: 

V. A list of referenced documents

- Order B-77664 of 2022-10-20
- Contract B-77664/30
- ČSN EN 13240:2002 - Roomheaters fired by solid fuel - Requirements and test methods
- ČSN EN 16510-1:2019 - Residential solid fuel burning appliances - Part 1: General requirements and test methods

Test Report compiled by: Radim Řepka

Test Report approved by:



Milan Holomek
Heat and Environment-Friendly
Equipment Test Station



– End of Test Report –