Strojírenský zkušební ústav, s.p.
(Engineering Test Institute, Public Enterprise)
Hudcova 424/56b, Medlánky, 621 00 Brno, Česká republika
Testing Laboratory 1045.1 accredited by the CAI pursuant to ČSN EN ISO/IEC 17025:2018

L 1045.1

INITIAL TYPE TEST REPORT
30-17406/T

Product:	Pellet stove
Type designation:	ORBITA NOVA

Customer:	TIM SISTEM d.o.o. ul. Prva industrijska br. 9 22330 Nova Pazova SERBIA
Manufacturer:	TIM SISTEM d.o.o. ul. Prva industrijska br. 9 22330 Nova Pazova SERBIA
Report issue date:	2024-10-22
Distribution list:	1 copy to the Customer 1 copy to the Engineering Test Institute

I. Specification of the product

Pellet stove ORBITA NOVA is designed to burn wood pellets. Stove is made with the integral fuel hopper and it is intended for supplementary heating and heating of residential and community spaces. It is designed to be used in a normal environment. Forced convection of heat is provided by the exhaust fan.

The stove consists of welded sheets of steel. The combustion chamber is closed by a door glazed with ceramic glass. Pellet burner is made of cast iron.

The 80 mm inside Ø exhaust branch is at the back. The fireplace stove has been designed with a retort and with an ash tray.

Detailed description is provided in the Instructions for installation and operation.

Basic technical specifications of pellet stove (Table 2)

Type	Main dimensions (mm)			Nominal heat output (kW)	Fuel consumption) (kg/h)	Diameter of flue gas connector (mm)	Operating draught (Pa)
	Height	Width	Depth				
ORBITA NOVA	1130	534	575	8.0 / 6.0	2.0 / 1.4	80	12

II. Sample tested

The sample indicated in the following table was used for the inspection, testing and evaluation:

(Table 2)

Type	Date	Sample Reg. No.
ORBITA NOVA	2019-05-10	0215.19.30726.001

The visual inspection, testing and evaluation of the product and technical documentation were conducted at the test station of the Engineering Test Institute in Brno by Ing. Radek Machara and Ing. Petr Smolinský.

The product has been selected in accordance with ČSN EN 16510-1 ed. 2:2023, supporting the choice of appliance(s) tested enabling it (them) to represent the family of appliances covered by the type test report with reference to the characteristics detailed in Table G.1

III. Measuring and test equipment:

No.	Name	Inventory number:	Calibration valid until:
1.	Barometer	MaR09_B	06/2020
2.	Thermometer – ambient	117044	02/2022
3.	Hygrometer	117044	02/2022
4.	Draught gauge	MaR09_Tah	06/2020
5.	Scale	022332	02/2021
6.	THERM 5500-3	021763	04/2022
7.	Analytical scale	021458	04/2021
8.	Calliper	114047	04/2020
9.	Combustion product analyser, HORIBA ENDA – 680P	022305	x
10.	Elemental analyser, PE 2400 CHNS	022107	
11.	Gravimat SHC 5 - TU	022328	09/2023
12.	Kit of temperature measurement	022399-B/8	11/2020
13.	Optiflux 5300 induction flow indicator	MaR08_Pr	02/2022
14.	WOHLER DP 600 Leakage tester	02-2388	11/2021

Note: X ... Verified with the use of calibration standards prior to measurement
+ ... ± 5 % of measured values

Measurement uncertainty:

Parameter measured	Uncertainty of measurement
Gas analysis	
CO	≤ 6 % of the limit values in Table 8
CO2	≤ 2 %
O2	≤ 2 %
Temperature	
Flue gas	≤ 5 K
Ambient room	≤ 1.5 K
Water	≤ 0.5 K
Surface	≤ 2 K
Touchable Area	≤ 2 K
Water flow	≤ 0.005 m^3/h
Static pressure	≤ 2 Pa
Mass	
- fuel consumption	± 20 g
- residue	± 5 g
- fuel load ≤ 7.5 kg	± 5 g
> 7.5 kg	± 10 g

Note: The stated extended measurement uncertainties are calculated as a factor of the measurement uncertainty and the extension coefficient k=2, corresponding to the coverage certainty of 95% as regards standard classification.
If a statement of conformity is provided, the decision rule pursuant to ILAC-G8:09/2019, Art. 4.2.1 - binary statement for the simple acceptance rule shall apply.

IV. Methods, results of tests and verifications

No.	Test objective	Requirement	Method of test	Test evaluation/verification *
1.	Mechanical resistance and stability	ČSN EN 16510-2-6: 2023, Art. 4.1	ČSN EN 16510-1 ed. 2: 2023, Art. A.4.10.2	+
2.	Safety in case of fire	ČSN EN 16510-2-6: 2023, Art. 4.2 ČSN EN 16510-1 ed. 2: 2023, Art. 5.6	ČSN EN 16510-1 ed. 2: 2023, Art. A.2.2, A.4.10	+
3.	Hygiene, health and the environment	ČSN EN 16510-2-6: 2023, Art. 4.3, 4.4, 4.5, 4.6	ČSN EN 16510-1 ed. 2: 2023, Art. A.4, A.4.1, A.4.2, A.4.3, A.4.4, A.4.5, A.4.6, A.4.7, A.4.8	+
4.	Safety and accessibility in use	ČSN EN 16510-2-6: 2023, Art. 4.7.2, 4.7.4, 4.7.6, 4.7.3, 4.7.5, 4.7.7, 4.7.8 ČSN EN 16510-1 ed. 2: 2023, Art. 5.5	ČSN EN 16510-1 ed. 2: 2023, Art. A.4.7, A.4.8, A.4.10.4	+
5.	Energy economy and heat retention	ČSN EN 16510-2-6: 2023, Art. 4.8.1, 4.8.3, 4.8.4, 4.8.6, 4.8.7, 4.8.8, 4.8.9, 4.8.10, 4.8.11	ČSN EN 16510-1 ed. 2: 2023, Art. A.4.7, A.4.8, A.6.2.1	+

*) **Evaluation / statement of conformity:**

+ ..... Requirement fulfilled
- ..... Requirement not fulfilled
0 ..... Not applicable
x ..... Not evaluated

Test objective:	**Hygiene, health and the environment** **Safety and accessibility in use** **Energy economy and heat retention**		
Exact name of the test procedure:	1.4*, 1.5* - Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions		
Test method:	ČSN EN 16510-1 ed. 2:2023, Art. A.4, A.4.1, A.4.2, A.4.3, A.4.4, A.4.5, A.4.6, A.4.7, A.4.10.4, A.4.11, A.6.2.1		
Sample tested:	ORBITA NOVA		
Measuring equipment used:	see Chapter III		
Date of test:	2020-01-21		
Ambient conditions:	22 °C Temperature	24 % Relative humidity	101 kPa Barometric pressure

8 kW

Variables measured and calculated: nominal heat output	**Unit**	**Tests**			**Limit according to:**
		1	**2**	**Average**	**EN 16510-2-6 2022**
Fuel used: pellets	mm	6 mm			
Combustion air setup – primary/secondary	%	automat			
Mass of the test	kg/hour	1.83	1.84	1.83	
Heat input	kW	8.7	8.8	8.7	
Combustion air temperature	°C	23	21	22	
Flue draft	Pa	12	12	12	
Average of flue gas temperature	°C	126	128	127	
CO_2	%	9.39	9.37	9.38	
CO – measured	%	0.0114	0.0096	0.0105	
CO – at O_2 = 13%	%	0.0090	0.0077	0.0084	
CO – at O_2 = 13%	mg/Nm^3	113	96	105	≤ 300
CO – at O_2 = 0%	mg/MJ	76	65	71	
NO_x – measured	ppm	58	59	58	
NO_x – at O_2 =13 %	mg/Nm^3	94	96	95	≤ 200
NO_x – at O_2 = 0%	mg/MJ	63	65	64	
OGC– measured	ppm	17	12	14	
OGC– at O_2 = 13 %	mg/Nm^3	23	17	20	≤ 60
OGC– at O_2 = 0%	mg/MJ	16	12	14	
Dust– measured	mg/Nm^3	19	18	19	
Dust– at O_2 = 13 %	mg/Nm^3	15	14	15	≤ 20
Dust– at O_2 = 0%	mg/MJ	10	10	10	
Chimney loss	%	8.2	8.6	8.4	
Chem. heat losses in the flue gases	%	0.1	0.1	0.1	
Efficiency at nominal heat output	%	91.5	91.2	91.3	
Total heat output	kW	8.0	8.0	8.0	
Nominal heat output	kW	8.0			
Flue gas mass flow	g/s	6.3	6.4	6.4	

6kW

Date of testing:	2019-05-21		t_{ok} = See tab.	°C	r.v. = 41 %	p_a = 97.5	kPa
Place of testing:	SZU	☒	Manufacturer`s premises	☐	Customer`s premises ☐	Other:	

6 kW

Variables measured and calculated: nominal heat output	Unit	Tests			Limit according to:
		1	2	Average	EN 16510-2-6 2022
Fuel used: pellets	mm	6 mm			
Combustion air setup – primary/secondary	%	automat			
Mass of the test	kg/hour	1,4	1,4	1,4	
Heat input	kW	6,7	6,7	6,7	
Combustion air temperature	°C	25	26	25	
Flue draft	Pa	12	12	12	
Average of flue gas temperature	°C	117	114	116	
CO_2	%	7,80	8,35	8,07	
CO – measured	%	0,0088	0,0095	0,0091	
CO – at O_2 = 13%	%	0,0085	0,0085	0,0085	
CO – at O_2 = 13%	mg/Nm^3	106	106	106	≤ 300
CO – at O_2 = 0%	mg/MJ	74	74	74	
NO_x – measured	ppm	57	59	58	
NO_x – at O_2 =13 %	mg/Nm^3	113	108	111	≤ 200
NO_x – at O_2 = 0%	mg/MJ	79	75	77	
OGC– measured	ppm	4	3	3	
OGC– at O_2 = 13 %	mg/Nm^3	6	5	6	≤ 60
OGC– at O_2 = 0%	mg/MJ	4	4	4	
Dust– measured	mg/Nm^3	11	17	14	
Dust– at O_2 = 13 %	mg/Nm^3	11	15	13	≤ 20
Dust– at O_2 = 0%	mg/MJ	7	11	9	
Chimney loss	%	8,9	8,0	8,4	
Chem. heat losses in the flue gases	%	0,1	0,1	0,1	
Efficiency at nominal heat output	%	90,8	91,7	91,3	
Total heat output	kW	6,1	6,2	6,1	
Nominal heat output	kW	6.0			
Flue gas mass flow	g/s	6	5,6	5,8	

Date of testing:	2020-01-22		t_{ok} = See tab.	°C	r.v. = 27	%	p_a = 100.2 kPa
Place of testing:	SZU	☒	Manufacturer`s premises	☐	Customer`s premises	☐	Other:

Variables measured and calculated: minimal heat output	Unit	Test	Limit according to: EN 16510-2-6 2022
Fuel used: pellets	mm	6 mm	
Combustion air setup – primary/secondary	%	automat	
Mass of the test	kg/hour	0.63	
Heat input	kW	3.0	
Combustion air temperature	°C	23	
Flue draft	Pa	8	
Average of flue gas temperature	°C	75	
CO_2	%	4.70	
CO – measured	%	0.0054	
CO – at O_2 = 13%	%	0.0086	
CO – at O_2 = 13%	mg/Nm^3	107	≤ 300
CO – at O_2 = 0%	mg/MJ	73	
NO_x – measured	ppm	27	
NO_x – at O_2 =13 %	mg/Nm^3	89	≤ 200
NO_x – at O_2 = 0%	mg/MJ	60	
OGC– measured	ppm	6	
OGC– at O_2 = 13 %	mg/Nm^3	18	≤ 60
OGC– at O_2 = 0%	mg/MJ	12	
Dust– measured	mg/Nm^3	8	
Dust– at O_2 = 13 %	mg/Nm^3	13	≤ 20
Dust– at O_2 = 0%	mg/MJ	9	
Chimney loss	%	7.8	
Chem. heat losses in the flue gases	%	0.1	
Efficiency at nominal heat output	%	92.0	
Total heat output	kW	2.8	
Nominal heat output	kW	2.8	
Flue gas mass flow	g/s	4.4	

8 kW

Energy efficiency			**Limit according to: EN 16510-2-6:2022**
At nominal heat output (el_{max})	kW	0,050	
At minimum heat output (elmin)	kW	0,016	
In standby mode (el_{sb})	kW	0,003	
Permanent pilot flame power requirement (P_{pilot})	kW	-	
correction factor F2	%	7	
correction factor F3	%	1	
correction factor F4	%	0.8	
correction factor F5	%	0	
Seasonal space heating energy efficiency ηs	%	88.5	≥ 79
Energy Efficiency Index (EEI)	-	129,6	
Energy Efficiency Class	-	A+	

6 kW

Energy efficiency			**Limit according to: EN 16510-2-6:2022**
At nominal heat output (el_{max})	kW	0,037	
At minimum heat output (elmin)	kW	0,016	
In standby mode (el_{sb})	kW	0,003	
Permanent pilot flame power requirement (P_{pilot})	kW	-	
correction factor F2	%	7	
correction factor F3	%	1	
correction factor F4	%	0.8	
correction factor F5	%	0	
Seasonal space heating energy efficiency ηs	%	88,5	≥ 79
Energy Efficiency Index (EEI)	-	129,6	
Energy Efficiency Class	-	A+	

Fuel analysis

Fuel type	Wood pellets		
Analytical indicator	**Symbol**	**Unit**	**Value**
Net calorific value	Q_j	[MJ/kg]	16.81
All water in original condition	W^r_t	[% by weight]	7.37
Ash	A	[% by weight]	0.38
Carbon	C	[% by weight]	47.02
Hydrogen	H	[% by weight]	6.26

Note: Sample in the original condition

Test objective:	**Leak tightness test on the receipt appliance**
Exact name of the test procedure:	1.4*, 1.5* - Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions
Test method:	ČSN EN 16510-2-6: 2023 Art.4.11, 4.11.2.2, 4.11.2.3
Sample tested:	ORBITA NOVA
Measuring equipment used:	see Chapter III

Test results:

Date of testing:	2019-05-20		t_{ok} = 26	°C	r.v. = 44	%	p_a = 97.3 kPa
Place of testing:	SZU	☒	Manufacturer`s premises	☐	Customer`s premises	☐	Other:

Test	Set pressure	Measured leakage	Limit
	Pa	m^3/h	
1	10	0.2	2.0
2	50	0.9	

Temperature rise of the operating components

Marco 60			
Measured point	**Material**	**Temperature rise (K)**	
		Measured	**Limit**
Front door handle	metal	removable	35
Handle of hopper	metal	30	35
Display	plastic	5	60
Switch	plastic	4	60
Fuel conveyor system	metal	58	65
Fuel hopper	metal	35	65

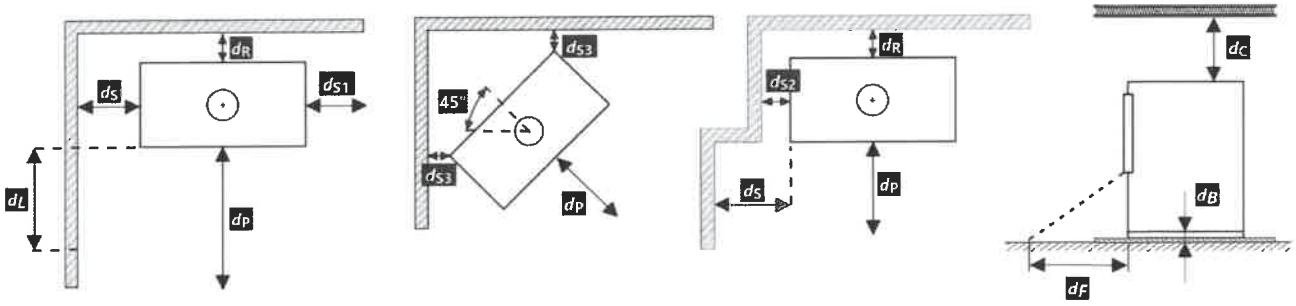
Note: *) A suitable glove is regarded as a tool.

Test objective:	**Safety in case of fire** **Mechanical resistance and stability**		
Exact name of the test procedure:	1.4*, 1.5* - Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions		
Test method:	ČSN EN 16510-1 ed. 2: 2023, Art. A.2.2, A.4.10; ČSN EN 16510-2-6: 2023, Art. A.4.10.4		
Sample tested:	ORBITA NOVA		
Measuring equipment used:	see Chapter III		
Date of test:	2019-05-20		
Ambient conditions:	26°C Temperature	44% Relative humidity	97,3 kPa Barometric pressure

Flue draught (Pa)	12 Pa
Maximum temperature rise in the pellet hopper	32 °C.
Load bearing capacity during thermal overload test	0 kg
Maximum reached flue gas temperature	139 °C

Protection of combustible materials	**Minimum distances to combustible materials, in mm**		**Maximum temperature rise, in K**
	bottom (d_B)	0	-
	floor in front (d_F)	1500	-
	ceiling (d_C)	>750	-
	rear (d_R)	300	35
	side (d_S)	300	57
	side radiation area (d_L)	1500	-
	adjacent combustible materials (e.g. furniture) (d_P)	800	59
	material type and thickness of protective insulation material (s), (if any)	-	-

Note: The tables show the highest values measured.
Limit is 65 K above room temperature at the hottest point of any adjacent walls.
After the overload tests, there was no permanent deformation or damage to the appliance.



Tested by: Ing. Radek Machara Date: 2024-10-22 Signed:

Reviewed and approved by: Milan Holomek Date: 2024-10-22 Signed:

V. A list of referenced documents

- Application dated on 2024-03-15 (ev. number B-83193 booked at SZU on 2024-10-04)
- Contract B-83193/30
- Test reports 30-14392/T and 39-14510/T
- Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC
- ČSN EN 16510-1 ed. 2:2023 - Residential solid fuel burning appliances - Part 1: General requirements and test methods
- ČSN EN 16510-2-6: 2023 - Residential solid fuel burning appliances - Part 2-6: Mechanically by wood pellets fed roomheaters, inset appliances and cookers
- Technical documentation (drawings, manual)

Test Report compiled by: Ing. Radek Machara

Test Report approved by: Milan Holomek
Combustion Equipment Manager

– End of Test Report –