0442

Testing Laboratory 1045.1
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Strojírenský zkušební ústav, s.p. Testing Laboratory, Hudcova 424/56b, 621 00 Brno
Workplace Brno, Hudcova 424/56b, 621 00 Brno, Czech Republic

L 1045.1

TEST REPORT
30-13782/T

Product:	Hot-water condensing boiler burning natural gas, category I_{2H}, I_{2E}, designation ONGAS 600 series
Type designation:	ONGAS 604, ONGAS 609
Customer:	Önmetal Döküm Sanayi Ve Ticaret Limited Şirketi İkitelli Organize Sanayi Bölgesi Atatürk Bulvari 17. Cadde No: 5 PK: 34306 Başakşehir Istanbul / Turkey
Manufacturer:	Önmetal Döküm Sanayi Ve Ticaret Limited Şirketi İkitelli Organize Sanayi Bölgesi Atatürk Bulvari 17. Cadde No: 5 PK: 34306 Başakşehir Istanbul / Turkey
Responsible employee:	Milan Holomek
Report date issue:	2018-06-29
Distribution list:	1 copy to the Engineering Test Institute 1 copy to the Customer

This Report was drafted on the basis of Order B-61509 of 2018-01-25 (received on 2018-02-05), Contract B-61509/30 of 2018-02-12. The above mentioned Report reproduces the test results of Report No. 30-12328/T of 2014-06-17.

I. Description of tested product

The boiler ONGAS 600 series, type ONGAS 604 and ONGAS 609,(Trade name: RIMA) is a floor standing gas fired condensing hot water boiler, designed to heat hot water in central heating systems. It is designed to burn natural gas. Based on the combustion products exhaust, the boiler is of B_{23} design. The appliance category is I_{2H} and I_{2E}.

ONGAS 600 Series Condensing boiler (Components List):

Component	Model	Manufacturer	Specification	Remarks
Burner Control	All range of ONGAS 600	Siemens	LMS 14.191	DVGW CE-0085BU0296
		Honeywell	S 4966 V 2052	Kiwa CE-0063BT1326
Display	All range of ONGAS 600	Siemens	AVS 37.295	CE EU Declaration of conformity of 2009-11-26
		Honeywell	DSP 49 G 2060	
Gas Valve	ONGAS 604	Honeywell	VR 420	Kiwa CE-0063AT1198 TÜV SÜD No.:Z-IS-TAF-MUC-13-05-112765-026 DVGW CE-0085BM0345
		DUNGS	MBC 300	
	ONGAS 605-606	Honeywell	VR 434	
		DUNGS	MBC 300	
	ONGAS 607-608-609	Honeywell	VR 434	
		DUNGS	MBC 700	
Fan	ONGAS 604	EBM	G1G 170	Manufacturer's Declaration of 2014-05-21
	ONGAS 605	EBM	G1G 170 (414 Watt)	
	ONGAS 606	EBM	G3G 200	
	ONGAS 607-608-609	EBM	G3G 250	
Venturi	ONGAS 604	Honeywell	VMU 335	
	ONGAS 605	Honeywell	VMU 400	
	ONGAS 606	Honeywell	VMU 500	
	ONGAS 607-608-609	Honeywell	VMU 680	
Premix Burner	ONGAS 604	Bekaert	Length = 295 mm	
	ONGAS 605	Bekaert	Length = 390 mm	
	ONGAS 606	Bekaert	Length = 485 mm	
	ONGAS 607	Bekaert	Length = 580 mm	
	ONGAS 608	Bekaert	Length = 675 mm	
	ONGAS 609	Bekaert	Length = 770 mm	
NTC Sensor	All range of ONGAS 600	Siemens	QAK 36.596	Declaration on reach of 2012-10-02
		Honeywell	SO11001	
Limit Thermostat	All range of ONGAS 600	IMIT	LS1	CE 0497
Ignition Transformer	All range of ONGAS 600	BERU	96600017	Declaration of conformity of 2013-06-22
		Danfoss	EB14 HPM	
Gas Pressure Switch	All range of ONGAS 600 (for DUNGS gas valve)	DUNGS	GW 150 A5	DVGW CE-0085AO3220

Basic technical specifications:

Boiler type	Nominal heat output [kW]	Dimensions [mm]	Operating temperature Radiator/Underfloor [°C]	Operating pressure min/max [bar]	Weight [kg]
ONGAS 604	200	604x1200x1450	40-80/20-40	0,8/6,0	195
ONGAS 609	542	714x1871x1605	40-80/20-40	0,8/6,0	423

II. Sample tested

The visual inspection, tests and verifications were conducted on the sample indicated in Table 1 below:

Boiler type	Serial number	Date of acceptance	SZÚ registration number	Qty
ONGAS 604	44 0514 00650	2014-03-05	0212.14.15540.002	1 x
ONGAS 609	49 0514 00655	2014-03-05	0212.14.15540.001	1 x

Visual inspection, testing, and verification were conducted at Engineering Test Institute, Hudcova 424/56b, 621 00 Brno, Czech Republic on 03/2014 by technician Ing. Zdeněk Laštovička and Ing. Ing.Ivo Potůček.

The testing was conducted using measurement and testing equipment with valid calibration.

III. Measuring and testing equipment

No.	Name	Inventory No. (Serial number)	Calibration valid until	Accuracy
1.	Barometer	11-1985	04/2019	see Calibration Sheet 6013-KL-K0005-14
2.	Thermometer – ambient	11-7044	02/2018	see Calibration Sheet 1072F/13
3.	Humidity meter	11-7044	02/2018	see Calibration Sheet 1072F/13
4.	DMP 331i pressure transmitter - barometer	022370/1	04/2019	see Calibration Sheet 3373/2014
5.	COMET, type THZ1 ext. digital thermometer and humidity	11-6259	11/2015	see Calibration Sheet 7629F/09
6.	GWF gas meter	02-2078	02/2018	see Calibration Sheet 5012-KL-P1072-13
7.	DMP 331i pressure transmitter – gas supply pressure	022389-C/11	01/2016	see Calibration Sheet 140061
8.	DMP 331i pressure transmitter – gas pressure at meter	022389-C/10	01/2016	see Calibration Sheet 140060
9.	Thermometer – gas temperature	02-2320/6	03/2015	see Calibration Sheet 120056
10.	Thermometer – air temperature	02-2320/7	03/2015	see Calibration Sheet 120057
11.	Thermometer – combustion product temperature	02-2320/8	03/2015	see Calibration Sheet 120058
12.	Therm data collection system – inlet and outlet water	022389-C/8	01/2017	see Calibration Sheet 140058

13.	Chronometer	99-0760	10/2015	see Calibration Sheet 2850E-07
14.	Horiba PG 250 combustion product analyser	02-2194	*)	see CRM 103000077337
15.	PE AutoSystem XL Gas Chromatograph – gas chromatograph	02-2186	12/2014	see CRM 315314913
16.	PE AutoSystem XL Gas Chromatograph	02-2247	12/2014	see CRM 315314913
17.	Water meter, NW 100	02-1576	09/2018	see Calibration Sheet 252/13
18.	Water meter, NW 40	02-1547	09/2018	see Calibration Sheet 253/13
19.	Device for blasting of appliances	02-2066	-------	-------
20.	Pressure gauge	18-0297	10/2014	see Calibration Sheet 120/168
21.	Soudness meter	11-5328	-	± 2 cm3/h
22.	Differential pressure gauge	02-2345/2	01/2016	see Calibration Sheet 140019
23.	Electrometer	11-7374	03/2019	see Calibration Sheet 001/09/E

Note: *) Calibration prior to each measurement using certified reference material

Further mentioned extended uncertainties of measurement are coefficient of measurement uncertainty and coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of 95%. The uncertainties do not reflect the effects of sampling and sample inhomogeneity. The standard uncertainty was determined in accordance with the document EA 4/02.

IV. Test results

No.	Name and specification	Technical standard / regulation applied	Source materials	Evaluation
1.	Soundness of the gas circuit	ČSN EN 15502-1+A1:2017 , Art. 8.2, 8.2.1	Page 6	+
2.	Soundness of the combustion circuit	ČSN EN 15502-2-1+A1:2017, Art. 8.2.2, 8.2.2.101, 8.2.2.102, 8.2.2.102.1, 8.2.2.103, 8.2.2.103.1, 8.2.2.103.2	Page 7 - 11	+
3.	Soundness of the water circuit	ČSN EN 15502-1+A1:2017 , Art. 8.2.3, 8.2.3.1	Page 12 - 13	+
4.	Hydraulic resistance	ČSN EN 15502-1+A1:2017 , Art. 8.3	Page 14	+
5.	Heat input, heat output and useful efficiency	ČSN EN 15502-1+A1:2017 , Art. 8.4, 8.4.1, 8.4.4, 8.4.5, 9, 9.1, 9.1.1, 9.2, 9.2.1, 9.3, 9.3.1	Page 15 - 21	+
6.	Limiting temperatures	ČSN EN 15502-1+A1:2017, Art. 8.5, 8.5.1, 8.5.2, 8.5.3, 8.5.4 ČSN EN 15502-2-1+A1:2017, Art. 8.5.101	Page 22 – 24	+
7.	Ignition, flame cross-lighting and stability	ČSN EN 15502-1+A1:2017 , Art. 8.6, 8.6.1, 8.6.2 ČSN EN 15502-2-1+A1:2017, Art. 8.6.3.101, 8.6.101	Page 25 – 30	+
8.	Adjusting, control and safety devices	ČSN EN 15502-1+A1:2017 , Art. 7.3.3, 7.3.3.1, 7.3.3.2, 7.3.3.3, 7.3.3.3.1, 8.7, 8.9, 8.11, 8.11.1, 8.11.4, 8.11.4.1, 8.11.4.2, 8.11.5, 8.11.5.2, 8.11.5.2.1, 8.11.5.2.2, 8.11.6, 8.11.6.2, 8.11.6.2.1,	Page 31 - 44	+

No.	Name and specification	Technical standard / regulation applied	Source materials	Evaluation
		8.11.6.2.2, 8.11.6.2.3, 8.11.6.2.4, 8.11.6.2.5, 8.11.7, 8.11.8, 8.11.8.1, 8.11.8.2, 8.11.8.2.1, 8.11.8.2.3 ČSN EN 15502-2-1+A1:2017, Art. 8.9.101, 8.9.103, 8.11.101, 8.11.101.1, 8.11.101.2, 8.11.101.3, 8.11.101.3.2, 8.11.101.3.3		
9.	Combustion efficiency	ČSN EN 15502-1+A1:2017 , Art. 8.12, 8.12.1, 8.12.2, 8.12.3, 8.12.3.1, 8.12.3.2, 8.12.3.3, 8.12.4, 8.12.5, 8.13, 8.13.1 ČSN EN 15502-2-1+A1:2017, Art. 8.12.2, 8.12.2.101, 8.12.2.102, 8.12.3, 8.12.3.1, 8.12.3.2, 8.12.3.3, 8.12.3.101, 8.12.3.101.8	Page 45 – 52	+
10.	Formation of condensate	ČSN EN 15502-1+A1:2017, Art. 8.15	Page 53	+

Evaluation: Note: + Requirement fulfilled x Not assessed
- Requirement not fulfilled 0 Not applicable

Testing Laboratory
Workplace Brno, Hudcova 424/56b, 621 00 Brno

Accredited test number: **T 001** Test title: **Soundness of the gas circuit**

Testing method: ČSN EN 15502-1+A1:2017 , Art. 8.2, 8.2.1

Sample tested: ONGAS 604, ONGAS 609

Measuring equipment used: see table in Chap. III

Place of testing:	at the Engineering Test Institute	☒	at the manufacturer	☐	at the customer	☐	*other:*

Test results:

Requirement	Specification of requirement	Test evaluation	Note
Soundness	ČSN EN 15502-1+A1:2017 , Art. 8.2		
Soundness of the gas circuit The gas circuit shall be sound. Internal soundness requirements for the controls are given in Clause 7. The external soundness of the gas circuit in the boiler is verified before and after all the tests of this standard. External soundness is assured if, under the test conditions below, the leakage of air does not exceed 0,14 dm^3/h.	ČSN EN 15502-1 +A1:2017 , Art. 8.2.1	+	

Note: + Requirement fulfilled x Not assessed
- Requirement not fulfilled 0 Not applicable

Measurement results:

Date of testing: 2014-05-14	t_{ok} = 21,2 °C	r.v. = 48,4 %	p_a = 989,0 mbar

Sample tested: ONGAS 609; ONGAS 604

Fuel distribution section		Testing pressure (mbar)	Medium leakage (dm^3/hour)	Medium leakage limit (dm^3/hour)
Test status	Before	50 (150)*	0,00 **	0.14
	After		0,00 **	

*) The pressure upstream of the boiler is 50 mbar for boilers which do not use third family gases and 150 mbar for boilers which do use third family gases.
**) The measured value is below the detection level of the measuring method used.

Test evaluation: The gas circuit is sound.

Accredited test number: **T 001** Test title: **Soundness of the combustion circuit**

Testing method: ČSN EN 15502-2-1+A1:2017, Art. 8.2.2, 8.2.2.101, 8.2.2.102, 8.2.2.102.1, 8.2.2.103, 8.2.2.103.1, 8.2.2.103.2

Sample tested: ONGAS 604, ONGAS 609

Measuring equipment used: see table in Chap. III

Place of testing:	at the Engineering Test Institute	☒	at the manufacturer	☐	at the customer	☐	*other:*

Test results:

Requirement	**Specification of requirement**	**Test evaluation**	**Note**
Soundness of the combustion circuit	ČSN EN 15502-2-1+A1:2017, Art. 8.2.2		
General Boilers and/or their ducts shall be sound in accordance with 8.2.2.102 or 8.2.2.103. Ducts that are part of the boiler shall be sound in accordance with 8.2.2.102.3, 8.2.2.102.4 and 8.2.2.102.5. Soundness is verified before and after all the tests of this standard, except the tests specified in the mechanical tests. All the joints identified in the installation instructions shall be checked, for example between: a) the boiler and its ducts; b) interconnecting ducts; c) the ducts and any bends and; d) the ducts and any fitting piece or terminal. In the case where leakage can also occur along the length of the ducts, the tests are also carried out with the maximum length of ducts as specified by the manufacturer in the installation instructions. In accordance with the installation instructions, the wall connections, the joint with the terminal or the joint with the fitting piece with another system of combustion products evacuation may be made sound.	ČSN EN 15502-2-1 +A1:2017, Art. 8.2.2.101	+	
Soundness of the air supply and combustion product circuit type C boilers	ČSN EN 15502-2-1+A1:2017, Art. 8.2.2.102		
Air supply and combustion product circuit Requirements Soundness with respect to the room where the boiler is installed is ensured if, under the specified test conditions, the leakage rates do not exceed the values in Table 102.	ČSN EN 15502-2-1 +A1:2017, Art. 8.2.2.102.1		

Table 102: Maximum admissible leakage rate

Test object	Surrounding of the combustion products circuit by the combustion air circuit	Maximum leakage rate (m^3/h)		
		$Q_n \leq 40kW$	$Q_n \geq 40kW$	
Boiler with its air supply and combustion products evacuation ducts and all their joints	completely	5	5 $Q_n/40$	0
	not completely	1	$Q_n/40$	0
Boiler and the joint to the air supply and	completely	3	3 $Q_n/40$	0

Requirement				Specification of requirement	Test evaluation	Note
combustion products evacuation duct	not completely	0,6	0,6 Q_n/40	ČSN EN 15502-2-1 +A1:2017, Art. 8.2.2.102.1	+	
Combustion products evacuation ducts, not completely surrounded by combustion air, with all its joints excluding the joint tested above		0,4	0,4 Q_n/40		0	
Air supply duct with all its joint excluding the joint tested above		2	2 Q_n/40		0	
Test Methods The test can be carried out either separately on the boiler body and on the ducts,or on the boiler assembled with its ducts. The combustion circuit of the test object in accordance with Table 102 is connected to a pressure source on one side and blocked on the other side. The test pressure (difference) is 0,5 mbar unless otherwise stated. For boilers with a fan where the combustion products circuit is not completely surrounded by the combustion air circuit, the test is also carried out on the part of the combustion circuit downstream of the fan, with a test pressure which is increased by the highest pressure between the combustion circuit, in the envelope of the boiler or the ducts, and the atmosphere, measured with the boiler in thermal equilibrium at nominal heat input and fitted with the longest ducts specified in the installation instructions.						
Requirements for combustion products evacuation duct for appliances with indirect air proving Requirements The soundness of the combustion products evacuation duct for installation both inside and outside the room where the boiler is installed, permitted for alternative control systems, is ensured if, under the test conditions, the leakage rate per surface area of the duct does not exceed 0,006 $dm^3/s \cdot m^2$. Test Methods The combustion products evacuation duct is connected to a pressure source on one side and blocked on the other side. The test pressure is 2,0 mbar. It is checked that the requirements are met.				ČSN EN 15502-2-1 +A1:2017, Art. 8.2.2.102.2	0	
Requirements for separate combustion products evacuation duct Requirements The soundness of a separate combustion products evacuation duct with respect to areas other than the room where the boiler is installed is ensured if under the test conditions the leakage rate per surface area of the duct does not exceed 0,006 $dm^3/(s \cdot m^2)$. Test methods When tested in accordance with 8.2.2.102.1 but with a test pressure of 2,0 mbar, it is checked that the requirements are met.				ČSN EN 15502-2-1 +A1:2017, Art. 8.2.2.102.3	0	
Requirements for the air supply circuit Requirements The soundness of the air supply circuit with respect to all areas other than the room where the boiler is installed, is ensured if under the test conditions of the leakage rate per surface area of the duct does not exceed 0,5 $dm^3/(s \cdot m^2)$. Test Methods When tested in accordance with 8.2.2.102.1, it is checked				ČSN EN 15502-2-1 +A1:2017, Art. 8.2.2.102.4	0	

Requirement	Specification of requirement	Test evaluation	Note
that the requirements are met.			
Requirements for leakage of combustion products for type C_7 boilers Requirements Under the test conditions combustion products shall only escape from the secondary flue outlet. Test Methods The sampling probe is removed. The test is carried out with one of the reference gases, or a gas actually distributed, for the category concerned at the nominal heat input. Escape of combustion products is looked for with a dew point plate, whose temperature is maintained at a value above the dew point of the ambient air. The plate is brought near to all the places around the air inlet/draught diverter where an escape is suspected. In doubtful cases, however, an escape is looked for with a sampling probe connected to a rapid response CO_2 analyser enabling concentrations of the order of 0,2 % to be detected. It is checked that the requirement is met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.2.2.102.5	0	
Soundness of the combustion product circuit of type B boilers	ČSN EN 15502-2-1+A1:2017, Art. 8.2.2.103		
General requirements Boilers shall comply with 8.2.2.103.2 or 8.2.2103.3. Ducts of type B_5 boilers shall comply with 8.2.2.103.4. Soundness shall be verified before and after all the tests.	ČSN EN 15502-2-1 +A1:2017, Art. 8.2.2.103.1	+	
Type B_2 and B_5 boilers Requirements The combustion products circuit of a boiler incorporating a fan shall be sound with respect to the room where the boiler is installed. This soundness is ensured if, under the following test conditions, combustion products only escape from the flue outlet. Additionally the ducts of type B_5 boilers should also meet the requirements of 8.2.2.103.4. Test method The boiler is tested alone without its flue duct. The maximum pressure at which the boiler can operate is determined by progressively blocking the combustion products evacuation duct or air inlet, until the air proving device acts. The air proving device is then put out of operation, to allow the operation of the burner at the maximum cut-off pressure of the air proving device. The boiler is then connected to a short length of flue duct incorporating a restriction to reach the maximum operating pressure determined above. Possible leaks are looked for with a dew point plate, whose temperature is maintained at a value slightly above the dew point of the ambient air. The plate is brought close to all the places where a leak is suspected. In doubtful cases, however, leaks are looked for with a sampling probe connected to a rapid response CO_2analyser enabling concentrations of the order of 0,20 % to be detected. In this case, precautions shall be taken to ensure that sampling does not interfere with the normal evacuation of the combustion products. It is checked that the above requirement is met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.2.2.103.2	+	

Requirement	Specification of requirement	Test evaluation	Note
Type B_3 boilers Requirements Soundness is ensured if one of the following requirements is met a) The leakage rate of the combustion products circuit does not exceed: 1) 3,0 m^3/h for boilers with a nominal heat input until 40 kW or 2) 3 Q_n/40 m^3/h for boilers above 40 kW; b) The leakage rate of the combustion circuit (with all the ducts and joints) does not exceed: 1) 5,0 m^3/h for boilers with a nominal heat input until 40 kW or 2) 5 Q_n/40 m^3/h for boilers above 40 kW. Test conditions The flue outlet is connected to a pressure source. The orifices through which the combustion air is supplied, are blocked. The test pressure is to be 0,5 mbar. It is checked that the above requirements are met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.2.2.103.3	0	
Combustion products evacuation ducts of type B_5 boilers B5 boilers include all the components necessary to exhaust the combustion products to the outside of the building. Requirements If the installation instructions specify that parts of its combustion products evacuation circuit could pass through areas other than the area where the boiler is installed, the soundness of a combustion products evacuation circuit to those other areas should be ensured. This soundness is assured if: a) The combustion products evacuation circuit is completely surrounded by combustion air circuit or b) Under the following test conditions the leakage rate per square metre surface of the duct does not exceed 0,006 $dm^3/(s \cdot m^2)$. Test conditions The test checks all the joints specified in the installation instructions, including the connections between: c) the boiler and its ducts; d) interconnecting ducts; e) the ducts and any bends and f) the ducts and any fitting piece or terminal. To guard against the possibility of leakage along the length of its ducts, the tests are also carried out with the maximum length of duct as specified in the installation instructions. The boiler's wall connections, its joint with the terminal or its joint with the fitting piece with another system of its combustion products evacuation circuit must be made sound In accordance with the installation instruction. The flue duct and its joint to the boiler shall be connected to a pressure source on one side and blocked on the other side with a pressure corresponding to the maximum pressure measured in 8.2.2.103.2. It is checked that the above requirement is met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.2.2.103.4	0	

Note: + Requirement fulfilled x Not assessed
- Requirement not fulfilled 0 Not applicable

Measurement results:

Date of testing:	2014-05-15	t_{ok} = 21,8	°C	r.v. = 47,5	%	p_a = 986,5	mbar

Samples tested: ONGAS 609; ONGAS 604

Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.2.2.102.1					
Test object	Surrounding of the combustion products circuit by the combustion air circuit	Measured leakage rate (m^3/h)		Maximum leakage rate (m^3/h)	
		ONGAS 609	Ongas604	$Q_n \leq 40kW$	$Q_n \geq 40kW$
Boiler with its air supply and combustion products evacuation ducts and all their joints	completely	-	-	5	5 $Q_n/40$
	not completely	-	-	1	$Q_n/40$
Boiler and the joint to the air supply and combustion products evacuation duct	completely	-	-	3	3 $Q_n/40$
	not completely	0**	0**	0,6	0,6 $Q_n/40$
Combustion products evacuation ducts, not completely surrounded by combustion air, with all its joints excluding the joint tested above		-	-	0,4	0,4 $Q_n/40$
Air supply duct with all its joint excluding the joint tested above		-	-	2	2 $Q_n/40$

Test according to ČSN EN 15502-2-1+A1:2017, Art.	Measured leakage rate (m^3/hour, $dm^3/s.m^2$)	Max. leakage rate (m^3/hour, $dm^3/s.m^2$)
Requirements for combustion products evacuation duct for appliances with indirect air proving		
8.2.2.102.2	-	0,006 $dm^3/s.m^2$
Requirements for separate combustion products evacuation duct		
8.2.2.102.3	-	0,006 $dm^3/s.m^2$
Requirements for the air supply circuit		
8.2.2.102.4	-	0,5 $dm^3/s.m^2$
Requirements for leakage of combustion products for type C_7 boilers		
8.2.2.102.5	-	

Test according to ČSN EN 15502-2-1+A1:2017, Art.	Test result		Note
	ONGAS 609	ONGAS 604	
Type B_2 and B_5 boilers			
8.2.2.103.2	No leakage was found out. Combustion products escaped only from the flue outlet.	No leakage was found out. Combustion products escaped only from the flue outlet.	

Test according to ČSN EN 15502-2-1+A1:2017, Art.	Measured leakage rate (m^3/hour, $dm^3/s.m^2$)	Max. leakage rate (m^3/hour, $dm^3/s.m^2$)
Type B_3 boilers		
8.2.2.103.3 test a)	-	3 m^3/h ($Q_n \leq 40kW$)
	-	3 $Q_n/40$ m^3/h ($Q_n \geq 40kW$)
8.2.2.103.3 test b)	-	5 m^3/h ($Q_n \leq 40kW$)
	-	5 $Q_n/40$ m^3/h ($Q_n \geq 40kW$)
Combustion products evacuation ducts of type B_5 boilers		
8.2.2.103.4	-	0,006 $dm^3/s.m^2$

**) The measured value is below the detection level of the measuring method used.

Accredited test number: **T 001** Test title: **Soundness of the water circuit**

Testing method: ČSN EN 15502-1+A1:2017 , Art. 8.2.3, 8.2.3.1, 8.2.3.4.2, 8.2.3.4.2.1, 8.2.3.4.2.2

Sample tested: ONGAS 609; ONGAS 604

Measuring equipment used: see table in Chap. III

Place of testing:	at the Engineering Test Institute	☒	at the manufacturer	☐	at the customer	☐	*other:*

Test results:

Requirement	Specification of requirement	Test evaluation	Note
Soundness of the water circuit	ČSN EN 15502-1+A1:2017 , Art. 8.2.3		
General Requirements: The boilers and/or their sections shall withstand a hydraulic test according to their classification as stated in 4.3. Test conditions: The tests are carried out with the water at ambient temperature and at the test pressures stated in 8.2.3.2, 8.2.3.3 or 8.2.3.4. The test pressure is maintained for at least 10 min.	ČSN EN 15502-1 +A1:2017 , Art. 8.2.3.1	+	
Boilers of pressure class 1 Requirements: Under the test conditions below, there shall be neither leakage during the test nor permanent visible distortionat the end of the test. Test conditions: The test pressure is 1,5 bar for boilers < 70 kW, and 2 x PMS for boilers > 70 kW. It is checked that the above requirements are met.	ČSN EN 15502-1 +A1:2017 , Art. 8.2.3.2	0	
Boilers of pressure class 2 Requirements: Under the test conditions below, there shall be neither leakage during the test nor permanent visible distortion at the end of the test. Test conditions: The test pressure is 4,5 bar for boilers < 70 kW, and 2 x PMS for boilers > 70 kW. It is checked that the above requirements are met.	ČSN EN 15502-1 +A1:2017 , Art. 8.2.3.3	0	
Boilers of pressure class 3	ČSN EN 15502-1+A1:2017 , Art. 8.2.3.4		
Boilers of sheet steel or non-ferrous metals Requirements: Under the test conditions below, there shall be neither leakage during the test, nor permanent visible distortion, at the end of the test. Test conditions: The test pressure is (2 × PMS) bar. It is checked that the above requirements are met.	ČSN EN 15502-1 +A1:2017 , Art. 8.2.3.4.1	0	

Requirement	Specification of requirement	Test evaluation	Note
Boilers of cast iron and cast materials	ČSN EN 15502-1+A1:2017 , Art. 8.2.3.4.2		
Boiler body Requirements: At a test pressure of 2 × PMS, with a minimum of 8 bar, there shall be neither leakage nor permanent visible distortion at the end of the test. Test conditions: It is checked that the above requirements are met.	ČSN EN 15502-1 +A1:2017 , Art. 8.2.3.4.2.1	0	
Resistance to bursting Requirements: Under the test conditions below, the sections shall remain sound at a pressure of 4 × PMS + 2 bar. Test conditions: Three samples of each type of section are subjected to the pressure. It is checked that the above requirements are met.	ČSN EN 15502-1 +A1:2017 , Art. 8.2.3.4.2.2	0	
Tie bars Requirements: The tie bars shall withstand a pressure of 4 × PMS. Verification method It is checked by either calculation or testing that these requirements are met.	ČSN EN 15502-1 +A1:2017 , Art. 8.2.3.4.2.3	0	

Note: + Requirement fulfilled
- Requirement not fulfilled
x Not assessed
0 Not applicable

Measurement results:

Date of testing:	2014-05-16	t_{ok} = 22,1	°C	r.v. = 46,2	%	p_a = 990,5	mbar

Sample tested: ONGAS 609; ONGAS 604

Testing pressure	Set pressure (bar)	Test duration (min)	Note
Max. working pressure x 2.0	12.0	10	ONGAS 609
Max. working pressure x 2.0	12.0	10	ONGAS 604

Test evaluation: There is no leakage and no permanent visible distortion.

Testing Laboratory
Workplace Brno, Hudcova 424/56b, 621 00 Brno

Accredited test number: **T 001** Test title: **Hydraulic resistance**

Testing method: ČSN EN 15502-1+A1:2017 , Art. 8.3

Sample tested: ONGAS 604, ONGAS 609

Measuring equipment used: see table in Chap. III

Place of testing:	at the Engineering Test Institute	☒	at the manufacturer	☐	at the customer	☐	*other:*

Test results:

Requirement	Specification of requirement	Test evaluation	Note
Hydraulic resistance Requirements: Under the test conditions below, the values of the hydraulic resistance or available pressure shall comply with the values given by the manufacturer in the technical instructions for the installer. Test conditions: The hydraulic resistance of a boiler (measured in mbar) has to be determined for the water rate corresponding to operation of the boiler at the nominal heat input with a water flow temperature of 80 °C and a temperature difference between the flow and the return water of 20 K generally, or that stated by the manufacturer. The test is carried out with the water at ambient temperature. The test rig is specified in Figure 5. Before or after the test itself, the two test pipes are connected directly to each other in order to determine their own resistance for different flow rates. Under the same test conditions, the curve of available pressures supplied by the manufacturer for boilers with integral pumps is checked.	ČSN EN 15502-1 +A1:2017 , Art. 8.3	+	

Note: + Requirement fulfilled
- Requirement not fulfilled
x Not assessed
0 Not applicable

Measurement results: **1. ONGAS 609**

Date of testing: 2014-05-19	t_{ok} = 20,0 °C	r.v. = 48,5 %	p_a = 975,5 mbar

Water flow (m^3/h)	Temperature difference (°C)	Resistance/pressure (mbar)	Note
24,2	20	67,5	resistance

Measurement results: **2. ONGAS 604**

Date of testing: 2014-05-20	t_{ok} = 20,1 °C	r.v. = 48,9 %	p_a = 979,0 mbar

Water flow (m^3/h)	Temperature difference (°C)	Resistance/pressure (mbar)	Note
8,4	20	38,8	resistance

Test evaluation: The available pressure comply with the values given by the manufacturer.

Accredited test number: **T 001** Test title: **Heat input, heat output and useful efficiency**

Testing method: ČSN EN 15502-1+A1:2017, Art. 8.4, 8.4.1, 8.4.4, 8.4.5, 9, 9.1, 9.1.1, 9.2.1, 9.2.2, 9.3, 9.3.1, 9.3.2, 9.3.2.1, 9.3.2.2

Sample tested: ONGAS 604, ONGAS 609

Measuring equipment used: see table in Chap. III

Place of testing:	at the Engineering Test Institute	☒	at the manufacturer	☐	at the customer	☐	*other:*

Test results:

Requirement	Specification of requirement	Test evaluation	Note
Heat inputs and heat output	ČSN EN 15502-1+A1:2017 , Art. 8.4		
Determination of the nominal heat input or the maximum and minimum heat input Requirements: The corrected heat input obtained under the test conditions below shall not differ by more than 5 % from: a) the nominal heat input, for boilers without a range rating device, or, b) the maximum and minimum heat input for boilers with a range rating device. If this 5 % is less than 500 W, a tolerance of 500 W is acceptable.	ČSN EN 15502-1 +A1:2017 , Art. 8.4.1	+	
Adjustment of the heat input by the downstream gas pressure Requirements: When the manufacturer's instructions specify the value of the downstream pressure that enables the nominal heat input to be obtained, the heat input obtained under the test conditions below shall not differ by more than 5 % from the nominal heat input. If this 5 % is less than 500 W, a tolerance of 500 W is acceptable.	ČSN EN 15502-1 +A1:2017 , Art. 8.4.2	0	
Ignition rate Requirements: For boilers, which may be ignited at a heat input less than the nominal heat input under the test conditions below, the ignition rate of the boiler shall not exceed the ignition rate declared by the manufacturer.	ČSN EN 15502-1 +A1:2017 , Art. 8.4.3	0	
Nominal output Requirements: The product of the efficiency determined under test condition 9.2 and the nominal heat input shall be no less than the nominal output.	ČSN EN 15502-1 +A1:2017 , Art. 8.4.4	+	
Verification of the nominal condensing output Requirements If the manufacturer states the nominal condensing output it is verified under the following test conditions.	ČSN EN 15502-1 +A1:2017 , Art. 8.4.5	+	
Nominal domestic hot water heat input Requirement Under the test conditions below, the nominal domestic hot water heat input shall be obtained or may be adjusted to	ČSN EN 15502-1 +A1:2017 , Art. 8.4.6	0	

Requirement	Specification of requirement	Test evaluation	Note
within ± 5 %.			
Water pressure to obtain the nominal heat input for instantaneous combination boilers Requirements Under the test conditions below, the heat input obtained shall be at least 95 % of the heat input obtained in 8.4.6.	ČSN EN 15502-1 +A1:2017 , Art. 8.4.7	0	
Obtaining the domestic hot water temperature for instantaneous combination boilers Requirements Under the conditions below, it shall be possible to achieve or adjust to, a water rate that corresponds to a temperature of between 50 °C and 80 °C for boilers with a thermostatic control or a temperature rise at the boiler outlet of between 45 K and 65 K for boilers with proportioning control.	ČSN EN 15502-1 +A1:2017 , Art. 8.4.8	0	
Heating-up time of the domestic hot water Requirement Under the test conditions below, the heating-up time shall not exceed 2 min.	ČSN EN 15502-1 +A1:2017 , Art. 8.4.9	0	
Useful efficiencies	ČSN EN 15502-1+A1:2017 , Art. 9		
General	ČSN EN 15502-1+A1:2017 , Art. 9.1		
Use of correction formula If the actual test conditions differ from the reference conditions (20 °C, 70 % relative humidity, 1 013,25 mbar) and/or the return water temperature differs from the specified value, the correction formulae given in Annex T are used to correct the determined useful efficiency for tests executed following the requirements of 9.1 and 9.2.	ČSN EN 15502-1 +A1:2017 , Art. 9.1.1	+	
Useful efficiency at the nominal heat input	ČSN EN 15502-1+A1:2017 , Art. 9.2		
Requirements The requirement below for useful efficiency is valid for: - boilers with a nominal heat output > 400 kW, - boilers with a nominal heat output ≤ 400 kW until 26 September 2015. NOTE 1 For boilers with a nominal heat output ≤ 400 kW, from 26 September 2015, see 9.5. The useful efficiency, measured according to 9.2.2, at nominal heat input, or the maximum heat input for range rated boilers, expressed in percent, shall be at least: $84 + 2 \log_{10} P_n$; $87{,}5 + 1{,}5 \log_{10} P_n$ for low temperature boilers; $91 + \log_{10} P_n$ for condensing boilers. where P_n is the nominal output (maximum output for range rated boilers), expressed in kilowatts (kW). NOTE 2 The value of efficiency is calculated using 400 kW as the maximum nominal output. In addition, for range rated boilers, the efficiency at a rate, corresponding to the arithmetic mean of the maximum and minimum heat input, expressed in percent, shall be at least: $84 + 2 \log_{10} P_a$; $87{,}5 + 1{,}5 \log_{10} Pa$ for low temperature boilers; $91 + \log_{10} Pa$ for condensing boilers.	ČSN EN 15502-1 +A1:2017 , Art. 9.2.1	+	

Requirement	Specification of requirement	Test evaluation	Note
where P_a is the arithmetic mean of the maximum and minimum useful heat output as stated in the technical specifications, expressed in kilowatts (kW). NOTE 3 The limit value of efficiency is calculated using 400 kW as the maximum nominal output. If the minimum useful heat output is also > 400 kW, then the efficiency will be calculated using 400 kW as P_a.	ČSN EN 15502-1 +A1:2017 , Art. 9.2.1	+	
Useful efficiency at part load	ČSN EN 15502-1+A1:2017 , Art. 9.3		
Requirements The requirement below for useful efficiency is valid for: - boilers with a nominal heat output > 400 kW, - boilers with a nominal heat output ≤ 400 kW until 26 September 2015. NOTE 1 For boilers with a nominal heat output ≤ 400 kW, from 26 September 2015, see 9.5. The useful efficiency, measured according to 9.3.2, for a load corresponding to 30 % of the nominal heat input or for range rated boilers to 30 % of the arithmetic mean of the maximum and minimum heat input, expressed in percent, shall be at least: 80 + 3 log10 Pi; 87,5 + 1,5 log10 Pi for low temperature boilers 97 + log10 Pi for condensing boilers where P_i is the nominal output P_n, or the arithmetic mean P_a of the maximum and minimum useful output as stated in the technical instructions for range rated boilers. NOTE 2 Where P_i is > 400 kW, the value of efficiency is calculated using 400 kW as the maximum nominal output. If the minimum useful heat output is also > 400 kW, then the efficiency will be calculated using 400 kW as P_i.	ČSN EN 15502-1 +A1:2017 , Art. 9.3.1	+	
Compliance with the eco-design regulation for efficiency	ČSN EN 15502-1+A1:2017, Art. 9.5		
Requirements for seasonal space heating energy efficiency	ČSN EN 15502-1+A1:2017, Art. 9.5.1		
Type B1 boilers with rated heat output ≤ 10kW and Type B1 Combination boilers with rated heat output ≤ 30kW As from 26 September 2015 the seasonal space heating efficiency calculated according to 9.5.2 shall be at least 75 %.	ČSN EN 15502-1 +A1:2017, Art. 9.5.1.1	0	
Boilers and combination boilers with rated heat output ≤ 70 kW, with the exception of type B1 boilers with rated heat output ≤ 10 kW and type B1 combination boilers with rated heat output ≤ 30 kW As from 26 September 2015 the seasonal space heating efficiency calculated according to 9.5.2 shall be at least 86 %.	ČSN EN 15502-1 +A1:2017, Art. 9.5.1.2	0	
Useful efficiency for nominal heat output > 70kW and ≤ 400kW Requirement: The full load useful efficiency η_4 shall be at least 86 % and the useful efficiency at 30 % of the rated heat output η_1 shall be at least 94%.	ČSN EN 15502-1 +A1:2017, Art. 9.5.3	0	

+ Requirement fulfilled
- Requirement not fulfilled
x Not assessed
0 Not applicable

Measurement results: **1. ONGAS 609**

Test according to ČSN EN 15502-1+A1:2017, Art. 8.4.1				
Date:		2013-09-24		
Type of fuel:		G 20		
Fuel flow:		Maximum	Minimum	Ignition
Heat input *)	(kW)	542	74	-
Fuel pressure before the boiler	(mbar)	20,0	20,0	-
Fuel pressure at the nozzle **)	(mbar)	-	-	-
Fuel pressure at the nozzle	(mbar)	-	-	-
Fuel pressure at the measuring gauge	(mbar)	280	280	-
Ambient temperature	(°C)	20,37	19,69	-
Relative air humidity	(%)	36,4	35,7	-
Barometric pressure	(mbar)	972,0	972,0	-
Fuel temperature	(°C)	19,2	19,3	-
Fuel consumption, measured	($m^3.h^{-1}$)	46,588	6,415	-
Fuel consumption, converted	($m^3.h^{-1}$)	58,967	8,118	-
Heat input (corrected)	**(kW)**	**563,46**	**77,57**	**-**
Deviation	**(%)**	**4,0**	**4,8**	**-**
Permitted deviation	**(%)**	**± 5**		**≤ spec. value**

Note: *) ... heat input specified by the manufacturer
**) ... fuel pressure at the nozzle specified by the manufacturer

Measurement results: **1. ONGAS 609**

Test according to ČSN EN 15502-1+A1:2017, Art. 8.4.4, 8.4.5							
Date:		2014-03-05	2014-03-06	2014-03-05	2014-03-06	2014-03-06	2014-03-06
Type of fuel:		**G 20**					
Heat capacity:		**Rated**	**Arithm. mean**	**Reduced**	**Rated**	**Reduced**	**Partial**
Temperature gradient	**(°C)**	**80/60**	**80/60**	**80/60**	**50/30**	**50/30**	**40/30**
ENTERED VALUES AND AVERAGE VALUES MEASURED:							
Heat input *)	(kW)	542,167	-	74,629	542,180	74,797	-
Heat capacity *)	(kW)	522,92	-	72,23	542,22	79,59	-
Barometric pressure	(mbar)	972,0	933,3	972,0	993,3	993,3	993,3
Ambient temperature	(°C)	20,37	18,26	19,69	17,51	17,16	17,66
Relative air humidity	(%)	36,4	36,1	35,7	35,1	36,5	35,8
Fuel pressure at the gas gauge	(mbar)	280	280	280	280	280	280
Fuel pressure before the appliance	(mbar)	20	20	20	20	20	20
Fuel pressure at the nozzle	(mbar)	-	-	-	-	-	-
Fuel temperature	(°C)	19,2	17,0	19,3	17,0	16,9	16,9
Fuel calorific value according to ČSN EN 437+A1:2009 at 15°C and 1013.25 mbar	($MJ.m^{-3}$)	34,4	34,4	34,4	34,4	34,4	34,4
Fuel consumption, measured	($m^3.h^{-1}$)	46,588	29,080	6,415	45,465	6,270	8,700
Fuel consumption, converted	($m^3.h^{-1}$)	56,738	36,291	7,810	56,740	7,828	10,861
Circulating water flow	($m^3.h^{-1}$)	24,163	15,988	3,128	24,497	3,156	9,144
Average outlet water temperature	(°C)	79,14	78,26	80,31	48,99	51,75	40,94
Average inlet water temperature	(°C)	60,21	59,91	60,12	29,83	29,91	30,49
Average cooling water temperature	(°C)	-	-	-	-	-	-
CALCULATED VALUES:							
Heat input	(kW)	542,167	346,785	74,629	542,180	74,797	103,785
Heat capacity	(kW)	522,92	335,55	72,23	542,22	79,59	110,25
Capacity / rated capacity x 100	(%)						
Calorific efficiency	**(%)**	**96,45**	**96,76**	**96,79**	**100,43**	**106,84**	**106,72**
Required boiler calorific efficiency, according to ČSN EN 15502-1+A1:2017 (must be ≥ than)	(%)	**93,6**	**93,78**	**-**	**-**	**-**	**93,78**
Required boiler calorific efficiency, according to Government Regulation 25/2003 Coll., (must be ≥ than)	(%)	-	-	-	-	-	-
Calculated boiler heat capacity	**(kW)**	**522,92**	**-**	**72,23**	**544,51**	**79,91**	**-**
Permitted boiler heat capacity	**(kW)**	**522,92**	**-**	**72,23**	**542,22**	**79,59**	**-**

Note: *) ... Values declared by the manufacturer

Measurement results: **2. ONGAS 604**

Test according to ČSN EN 15502-1+A1:2017, Art. 8.4.1				
Date:		2013-09-26	2013-09-25	
Type of fuel:		G 20		
Fuel flow:		Maximum	Minimum	Ignition
Heat input *)	(kW)	200	30	-
Fuel pressure before the boiler	(mbar)	20,0	20,0	-
Fuel pressure at the nozzle **)	(mbar)	-	-	-
Fuel pressure at the nozzle	(mbar)	-	-	-
Fuel pressure at the measuring gauge	(mbar)	280	280	-
Ambient temperature	(°C)	18,45	17,69	-
Relative air humidity	(%)	35,2	34,5	-
Barometric pressure	(mbar)	997,3	972,0	-
Fuel temperature	(°C)	18,4	17,3	-
Fuel consumption, measured	($m^3.h^{-1}$)	16,260	2,495	-
Fuel consumption, converted	($m^3.h^{-1}$)	20,816	3,168	-
Heat input (corrected)	**(kW)**	**198,91**	**30,27**	**-**
Deviation	**(%)**	**-0,5**	**0,9**	**-**
Permitted deviation	**(%)**	**± 5**		**≤ spec. value**

Note: *) ... heat input specified by the manufacturer
**) ... fuel pressure at the nozzle specified by the manufacturer

Measurement results: **2. ONGAS 604**

Test according to ČSN EN 15502-1+A1:2017, Art. 8.4.4, 8.4.5							
Date:		2014-03-07	2014-03-12	204-03-10	2014-03-07	2014-03-07	2014-03-12
Type of fuel:		**G 20**					
Heat capacity:		**Rated**	**Arithm. mean**	**Reduced**	**Rated**	**Reduced**	**Partial**
Temperature gradient	**(°C)**	**80/60**	**80/60**	**80/60**	**50/30**	**50/30**	**40/30**
ENTERED VALUES AND AVERAGE VALUES MEASURED:							
Heat input *)	(kW)	193,579	-	29,225	201,265	30,236	-
Heat capacity *)	(kW)	184,31	-	27,78	200,80	31,75	-
Barometric pressure	(mbar)	997,3	1002,7	972,0	997,3	997,3	1002,7
Ambient temperature	(°C)	18,45	20,0	17,69	16,78	17,96	17,55
Relative air humidity	(%)	35,2	36,1	34,5	34,4	31,7	31,4
Fuel pressure at the gas gauge	(mbar)	280	280	280	280	280	280
Fuel pressure before the appliance	(mbar)	20	20	20	20	20	20
Fuel pressure at the nozzle	(mbar)	-	-	-	-	-	-
Fuel temperature	(°C)	18,4	19,5	17,3	16,2	17,4	17,4
Fuel calorific value according to ČSN EN 437+A1:2009 at 15°C and 1013.25 mbar	($MJ.m^{-3}$)	34,65	34,65	34,65	34,65	34,65	34,65
Fuel consumption, measured	($m^3.h^{-1}$)	16,260	9,469	2,495	16,778	2,531	3,372
Fuel consumption, converted	($m^3.h^{-1}$)	20,258	11,803	3,058	21,063	3,164	4,233
Circulating water flow	($m^3.h^{-1}$)	8,394	4,776	1,186	8,563	1,392	3,534
Average outlet water temperature	(°C)	80,51	79,95	79,56	51,07	50,17	40,52
Average inlet water temperature	(°C)	61,30	60,00	59,08	30,76	30,41	30,09
Average cooling water temperature	(°C)	-	-	-	-	-	-
CALCULATED VALUES:							
Heat input	(kW)	193,579	112,782	29,225	201,265	30,236	40,453
Heat capacity	(kW)	184,31	108,99	27,78	200,80	31,75	42,56
Capacity / rated capacity x 100	(%)						
Calorific efficiency	**(%)**	**95,21**	**96,64**	**95,07**	**100,32**	**105,52**	**105,70**
Required boiler calorific efficiency, according to ČSN EN 15502-1+A1:2017 (must be ≥ than)	(%)	-	**93,04**	-	-	-	**99,04**
Required boiler calorific efficiency, according to Government Regulation 25/2003 Coll., (must be ≥ than)	(%)	-	**86,0**	-	-	-	**94,0**
Calculated boiler heat capacity	**(kW)**	**184,31**	-	**27,78**	**201,91**	**31,91**	-
Permitted boiler heat capacity	**(kW)**	**184,31**	-	**27,78**	**200,80**	**31,75**	-

Note: *) ... Values declared by the manufacturer

Accredited test number: **T 001** Test title: **Limiting temperatures**

Testing method: ČSN EN 15502-1+A1:2017, Art. 8.5, 8.5.1, 8.5.2, 8.5.3, 8.5.4
ČSN EN 15502-2-1+A1:2017, Art. 8.5.101

Sample tested: ONGAS 604, ONGAS 609

Measuring equipment used: see table in Chap. III

Test results:

Requirement	Specification of requirement	Test evaluation	Note
Limiting temperatures	ČSN EN 15502-1 +A1:2017, Art. 8.5.		
General The boiler is installed as stated in 8.1.2, supplied with one of the reference gases, or an actually distributed gas distribute, at the nominal heat input and an adjustable thermostat or adjustable control temperature set point is set to the position or value giving the highest temperature. The limiting temperatures are measured when thermal equilibrium is reached.	ČSN EN 15502-1 +A1:2017, Art. 8.5.1	+	
Limiting temperatures of the adjusting, control and safety devices Requirements: Under the test conditions below, the temperature of the adjusting, control and safety devices shall not exceed the value stated by the manufacturer and their operation shall remain satisfactory. The surface temperatures of the control knobs and of all the parts that have to be touched during normal use of the boiler, measured only in the zones intended to be gripped, and under the conditions stated below, shall not exceed the ambient temperature by more than: 35 K for metals; 45 K for porcelain; 60 K for plastics. Nevertheless, parts of the case within 5 cm of the edge of the lighting hole or sight glass, if any, and within 15 cm of the flue duct are exempt from this requirement.	ČSN EN 15502-1 +A1:2017, Art. 8.5.2	+	
Limiting temperatures of the side walls, the front and the top Requirements: The temperature of the side walls, front and top of the boiler shall not exceed the ambient temperature by more than 80 K, when measured under the test conditions below. Nevertheless, parts of the case within 5 cm of the edge of the lighting hole or sight glass, and within 15 cm of the flue duct are exempt from this requirement.	ČSN EN 15502-1 +A1:2017, Art. 8.5.3	+	
Limiting temperatures of the test panels and the floor Requirements: The temperature of the floor on which the boiler is placed, where appropriate, and that of the panels placed at the side of and behind the boiler shall not, at any point, exceed the ambient temperature by more than 80 K under the test conditions below. When this temperature rise is between 60 K and 80 K, the	ČSN EN 15502-1 +A1:2017, Art. 8.5.4	+	

Requirement	Specification of requirement	Test evaluation	Note
manufacturer shall state in the technical instructions for the installer the nature of the protection, which has to be applied between the boiler and the floor or walls when these latter are made of inflammable materials. This protection shall be supplied to the test laboratory which shall check that, with the boiler fitted with it, the floor and panel temperatures measured under the test conditions below do not exceed the ambient temperature by more than 60 K.	ČSN EN 15502-1 +A1:2017, Art. 8.5.4	+	
External temperature of the ducts where the ducts are in contact with and or passing through a wall Requirements The temperature of the ducts in contact with or passing through the walls of a dwelling shall not exceed the ambient temperature by more than 60 K under the test conditions below. However, when this temperature rise exceeds 60 K, the installation instructions shall state the nature of the protection which has to be applied between the ducts and the walls in case they are constructed from inflammable materials. This protection shall be supplied to the test laboratory which shall check that, with the boiler fitted with it, the external surface temperature in contact with the wall measured under the following test conditions does not exceed the ambient temperature by more than 60 K.	ČSN EN 15502-2-1 +A1:2017, Art. 8.5.101	+	

Note: + Requirement fulfilled x Not assessed
- Requirement not fulfilled 0 Not applicable

Measurement results: **1. ONGAS 609**

Date of testing: 2014-03-17	t_{ok} = 19,5 °C	r.v. = 41,8 %	p_a = 978,2 mbar

Test according to ČSN EN 15502-1+A1:2017 , Art. 8.5.2			
Point measured	**Contact material**	**Temperature rise (K)**	
		Value measured	**Max. permitted value**
Control board	plastic	max. 3,2	60

Test according to ČSN EN 15502-1+A1:2017 , Art. 8.5.3		
Measured point (grid method)	**Temperature rise (K)**	
	Value measured	**Max. permitted value**
Appliance front wall	max. 14,0	80
Appliance left wall		80
Appliance right wall		80
Appliance bottom wall		80
Appliance top wall		80
Appliance rear wall		80

Test according to ČSN EN 15502-1+A1:2017 , Art. 8.5.4		
Measured point (grid method)	**Temperature rise (K)**	
	Value measured	**Max. permitted value**
Right wall of the corner	max. 4,1	60
Left wall of the corner		60
Rear wall of the corner		60
Floor of the corner		-

Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.5.101		
Measured point (grid method)	**Temperature rise (K)**	
	Value measured	**Max. permitted value**
Ducts	32,5	60

Measurement results: **2. ONGAS 604**

Date of testing: 2014-03-18	t_{ok} = 19,1 ^{0}C	r.v. = 44,5 %	p_a = 964,8 mbar

Test according to ČSN EN 15502-1+A1:2017 , Art. 8.5.2			
Point measured	**Contact material**	**Temperature rise (K)**	
		Value measured	**Max. permitted value**
Control board	plastic	max. 2,9	60

Test according to ČSN EN 15502-1+A1:2017 , Art. 8.5.3		
Measured point (grid method)	**Temperature rise (K)**	
	Value measured	**Max. permitted value**
Appliance front wall	max. 12,5	80
Appliance left wall		80
Appliance right wall		80
Appliance bottom wall		80
Appliance top wall		80
Appliance rear wall		80

Test according to ČSN EN 15502-1+A1:2017 , Art. 8.5.4		
Measured point (grid method)	**Temperature rise (K)**	
	Value measured	**Max. permitted value**
Right wall of the corner	max. 3,5 (right wall)	60
Left wall of the corner		60
Rear wall of the corner		60
Floor of the corner		-

Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.5.101		
Measured point (grid method)	**Temperature rise (K)**	
	Value measured	**Max. permitted value**
Ducts	29,3	60

Accredited test number: **T 001** Test title: **Ignition – Cross lighting – Flame stability**

Testing method: ČSN EN 15502-1+A1:2017, Art. 8.1.1.1, 8.6, 8.6.1, 8.6.2, annex U
ČSN EN 15502-2-1+A1:2017, Art. art. 8.6.3.101, 8.6.3.104, 8.6.3.105, 8.6.3.106, 8.6.3.108, 8.6.3.111

Sample tested: ONGAS 604, ONGAS 609

Measuring equipment used: see table in Chap. III

Place of testing:	at the Engineering Test Institute	☒	at the manufacturer	☐	at the customer	☐	*other:*

Test results:

Requirement	**Specification of requirement**	**Test evaluation**	**Note**
Ignition, cross lighting, flame stability	ČSN EN 15502-1 +A1:2017, Art. 8.6		
General The tests are carried out twice, with the boiler at ambient temperature and at thermal equilibrium.	ČSN EN 15502-1 +A1:2017, Art. 8.6.1	+	

Limit conditions Requirements: Under the test conditions specified below and in still air, ignition and cross lighting shall be capable of being effected correctly, rapidly and quietly. The flames shall be stable. A slight tendency to lift at the moment of ignition is permissible, but the flames shall be stable thereafter. Ignition of the burner shall occur at all gas rates, which can be given by the controls as stated by the manufacturer and there shall be neither light-back nor prolonged flame lift. However, brief light-back during ignition or extinction of the burner is accepted if this does not affect correct operation. A permanent ignition burner shall not be extinguished during ignition or extinction of the burner; while the boiler is operating, the ignition burner flame shall not change to such an extent that it can no longer fulfil its function (ignition of the burner, operation of the flame supervision device). When the ignition burner has been alight for a sufficient time for normal and regular operation of the boiler to be obtained, it shall always be ready to operate without fail, even if the gas supply to the burner is turned off and on by several quick and successive adjustments of the thermostat or electronic temperature control system. For boilers fitted with a range rating-device, these requirements are checked both at the maximum heat input and minimum heat input stated by the manufacturer. In addition, to test flame stability for boilers, which have an indirect means of indicating the presence of the flame, the carbon monoxide concentration, at thermal equilibrium, of the dry, air-free combustion products using flame lift limit gas shall not be more than 1000 ppm. NOTE 1 ppm = 1 cm^3/m^3 The above requirements shall also be fulfilled where spark restoration or recycling is provided.	ČSN EN 15502-1 +A1:2017, Art. 8.6.2	+ + 0 0 + 0 +	
Special flue conditions	ČSN EN 15502-2-1+A1:2017, Art. 8.6.3.		
General Requirements Under the following test conditions for ignition of the ignition burner; ignition of the main burner by the ignition burner; or direct ignition of the main burner, complete cross lighting of the main burner and also stability of the ignition burner when it alone is alight, or of the ignition burner and main burner operating simultaneously, shall be assured. Slight flame disturbance is permitted but there shall be no flame extinction.	ČSN EN 15502-2-1 +A1:2017, Art. 8.6.3.101	+	
Reduction of the gas rate of the ignition burner Requirements: Under the test conditions below and when the gas rate of the ignition burner is reduced to the minimum required to keep open the gas valve of the flame supervision device, ignition of the main burner shall be assured without damage to the boiler. Ignition of the main burner shall be assured without flame roll-out outside the case.	ČSN EN 15502-1 +A1:2017, Art. 8.6.4	0	
Resistance to draught for type B boilers Requirements The flames shall be stable under the following test	ČSN EN 15502-2-1 +A1:2017, Art. 8.6.101	+	

conditions.			

Note: + Requirement fulfilled
- Requirement not fulfilled
x Not assessed
0 Not applicable

Measurement results: **1. ONGAS 609**

Date of testing: 2014-03-05	t_{ok} = 20,8 °C	r.v. = 37,1 %	p_a = 972,0 mbar

Operating conditions	Heat input	Fuel supply pressure (mbar)	Test gas	Results	Note
Limit conditions					
Limit according to Test No. 1 of ČSN EN 15502-1+A1, Art. 8.6.2	Q_n	14	G 20	+	
	Q_m			+	
Limit according to Test No. 2 of ČSN EN 15502-1+A1, Art. 8.6.2	Q_n	17	G 222	+	gas flow rate: - 9% (G20)
	Q_m			+	gas flow rate: - 9% (G20)
Limit according to Test No. 3 of ČSN EN 15502-1+A1, Art. 8.6.2	Q_n	17	G 23	0	
	Q_m			0	
Limit according to Test No. 4 of ČSN EN 15502-1+A1, Art. 8.6.2	Q_n	25	G 23	+	gas flow rate: + 9% (G20)
Limit according to Test No. 5 of ČSN EN 15502-1+A1, Art. 8.6.2	Q_n	20	G 23	+	gas flow rate: + 9% (G20)
Special conditions					
C_1, C_3 and C_9 design boilers					
Special con. according to 1st series of tests (ČSN EN 15502-2-1+A1, Art. 8.6.3.102)	Q_n	20	G 20	0	
	Q_m			0	
Special con. according to 2nd series of tests (ČSN EN 15502-2-1+A1, Art. 8.6.3.102)	Q_n			0	
	Q_m			0	
Special con. according to 3ed series of tests (ČSN EN 15502-2-1+A1, Art. 8.6.3.102)	Q_n			0	
	Q_m			0	
C_2 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.103, test a)	Q_n	20	G 20	0	
	Q_m			0	

Operating conditions	Heat input	Fuel supply pressure (mbar)	Test gas	Results	Note
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.103, test b)	Q_n	20	G 20	0	
	Q_m			0	
C_4 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.104	Q_n	20	G 20	0	
	Q_m			0	
C_5 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.105	Q_n	20	G 20	0	
	Q_m			0	
C_6 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.106	Q_n	20	G 20	0	
	Q_m			0	
C_7 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.107	Q_n	20	G 20	0	
	Q_m			0	
C_8 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.108	Q_n	20	G 20	0	
	Q_m			0	
B_2, B_3 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.109, test 1)	Q_n	20	G 20	+	
	Q_m			+	
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.109, test 2)	Q_n	20	G 20	+	
	Q_m			+	
B_5 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.110	Q_n	20	G 20	0	
	Q_m			0	
Reduction of the gas rate					
Test according to ČSN EN 15502-1+A1, Art. 8.6.4	Q_n	18,5	G 20	0	
	Q_m			0	
Resistance to draught, B design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.101	Q_n	20	G 20	0	
	Q_m			0	

Measurement results: **2. ONGAS 604**

Date of testing: 2014-03-07	t_{ok} = 18,7 °C	r.v. = 35,6 %	p_a = 997,3 mbar

Operating conditions	Heat input	Fuel supply pressure (mbar)	Test gas	Results	Note
Limit conditions					
Limit according to Test No. 1 of ČSN EN 15502-1+A1, Art. 8.6.2	Q_n	14	G 20	+	
	Q_m			+	
Limit according to Test No. 2 of ČSN EN 15502-1+A1, Art. 8.6.2	Q_n	17	G 222	+	gas flow rate: - 9% (G20)
	Q_m			+	gas flow rate: - 9% (G20)
Limit according to Test No. 3 of ČSN EN 15502-1+A1, Art. 8.6.2	Q_n	17	G 23	0	
	Q_m			0	
Limit according to Test No. 4 of ČSN EN 15502-1+A1, Art. 8.6.2	Q_n	25	G 23	+	gas flow rate: + 9% (G20)
Limit according to Test No. 5 of ČSN EN 15502-1+A1, Art. 8.6.2	Q_n	20	G 23	+	gas flow rate: + 9% (G20)
Special conditions					
C_1, C_3 and C_9 design boilers					
Special con. according to 1st series of tests (ČSN EN 15502-2-1+A1, Art. 8.6.3.102)	Q_n	20	G 20	0	
	Q_m			0	
Special con. according to 2nd series of tests (ČSN EN 15502-2-1+A1, Art. 8.6.3.102)	Q_n			0	
	Q_m			0	
Special con. according to 3ed series of tests (ČSN EN 15502-2-1+A1, Art. 8.6.3.102)	Q_n			0	
	Q_m			0	
C_2 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.103, test a)	Q_n	20	G 20	0	
	Q_m			0	
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.103, test b)	Q_n	20	G 20	0	
	Q_m			0	
C_4 design boilers					

Operating conditions	Heat input	Fuel supply pressure (mbar)	Test gas	Results	Note
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.104	Q_n	20	G 20	0	
	Q_m			0	
C_5 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.105	Q_n	20	G 20	0	
	Q_m			0	
C_6 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.106	Q_n	20	G 20	0	
	Q_m			0	
C_7 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.107	Q_n	20	G 20	0	
	Q_m			0	
C_8 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.108	Q_n	20	G 20	0	
	Q_m			0	
B_2, B_3 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.109, test 1)	Q_n	20	G 20	+	
	Q_m			+	
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.109, test 2)	Q_n	20	G 20	+	
	Q_m			+	
B_5 design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.3.110	Q_n	20	G 20	0	
	Q_m			0	
Reduction of the gas rate					
Test according to ČSN EN 15502-1+A1, Art. 8.6.4	Q_n	18,5	G 20	0	
	Q_m			0	
Resistance to draught, B design boilers					
Test according to ČSN EN 15502-2-1+A1, Art. 8.6.101	Q_n	20	G 20	0	
	Q_m			0	

Accredited test number: **T 001** Test title: **Adjusting, control and safety devices**

Testing method:	ČSN EN 15502-1+A1:2017, Art. 7.3.3, 7.3.3.1, 7.3.3.2, 7.3.3.3, 7.3.3.3.2, 8.7, 8.9, 8.11, 8.11.1, 8.11.4, 8.11.4.1, 8.11.4.2, 8.11.5, 8.11.5.2, 8.11.5.2.1, 8.11.5.2.2, 8.11.6, 8.11.6.2, 8.11.6.2.1, 8.11.6.2.2, 8.11.6.2.4, 8.11.6.2.5, 8.11.7, 8.11.8, 8.11.8.1, 8.11.8.2, 8.11.8.2.1, 8.11.8.2.3 ČSN EN 15502-2-1+A1:2017, Art. 8.9.101, 8.9.103, 8.11.101, 8.11.101.1, 8.11.101.3, 8.11.101.3.2, 8.11.101.3.3, 8.11.101.4
Sample tested:	ONGAS 604, ONGAS 609
Measuring equipment used:	see table in Chap. III

Place of testing:	at the Engineering Test Institute	☒	at the manufacturer	☐	at the customer	☐	*other:*

Test results:

Requirement	Specification of requirement	Test evaluation	Note
Performance	ČSN EN 15502-1+A1:2017, Art. 7.3.3		
General Requirements: Under the test conditions as mentioned below, the opening and closing temperatures of the thermostats shall not differ from those stated by the manufacturer by more than 6 K. For adjustable thermostats, this requirement applies at the minimum and maximum temperatures of the control range.	ČSN EN 15502-1 +A1:2017, Art. 7.3.3.1	+	
Control thermostat – Endurance Requirements: Thermostats shall withstand an endurance test of 250 000 cycles under the test conditions as specified. At the end of the tests, their operation shall comply with the following requirements: — the switch point of a fixed setting thermostat shall be within ± 10 K of the temperature stated by the manufacturer; — for an adjustable thermostat, it shall be possible to select the switch point, to within ± 10 K of a temperature in the range as stated by the manufacturer.	ČSN EN 15502-1 +A1:2017, Art. 7.3.3.2	0 +	
Water temperature limiting devices – Endurance	ČSN EN 15502-1+A1:2017, Art. 7.3.3.3		
Temperature limiters Requirements: Temperature limiters shall withstand an endurance test of 10 000 cycles under the test conditions as specified. At the end of the tests, their operation shall comply with the requirements of 7.3.3.1.	ČSN EN 15502-1 +A1:2017, Art. 7.3.3.3.1	0 0	
Overheat cut-out devices Requirements: The devices shall withstand an endurance test of 4 500 thermal cycles without activation and 500 cycles of locking and resetting, under the test conditions as specified.	ČSN EN 15502-1 +A1:2017,	+	

Requirement	Specification of requirement	Test evaluation	Note
At the end of the tests, their operation shall comply with the requirements of 7.3.3.1. Under the test conditions, an interruption of the link between the sensor and the device responding to its signal shall result in at least safety shut-down.	Art. 7.3.3.3.2	0 0	
Reduction of the gas pressure Requirements: Under the test conditions below, there shall be no dangerous situation for the user or damage to the boiler.	ČSN EN 15502-1 +A1:2017, Art. 8.7	+	
Defective closure of the gas valve immediately upstream of the main burner Requirements: Where the gas line is designed such that the gas supply to the ignition burner is taken from between the two main burner gas valves, it is checked under the test conditions below that no dangerous situation can arise in the event of defective closure of the gas valve immediately upstream of the main burner when the ignition burner is ignited.	ČSN EN 15502-1 +A1:2017, Art. 8.8	0	
Pre-purge	ČSN EN 15502-1+A1:2017, Art. 8.9		
General Requirements For fan-assisted boilers, pre-purge is mandatory before each ignition of the main burner (a single ignition attempt or several consecutive automatic ignition attempts) unless one of the following conditions is fulfilled: a) boilers with a permanent or alternating ignition burner; b) boilers in which the main burner gas line is fitted with a leakage control device; c) boilers above 0.25 kW and up to 150 kW, fitted with two Class C valves or a Class B and a Class J valve, which close simultaneously; d) boilers above 150 kW and up to 300kW, fitted with two Class B valves; e) boilers above 300 kW, fitted with two Class A valves; f) boilers below 70 kW satisfying 8.9.102 (Verification of the protected nature of a combustion chamber); g) boilers below 70 kW satisfying 8.9.103. (Verification of normal ignition in a combustible air/gas mixture for type C boilers incorporating a fan) This condition is only applicable for type C_{12} and C_{13} boilers. Pre-purge is always necessary after a safety shutdown or a lock out situation unless, when tested in accordance with the test sequence as described below, no hazard or damage occurs. The boiler is installed as indicated in 8.1.2. The boiler is supplied successively with each of the reference gases of the boiler category, at normal pressure. A series of tests is carried out with gas admitted to the boiler at the maximum nominal heat input of the boiler in the hot condition. The ignition sequence is deactivated. The first test is carried out by supplying gas for a period of 1 s after which the ignition sequence, including any delay times within the sequence, is activated. Subsequent tests are carried out by increasing the time up to the end of the time given by the sum of the TSE and the valve(s) closing time declared in the installation instructions. At the end of each period of time,	ČSN EN 15502-2-1 +A1:2017, Art. 8.9.101	+ 0 0 0 0 0 0 + + +	

Requirement	Specification of requirement	Test evaluation	Note
the ignition sequence, including any delay times within the sequence, is activated.			
It is checked that the requirement for pre-purge under safety of operation is met.		+	
The pre-purge shall correspond to the values listed in the text below or as illustrated in table 103:		+	
h) For boilers with a nominal heat input not exceeding 70 kW.			
Under the following test conditions, the volume or the duration of the pre-purge shall be:			
1) for boilers where the pre-purge air is induced over the whole cross section of the combustion chamber inlet: at least the volume of the combustion chamber or at least 5s at the air rate corresponding to the nominal heat input,		0	
2) for other boilers: at least three times the volume of the combustion chamber or at least 15s at the air rate at the nominal heat input (Q_n).	ČSN EN 15502-2-1 +A1:2017, Art. 8.9.101	0	
i) For boilers with a nominal heat input exceeding 70 kW			
The pre-purge shall correspond to either:			
1) a volume of at least three times the volume of the combustion chamber at an air rate of at least 40% of the air rate at the nominal heat input (Q_n), or		0	
2) a time of:			
i) at least 30s at an air rate equal to at least the air rate at the nominal heat input (Q_n), or		+	
ii) a proportionally longer time when the air rate is between 40% of the air rate at nominal heat input and 100% of the air rate at nominal heat input (Q_n).		0	
as illustrated in Table 103.			
For modular boilers, in which the products of combustion from each module vent into a common chamber before entering the flue system, the pre-purge at the time of each initial startup shall be at least three times the volume of the complete assembly of modules.		0	
When at least one module is already operating, the pre-purge for the startup of any other modules shall be that provided for the individual module.		0	
For modular boilers in which the products of combustion from each module vent directly into the flue system, the pre-purge shall be that provided for the individual module.		0	
Verification of the protected nature of a combustion chamber Requirements If the protected nature of a combustion chamber is claimed, then under the following test conditions it is checked that an ignition within the combustion chamber does not ignite a combustible mixture of air and gas outside the combustion chamber.	ČSN EN 15502-2-1 +A1:2017 Art. 8.9.102	0	

Requirement	Specification of requirement	Test evaluation	Note
Verification of normal ignition in a combustible air/gas mixture for type C boilers incorporating a fan If normal ignition in a combustible gas/air mixture for type C boilers incorporating a fan is claimed then under the following test conditions it is checked that ignition occurs correctly without deterioration of the boiler when the combustion chamber is first filled with a combustible air/gas mixture.	ČSN EN 15502-2-1 +A1:2017 Art. 8.9.103	+	
Functioning of a permanent ignition burner when the fan stops during the standby time Requirements: Under the test conditions below, the flame stability of the ignition burner shall be correct. — The boiler is installed in accordance with the conditions of 8.1.2. The ignition burner is adjusted using the reference gases at the normal pressure in accordance with the manufacturer's instructions.	ČSN EN 15502-1 +A1:2017, Art. 8.10	0	
Adjustment, control and safety devices	ČSN EN 15502-1+A1:2017, Art. 8.11		
General Except where otherwise stated, the tests are carried out at ambient temperature and at the maximum temperature. The maximum temperature is that to which the device is subjected in the boiler, adjusted to the nominal heat input with the reference gas when thermal equilibrium is reached, with an adjustable thermostat or electronic temperature control system set to the position corresponding the maximum water temperature.	ČSN EN 15502-1 +A1:2017, Art. 8.11.1	+	
Boilers intended to be installed in a partially protected place For boilers intended to be installed in a partially protected place, the devices shall operate correctly at the temperatures to which they are subjected on the basis of: a) the "minimum declared installation temperature for boilers in partially protected places" (see definition); b) eventually the maximum ambient temperature declared by the manufacturer.	ČSN EN 15502-1 +A1:2017, Art. 8.11.2	0	
Safety of the domestic hot water circuit	ČSN EN 15502-1+A1:2017, Art. 8.11.3.1		
Instantaneous and storage types	ČSN EN 15502-1+A1:2017, Art. 8.11.3.1.1		
Soundness of parts containing domestic water Requirements Under the following test conditions, the parts containing domestic water shall withstand the test pressure without permanent distortion or soundness defects, with respect to the outside or the heating circuit.	ČSN EN 15502-1 +A1:2017, Art. 8.11.3.1.1.1	0	
Overheating of the domestic hot water by the heating circuit Requirements Under the following test conditions, the domestic hot water temperature shall not exceed 95 °C.	ČSN EN 15502-1 +A1:2017, Art. 8.11.3.1.1.2	0	
Failure of the domestic hot water temperature control device Requirements For boilers in which the sanitary water circuit is not in contact with the combustion products, with normal control out of	ČSN EN 15502-1 +A1:2017, Art. 8.11.3.1.1.3	0	

Requirement	Specification of requirement	Test evaluation	Note
operation and according to the option chosen, at least the requirement relating to the temperature limiter (see 8.11.8.2.2 Test no.1) or the overheat cut-out device (see 8.11.8.2.3 Test no.1 or nr.2 – depending of the used option) shall be met. For boilers in which the sanitary water circuit does come into total or partial contact with the combustion products, the temperature limiter shall at least cause safety shutdown before the tap water reaches a temperature of 100 °C.			
Instantaneous type	ČSN EN 15502-1+A1:2017, Art. 8.11.3.1.2		
Maximum temperature of the domestic hot water Requirements Under the test conditions below, the domestic hot water temperature shall not exceed 95 °C.	ČSN EN15502-1 +A1:2017, Art. 8.11.3.1.2.1	0	
Overheating of the domestic hot water Requirements Under the test below conditions, the domestic hot water temperature shall not exceed 95 °C.	ČSN EN15502-1 +A1:2017, Art. 8.11.3.1.2.2	0	
Control devices	ČSN EN 15502-1+A1:2017, Art. 8.11.4		
Rotary knob Requirements: Under the test conditions below, the operating torque of a knob shall not exceed 0,6 N.m or 0,017 N.m/mm of knob diameter.	ČSN EN 15502-1 +A1:2017, Art. 8.11.4.1	+	
Push-button Requirements: Under the below test conditions the force required to open and/or to keep open the closure element shall not exceed 45 N or 0,5 N/mm^2 of the area of the button.	ČSN EN 15502-1 +A1:2017, Art. 8.11.4.2	+	
Ignition devices	ČSN EN 15502-1+A1:2017, Art. 8.11.5		
Manual ignition device for the ignition burner Requirements: Under the test conditions below, at least half the manual ignition attempts shall result in correct ignition of the ignition burner. The effectiveness of the ignition device shall be independent of the operating speed and sequence. The operation of manually operated electrical ignition devices shall remain satisfactory at the maximum temperature to which they are subjected in the boiler and when the voltage is varied between 0,85 times and 1,1 times the nominal voltage and under any combination of these conditions. The supply of gas to the main burner shall only be permitted after detection of the ignition burner flame.	ČSN EN 15502-1 +A1:2017, Art. 8.11.5.1	0	
Automatic ignition system for the ignition burner and main burner	ČSN EN 15502-1+A1:2017, Art. 8.11.5.2		
General Ignition shall be effected within a maximum of 5 automatic ignition attempts. Each ignition attempt starts with the opening of the valve(s) and ends either by detecting flame or by closing of the gas valve(s).	ČSN EN 15502-1 +A1:2017, Art. 8.11.5.2.1	+	

Requirement	Specification of requirement	Test evaluation	Note
Ignition Requirements: Under the test conditions below, ignition devices shall ensure safe ignition. The ignition system shall be activated at the latest at the same time as the signal to open the valve(s). The ignition shall continue at least to the moment flame is sensed but not exceeding the end of the T_{SA} . If flame sensing can be influenced by ignition, interruption of ignition is allowed to check availability of flame signal.	ČSN EN 15502-1 +A1:2017, Art. 8.11.5.2.2	+ + + 0	
Ignition burner Requirements: Under the test conditions below, the heat input of any ignition burner that remains alight when the main burner is extinguished shall not exceed 0,250 kW. The signal to open the gas supply to the main burner shall only be given after the ignition burner flame has been detected.	ČSN EN 15502-1 +A1:2017, Art. 8.11.5.3	0	
Flame supervision device	ČSN EN 15502-1+A1:2017, Art. 8.11.6		
Thermoelectric device	ČSN EN 15502-1+A1:2017, Art. 8.11.6.1		
Ignition opening time (T_{1A}) Requirements: Under the test conditions below, the T_{IA} of a permanent ignition burner shall not exceed 30 s. This time can be raised to 60 s if no manual intervention is required during it.	ČSN EN 15502-1 +A1:2017, Art. 8.11.6.1.1	0	
Extinction delay time (T_{1E}) Requirements: Under the test conditions below, the extinction delay time of a thermoelectric flame supervision device shall not exceed: a) 60 s if $Q_n \leq 35$ kW; b) 45 s if $Q_n > 35$ kW. When a safety device acts on the thermoelectric flame supervision device, closure shall occur without delay.	ČSN EN 15502-1 +A1:2017, Art. 8.11.6.1.2	0	
Automatic burner control system	ČSN EN 15502-1+A1:2017, Art. 8.11.6.2		
Ignition safety time (T_{SA}) Requirements: The T_{SA} is stated by the manufacturer. If the heat input of the ignition burner does not exceed 0,250 kW, there is no requirement in respect of the T_{SA}. Where the heat input of the ignition burner is between 0,250 kW and 1 kW, there is no requirement in respect of T_{SA} if suitable evidence is given by the manufacturer that no dangerous situation for the user or damage to the boiler occurs. In all other cases, the T_{SA} is chosen by the manufacturer in accordance with 8.11.6.2.5 (Delayed ignition) However, a delayed ignition test is not necessary if the T_{SA}, determined under the test conditions below, complies with the following requirement: for $Q_n \leq 150$ kW: $T_{SA} \leq 5 \cdot \frac{Q_n}{Q_{ign}}$ seconds but without exceeding 10 s; for $Q_n > 150$ kW: $T_{SA} \leq \cdot \frac{5 \times 150}{Q_{ign}}$ seconds but without exceeding 10 s	ČSN EN 15502-1 +A1:2017, Art. 8.11.6.2.1	+ 0 0 + 0 +	

Requirement	Specification of requirement	Test evaluation	Note
where Qn is the nominal input in kW; Q_{ign} is the ignition rate in kW. Where several automatic ignition attempts are made without being followed by a purge corresponding to 8.9, the sum of the duration of the ignition attempts shall comply with the above requirement for T_{SA}. Where several automatic ignition attempts are made followed by a purge corresponding to 8.9 the ignition safety time shall be less than T_{SA} for each attempt. For B_{11} and B_{11BS} boilers with several automatic ignition attempts, a waiting time of at least 30 s between the attempts is required. When these boilers burn gases with relative densities greater than 1,0, the maximum number of ignition attempts is 2. When these boilers burn gases with relative densities less than 1,0, the maximum number of ignition attempts is 5.	ČSN EN 15502-1 +A1:2017, Art. 8.11.6.2.1	0 + 0	
Extinction safety time (T_{SE}) Requirements: Under the test conditions below, unless spark restoration occurs, the extinction safety time of the ignition burner and main burner shall not exceed, for heat inputs: a) ≤ 70 kW 5 s b) > 70 kW 3 s	ČSN EN 15502-1 +A1:2017, Art. 8.11.6.2.2	0 +	
Spark restoration Requirements: If spark restoration takes place, under the test conditions below, the ignition device shall be re-energised within a maximum time of 1 s after the disappearance of the flame signal. In this case the T_{SA} is the same as is used for ignition and it starts when the ignition device is energised.	ČSN EN 15502-1 +A1:2017, Art. 8.11.6.2.3	+	
Recycling Requirements: If recycling takes place, under the test conditions below, this shall be preceded by an interruption of the gas supply; the ignition sequence shall restart from the beginning. In this case, the T_{SA} is the same as is used for ignition and starts when the ignition device is energised.	ČSN EN 15502-1 +A1:2017, Art. 8.11.6.2.4	+	
Delayed ignition Requirements: Under the test conditions below, there shall be no deterioration of the boiler, no hazard to the user. The test as stated below is repeated with the delay starting at one second and increased by one second each time up to a maximum of $T_{SA.}$	ČSN EN 15502-1 +A1:2017, Art. 8.11.6.2.5	+	

Requirement	Specification of requirement	Test evaluation	Note
Gas pressure regulator Requirements: Under the test conditions below, the gas rate of boilers fitted with a regulator shall not differ from the gas rate obtained at normal pressure by more than: a) 7,5 % and - 10 % for first family gases; b) + 5 % and - 7,5 % for second family gases without a pressure couple; c) ± 5 % for second and third family gases with a pressure couple; d) ± 5 % for third family gases without a pressure couple. In the case where boilers, using gases of the second and third family without a pressure couple, do not meet the requirements between p_n and p_{min}, these boilers shall meet the requirements for a boiler without a Gas pressure regulator, for this pressure range.	ČSN EN 15502-1 +A1:2017, Art. 8.11.7	0 0 + 0 0	
Thermostats and water temperature limiting devices	ČSN EN 15502-1+A1:2017, Art. 8.11.8		
Water control thermostats For electronic temperature control systems, the terms: a) fixed setting thermostat should be read as fixed control temperature setpoint; b) adjustable thermostat should be read as adjustable control temperature setpoint. Requirements: Under the test conditions below, a) the maximum water temperature of boilers fitted with a fixed setting thermostat shall be within ± 10 K of the temperature stated by the manufacturer; b) for boilers fitted with an adjustable thermostat, it shall be possible to select, to within ± 10 K, the water flow temperatures stated by the manufacturer; c) the flow temperature shall not exceed the maximum temperature declared by the manufacturer; however, when the control thermostat is located on the return, this requirement may be met by action of the temperature limiter located on the water flow.	ČSN EN 15502-1 +A1:2017, Art. 8.11.8.1	0 + +	
Water temperature limiting devices	ČSN EN 15502-1+A1:2017, Art. 8.11.8.2		
Inadequate water circulation Requirements: No deterioration of the boiler shall occur under the test conditions below. This requirement does not apply to boilers intended exclusively for a central heating system with an open expansion vessel.	ČSN EN 15502-1 +A1:2017, Art. 8.11.8.2.1	+	
Overheating of boilers of pressure classes 1 and 2 For electronic temperature control systems, the terms: a) control thermostat should be read as control temperature set point; b) temperature limiter should be read as temperature limit set point; c) overheat cut-out device should be read as overheat cut-out set point. Requirements: Under the test conditions below (Test no 1) the temperature limiter shall cause safety shutdown before the water flow temperature exceeds the preset value (See 5.7.8.3).	ČSN EN 15502-1 +A1:2017, Art. 8.11.8.2.2	0	

Requirement	Specification of requirement	Test evaluation	Note
Under the test conditions of below (Test no 2) the overheat cut-out device shall cause non-volatile lockout of the boiler before a situation occurs that is dangerous to the user or capable of damaging the boiler.			
Overheating of boilers of pressure class 3 For electronic temperature control systems, the terms: a) control thermostat should be read as control temperature set point; b) temperature limiter should be read as temperature limit set point; **c)** overheat cut-out device should be read as overheat cut-out set point. **Test no 1** Requirements for Test no 1: Under the test conditions below (Test no 1) the temperature limiter shall cause safety shutdown before the water flow temperature exceeds the preset value. **Test no 2** Requirements for Test no 2: Under the test conditions of below (Test no 2) the overheat cut-out device shall cause non-volatile lockout of the boiler before a situation occurs that is dangerous to the user or capable of damaging the boiler or if the temperature exceeds 110 °C. **Test no 3** Requirements for Test no 3: Under the test conditions of below (Test no 3) the overheat cut-out device shall cause non-volatile lockout of the boiler before the temperature exceeds 110 °C.	ČSN EN 15502-1 +A1:2017, Art. 8.11.8.2.3 ČSN EN 15502-1 +A1:2017, Art. 8.11.8.2.3	+ + +	
Air proving device	ČSN EN 15502-2-1+A1:2017, Art. 8.11.101		
General Depending on the principle of air proving, the applicable requirements are described in the clauses below. The boiler is installed as stated in 8.1.2.1. The boiler is supplied with one of the reference gases for the category to which it belongs. The boiler is fitted with the longest combustion air supply and combustion products evacuation ducts stated in the installation instructions. The tests may be carried out without the terminal or fitting piece. The CO concentration is determined as stated in 8.12.1.	ČSN EN 15502-2-1 +A1:2017, Art. 8.11.101.1	+	

Requirement	Specification of requirement	Test evaluation	Note
Supervision of the combustion air rate or the combustion products rate Requirements At a reduced flow rate the CO concentration (dry, air-free) may not exceed a specific value. The following methods of flow reduction are to be examined: a) Progressive blockage of the air inlet; b) Progressive blockage of the combustion products evacuation ducts; c) Progressive reduction of the fan speed, for example by reduction of the fan voltage. There are two alternative supervision strategies for the air proving; a start up supervision or a continuous supervision. Based on the supervision strategy the boiler shall at a reduced flow rate meet one of the following two requirements: d) Continuous supervision: Shutdown before the CO concentration exceeds 0,2 %, or e) Start up supervision: Not start if the CO concentration exceeds 0,1 %.	ČSN EN 15502-2-1 +A1:2017, Art. 8.11.101.2	+	
Gas/air ratio controls	ČSN EN 15502-2-1+A1:2017, Art. 8.11.101.3		
Leakage of control tubes Requirements When control tubes are not made of metal or of other materials with at least equivalent properties, their disconnection, breakage or leakage shall not lead to an unsafe situation. This implies either locking out or safe operation with no leakage of gas outside the boiler.	ČSN EN 15502-2-1 +A1:2017, Art. 8.11.101.3.1	0	
Supervision of the combustion air rate or the combustion products rate Requirements At a reduced flow rate the CO concentration may not exceed a specific value. The following methods of flow reduction are to be examined: a) Progressive blockage of the air inlet; b) Progressive blockage of the combustion products evacuation ducts; c) If internal recirculation can occur then an additional test must be carried out by progressive reduction of the fan speed, for example by reduction of the fan voltage. There are two alternative supervision strategies for the air proving; a start up supervision or a continuous supervision. Based on the supervision strategy the boiler shall at a reduced flow rate meet one of the following two requirements: d) Continuous supervision: Shutdown before the CO concentration (dry, air free) exceeds: 1) 0,20 % over the range of modulation specified in the installation instructions), or 2) CO_{mes} x Q / Q_{KB} ≤ 0,20% below the minimum rate of the modulation range. *where:* - Q is the instantaneous heat input, in kW; - Q_{KB} is the heat input at the minimum rate, in kW;	ČSN EN 15502-2-1 +A1:2017, Art. 8.11.101.3.2	+ + + 0 + 0	

Requirement	Specification of requirement	Test evaluation	Note
- CO_{mes} is the measured CO concentration (dry, air free). e) Start up supervision: Not start if the CO concentration (dry, air free) exceeds 0,1 %.		0	
Adjustment of the gas/air ratio Requirements The installation instructions shall declare (see 12.2.1.2.d) values which give rise to minimum and maximum CO_2 levels between which no adjustment action is required. If the gas/air ratio is adjustable for CO_2 the test of 8.11.101.3.2 shall be repeated at the test conditions below.	ČSN EN 15502-2-1 +A1:2017, Art. 8.11.101.3.3	+ +	
Functioning of the fan of a type C_4 boiler Requirements For type C_{42} and C_{43} boilers, when controlled shutdown or safety shutdown occurs, the fan shall stop after any post-purge. If the boiler is fitted with a permanent or alternating ignition burner, it is permissible for the fan to function at the lowest speed corresponding to the flow which is necessary for the ignition burner.	ČSN EN 15502-2-1 +A1:2017, Art. 8.11.101.4	0 0	

Note: + Requirement fulfilled x Not assessed
- Requirement not fulfilled 0 Not applicable

Measurement results:

Sample tested: ONGAS 604; ONGAS 609

Date of testing: 2014-04-04	t_{ok} = 20,1 °C	r.v. = 47,8 %	p_a = 991,2 mbar

Required properties	Test result	Note
Performance ČSN EN 15502-1+A1:2017 , Art. 7.3.3		
General		
ČSN EN 15502-1+A1, Art. 7.3.3.1	+	See CE-0085BU0296
Control thermostat – Endurance		
ČSN EN 15502-1+A1, Art. 7.3.3.2	+	See CE-0085BU0296
Water temperature limiting devices – Endurance		
Temperature limiters		
ČSN EN 15502-1+A1, Art. 7.3.3.3.1	+	See CE-0085BU0296
Overheat cut-out devices		
ČSN EN 15502-1+A1, Art. 7.3.3.3.2	0	

Note: + Requirement fulfilled x Not assessed

Operating conditions	Heat input	Fuel supply pressure (mbar)	Test gas	Results	Note
Fuel pressure reduction					
Test according to ČSN EN 15502-1+A1, Art. 8.7	Q_n	14, 13 ... 0	G 20	+	
Defective closure of the gas valve immediately upstream of the main burner					
Test according to ČSN EN 15502-1+A1, Art. 8.8	Q_n	20	G 20	0	

Note: + Requirement fulfilled x Not assessed Q_n rated heat input, Q_m minimum heat input
- Requirement not fulfilled 0 Not applicable

Required properties	Test result	Note
General		
Test according to ČSN EN 15502-2-1+A1, Art. 8.9.101 paragraph h) point 1)	0	
Test according to ČSN EN 15502-2-1+A1, Art. 8.9.101 paragraph h) point 2)	+	Tthree consecutive automatic ignition attempts.
Verification of protected combustion chamber		
ČSN EN 15502-2-1+A1, Art. 8.9.102	0	
Verification of normal ignition in a combustible air/gas mixture for type C boilers incorporating a fan		
ČSN EN 15502-2-1+A1, Art. 8.9.103	+	The ignition occurs correctly without deterioration of the boiler.
Functioning of a permanent ignition burner when the fan stops during the standby time		
Test according to ČSN EN 15502-1+A1, Art. 8.10	0	
Soundness of parts containing domestic water		
ČSN EN 15502-1+A1, Art. 8.11.3.1.1.1	0	
Overheating of the domestic hot water by the heating circuit		
ČSN EN 15502-1+A1, Art. 8.11.3.1.1.2	0	
Failure of the domestic hot water temperature control device		
ČSN EN 15502-1+A1, Art. 8.11.3.1.1.3	0	
Maximum temperature of the domestic hot water		
ČSN EN 15502-1+A1, Art. 8.11.3.1.2.1	0	
Overheating of the domestic hot water		
ČSN EN 15502-1+A1, Art. 8.11.3.1.2.2	0	
Rotary knob		
Test according to ČSN EN 15502-1+A1, Art. 8.11.4.1	+	The operating torque of the manual rotary knobs didn't exceed 0.6 N.m or 0,017N.m per 1 mm of the knob diameter.
Push-button		
Test according to ČSN EN 15502-1+A1, Art. 8.11.4.2	+	The force required to open and/or to keep open the closure element didn't exceed 45 N or 0,5 N per 1 mm^{-2} of the area of the button.

Required properties	Test result	Note
Ignition devices		
Manual ignition device for the ignition burner		
ČSN EN 15502-1+A1, Art. 8.11.5.1	0	
Automatic ignition system for the ignition burner and main burner		
General		
ČSN EN 15502-1+A1, Art. 8.11.5.2.1	+	see CE-0085BU0296
Ignition		
ČSN EN 15502-1+A1, Art. 8.11.5.2.2	+	see CE-0085BU0296
ČSN EN 15502-1+A1, Art. 8.11.5.3	0	
Flame supervision device		
Thermoelectric device		
Ignition opening time (T_{IA})		
ČSN EN 15502-1+A1, Art. 8.11.6.1.1	0	
Extinction delay time (T_{IE})		
ČSN EN 15502-1+A1, Art. 8.11.6.1.2	0	
Automatic burner control system		
Ignition safety time (T_{SA})		
ČSN EN 15502-1+A1, Art. 8.11.6.2.1	+	see CE-0085BU0296
Extinction safety time (T_{SE})		
ČSN EN 15502-1+A1, Art. 8.11.6.2.2	+	see CE-0085BU0296
Spark restoration		
ČSN EN 15502-1+A1, Art. 8.11.6.2.3	0	
Recycling		
ČSN EN 15502-1+A1, Art. 8.11.6.2.4	+	see CE-0085BU0296
Delayed ignition		
ČSN EN 15502-1+A1, Art. 8.11.6.2.5	+	see CE-0085BU0296
Gas pressure regulator		
ČSN EN 15502-1+A1, Art. 8.11.7	+	see CE-0085BM0345
Thermostats and water temperature limiting devices		
Water control thermostats		
ČSN EN 15502-1+A1, Art. 8.11.8.1	+	It is possible to select water temperature in boilers equipped with adjustable thermostat within the tolerance of ±10 K of the water temperature declared by the manufacturer. It is possible to select temperatures of the outlet heating water within the tolerance of ±10 K. The temperature of the outlet heating water will not exceed 95°C (measured / adjusted value of the temperature 81,1°C / 84,4°C).

Required properties	Test result	Note
Water temperature limiting devices		
Inadequate water circulation		
ČSN EN 15502-1+A1, Art. 8.11.8.2.1	+	No boiler damage will occur. Shut-down temperature 96,2°C.
Overheating of boilers of pressure classes 1 and 2		
ČSN EN 15502-1+A1, Art. 8.11.8.2.2	0	
Overheating of Boilers of pressure class 3		
ČSN EN 15502-1+A1, Art. 8.11.8.2.3	+	The overheating safety device will cause permanent blocking of the boiler before the operating staff is exposed to risk or before the boiler is damaged. At 108°C the overheating safety device will shut-down and permanently block the boiler.
Air proving device		
General		
ČSN EN 15502-2-1+A1, Art. 8.11.101.1	+	CO concentration did not exceed 0,10 %.
Supervision of the combustion air rate or the combustion products rate		
ČSN EN 15502-2-1+A1, Art. 8.11.101.2	+	The fuel supply will close before the concentration of CO exceeds 0,20%.
Gas/air ratio controls		
Supervision of the combustion air rate or the combustion products rate		
ČSN EN 15502-2-1+A1, Art. 8.11.101.3.2	+	The fuel supply will close before the concentration of CO exceeds 0,20%.
Adjustment of the gas/air ratio		
ČSN EN 15502-2-1+A1, Art. 8.11.101.3.3	+	The fuel supply closes before the concentration of CO exceeds 0,20%.
Functioning of the fan of a type C_4 boiler		
ČSN EN 15502-2-1+A1, Art. 8.11.101.4	0	

Note: + Requirement fulfilled
- Requirement not fulfilled
x Not assessed
0 Not applicable

Accredited test number: **T 001** Test title: **Combustion efficiency**

Testing method:	ČSN EN 15502-1+A1:2017, Art. 8.1.1.1, 8.12, 8.12.1, 8.12.3, 8.12.3.1, 8.12.3.2, 8.12.3.3, 8.12.4, 8.12.5, 8.13, 8.13.1, 8.13.2.1.,8.13.2.6, annex U ČSN EN 15502-2-1+A1:2017, Art. 8.12.2, 8.12.2.101, 8.12.2.102, 8.12.3, 8.12.3.1, 8.12.3.101, 8.12.3.101.3, 8.12.3.101.4, 8.12.3.101.5, 8.12.3.101.7, 8.12.3.101.8
Sample tested:	ONGAS 604, ONGAS 609
Measuring equipment used:	see table in Chap. III

Place of testing:	at the Engineering Test Institute	☒	at the manufacturer	☐	at the customer	☐	*other:*

Test results:

Requirement	**Specification of requirement**	**Test evaluation**	**Note**
Carbon monoxide	ČSN EN 15502-1+A1:2017, Art. 8.12		
General Requirements: The CO concentration in the dry, air-free, products of combustion shall not exceed the values stated in 8.12.2 and 8.12.3.	ČSN EN 15502-1 +A1:2017, Art. 8.12.1	+	
Limit conditions	ČSN EN 15502-2-1+A1:2017, Art. 8.12.2		

Boilers without gas/air ratio controls Requirements: Under the test conditions below, the CO concentration shall not exceed 0,10 %.	ČSN EN 15502-2-1 +A1:2017, Art. 8.12.2.101	+	
Boilers using Gas/air Ratio Controls Appliances using gas/air ratio control systems are subjected to the following tests. The CO and CO_2 concentrations are measured: a) The gas/air ratio control is adjusted in accordance with the manufacturer's installation instructions (or left as factory set if the control is not adjustable). The appliance is operated at both maximum and minimum heat input allowed by the control system; b) Simulate reasonable maladjustment of any adjustable "throttle" setting by adjusting the CO_2 at maximum rate to be 0.5% higher than the maximum value to which the gas/air ratio control should be set. For gas/air ratio controls that are adjustable then the maximum value shall include the maximum extent of the setting tolerance. For non - adjustable gas/air ratio controls the maximum value shall include the maximum extent of the factory setting tolerance. Following this adjustment, the appliance is operated at both maximum and minimum heat input allowed by the control system; c) Simulate reasonable maladjustment of any adjustable "offset" setting by measuring the gas/air ratio control differential pressure (with the boiler operating at minimum rate) and adjusting the offset screw sufficiently to increase the differential pressure by 5 Pa. Following this adjustment, the appliance is again operated at both maximum and minimum heat input allowed by the control	ČSN EN 15502-2-1 +A1:2017, Art. 8.12.2.102	+	

Requirement	**Specification of requirement**	**Test evaluation**	**Note**
system. The tests are repeated by adjusting the offset screw sufficiently to decrease the differential pressure by 5 Pa. For each test condition it is checked that the requirement of 8.12.2.101 is met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.12.2.102	+	
Special conditions	ČSN EN 15502-1+A1:2017, Art. 8.12.3		
Incomplete combustion Requirements: Under the test conditions below, the CO concentration shall not exceed 0,20 %.	ČSN EN 15502-1 +A1:2017, Art. 8.12.3.1	+	
Supplementary test for fan assisted boilers Requirements: Under the test conditions below, the CO concentration shall not exceed 0,20 %.	ČSN EN 15502-1 +A1:2017, Art. 8.12.3.2	+	
Flame lift Requirements: Under the test conditions below, the CO concentration shall not exceed 0,20 %.	ČSN EN 15502-1 +A1:2017, Art. 8.12.3.3	+	
Special flue conditions	ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101		

Requirement	Specification of requirement	Test evaluation	Note
Type C_1, C_3 and C_9 boilers The test is carried out as stated in the first and third test series in 8.6.3.102, as appropriate. For each of the test series, the value of the arithmetic mean of the CO concentrations determined at the nine combinations of wind speed and angle of incidence that produce the highest CO concentration in the combustion products is calculated. It is checked that the above requirement is met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.12.3.101.1	0	
Type C_2 boilers Under the test conditions of 8.6.3.103 it is checked that the above requirements are met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.12.3.101.2	0	
Type C_4 boilers Under the test conditions of 8.6.3.104 it is checked that the above requirements are met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.12.3.101.3	0	
Type C_5 boilers Under the test conditions of 8.6.3.105 it is checked that the above requirements are met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.12.3.101.4	0	
Type C_6 boilers In accordance with CEN/TR 1749 these boilers are intended to be connected to a separately approved and marketed system for the supply of combustion air and discharge of the combustion products. Type C_6 boilers are fitted with a restriction to simulate the minimum pressure loss stated in the installation instructions. The air supply is fitted with a mixing device which permits adjustment of the recirculation of the products of combustion. The mixing device is adjusted such that 10 % of the combustion products are recirculated to the air supply. It is checked that the above requirement is met. A supplementary test is carried out by adjusting the restriction such that the air proving device just fails to operate. If the boiler is fitted with an air proving device that does not interrupt the gas rate before the CO concentration exceeds 0,20 %, the test is done with a blockage that generates a CO concentration of 0,10 % at equilibrium. For appliances with gas/air ratio controls the supplementary test is done at the minimum adjustable heat input. Under the test conditions of 8.6.3.106, it is checked that the above requirement is met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.12.3.101.5	0 0	
Type C_7 boilers Under the test conditions of 8.6.3.107 it is checked that the above requirement is met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.12.3.101.6	0	
Type C_8 boilers Under the test conditions of 8.6.3.108 it is checked that the above requirement is met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.12.3.101.7	0	
Type B_2 and B_3 boilers Under the test conditions of 8.6.3.109 it is checked that the above requirement is met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.12.3.101.8	+	
Type B_5 boilers Under the test conditions of 8.6.3.110 it is checked that the above requirement is met.	ČSN EN 15502-2-1 +A1:2017, Art. 8.12.3.101.9	0	
Sooting Requirements: Under the test conditions below, no soot deposition shall be observed although yellow tipping is acceptable.	ČSN EN 15502-1 +A1:2017, Art. 8.12.4	+	

Requirement	Specification of requirement	Test evaluation	Note
Supplementary test for low temperature boilers and condensing boilers Requirements: The formation of condensate shall not impair the correct operation of the boiler. If the is boiler is equipped with a condensate discharge then by choice of the manufacturer, the boiler shall meet one of the following requirements: a) when the condensate discharge is blocked, the gas supply of the boiler shall be shut off before the CO concentration exceeds 0,20 %, or b) when the condensate discharge is blocked, causing a restriction in the flow of combustion products or air for combustion, resulting in a CO concentration equal to or greater than 0,10 % at equilibrium, restart shall not be possible from cold. In either case, there shall be no spillage of condensate from the boiler.	ČSN EN 15502-1 +A1:2017, Art. 8.12.5	+ + 0 +	
NO_x	ČSN EN 15502-1+A1:2017, Art. 8.13		
Requirement The manufacturer shall select the NO_x class of the boiler from Table 4. Under the test and calculation conditions below, the permissible NO_x concentration assigned to this class in the dry, air free products of combustion shall not be exceeded. Table 4: NO_x classes	ČSN EN 15502-1 +A1:2017, Art. 8.13.1	+	

NO_x classes	Limit NO_x concentration mg/kWh based on NCV	Limit NO_x concentration mg/kWh based on GCV
1	260	
2	200	
3	150	
4	100	
5	70	
6		56

Note: + Requirement fulfilled
- Requirement not fulfilled
x Not assessed
0 Not applicable

Measurement results:

a) Sample tested: ONGAS 609

Date of testing: 2014-03-05	t_{ok} = 20,4 °C	r.v. = 36,5 %	p_a = 972,0 mbar

Type of gas	Operating conditions	Gas pressure before the appliance/ at the nozzle (mbar)		O_2 (% vol.)	CO_2 (% vol.)	CO		CO limit at n=1 (% vol.)
						Meas. (ppm)	At n=1 (% vol.)	
Limit conditions								
G 20	Test according to ČSN EN 15502-1+A1, Art. 8.12.2 (1.00 x Q_{max})	20	-	4,7	9,1	67	0,0086	0,10
-		-	-	-	-	-	-	
G 20	Test according to ČSN EN 15502-1+A1, Art. 8.12.2 (1.00 x Q_{min})	20	-	5,3	8,8	10	0,0013	
-		-	-	-	-	-	-	

Type of gas	Operating conditions	Gas pressure before the appliance/ at the nozzle (mbar)		O_2 (% vol.)	CO_2 (% vol.)	CO		CO limit at n=1 (% vol.)
						Meas. (ppm)	At n=1 (% vol.)	
Special conditions								
Incomplete combustion								
G 21 (G20)	Test according to ČSN EN 15502-1+A1, Art. 8.12.3.1 (1,19 x Q_{max})	20	-	4,7	9,1	67	0,0086	0,20
	Test according to ČSN EN 15502-1+A1, Art. 8.12.3.1 (1,19 x Q_{min})	-	-	-	-	-	-	
G 20	Test according to ČSN EN 15502-1+A1, Art. 8.12.3.2 (85% →110% voltage)	20	-	4,5	9,2	72	0,0092	0,20
Test of combustion level with the use of limit test gas for flame lift								
G 23 (G20)	Test according to ČSN EN 15502-1+A1, Art. 8.12.3.3 (0,91 x Q_{min})	20	-	5,4	8,7	10	0,0013	0,20
-		-	-	-	-	-	-	
C_1, C_3 and C_9 design boilers								
C design boilers with a horizontal protective mouth, to be wall-mounted vertically (concentrating pipe 60/100 mm)								
Combustion level tests according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.1 (Q_n – wind 1 m/s)								
Arithmetic mean of CO concentrations: NA / - (P_n / P_{min})								
Angle of incidence at which the greatest CO concentration comes into existence:								
G 20	Plane ...°	Angle ...°	-	-	-	-	-	-	0,20
Combustion level tests according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.1 (Q_n – wind 2.5 m/s)								
Arithmetic mean of CO concentrations: NA / - (P_n / P_{min})								
Angle of incidence at which the greatest CO concentration comes into existence:								
G 20	Plane ...°	Angle ...°	-	-	-	-	-	-	0,20
Combustion level tests according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.1 (Q_n – wind 12.5 m/s)								
Arithmetic mean of CO concentrations: NA / - (P_n / P_{min})								
Angle of incidence at which the greatest CO concentration comes into existence:								
G 20	Plane ...°	Angle ...°	-	-	-	-	-	-	0,20
C_4 design boilers								
G 20	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.3 (0.5 mbar) P_n	-	-	-	-	-	-	-
G 20	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.3 (0.5 mbar) P_{min}	-	-	-	-	-	-	-
C_5 design boilers								
G 20	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.4 (2.0 mbar) P_n	-	-	-	-	-	-	-
G 20	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.4 (2.0 mbar) P_{min}	-	-	-	-	-	-	-
C_6 design boilers								

Type of gas	Operating conditions	Gas pressure before the appliance/ at the nozzle (mbar)		O_2 (% vol.)	CO_2 (% vol.)	CO		CO limit at n=1 (% vol.)
						Meas. (ppm)	At n=1 (% vol.)	
G 20	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.5 (0.5 mbar) P_n	-	-	-	-	-	-	-
	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.5 (0.5 mbar) P_{min}			-	-	-	-	
C_8 design boilers								
G 20	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.7 (2.0 mbar) P_n	-	-	-	-	-	-	-
G 20	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.7 (2.0 mbar) P_{min}	-	-	-	-	-	-	-
Sooting								
G 21	Test according to ČSN EN 15502-1+A1, Art. 8.12.4 (1.05 x Q_n)	20	No sooting will occur.					
Supplementary test for low temperature boilers and condensing boilers								
G 20	Test according to ČSN EN 15502-1+A1, Art. 8.12.5 (Q_n)	20	Level switch caused the shutdown.					

Other contaminants					
Type of gas	**Operating conditions**	**Fuel pressure before the appliance (mbar)**	**O_2 (% vol.)**	**NO_x**	
				Meas. (ppm)	**At O_2=0 % (mg/kWh)**
Combustion level tests according to ČSN EN 15502-1+A1, Art. 8.13.1					
G 20	70 % Q_a	20	4,7	18	41
G 20	60 % Q_a	20	4,9	17	39
G 20	40 % Q_a	20	5,1	15	35
G 20	20 % Q_a	20	5,3	10	24
$NO_{x,o}$ at O_2 = 0 %: 30 mg/kWh (NCV) $NO_{x,o}$ at O_2 = 0 %: 27 mg/kWh (GCV)			NOx class: 6		

b) Sample tested: ONGAS 604

Date of testing: 2014-03-07	t_{ok} = 18,5 °C	r.v. = 35,2 %	p_a = 997,3 mbar

Type of gas	Operating conditions	Gas pressure before the appliance/ at the nozzle (mbar)		O_2 (% vol.)	CO_2 (% vol.)	CO		CO limit at n=1 (% vol.)
						Meas. (ppm)	At n=1 (% vol.)	
Limit conditions								
G 20	Test according to ČSN EN 15502-1+A1, Art. 8.12.2 (1.00 x Q_{max})	20	-	4,8	9,0	57	0,0074	0,10
-		-	-	-	-	-	-	

Type of gas	Operating conditions	Gas pressure before the appliance/ at the nozzle (mbar)		O_2 (% vol.)	CO_2 (% vol.)	CO		CO limit at n=1 (% vol.)
						Meas. (ppm)	At n=1 (% vol.)	
G 20	Test according to ČSN EN 15502-1, Art. 8.12.2 (1.00 x Q_{min})	20	-	6,0	8,3	31	0,0043	
-		-	-	-	-	-	-	
Special conditions								
Incomplete combustion								
G 21 (G20)	Test according to ČSN EN 15502-1+A1, Art. 8.12.3.1 (1,19 x Q_{max})	20	-	4,8	9,0	57	0,0074	0,20
	Test according to ČSN EN 15502-1+A1, Art. 8.12.3.1 (1,19 x Q_{min})	-	-	-	-	-	-	
G 20	Test according to ČSN EN 15502-1+A1, Art. 8.12.3.2 (85% →110% voltage)	20	-	4,6	9,1	65	0,0083	0,20
Test of combustion level with the use of limit test gas for flame lift								
G 23 (G20)	Test according to ČSN EN 15502-1+A1, Art. 8.12.3.3 (0,91 x Q_{min})	20	-	6,2	8,2	6	0,0009	0,20
-		-	-	-	-	-	-	
C_1, C_3 and C_9 design boilers								
C design boilers with a horizontal protective mouth, to be wall-mounted vertically (concentrating pipe 60/100 mm)								
Combustion level tests according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.1 (Q_n – wind 1 m/s)								
Arithmetic mean of CO concentrations: NA / - (P_n / P_{min})								
Angle of incidence at which the greatest CO concentration comes into existence:								
G 20	Plane ...°	Angle ...°	-	-	-	-	-	-	0,20
Combustion level tests according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.1 (Q_n – wind 2.5 m/s)								
Arithmetic mean of CO concentrations: NA / - (P_n / P_{min})								
Angle of incidence at which the greatest CO concentration comes into existence:								
G 20	Plane ...°	Angle ...°	-	-	-	-	-	-	0,20
Combustion level tests according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.1 (Q_n – wind 12.5 m/s)								
Arithmetic mean of CO concentrations: NA / - (P_n / P_{min})								
Angle of incidence at which the greatest CO concentration comes into existence:								
G 20	Plane ...°	Angle ...°	-	-	-	-	-	-	0,20
C_4 design boilers								
G 20	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.3 (0.5 mbar) P_n	-	-	-	-	-	-	-
G 20	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.3 (0.5 mbar) P_{min}	-	-	-	-	-	-	-
C_5 design boilers								
G 20	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.4 (2.0 mbar) P_n	-	-	-	-	-	-	-
G 20	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.4 (2.0 mbar) P_{min}	-	-	-	-	-	-	-

Type of gas	Operating conditions	Gas pressure before the appliance/ at the nozzle (mbar)		O_2 (% vol.)	CO_2 (% vol.)	CO		CO limit at n=1 (% vol.)
						Meas. (ppm)	At n=1 (% vol.)	
G 20	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.5 (0.5 mbar) P_n	-	-	-	-	-	-	-
	Test according to ČSN EN 15502-2-1+A1, Art. 8.12.3.101.5 (0.5 mbar) P_{min}			-	-	-	-	
Sooting								
G 21	Test according to ČSN EN 15502-1+A1, Art. 8.12.4 (1.05 x Q_n)	20	No sooting will occur.					
Supplementary test for low temperature boilers and condensing boilers								
G 20	Test according to ČSN EN 15502-1+A1, Art. 8.12.5 (Q_n)	20	Level switch caused the shutdown.					

Other contaminants

Type of gas	Operating conditions	Fuel pressure before the appliance (mbar)	O_2 (% vol.)	NO_x	
				Meas. (ppm)	At O_2=0 % (mg/kWh)
Combustion level tests according to ČSN EN 15502-1+A1, Art. 8.13.1					
G 20	70 % Q_a	20	5,1	21	49
G 20	60 % Q_a	20	5,5	17	41
G 20	40 % Q_a	20	6,2	12	30
G 20	20 % Q_a	20	6,9	8	21
$NO_{x,o}$ at O_2 = 0 %: 31 mg/kWh (NCV) $NO_{x,o}$ at O_2 = 0 %: 28 mg/kWh (GCV)			NOx class: 6		

Accredited test number: **T 001** Test title: **Formation of condensate**

Testing method: ČSN EN 15502-1+A1:2017, Art. 8.15

Sample tested: ONGAS 604, ONGAS 609

Measuring equipment used: see table in Chap. III

Test results:

Requirement	Specification of requirement	Test evaluation	Note
Formation of condensate Requirements When the boiler is installed in accordance with the test conditions for efficiency measurement under 9.3.2 and at the maximum flue length specified by the manufacturer, under the conditions specified the condensate shall only form at the points intended for this purpose and shall be readily drained. Condensate shall not find its way to parts of the boiler which are not intended for formation, collection and discharge of condensate, nor may the condensate cause any nuisance to the operation the boiler and the surroundings.	ČSN EN15502-1 +A1:2017, Art. 8.15	+	

Note: + Requirement fulfilled x Not assessed
- Requirement not fulfilled 0 Not applicable

Measurement results: **1. ONGAS 609**

Date of testing:	2014-03-06	t_{ok} = 17,7	°C	r.v. = 35,8	%	p_a = 993,0	mbar

Water temperature, return/outlet (°C)	Volume of water (l)	Time of the test (h)	Note
30±0,5 / 40	-	4	

Measurement results: **2. ONGAS 604**

Date of testing:	2014-03-12	t_{ok} = 17,6	°C	r.v. = 31,4	%	p_a = 100,3	kPa

Water temperature, return/outlet (°C)	Volume of water (l)	Time of the test (h)	Note
30±0,5 / 40	-	4	

Test evaluation: The condensate is drained properly.

Testing engineer responsible for the test results:

Ing. Zdeněk Laštovička	2014-06-17	
Name	Date	Signature

Reviewed by:

Milan Holomek	2018-06-18	
Name	Date	Signature

V. List of additional documents used

- Order no. B-61509 of 2018-01-25 (received on 2018-02-05)
- Contract no. B-61509/30 of 2018-02-12
- Implementation date change of 2018-06-29
- Regulation (EU) 2016/426 of the European Parliament and of the Council, on appliances burning gaseous fuels and repealing Directive 2009/142/EC
- Directive 92/42/EEC, as amended by Council Directive 93/68/EEC (hereinafter referred to as Directive 92/42/EEC), on efficiency requirements for new hot-water boilers burning liquid or gaseous fuels (transposed into Government Regulation 25/2003 Coll., as amended by Government Regulation 126/2004 Coll. and Government Regulation 42/2006 Coll.) (hereinafter referred to as Government Regulation 25/2003 Coll.).
- ČSN EN 15502-1+A1:2017 – Gas-fired heating boilers – Part 1: General requirements and tests
- ČSN EN 15502-2-1+A1:2017 – Gas-fired central heating boilers – Part 2-1: Specific standard for type C appliances and type B_2, B_3 and B_5 appliances of a nominal heat input not exceeding 1 000 kW
- ČSN EN 437+A1:2009 – Test gases - Test pressures - Appliance categories
- Materials archived within the Task No. 30-12328
- Installation, user and service manual
- Main drawing documentation:
  - general drawing of the boiler ONGAS 604, 605, 606, 607, 608, 609
  - heat exchanger ONGAS 604, 605, 606, 607, 608, 609, ONGAS 600 – front section, ONGAS 600 – middle section, ONGAS 600 - back section
  - burners No. E0010104, E0010125, E0010131, E0010137, E0010141, E0010145

Test Report compiled by: Milan Holomek

Person responsible for correctness of the Report:

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