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



L 1045.1

# TEST REPORT
# 30-16068/T

| | |
|---|---|
| **Product:** | Hot-water condensing boiler |
| **Type designation:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Customer:** | ÖNMETAL DÖKÜM SAN. A.Ş.<br>Ikitelli OSB Mah. 25. Cad. No:10 Başakşehir<br>343 06, Istanbul,<br>TURKEY |
| **Manufacturer:** | ÖNMETAL DÖKÜM SAN. A.Ş.<br>Ikitelli OSB Mah. 25. Cad. No:10 Başakşehir<br>343 06, Istanbul,<br>TURKEY |
| **Manufacturing plant:** | ÖNMETAL DÖKÜM SAN. A.Ş.<br>Edirne OSB 4. Cad. No:3-5<br>22560 Süloğlu, Edirne,<br>TURKEY |
| **Employee responsible:** | Ing. Bohdan Brázda |
| **Report issue date:** | 2023-05-17 |
| **Distribution list:** | 1 copy to the Engineering Test Institute<br>1 copy to the Customer |

## I. Description of product tested

The boiler ONGAS Compact 24-28 kW Domestic Condensing Boiler is wall-hang gas fired condensing hot water boiler. The boiler is designed for the heating of the water in central heating systems and for the generation of domestic hot water (DHW). The boiler is equipped with premix burner burning natural gas (G20) and propane (G31). According to the combustion products exhaust, the boiler is of $C_{13}$, $C_{33}$, $C_{93}$ type. Gas category of this boiler is $I_{2H}$, $I_{2E}$, $I_{3P}$, $II_{2H3P}$.

Technical data of the appliance for natural gas (G20):

| Model | Heat input [kW] | Heat output [kW] | | Nominal heat input (in the domestic hot water mode) [kW] | Power supply | |
|---|---|---|---|---|---|---|
| | | at 80/60 °C | at 50/30 °C | | Voltage [V] | Frequency [Hz] |
| ONGAS Compact 24-28 kW Domestic Condensing Boiler | 3,5 – 23,7 | 3,4 – 22,9 | 3,6 – 24,0 | 27,5 | 230 | 50 |

Technical data of the appliance for propane (G31):

| Model | Heat input [kW] | Heat output [kW] | | Nominal heat input (in the domestic hot water mode) [kW] | Power supply | |
|---|---|---|---|---|---|---|
| | | at 80/60 °C | at 50/30 °C | | Voltage [V] | Frequency [Hz] |
| ONGAS Compact 24-28 kW Domestic Condensing Boiler | 3,5 – 23,7 | 3,4 – 22,9 | 3,6 – 23,6 | 27,5 | 230 | 50 |

This condensing hot water boiler is equipped with following components:

| Component | Manufacturer | Specification | Remarks |
|---|---|---|---|
| PCB | Resideo | S4962V3125 | EU Declaration of Conformity of 2019-06-04 |
| PCB (alternative) | Enpi | ECB 315 0009 | Certificate no. EMC-B-00323-22 of 2022-02-15<br>Certificate no. LVD-B-00322-22 of 2022-02-15<br>Certificate no. GAR-1015-00321-22 of 2022-02-15 |
| Blower | SIT | 0481209 NG40E | EC Declaration of conformity of 2022-07-29 |
| Blower (alternative) | EBM-Papst | VG100 55667.80270 | EU Declaration of Conformity of 2021-06-15 |
| Venturi | SIT | W990000610 (20mm) | |
| Venturi (alternative) | EBM-Papst | VG100 55667.80270 | |
| Gas valve | SIT | D848106A | EU type examination certificate (GAR) no. 17GR0143/04 of 2021-01-26 |
| Gas valve (alternative) | Resideo | VK8205VE1003B | EU type examination certificate (GAR) no. 18GR0202/02 of 2018-08-02 |
| Burner | Polidoro | - | |
| Burner (alternative) | Beckett-Worgas | - | |
| Pump | Grundfos | UPM3S 15-60 AOKR | EU declaration of conformity of 2019-11-28 |
| Pump | Duca | BPE 15-8 | Certificate attestation of Conformity of 2021-06-02 |
| Expansion vessel | Önaysan | YMM RCF0801 8 LT 3/8" | |

| Component | Manufacturer | Specification | Remarks |
|---|---|---|---|
| Hydraulic group (inlet) | Pakkens | 1590103001 HB103R2 | |
| Hydraulic group (outlet) | Pakkens | 1590200100 HB103F1 | |
| Plate heat exchanger for DHW | Hrale (Pakkens) | T12A-137 16P | |
| 3-way valve motor | Chunhui (Pakkens) | 1599000002 | |
| Pressure sensor | GTE | TCBAA00 | Attestation of conformity no. 3507070.01_AoC_EMC of 2020-05-29 |
| NTC sensors | Enpi | STD 1310K00KE | EC Declaration of conformity of 2020-05-14 |
| Ignition electrode | Erta | BU-76-20 | |
| Heat exchanger | Önmetal | ONGAS Compact HEX | |
| Siphon | Gropalli | T01.003.000020.22504A | |
| Chimney | Ant Kalip | Air-flue system Rigid and flexible | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 |

## II. Sample tested

| SZU reg. no. | Product name | Date of submission |
|---|---|---|
| 0212.22.36742.001 | ONGAS Compact 24-28 kW Domestic Condensing Boiler | 2022-05-20 |

The visual inspection, tests and verification were carried out by technicians Ondřej Ptáček and Milan Holomek at the test station of SZU since 2022-05-23 till 2022-06-01.
The tests were performed using measuring and testing equipment with valid calibration.

## III. Measuring and testing equipment

| No. | Description | Inventory No. |
|---|---|---|
| 1. | Barometer | 022389-B/14 |
| 2. | Water meter DN10 Optiflux 5000 F | 022389-C/4 |
| 3. | Water meter DN15 Optiflux 5000 F | 022389-C/3 |
| 4. | Gas meter IRM-A | ME 561 |
| 5. | Humidity meter and thermometer | 022389-C/5 |
| 6. | Elektrometer | 022389-C/16 |
| 7. | Set for measuring of temperatures | 022389-C/5 |
| 8. | Manometer (gas pressure at gas meter) | 022389-C/10 |
| 9. | Manometer (gas pressure before the boiler) | 022389-C/11 |
| 10. | Chronometer | 990760 |
| 11. | Combustion product analyser Horiba PG 350 PMA *) | 022392 |
| 12. | Thermometer Therm 2285-2 | 021759 |
| 13. | Manometer | ME 546 |
| 14. | Pressure pump | ME 529 |
| 15. | Soundness meter WÖHLER DP 600 | 022388 |

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

## IV. Test results

| No. | Test objective | Requirement | Method of test | Documentation | Test evaluation/ verification * |
|---|---|---|---|---|---|
| 1. | Soundness of the gas circuit | ČSN EN 15502-1:2022, Art. 8.2.1.1, 8.2.1.3 | ČSN EN 15502-1:2022, Art. 8.2.1.2 | 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 | ČSN EN 15502-2-1+A1:2017, Art. 8.2.2.102.1 | Page 7 - 10 | + |
| 3. | Soundness of the water circuit | ČSN EN 15502-1:2022, Art. 8.2.3.1.1, 8.2.3.3.1, 8.2.4 | ČSN EN 15502-1:2022, Art. 8.2.3.1.2, 8.2.3.3.2 | Page 11 - 12 | + |
| 4. | Hydraulic resistance | ČSN EN 15502-1:2022, Art. 8.3.1 | ČSN EN 15502-1:2022, Art. 8.3.2 | Page 13 | + |
| 5. | Heat input, heat output and useful efficiency | ČSN EN 15502-1:2022, Art. 8.4.1.1, 8.4.4, 8.4.5.1, 8.4.6.1, 8.4.7.1, 8.4.8.1, 8.4.9.1, 9.1.1 Commission regulation (EU) No. 813/2013, Annex II, Art. 1 a) | ČSN EN 15502-1:2022, Art. 8.4.1.2, 8.4.5.2, 8.4.6.2, 8.4.7.2, 8.4.8.2, 8.4.9.2, 9, 9.1, 9.2.2, 9.3.2, 9.3.2.2, 9.3.2.3.1.3, 9.4, 9.4.6 | Page 14 - 21 | + |
| 6. | Limiting temperatures | ČSN EN 15502-1:2022, Art. 8.5.1, 8.5.2.1, 8.5.2.1.1, 8.5.2.1.2, 8.5.4 ČSN EN 15502-2-1+A1:2017, Art. 8.5.101 | ČSN EN 15502-1:2022, Art. 8.5.2.2, 8.5.3.2, 8.5.4.2 ČSN EN 15502-2-1+A1:2017, Art. 8.5.101 | Page 22 - 24 | + |
| 7. | Ignition, flame cross-lighting and stability | ČSN EN 15502-1:2022, Art. 8.6.2, 8.6.2.1 ČSN EN 15502-2-1+A1:2017, Art. 8.6.3.101 | ČSN EN 15502-1:2022, Art. 8.6.2.2 ČSN EN 15502-2-1+A1:2017, Art. 8.6.3.101, 8.6.3.102 | Page 25 - 29 | + |
| 8. | Adjusting, control and safety devices | ČSN EN 15502-1:2022, Art. 7.3.3.1, 7.3.3.1.1, 7.3.3.2.1, 7.3.3.3.2.1, 8.7.1, 8.11.1, 8.11.3, 8.11.3.1.1.1, 8.11.3.1.1.2, 8.11.3.1.1.3, 8.11.3.1.2.1, 8.11.3.1.2.2, 8.11.4.2.1, 8.11.5.2.1, 8.11.5.2.2.1, 8.11.6.2.1.1, 8.11.6.2.2.1, 8.11.6.2.4.1, 8.11.6.2.5.1, 8.11.7.1, 8.11.8.1.1, 8.11.8.1.2, 8.11.8.2.1.1, 8.11.8.2.2.1, 8.11.8.2.2.2 ČSN EN 15502-2-1+A1:2017, Art. 8.9.101, 8.9.103, 8.11.101, 8.11.101.1, 8.11.101.3.2, 8.11.101.3.3 | ČSN EN 15502-1:2022, Art. 7.3.3.1.2, 7.3.3.2.2, 7.3.3.3.2.2, 8.7.2, 8.11.3.1.1.1, 8.11.3.1.1.2, 8.11.3.1.1.3, 8.11.3.1.2.1, 8.11.3.1.2.2, 8.11.4.2.2, 8.11.5.2.2.2, 8.11.6.2.1.2, 8.11.6.2.2.2, 8.11.6.2.4.2, 8.11.6.2.5.2, 8.11.7.2, 8.11.8.1.3, 8.11.8.2.1.2, 8.11.8.2.2.3 ČSN EN 15502-2-1+A1:2017, Art. 8.9.101, 8.9.103, 8.11.101.3.2, 8.11.101.3.3 | Page 30 - 44 | + |

| No. | Test objective | Requirement | Method of test | Documentation | Test evaluation/ verification * |
|---|---|---|---|---|---|
| 9. | Combustion efficiency | ČSN EN 15502-1:2022, Art. 8.12, 8.12.1.1, 8.12.2, 8.12.2.2, 8.12.3, 8.12.3.1.1, 8.12.3.2, 8.12.3.2.1, 8.12.3.3, 8.12.3.3.1, 8.12.4, 8.12.4.1, 8.12.5, 8.12.5.1 ČSN EN 15502-2-1+A1:2017, Art. 8.12.2, 8.12.2.101, 8.12.2.102, 8.12.3 Commission regulation (EU) No. 813/2013, Annex II, Art. 4 a) | ČSN EN 15502-1:2022, Art. 8.12.1.2, 8.12.2.1, 8.12.2.3, 8.12.3.1.2, 8.12.3.2.2, 8.12.3.3.2, 8.12.4.2, 8.12.5.2, 8.13.2, 8.13.2.1, 8.13.2.2, 8.13.2.6, 8.13.3 ČSN EN 15502-2-1+A1:2017, Art. 8.12.2.102, 8.12.3, 8.12.3.101, 8.12.3.101.1 | Page 45 – 53 | + |
| 10. | Formation of condensate | ČSN EN 15502-1:2022, Art. 8.15.1 | ČSN EN 15502-1:2022, Art. 8.15.2 | Page 54 | + |
| 11. | Temperature of combustion products | ČSN EN 15502-1:2022, Art. 8.16.1 ČSN EN 15502-2-1+A1:2017, Art. 8.16.102.1, 8.16.102.2 | ČSN EN 15502-1:2022, Art. 8.16.2 ČSN EN 15502-2-1+A1:2017, Art. 8.16.102.1, 8.16.102.2 | Page 55 - 56 | + |
| 12. | Mechanical resistance and stability of ducts, terminal and fitting pieces | ČSN EN 15502-2-1+A1:2017 Art. 8.101.1, 8.101.2.1, 8.101.2.2, 8.101.2.3, 8.101.3.1, 8.101.3.2, 8.101.4, 8.102.1, 8.102.2.1, 8.102.2.2, 8.102.2.3, 8.102.2.4, 8.102.2.5, 8.102.2.6, 8.102.2.7, 8.103.1, 8.103.2, 8.103.3, 8.103.4, 8.103.5, 8.103.6, 8.103.7, 8.103.8.1, 8.103.8.2 | - | Page 57 - 64 | + |
| 13. | Electric auxiliary energy | ČSN EN 15502-1:2022, Art. 10.1, 10.1.1, 10.1.2, 10.1.3.1, 10.1.4.1, 10.1.5.1, 10.2.1, 10.2.2, 10.2.3.1, 10.2.4.1, 10.2.5.1 | ČSN EN 15502-1:2022, Art. 10.1.3.2, 10.1.4.2, 10.1.5.2, 10.2.3.2, 10.2.4.2, 10.2.5.2 | Page 65 - 67 | + |

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

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

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

| | |
|---|---|
| **Test objective:** | **Soundness of the gas circuit** |
| **Exact name of the test procedure:** | T 001*<br>Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions |
| **Test method:** | ČSN EN 15502-1:2022, Art. 8.2.1.2 |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |
| **Date of test:** | 2022-05-23 |

**Test results:**

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Soundness of the gas circuit** | ČSN EN 15502-1:2022, Art. 8.2.1 | | |
| **Requirements**<br>The gas circuit shall be sound. Internal soundness requirements for the controls are given in Clause 7.<br>The external soundness of the gas circuit in the boiler is verified before and after all the tests of this standard.<br>External soundness is assured if, under the test conditions below, the leakage of air does not exceed 0,14 $dm^3/h$. | ČSN EN 15502-1:2022, Art. 8.2.1.1 | + | |
| **Water penetration into the gas circuit**<br>The gas circuit and the water circuits shall be separate. If an actuator or a control has a sliding shaft or a link with the diaphragm separating:<br>a) the gas circuit and the heating water circuit;<br>b) the gas circuit and the domestic water circuit.<br>There shall be an air vent between these circuits. The area of this aperture shall be at least 19 $mm^2$ and it shall be possible to introduce a 3,5 mm pin gauge into it. | ČSN EN 15502-1:2022, Art. 8.2.1.3 | + | |

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

**Measurement results:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date of testing: | 2022-05-23 | $t_{amb}$ = 20,0 | °C | rel. Humidity = 27,5 | % | $p_a$ = 982,5 | mbar |

| Testing pressure (mbar) | Medium leakage ($dm^3$/hour) | Medium leakage limit ($dm^3$/hour) |
|---|---|---|
| 150 | 0 | 0,14 |

**Test evaluation:** The gas circuit is sound.

| | |
|---|---|
| **Test objective:** | **Soundness of the combustion circuit** |
| **Exact name of the test procedure:** | T 001*<br>Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions |
| **Test method:** | ČSN EN 15502-2-1+A1:2017, Art. 8.2.2.102.1 |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |
| **Date of test:** | 2022-05-30 |

**Test results:**

<table>
<tr><th>Requirement</th><th>Specification of requirement</th><th>Test evaluation</th><th>Note</th></tr>
<tr><td>Soundness of the combustion circuit</td><td colspan="3">ČSN EN 15502-2-1+A1:2017, Art. 8.2.2</td></tr>
<tr><td>General<br>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.<br>Soundness is verified before and after all the tests of this standard, except the tests specified in the mechanical tests.<br>All the joints identified in the installation instructions shall be checked, for example between:<br>a) the boiler and its ducts;<br>b) interconnecting ducts;<br>c) the ducts and any bends and;<br>d) the ducts and any fitting piece or terminal.<br>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.<br>In accordance with the installation instructions, the wall connections, the joint with the terminal tone joint with the fitting piece with another systém of combustion products evacuation may be made sound.</td><td>ČSN EN 15502-2-1+A1: 2017, Art. 8.2.2.101</td><td>+</td><td></td></tr>
<tr><td>Soundness of the air supply and combustion product circuit type C boilers</td><td colspan="3">ČSN EN 15502-2-1+A1:2017, Art. 8.2.2.102</td></tr>
<tr><td>Air supply and combustion product circuit<br>Requirements<br>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.<br>Table 102: Maximum admissible leakage rate
<table>
<tr><th rowspan="2">Test object</th><th rowspan="2">Surrounding of the combustion products circuit by the combustion air circuit</th><th colspan="2">Maximum leakage rate ($m^3/h$)</th></tr>
<tr><th>$Q_n \leq 40kW$</th><th>$Q_n \geq 40kW$</th></tr>
<tr><td rowspan="2">Boiler with its air supply and combustion products evacuation ducts and all their joints</td><td>completely</td><td>5</td><td>5 $Q_n/40$</td></tr>
<tr><td>not completely</td><td>1</td><td>$Q_n/40$</td></tr>
<tr><td rowspan="2">Boiler and the joint to the air supply and combustion products evacuation duct</td><td>completely</td><td>3</td><td>3 $Q_n/40$</td></tr>
<tr><td>not completely</td><td>0,6</td><td>0,6 $Q_n/40$</td></tr>
</table></td><td>ČSN EN 15502-2-1: 2017, Art. 8.2.2.102.1</td><td>0<br>0<br>+<br>0</td><td></td></tr>
</table>

| Requirement | | | Specification of requirement | Test evaluation | Note |
|---|---|---|---|---|---|
| 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 | |
| **Requirements for combustion products evacuation duct for appliances with indirect air proving**<br>Requirements<br>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 $dm^3/s \cdot m^2$. | | | ČSN EN 15502-2-1+A1 2017, Art. 8.2.2.102.2 | 0 | |
| **Requirements for separate combustion products evacuation duct**<br>Requirements<br>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 $dm^3/(s \cdot m^2)$. | | | ČSN EN 15502-2-1+A1 2017, Art. 8.2.2.102.3 | 0 | |
| **Requirements for the air supply circuit**<br>Requirements<br>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 $dm^3/(s \cdot m^2)$. | | | ČSN EN 15502-2-1+A1 2017, Art. 8.2.2.102.4 | 0 | |
| **Requirements for leakage of combustion products for type $C_7$ boilers**<br>Requirements<br>Under the test conditions combustion products shall only escape from the secondary flue outlet. | | | 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**<br>Boilers shall comply with 8.2.2.103.2 or 8.2.2.103.3. 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 | 0 | |
| **Type $B_2$ and $B_5$ boilers**<br>Requirements<br>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. | | | ČSN EN 15502-2-1+A1 2017, Art. 8.2.2.103.2 | 0 | |
| **Type $B_3$ boilers**<br>Requirements<br>Soundness is ensured if one of the following requirements is met<br>a) The leakage rate of the combustion products circuit does not exceed:<br>1) 3,0 $m^3/h$ for boilers with a nominal heat input until 40 kW or<br>2) 3 $Q_n$/40 $m^3/h$ for boilers above 40 kW; | | | ČSN EN 15502-2-1+A1 2017, Art. 8.2.2.103.3 | 0 | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| b) The leakage rate of the combustion circuit (with all the ducts and joints) does not exceed:<br>1) 5,0 $m^3/h$ for boilers with a nominal heat input until 40 kW or<br>2) 5 $Q_n/40$ $m^3/h$ for boilers above 40 kW. | | | |
| **Combustion products evacuation ducts of type $B_5$ boilers**<br>$B_5$ boilers include all the components necessary to exhaust the combustion products to the outside of the building.<br>Requirements<br>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:<br>a) The combustion products evacuation circuit is completely surrounded by combustion air circuit or<br>b) Under the following test conditions the leakage rate per square metre surface of the duct does not exceed 0,006 $dm^3/(s \cdot m^2)$.<br>Test conditions<br>The test checks all the joints specified in the installation instructions, including the connections between:<br>c) the boiler and its ducts;<br>d) interconnecting ducts;<br>e) the ducts and any bends and<br>f) the ducts and any fitting piece or terminal.<br>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 systém of its combustion products evacuation circuit must be made sound In accordance with the installation instruction.<br>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.<br>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
- Requirement not fulfilled
x Not assessed
0 Not applicable

**Measurement results:**

| | | | |
|---|---|---|---|
| Date of testing: 2022-05-30 | $t_{amb}$ = 21,0 °C | rel. Humidity = 37,3 % | $p_a$ = 985,5 mbar |

| 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 Compact 24-28 kW Domestic Condensing Boiler | $Q_n \leq 40kW$ | $Q_n \geq 40kW$ |
| 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 | 2,5 | 3 | 3 $Q_n/40$ |
| | not completely | - | 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 objective:** | **Soundness of the water circuit** |
| **Exact name of the test procedure:** | T 001*<br>Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions |
| **Test method:** | ČSN EN 15502-1:2022, Art. 8.2.3.1.2, 8.2.3.3.2 |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |
| **Date of test:** | 2022-06-01 |

**Test results:**

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **General** | ČSN EN 15502-1:2022, Art. 8.2.3.1 | | |
| **Requirements**<br>The boilers and/or their sections shall withstand a hydraulic test according to their classification as stated in 4.3. | ČSN EN 15502-1:2022, Art. 8.2.3.1.1 | + | |
| **Boilers of pressure class 1** | ČSN EN 15502-1:2022, Art. 8.2.3.2 | | |
| **Requirements**<br>Under the test conditions below, there shall be neither leakage during the test nor permanent visible distortionat the end of the test. | ČSN EN 15502-1:2022, Art. 8.2.3.2.1 | 0 | |
| **Boilers of pressure class 2** | ČSN EN 15502-1:2022, Art. 8.2.3.3 | | |
| **Requirements**<br>Under the test conditions below, there shall be neither leakage during the test nor permanent visible distortion at the end of the test. | ČSN EN 15502-1:2022, Art. 8.2.3.3.1 | + | |
| **Boilers of pressure class 3** | ČSN EN 15502-1:2022, Art. 8.2.3.4 | | |
| **Boilers of sheet steel or non-ferrous metals** | ČSN EN 15502-1:2022, Art. 8.2.3.4.1 | | |
| **Requirements**<br>Under the test conditions below, there shall be neither leakage during the test, nor permanent visible distortion, at the end of the test. | ČSN EN 15502-1:2022, Art. 8.2.3.4.1.1 | 0 | |
| **Boilers of systém iron and system materials** | ČSN EN 15502-1:2022, Art. 8.2.3.4.2 | | |
| **Boiler body requirements**<br>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. | ČSN EN 15502-1:2022, Art. 8.2.3.4.2.1 | 0 | |
| **Resistance to bursting requirements**<br>Under the test conditions below, the sections shall remain sound at a pressure of 4 × PMS + 2 bar. | ČSN EN 15502-1:2022, Art. 8.2.3.4.2.3 | 0 | |
| **Tie bars requirements**<br>The tie bars shall withstand a pressure of 4 × PMS. | ČSN EN 15502-1:2022, Art. 8.2.3.4.2.5 | 0 | |
| **Soundness of the domestic water circuit**<br>The domestic hot water circuit and the heating circuit shall be separate. If an actuator or a control has a sliding shaft or a link with the diaphragm separating:<br>a) the gas circuit and the heating water circuit;<br>b) the heating water circuit and the domestic water circuit;<br>c) the gas circuit and the domestic water circuit.<br>There shall be an air vent between these circuits. The area | ČSN EN 15502-1:2022, Art. 8.2.4 | + | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| of this aperture shall be at least 19 $mm^2$ and it shall be possible to introduce a 3,5 mm pin gauge into it. | | | |

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

**Measurement results:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date of testing: | 2022-06-01 | $t_{amb}$ = 20,6 | °C | rel. Humidity = 30,2 | % | $p_a$ = 997,6 | mbar |

| Test conditions | Maximum working pressure [bar] | Test pressure [bar] | Test duration [min] | Test evaluation | Note |
|---|---|---|---|---|---|
| ČSN EN 15502-1:2022, Art. 8.2.3.3.2 | 3,0 | 4,5 | 10 | There is no leakage and no permanent visible distortion. | |

| | |
|---|---|
| **Test objective:** | **Hydraulic resistance** |
| **Exact name of the test procedure:** | T 001*<br>Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions |
| **Test method:** | ČSN EN 15502-1:2022, Art. 8.3.2 |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |

**Test results:**

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Requirements**<br>Under the test conditions below, the values of the hydraulic resistance or available pressure shall comply with the values given in the instructions for installation. | ČSN EN 15502-1:2022, Art. 8.3.1 | + | |

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

**Measurement results:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date of testing: | 2022-05-23 | $t_{amb}$ = 20,0 | °C | rel. humidity = 27,5 | % | $p_a$ = 982,5 | mbar |

| Test conditions | Water flow [$m^3/h$] | Test evaluation: |
|---|---|---|
| ČSN EN 15502-1:2022, Art. 8.3.2 | 0,942 | The measured hydraulic resistance comply with the value given by the manufacturer in manual. |

| | |
|---|---|
| **Test objective:** | **Heat input, heat output and useful efficiency** |
| **Exact name of the test procedure:** | T 001*<br>Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions |
| **Test method:** | ČSN EN 15502-1:2022, Art. 8.4.1.2, 8.4.5.2, 8.4.6.2, 8.4.7.2, 8.4.8.2, 8.4.9.2, 9, 9.1, 9.2.2, 9.3.2, 9.3.2.2, 9.3.2.3.1.3, 9.4, 9.4.6 |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |

**Test results:**

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Determination of the nominal heat input or the maximum and minimum heat input** | ČSN EN 15502-1:2022, Art. 8.4.1 | | |
| **Requirements**<br>The corrected heat input obtained under the test conditions below shall not differ by more than 5 % from:<br>a) the nominal heat input, for boilers without a range rating device, or,<br>b) the maximum and minimum heat input for boilers with a range rating device.<br>If this 5 % is less than 500 W, a tolerance of 500 W is acceptable. | ČSN EN 15502-1:2022, Art. 8.4.1.1 | + | |
| **Adjustment of the heat input by the downstream gas pressure** | ČSN EN 15502-1:2022, Art. 8.4.2 | | |
| **Requirements**<br>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 15502-1:2022, Art. 8.4.2.2 | 0 | |
| **Ignition rate** | ČSN EN 15502-1:2022, Art. 8.4.3 | | |
| **Requirements**<br>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 15502-1:2022, Art. 8.4.3.1 | 0 | |
| **Nominal output**<br>Requirements:<br>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 15502-1:2022, Art. 8.4.4 | + | |
| **Verification of the nominal condensing output** | ČSN EN 15502-1:2022, Art. 8.4.5 | | |
| **Requirements**<br>If the instruction for installation state the nominal condensing output it is verified under the following test conditions. | ČSN EN 15502-1:2022, Art. 8.4.5.1 | + | |
| **Nominal domestic hot water heat input** | ČSN EN 15502-1:2022, Art. 8.4.6 | | |
| **Requirement**<br>Under the test conditions below, the nominal domestic hot water heat input shall be obtained or may be adjusted to within ± 5 %. | ČSN EN 15502-1:2022, Art. 8.4.6.1 | + | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Water pressure to obtain the nominal heat input for instantaneous combination boilers** | ČSN EN 15502-1:2022, Art. 8.4.7 | | |
| **Requirements**<br>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 15502-1:2022, Art. 8.4.7.1 | + | |
| **Obtaining the domestic hot water temperature for instantaneous combination boilers** | ČSN EN 15502-1:2022, Art. 8.4.8 | | |
| **Requirements**<br>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 15502-1:2022, Art. 8.4.8.1 | + | |
| **Heating-up time of the domestic hot water** | ČSN EN 15502-1:2022, Art. 8.4.9 | | |
| **Requirement**<br>Under the test conditions below, the heating-up time shall not exceed 2 min. | ČSN EN 15502-1:2022, Art. 8.4.9.1 | + | |
| **Useful efficiencies** | ČSN EN 15502-1:2022, Art. 9 | | |
| **General** | ČSN EN 15502-1:2022, Art. 9.1 | | |
| **Correction of measured efficiency to reference conditions**<br>The measured part load efficiency of low temperature boilers (LTB) and that of condensing boilers (CB) shall be corrected according to annex T if the relative humidity and the return temperature deviate from the following reference conditions<br>- Relative humidity: 10 g water/kg diy air<br>- Return temperature for Low temperature boilers: 37 °C<br>- Return temperature for condensing boilers: 30 °C<br>This correction is not relevant for part load efficiency of standard boilers and full load efficiency of all types boilers. | ČSN EN 15502-1:2022, Art. 9.1.1 | + | |
| **Useful efficiency at the nominal heat input** | ČSN EN 15502-1:2022, Art. 9.2 | | |
| **Requirements**<br>The requirement below for useful efficiency is valid for:<br>- boilers with a nominal heat output > 400 kW<br>The instructions for installation of the boiler shall declare the boiler to be a "low temperature boiler", a "condensing boiler" a "standard boiler" or an "other boiler".<br>The useful efficiency of non-range rated boilers measured at nominal heat input according to 9.2.2 and the the useful efficiency of range rated boilers measuted at both the maximum heat input and the arithmetic mean of the maximum and minimum heat input according to 9.2.2, expressed in percent, shall be at least:<br>89,2 % for all boilers<br>91,4 % for low temperature boilers;<br>93,6 % for condensing boilers.<br>NOTE ‚%' is read as ‚% points' | ČSN EN 15502-1:2022, Art. 9.2.1 | 0 | |
| **Useful efficiency at part load** | ČSN EN 15502-1:2022, Art. 9.3 | | |
| **Requirements**<br>The requirement below for useful efficiency is valid for:<br>- boilers with a nominal heat output > 400 kW<br>The instructions for installation of the boiler shall declare the boiler to be a "low temperature boiler", a "condensing boiler" a "standard boiler" or an "other boiler". | ČSN EN 15502-1:2022, Art. 9.3.1 | 0 | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| 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:<br>89,2 % for all boilers<br>91,4 % for low temperature boilers;<br>93,6 % for condensing boilers. | ČSN EN 15502-1:2022, Art. 9.3.1 | 0 | |

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

| Requirement | Specification of requirement | Evaluation | Note |
|---|---|---|---|
| **1. Requirements for seasonal space heating energy efficiency** | Commission Regulation (EU) No 813/2013, Annex II Art. 1 a) | + | |
| a) From 26 September 2015 the seasonal space heating energy efficiency and useful efficiencies of heaters shall not fall below the following values: | | | |
| **Fuel boiler space heaters with rated heat output ≤ 70 kW and fuel boiler combination heaters 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:**<br>The seasonal space heating energy efficiency shall not fall below 86 %. | | + | |
| **Type B1 boilers with rated heat output ≤ 10 kW and type B1 combination boilers with rated heat output ≤ 30 kW:**<br>The seasonal space heating energy efficiency shall not fall below 75 %. | | 0 | |
| **Fuel boiler space heaters with rated heat output > 70 kW and ≤ 400 kW and fuel boiler combination heaters with rated heat output > 70 kW and ≤ 400 kW:**<br>The useful efficiency at 100 % of the rated heat output shall not fall below 86 %, and the useful efficiency at 30 % of the rated heat output shall not fall below 94 %. | | 0 | |

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

**Measurement results:**

| Test according to ČSN EN 15502-1:2022, Art. 8.4.1.2 | | | |
|---|---|---|---|
| Type of fuel: | | **G20** | |
| Sample tested: | | **ONGAS Compact 24-28 kW Domestic Condensing Boiler** | |
| Date: | | 2022-05-23 | 2022-05-24 |
| Fuel flow: | | Maximum | Minimum |
| Stated heat input corrected *) (expressed in terms of NCV) | (kW) | 23,7 | 3,5 |
| Fuel pressure before the boiler | (mbar) | 20,3 | 20,0 |
| Fuel pressure at the measuring gauge | (mbar) | 20,5 | 20,0 |
| Ambient temperature | (°C) | 20,3 | 20,3 |
| Relative air humidity | (%) | 27,6 | 40,6 |
| Barometric pressure | (mbar) | 982,4 | 979,5 |
| Fuel consumption, measured | ($m^3.h^{-1}$) | 2,377 | 0,342 |
| Fuel consumption, **corrected** | ($m^3.h^{-1}$) | 2,446 | 0,351 |
| **Heat input (corrected)** (expressed in terms of NCV) | **(kW)** | **23,64** | **3,39** |
| Uncertainty of heat input | (kW) | 0,12 | 0,02 |
| **Deviation** | **(%)** | **-0,26** | **-3,01** |
| **Permitted deviation** | **(%)** | **± 5** | **± 5** |

Note: *) ... heat input specified by the manufacturer

**Measurement results:**

| Test according to ČSN EN 15502-1:2022, Art. 8.4.4, 8.4.5.2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Type of fuel:** | | **G20** | | | | | |
| **Sample tested:** | | **ONGAS Compact 24-28 kW Domestic Condensing Boiler** | | | | | |
| **Date:** | | 2022-05-23 | 2022-05-23 | 2022-05-24 | 2022-05-23 | 2022-05-23 | 2022-05-23 |
| **Heat output:** | | **Nominal** | **Arithm. Mean** | **Minimum** | **Nominal condensing** | **Minimum** | **Partial** |
| **Temperature gradient** | (°C) | **80/60** | **80/60** | **80/60** | **50/30** | **50/30** | **37/30** |
| **ENTERED VALUES AND AVERAGE VALUES MEASURED:** | | | | | | | |
| Heat input [1] (expressed in terms of NCV) | (kW) | 23,7 | - | 3,5 | 23,7 | 3,5 | - |
| Heat output [1] | (kW) | 22,9 | - | 3,4 | 24,0 | 3,6 | - |
| Barometric pressure | (mbar) | 982,4 | 980,5 | 979,5 | 979,8 | 979,0 | 979,8 |
| Ambient temperature | (°C) | 20,3 | 20,9 | 20,3 | 20,6 | 20,1 | 20,0 |
| Relative air humidity | (%) | 27,6 | 27,3 | 40,6 | 40,5 | 28,7 | 29,0 |
| Fuel pressure at the gas gauge | (mbar) | 20,5 | 20,8 | 20,0 | 20,3 | 20,1 | 21,2 |
| Fuel pressure before the appliance | (mbar) | 20,3 | 20,5 | 20,2 | 20,2 | 20,0 | 21,0 |
| Fuel net calorific value (NCV) at 15°C and 1013.25 mbar | ($MJ.m^{-3}$) | 34,79 | 34,79 | 34,79 | 34,79 | 34,79 | 34,79 |
| Fuel gross calorific value (GCV) at 15°C and 1013.25 mbar | ($MJ.m^{-3}$) | 38,61 | 38,61 | 38,61 | 38,61 | 38,61 | 38,61 |
| Fuel consumption, measured | ($m^3.h^{-1}$) | 2,377 | 1,351 | 0,342 | 2,284 | 0,356 | 0,446 |
| Fuel consumption, converted | ($m^3.h^{-1}$) | 2,269 | 1,282 | 0,327 | 2,178 | 0,339 | 0,426 |
| Circulating water flow | ($m^3.h^{-1}$) | 0,942 | 0,515 | 0,133 | 0,928 | 0,151 | 0,483 |
| Average outlet water temperature | (°C) | 79,9 | 80,2 | 80,0 | 49,9 | 49,5 | 37,8 |
| Average inlet water temperature | (°C) | 60,0 | 59,6 | 59,7 | 29,8 | 29,9 | 29,9 |
| Average temperature of combustion products | (°C) | 82,7 | 68,6 | 54,3 | 60,4 | 42,6 | 32,9 |
| **CALCULATED VALUES:** | | | | | | | |
| Heat input (expressed in terms of NCV) | (kW) | 21,93 | 12,39 | 3,16 | 21,05 | 3,27 | 4,11 |
| Heat output | (kW) | 21,19 | 12,01 | 3,05 | 21,30 | 3,39 | 4,39 |
| Uncertainty of heat output | (kW) | 0,14 | 0,08 | 0,02 | 0,14 | 0,02 | 0,07 |
| Heat output / rated heat output x 100 | (%) | 92,54 | 52,21 | 13,27 | 88,74 | 14,75 | 19,09 |
| **Calorific efficiency** (expressed in terms of NCV) | **(%)** | **96,65** | **96,92** | **96,65** | **101,31** | **103,92** | **107,09** |
| Uncertainty of calorific efficiency (expressed in terms of NCV) | (%) | 0,82 | 0,81 | 0,82 | 0,86 | 0,89 | 1,72 |
| **Calorific efficiency (expressed in terms of GCV)** | **(%)** | **87,09** | **87,33** | **87,08** | **91,29** | **93,64** | **96,49** |
| **Seasonal space heating energy efficiency** (expressed in terms of GCV) [2] | (%) | **91,57** | | | | | |
| Uncertainty of seasonal space heating energy efficiency (expressed in terms of GCV) | (%) | 1,47 | | | | | |
| Required boiler calorific efficiency (expressed in terms of GCV) according to Government Regulation 25/2003 Coll., (must be ≥ than) [2] | (%) | 86 | | | | | |
| Standby loss | (kW) | 0,067 | | | | | |
| Calculated boiler heat output according to ČSN EN 15502-1: 2022, Art. 8.4.4. | (kW) | **22,91** | - | - | **24,01** | - | - |

Note: 1) ...Values declared by the manufacturer
2) ...see Commission regulation (EU) No 813/2013, Annex II, Art. 1 a)

**Measurement results:**

| Test according to ČSN EN 15502-1+A1:2017, Art. 8.4.6.2, 8.4.7.2 | | | |
|---|---|---|---|
| Type of fuel: | | **G20** | |
| Sample tested: | | **ONGAS Compact 24-28 kW Domestic Condensing Boiler** | |
| Date: | | 2022-05-25 | 2022-05-25 |
| Nominal domestic hot water heat input *) | (kW) | 27,5 | 27,5 |
| Domestic hot water pressure | (bar) | 2 | 0,7 |
| Fuel pressure before the boiler | (mbar) | 20,4 | 20,3 |
| Fuel pressure at the measuring gauge | (mbar) | 20,1 | 20,0 |
| Ambient temperature | (°C) | 20,8 | 20,8 |
| Relative air humidity | (%) | 46,3 | 45,6 |
| Barometric pressure | (mbar) | 986,9 | 987,1 |
| Fuel consumption, measured | ($m^3.h^{-1}$) | 2,769 | 2,760 |
| Fuel consumption, corrected | ($m^3.h^{-1}$) | 2,831 | 2,822 |
| Average inlet DHW temperature | (°C) | 10,0 | 10,2 |
| Average outlet DHW temperature | (°C) | 50,0 | 52,7 |
| **Heat input (corrected)** | **(kW)** | **27,36** | **27,27** |
| Uncertainy of heat input | (kW) | 0,14 | 0,13 |
| **Deviation** | **(%)** | **-0,50** | **-0,84** |
| **Permitted deviation** | **(%)** | **± 5** | **± 5** |

Note: *) ... heat input specified by the manufacturer

**Measurement results:**

| Test according to ČSN EN 15502-1:2022, Art. 8.4.1.2 | | | |
|---|---|---|---|
| Type of fuel: | | **G31** | |
| Sample tested: | | **ONGAS Compact 24-28 kW Domestic Condensing Boiler** | |
| Date: | | 2022-05-24 | 2022-05-24 |
| Fuel flow: | | Maximum | Minimum |
| Stated heat input corrected *) (expressed in terms of NCV) | (kW) | 23,7 | 3,5 |
| Fuel pressure before the boiler | (mbar) | 37,0 | 36,8 |
| Fuel pressure at the measuring gauge | (mbar) | 37,2 | 36,8 |
| Ambient temperature | (°C) | 20,2 | 20,3 |
| Relative air humidity | (%) | 40,3 | 53,9 |
| Barometric pressure | (mbar) | 980,3 | 984,5 |
| Fuel consumption, measured | ($m^3.h^{-1}$) | 0,897 | 0,141 |
| Fuel consumption, **corrected** | ($m^3.h^{-1}$) | 0,920 | 0,145 |
| **Heat input (corrected)** (expressed in terms of NCV) | **(kW)** | **22,60** | **3,55** |
| Uncertainty of heat input | (kW) | 0,11 | 0,02 |
| **Deviation** | **(%)** | **-4,66** | **+1,38** |
| **Permitted deviation** | **(%)** | **± 5** | **± 5** |

Note: *) ... heat input specified by the manufacturer

**Measurement results:**

| Test according to ČSN EN 15502-1:2022, Art. 8.4.4, 8.4.5.2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Type of fuel:** | | **G31** | | | | | |
| **Sample tested:** | | **ONGAS Compact 24-28 kW Domestic Condensing Boiler** | | | | | |
| **Date:** | | 2022-05-24 | 2022-05-24 | 2022-05-25 | 2022-05-24 | 2022-05-25 | 2022-05-24 |
| **Heat output:** | | **Nominal** | **Arithm. Mean** | **Minimum** | **Nominal condensing** | **Minimum** | **Partial** |
| **Temperature gradient** | **(°C)** | **80/60** | **80/60** | **80/60** | **50/30** | **50/30** | **37/30** |
| **ENTERED VALUES AND AVERAGE VALUES MEASURED:** | | | | | | | |
| Heat input [1] (expressed in terms of NCV) | (kW) | 23,7 | - | 3,5 | 23,7 | 3,5 | - |
| Heat output [1] | (kW) | 22,9 | - | 3,4 | 23,6 | 3,6 | - |
| Barometric pressure | (mbar) | 980,3 | 980,7 | 984,5 | 980,4 | 984,2 | 980,8 |
| Ambient temperature | (°C) | 20,2 | 20,3 | 20,3 | 20,5 | 20,4 | 20,2 |
| Relative air humidity | (%) | 40,3 | 41,2 | 53,9 | 42,6 | 53,4 | 44,1 |
| Fuel pressure at the gas gauge | (mbar) | 37,2 | 36,9 | 36,8 | 37,0 | 36,8 | 36,8 |
| Fuel pressure before the appliance | (mbar) | 37,2 | 36,9 | 36,8 | 37,0 | 36,8 | 36,8 |
| Fuel net calorific value (NCV) at 15°C and 1013.25 mbar | ($MJ.m^{-3}$) | 88,38 | 88,38 | 88,38 | 88,38 | 88,38 | 88,38 |
| Fuel gross calorific value (GCV) at 15°C and 1013.25 mbar | ($MJ.m^{-3}$) | 97,19 | 97,19 | 97,19 | 97,19 | 97,19 | 97,19 |
| Fuel consumption, measured | ($m^3.h^{-1}$) | 0,897 | 0,528 | 0,141 | 0,912 | 0,144 | 0,167 |
| Fuel consumption, converted | ($m^3.h^{-1}$) | 0,869 | 0,512 | 0,138 | 0,884 | 0,141 | 0,162 |
| Circulating water flow | ($m^3.h^{-1}$) | 0,908 | 0,540 | 0,146 | 0,942 | 0,153 | 0,535 |
| Average outlet water temperature | (°C) | 80,5 | 79,8 | 80,1 | 49,8 | 50,6 | 36,5 |
| Average inlet water temperature | (°C) | 60,3 | 59,8 | 60,3 | 29,8 | 30,2 | 29,7 |
| Average temperature of combustion products | (°C) | 82,7 | 64,4 | 55,3 | 62,0 | 31,3 | 31,1 |
| **CALCULATED VALUES:** | | | | | | | |
| Heat input (expressed in terms of NCV) | (kW) | 21,34 | 12,56 | 3,40 | 21,70 | 3,47 | 3,98 |
| Heat output | (kW) | 20,65 | 12,21 | 3,28 | 21,58 | 3,59 | 4,19 |
| Uncertainty of heat output | (kW) | 0,14 | 0,08 | 0,02 | 0,14 | 0,02 | 0,07 |
| Heat output / rated heat output x 100 | (%) | 90,19 | 53,32 | 14,33 | 91,46 | 15,21 | 17,75 |
| **Calorific efficiency** (expressed in terms of NCV) | **(%)** | **96,76** | **97,22** | **96,54** | **99,58** | **103,56** | **105,25** |
| Uncertainty of calorific efficiency (expressed in terms of NCV) | (%) | 0,82 | 0,82 | 0,82 | 0,84 | 0,87 | 1,93 |
| **Calorific efficiency (expressed in terms of GCV)** | **(%)** | **87,99** | **88,41** | **87,79** | **90,55** | **94,18** | **95,71** |
| **Seasonal space heating energy efficiency** (expressed in terms of GCV) [2] | (%) | **91,05** | | | | | |
| Uncertainty of seasonal space heating energy efficiency (expressed in terms of GCV) | (%) | 1,65 | | | | | |
| Required boiler calorific efficiency (expressed in terms of GCV) according to Government Regulation 25/2003 Coll., (must be ≥ than) [2] | (%) | **86** | | | | | |
| Standby loss | (kW) | 0,067 | | | | | |
| Calculated boiler heat output according to ČSN EN 15502-1: 2022, Art. 8.4.4. | (kW) | **22,93** | **-** | **-** | **23,60** | **-** | **-** |

Note: 1) ...Values declared by the manufacturer
2) ...see Commission regulation (EU) No 813/2013, Annex II, Art. 1 a)

| Required properties | Test result | Note |
|---|---|---|
| **Obtaining the domestic hot water temperature for instantaneous combination boilers** | | |
| ČSN EN 15502-1:2022, Art. 8.4.8.2 | + | It is possible to reach a water temperature of 60 °C up to a pressure of 6 bar |
| **Heating-up time of the domestic hot water** | | |
| ČSN EN 15502-1:2022, Art. 8.4.9.2 | + | Heating-up time did not exceed 2 minutes, it was 82 seconds. |

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

| | |
|---|---|
| **Test objective:** | **Limiting temperatures** |
| **Exact name of the test procedure:** | T 001*<br>Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions |
| **Test method:** | ČSN EN 15502-1:2022, Art. 8.5.2.2, 8.5.3.2, 8.5.4.2<br>ČSN EN 15502-2-1+A1:2017, Art. 8.5.101 |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |
| **Date of test:** | 2022-05-23 |

**Test results:**

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **General**<br>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.<br>The limiting temperatures are measured when thermal equilibrium is reached. | ČSN EN 15502-1:2022, Art. 8.5.1 | + | |
| **Limiting temperatures of the adjusting, control and safety devices** | ČSN EN 15502-1:2022, Art. 8.5.2 | | |
| **Requirements** | ČSN EN 15502-1:2022, Art. 8.5.2.1 | | |
| **Requirements for operating temperatures**<br>Under the test conditions below, the temperature of the adjusting, control and safety devices shall not exceed the value stated in the instruction for installation and their operation shall remain satisfactory. | ČSN EN 15502-1:2022, Art. 8.5.2.1.1 | + | |
| **Requirements for surface temperatures**<br>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:<br>35 K for metals;<br>45 K for porcelain;<br>60 K for plastics.<br>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 15502-1:2022, Art. 8.5.2.1.2 | + | |
| **Limiting temperatures of the side walls, the front and the top** | ČSN EN 15502-1:2022, Art. 8.5.3 | | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Requirements**<br>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.<br>Note: Requirements related to the risks particular to children and elderly people are not covered in this clause. They may found in the applicable part 2. | ČSN EN 15502-1:2022, Art. 8.5.3.1 | + | |
| **Limiting temperatures of the test panels and the floor** | ČSN EN 15502-1:2022, Art. 8.5.4 | | |
| **Requirements:**<br>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.<br>When this temperature rise is between 60 K and 80 K, the instructions for installation 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.<br>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.<br>Note: Requirements related to the risks particular to children and elderly people are not covered in this clause. They may found in the applicable part 2 | ČSN EN 15502-1:2022, Art. 8.5.4.1 | +<br>0<br>0 | |
| **External temperature of the ducts where the ducts are in contact with and or passing through a wall**<br>Requirements<br>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.<br>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
- Requirement not fulfilled
x Not assessed
0 Not applicable

**Measurement results:**

| Date of testing: 2022-05-23 | $t_{amb}$ = 20,8 °C | rel. Humidity = 27,5 % | $p_a$ = 982,5 mbar |
|---|---|---|---|

| Test according to ČSN EN 15502-1:2022, Art. 8.5.2.2 | | | |
|---|---|---|---|
| **Point measured** | **Contact material** | **Temperature rise (K)** | |
| | | **Value measured** | **Max. permitted value** |
| "On/off" button | plastic | 5,0 | 60 |
| "Reset" button | plastic | 5,0 | 60 |
| "Summer/winter mode" button | plastic | 5,0 | 60 |
| " DHW +" button | plastic | 5,0 | 60 |
| " DHW -" button | plastic | 5,0 | 60 |
| " CH +" button | plastic | 5,0 | 60 |
| " CH -" button | plastic | 5,0 | 60 |

| Test according to ČSN EN 15502-1:2022, Art. 8.5.3.2 | | |
|---|---|---|
| **Measured point (grid method)** | **Temperature rise (K)** | |
| | **Value measured** | **Max. permitted value** |
| Front wall of the boiler | 12,0 | 80 |
| Left wall of the boiler | 15,0 | 80 |
| Right wall of the boiler | 8,0 | 80 |
| Bottom wall of the boiler | 11,0 | 80 |
| Top wall of the boiler | 16,0 | 80 |
| Rear wall of the boiler | 14,0 | 80 |

| Test according to ČSN EN 15502-1:2022, Art. 8.5.4.2 | | |
|---|---|---|
| **Measured point (grid method)** | **Temperature rise (K)** | |
| | **Value measured** | **Max. permitted value** |
| Left wall of the corner | 7,0 | 60 |
| Back wall of the corner | 8,0 | 60 |

| 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** |
| Flue duct DN 60/100 mm | 21,0 | 60 |

| | |
|---|---|
| **Test objective:** | **Ignition – Cross lighting – Flame stability** |
| **Exact name of the test procedure:** | T 001*<br>Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions |
| **Test method:** | ČSN EN 15502-1:2022, Art. 8.6.2.2<br>ČSN EN 15502-2-1+A1:2017, Art. 8.6.3.101, 8.6.3.102 |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |

**Test results:**

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Ignition, cross lighting, flame stability** | ČSN EN 15502-1:2022, Art. 8.6 | | |
| **General**<br>The tests are carried out twice, with the boiler at ambient temperature and at thermal equilibrium. | ČSN EN 15502-1 :2022, Art. 8.6.1 | + | |
| **Limit conditions** | ČSN EN 15502-1:2022, Art. 8.6.2 | | |
| **Requirements:**<br>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. | ČSN EN 15502-1:2022, Art. 8.6.2.1 | + | |
| 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). | | 0 | |
| 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 systém. | | 0 | |
| 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, the carbon monoxide concentration, at thermal ekvilibrium, of the dry, air-free combustion products using flame lift limit gas shall not be more than 1000 ppm. | | + | |
| NOTE 1 ppm = 1 $cm^3/m^3$<br>The above requirements shall also be fulfilled where spark restoration or recycling is provided. | | + | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Special flue conditions** | ČSN EN 15502-2-1+A1:2017, Art. 8.6.3 | | |
| **General**<br>Requirements<br>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 | + | |
| **Type $C_1$, $C_3$ and $C_9$ boilers**<br>The boiler is installed in accordance with the installation instructions, with the accessories specified in the installation instructions on the applicable test apparatus of Figures 105 or 106 for type $C_1$ boilers and Figures 107 or 108 for type $C_3$ and $C_9$ boilers. The figures relate to:<br>Figure 105 = Test rig for type C boilers fitted with a horizontal terminal installed on a vertical wall<br>Figure 106 = Test rig for type C boilers fitted with a horizontal terminal on a roof<br>Figure 107 = Test rig for type C boilers fitted with a vertical terminal installed on a flat roof<br>Figure 108 = Test rig for type C boilers fitted with a vertical terminal installed on a pitched roof<br>The following tests are then carried out:<br>First test series<br>The terminal is subjected successively to winds of three different speeds (1 m/s, 2,5 m/s and 12,5 m/s) and with directions in three planes as given in Figures 105, 106, 107 and 108 depending on the boiler type and the situation.<br>For each of the three planes of incidence:<br>a) the three combinations of wind speed and angle of incidence are found giving the lowest $CO_2$ concentration (for evaluating the above requirements );<br>b) the three combinations are found for which the highest CO concentrations are measured, in the dry air-free combustion products (for evaluating 8.12.3.101.1).<br>Second test series<br>The boiler is in thermal equilibrium.<br>For each of the nine combinations that produce the lowest $CO_2$ concentration, noted in the first test series, it is checked that the above requirement is met.<br>Third test series<br>If the technical instruction states there are provisions for a terminal guard, this is fitted in accordance with the technical instructions and the nine tests in the first series that gave the highest CO concentrations in the dry air-free combustion products are repeated. The measured values are noted to be used for the calculation in 8.12.3.101.1. | ČSN EN 15502-2-1+A1:2017, Art. 8.6.3.102 | + | |
| **Type $C_4$ boilers**<br>The boiler is installed with the shortest ducts specified in the installation instructions. A suction of 0,5 mbar is applied to the combustion products evacuation duct.<br>It is checked that the requirements are met. | ČSN EN 15502-2-1+A1:2017, Art. 8.6.3.104 | 0 | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Type $C_5$ boilers**<br>The boiler is installed with the shortest ducts specified in the installation instructions. A suction of 2,0 mbar is applied to the combustion products evacuation duct.<br>It is checked that the requirements are met. | ČSN EN 15502-2-1+A1:2017, Art. 8.6.3.105 | 0 | |
| **Type $C_6$ boilers**<br>The boiler is installed in accordance to the installation instructions. A suction of 0,5 mbar is applied at the combustion products outlet.<br>It is checked that the above requirements are met. | ČSN EN 15502-2-1+A1:2017, Art. 8.6.3.106 | 0 | |
| **Type $C_8$ boilers**<br>The boiler is installed with the shortest ducts specified in the installation instructions. A suction of 2,0 mbar is applied to the combustion products evacuation duct.<br>It is checked that the requirements are met. | ČSN EN 15502-2-1+A1:2017, Art. 8.6.3.108 | 0 | |
| **Type $C_{(10)}$ boilers**<br>For type $C_{(10)}$ boilers:<br>a) the boiler is installed with the shortest fitting pieces specified in the installation instruction;<br>b) a suction equal to the declared minimum safety pressure difference of 200 Pa ($p_{min,saf}$=200Pa) is applied to the combustion evacuation duct, and<br>c) a recirculation of 10% is applied to the combustion air inlet duct.<br>It is checked that the requirements are met. | ČSN EN 15502-2-1+A1:2017, Art. 8.6.3.109 | 0 | |
| **Type $B_2$, $B_3$ boilers**<br>**— Test no 1**<br>The boiler is installed with 0,5 m duct. For type $B_3$ boilers, this is a completely surrounded combustion circuit. A suction of 0,5 mbar is applied to the combustion products evacuation duct while the appliance is running.<br>It is checked that the requirements are met.<br><br>**— Test no 2**<br>The flue outlet is progressively blocked until the pressure at the flue outlet of the boiler has reached the value of 50 Pa.<br>For boilers intended to operate with a pressurised flue duct, designated by a "P", this value is raised to the maximum nominal overpressure declared in the installation instructions, which has not to be greater than 200 Pa.<br>It is checked that the requirements are met. | ČSN EN 15502-2-1+A1:2017, Art. 8.6.3.111 | 0 | |
| **Reduction of the gas rate of the ignition burner** | ČSN EN 15502-1:2022, Art. 8.6.4 | | |
| **Requirements**<br>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.<br>Ignition of the main burner shall be assured without flame roll-out outside the case. | ČSN EN 15502-1:2022, Art. 8.6.4.1 | 0 | |

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

**Measurement results:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date of testing: | 2022-05-24 | $t_{amb}$ = 20,4 | °C | rel. Humidity = 41,2 | % | $p_a$ = 980,0 | mbar |
| Date of testing: | 2022-05-25 | $t_{amb}$ = 20,7 | °C | rel. Humidity = 49,1 | % | $p_a$ = 985,0 | mbar |

| Operating conditions | Heat input | Fuel supply pressure (mbar) | Test gas | Results | Note |
|---|---|---|---|---|---|
| **Limit conditions** | | | | | |
| Limit conditions according to Test No. 1 of ČSN EN 15502-1:2022, Art. 8.6.2.2 | $Q_n$ | 14 | G20 | + | |
| | $Q_m$ | | | + | |
| | $Q_n$ | 17,5 | G20 | + | |
| | $Q_m$ | | | + | |
| | $Q_n$ | 25 | G31 | + | |
| | $Q_m$ | | | + | |
| Limit conditions according to Test No. 2 of ČSN EN 15502-1:2022, Art. 8.6.2.2 | $Q_n$ | 17 | G222 | + | |
| | $Q_m$ | | | + | |
| | $Q_n$ | 18 | G222 | + | |
| | $Q_m$ | | | + | |
| | $Q_n$ | 25 | G32 | + | |
| | $Q_m$ | | | + | |
| Limit conditions according to Test No. 3 of ČSN EN 15502-1:2022, Art. 8.6.2.2 | $Q_n$ | 25 | G23 | + | |
| | $Q_m$ | | | + | |
| | $Q_n$ | | G231 | + | |
| | $Q_m$ | | | + | |
| | $Q_n$ | 33 | G23 | + | |
| | $Q_m$ | | | + | |
| | $Q_n$ | 45 | G31 | + | |
| | $Q_m$ | | | + | |
| **Special conditions** | | | | | |
| **$C_1$, $C_3$ and $C_9$ design boilers** | | | | | |
| Special con. according to 1st series of tests (ČSN EN 15502-2-1, Art. 8.6.3.102) | $Q_n$ | 20 | G20 | + | |
| | $Q_m$ | | | + | |
| Special con. according to 2nd series of tests (ČSN EN 15502-2-1, Art. 8.6.3.102) | $Q_n$ | | | + | |
| | $Q_m$ | | | + | |
| Special con. according to 3ed series of tests (ČSN EN 15502-2-1, Art. 8.6.3.102) | $Q_n$ | | | 0 | |
| | $Q_m$ | | | 0 | |
| **$C_4$ design boilers** | | | | | |
| Test according to ČSN EN 15502-2-1, Art. 8.6.3.104 | $Q_n$ | 20 | G20 | 0 | |
| | $Q_m$ | | | 0 | |

| Operating conditions | Heat input | Fuel supply pressure (mbar) | Test gas | Results | Note |
|---|---|---|---|---|---|
| **$C_5$ design boilers** | | | | | |
| Test according to ČSN EN 15502-2-1, Art. 8.6.3.105 | $Q_n$ | 20 | G20 | 0 | |
| | $Q_m$ | | | 0 | |
| **$C_6$ design boilers** | | | | | |
| Test according to ČSN EN 15502-2-1, Art. 8.6.3.106 | $Q_n$ | 20 | G20 | 0 | |
| | $Q_m$ | | | 0 | |
| **$C_8$ design boilers** | | | | | |
| Test according to ČSN EN 15502-2-1, Art. 8.6.3.108 | $Q_n$ | 20 | G20 | 0 | |
| | $Q_m$ | | | 0 | |
| **$C_{(10)}$ design boilers** | | | | | |
| Test according to ČSN EN 15502-2-1, Art. 8.6.3.109 | $Q_n$ | 20 | G 20 | 0 | |
| | $Q_m$ | | | 0 | |
| **$C_{(11)}$ design boilers** | | | | | |
| Test according to ČSN EN 15502-2-1, Art. 8.6.3.110 | $Q_n$ | 20 | G 20 | 0 | |
| | $Q_m$ | | | 0 | |
| **$B_2$, $B_3$ design boilers** | | | | | |
| Test according to ČSN EN 15502-2-1, Art. 8.6.3.111, test 1) | $Q_n$ | 20 | G20 | 0 | |
| | $Q_m$ | | | 0 | |
| Test according to ČSN EN 15502-2-1, Art. 8.6.3.111, test 2) | $Q_n$ | 20 | G20 | 0 | |
| | $Q_m$ | | | 0 | |
| **$B_5$ design boilers** | | | | | |
| Test according to ČSN EN 15502-2-1, Art. 8.6.3.112 | $Q_n$ | 20 | G20 | 0 | |
| | $Q_m$ | | | 0 | |
| **Reduction of the gas rate of the ignition burner** | | | | | |
| Test according to ČSN EN 15502-1, Art. 8.6.4.2 | $Q_n$ | 18,5 | G20 | 0 | |
| | $Q_m$ | | | 0 | |
| **Resistance to draught, B design boilers** | | | | | |
| Test according to ČSN EN 15502-2-1, Art. 8.6.101 | $Q_n$ | 20 | G20 | 0 | |
| | $Q_m$ | | | 0 | |

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

| | |
|---|---|
| **Test objective:** | **Adjusting, control and safety devices** |
| **Exact name of the test procedure:** | T 001*<br>Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions |
| **Test method:** | ČSN EN 15502-1:2022, Art. 7.3.3.1.2, 7.3.3.2.2, 7.3.3.3.2.2, 8.7.2, 8.11.3.1.1.1, 8.11.3.1.1.2, 8.11.3.1.1.3, 8.11.3.1.2.1, 8.11.3.1.2.2, 8.11.4.2.2, 8.11.5.2.2.2, 8.11.6.2.1.2, 8.11.6.2.2.2, 8.11.6.2.4.2, 8.11.6.2.5.2, 8.11.7.2, 8.11.8.1.3, 8.11.8.2.1.2, 8.11.8.2.2.3<br>ČSN EN 15502-2-1+A1:2017, Art. 8.9.101, 8.9.103, 8.11.101.3.2, 8.11.101.3.3 |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |

**Test results:**

| **Requirement** | **Specification of requirement** | **Test evaluation** | **Note** |
|---|---|---|---|
| **Performance** | ČSN EN 15502-1:2022, Art. 7.3.3 | | |
| **General** | ČSN EN 15502-1:2022, Art. 7.3.3.1 | | |
| **Requirements**<br>Under the test conditions as mentioned below, the opening and closing temperatures of the thermostats shall not differ from those stated in the technical documentation by more than 6 K. For adjustable thermostats, this requirement applies at the minimum and maximum temperatures of the control range. | ČSN EN 15502-1:2022, Art. 7.3.3.1.1 | + | |
| **Control thermostat – Endurance** | ČSN EN 15502-1:2022, Art. 7.3.3.2 | | |
| **Requirements**<br>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:<br>— the switch point of a fixed setting thermostat shall be within ± 10 K of the temperature stated by the manufacturer;<br>— 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 in the instructions for installation. | ČSN EN 15502-1:2022, Art. 7.3.3.2.1 | +<br>0<br>+ | |
| **Water temperature limiting devices – Endurance** | ČSN EN 15502-1:2022, Art. 7.3.3.3 | | |
| **Temperature limiters** | ČSN EN 15502-1:2022, Art. 7.3.3.3.1 | | |
| **Requirements**<br>Temperature limiters shall withstand an endurance test of 10 000 cycles under the test conditions as specified.<br>At the end of the tests, their operation shall comply with the requirements of 7.3.3.1. | ČSN EN 15502-1:2022, Art. 7.3.3.3.1.1 | 0 | |
| **Overheat cut-out devices** | ČSN EN 15502-1:2022, Art. 7.3.3.3.2 | | |
| **Requirements**<br>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.<br>At the end of the tests, their operation shall comply with the requirements of 7.3.3.1. | ČSN EN 15502-1:2022, Art. 7.3.3.3.2.1 | +<br>+ | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| 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. | | + | |
| **Reduction of the gas pressure** | ČSN EN 15502-1:2022, Art. 8.7 | | |
| **Requirements**<br>Under the test conditions below, there shall be no dangerous situation for the user or damage to the boiler. | ČSN EN 15502-1:2022, Art. 8.7.1 | + | |
| **Defective closure of the gas valve immediately upstream of the main burner** | ČSN EN 15502-1:2022, Art. 8.8 | | |
| **Requirements**<br>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 15502-1:2022, Art. 8.8.1 | 0 | |
| **Pre-purge** | ČSN EN 15502-2-1+A1:2017, Art. 8.9 | | |
| **General**<br>Requirements<br>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:<br>a) boilers with a permanent or alternating ignition burner;<br>b) boilers in which the main burner gas line is fitted with a leakage control device;<br>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;<br>d) boilers above 150 kW and up to 300kW, fitted with two Class B valves;<br>e) boilers above 300 kW, fitted with two Class A valves;<br>f) boilers below 70 kW satisfying 8.9.102 (Verification of the protected nature of a combustion chamber);<br>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.<br>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.<br>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.<br>A series of tests is carried out with gas admitted to the boiler or module boiler at the maximum nominal heat input ($Q_{n,max}$) of the boiler or boiler module 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, the ignition sequence, including any delay times within the sequence, is | ČSN EN 15502-2-1+A1:2017, Art. 8.9.101 | +<br>0<br>0<br>+<br>0<br>0<br>0<br>0<br>+<br>+<br>+ | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| activated.<br>It is checked that the requirement for pre-purge under safety of operation is met.<br>The pre-purge shall correspond to the values listed in the text below or as illustrated in table 103:<br><br>h) For boilers or boiler modules with a nominal heat input ($Q_n$) not exceeding 70 kW.<br>Under the following test conditions, the volume or the duration of the pre-purge shall be:<br>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,<br>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 ($Q_n$).<br>i) For boilers or boiler modules with a nominal heat input ($Q_n$) exceeding 70 kW:<br>The pre-purge shall correspond to either:<br>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<br>2) a time of:<br>a) at least 30s at an air rate equal to at least the air rate at the nominal heat input ($Q_n$), or<br>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 ($Q_n$).<br>For modular boilers, in which the products of combustion from each module vent into a common chamber before entering the flue systém, the pre-purge at the time of each initial startup shall be at least three times the volume of the complete assembly of modules.<br>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.<br>For modular boilers in which the products of combustion from each module vent directly into the flue systém, the pre-purge shall be that provided for the individual module. | ČSN EN 15502-2-1+A1:2017, Art. 8.9.101 | +<br>+<br>0<br>+<br>0<br>0<br>0<br>0<br>0<br>0 | |
| **Verification of the protected nature of a combustion chamber**<br>Requirements<br>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 | |
| **Verification of normal ignition in a combustible air/gas mixture for type C boilers incorporating a fan**<br>If normal ignition in a combustible gas/air mixture for type C boilers incorporating a fan is claimed then under the | ČSN EN 15502-2-1+A1:2017 Art. 8.9.103 | + | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| 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. | | | |
| **Functioning of a permanent ignition burner when the fan stops during the standby time** | ČSN EN 15502-1:2022, Art. 8.10 | | |
| **Requirements**<br>Under the test conditions below, the flame stability of the ignition burner shall be correct. | ČSN EN 15502-1:2022, Art. 8.10.1 | 0 | |
| **Adjustment, control and safety devices** | ČSN EN 15502-1:2022, Art. 8.11 | | |
| **Requirement**<br>The temperature specification of the adjustment, control and/or safety device shall be wider than the operating temperature range. | ČSN EN 15502-1:2022, Art. 8.11.1 | + | |
| **Combination Boilers**<br>If the nominal heat input in domestic hot water mode exceeds the nominal heat input in the central heating mode, the following safety requirements of this standard are checked at the nominal heat input in the domestic hot water mode and at the maximum water temperature:<br>a) soundness of the combustion circuit;<br>b) limiting temperatures;<br>c) ignition – cross lighting – flame stability;<br>d) flame supervision device;<br>e) combustion products discharge safety device (for type $B_{11BS}$ boilers);<br>f) carbon monoxide. | ČSN EN 15502-1:2022, Art. 8.11.3 | + | |
| **Safety of the domestic hot water circuit** | ČSN EN 15502-1:2022, Art. 8.11.3.1 | | |
| **Instantaneous and storage types** | ČSN EN 15502-1:2022, Art. 8.11.3.1.1 | | |
| **Soundness of parts containing domestic water**<br>a) Requirements<br>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 15502-1:2022, Art. 8.11.3.1.1.1 | + | |
| **Overheating of the domestic hot water by the heating circuit**<br>a) Requirements<br>Under the following test conditions, the domestic hot water temperature shall not exceed 95 °C. | ČSN EN 15502-1:2022, Art. 8.11.3.1.1.2 | + | |
| **Failure of the domestic hot water temperature control device**<br>a) Requirements<br>For boilers in which the sanitary water circuit is not in contact with the combustion products, with normal control out of 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.<br>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. | ČSN EN 15502-1:2022, Art. 8.11.3.1.1.3 | + | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Instantaneous type** | ČSN EN 15502-1:2022, Art. 8.11.3.1.2 | | |
| **Maximum temperature of the domestic hot water**<br>a) Requirements<br>Under the test conditions below, the domestic hot water temperature shall not exceed 95 °C. | ČSN EN 15502-1:2022, Art. 8.11.3.1.2.1 | + | |
| **Overheating of the domestic hot water**<br>a) Requirements<br>Under the test below conditions, the domestic hot water temperature shall not exceed 95 °C. | ČSN EN 15502-1:2022, Art. 8.11.3.1.2.2 | + | |
| **Storage type** | ČSN EN 15502-1:2022, Art. 8.11.3.1.3 | | |
| **Maximum temperature of the domestic hot water**<br>a) Requirements<br>Under the test conditions below, the domestic hot water temperature shall not exceed 95 °C. | ČSN EN 15502-1:2022, Art. 8.11.3.1.3.1 | 0 | |
| **Overheating of the domestic hot water**<br>a) Requirements<br>Under the test conditions below, for boilers in which part of the tank is in contact with products of combustion, the domestic hot water temperature shall not exceed 95 °C. | ČSN EN 15502-1:2022, Art. 8.11.3.1.3.2 | 0 | |
| **Temperature of the domestic hot water**<br>a) Requirements<br>Under the test conditions below, it shall be possible to adjust to or obtain a domestic hot water temperature of at least 60 °C in the tank. | ČSN EN 15502-1:2022, Art. 8.11.3.1.3.3 | 0 | |
| **Control devices** | ČSN EN 15502-1:2022, Art. 8.11.4 | | |
| **Rotary knob** | ČSN EN 15502-1:2022, Art. 8.11.4.1 | | |
| **Requirements**<br>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 15502-1:2022, Art. 8.11.4.1.1 | 0 | |
| **Push-button** | ČSN EN 15502-1:2022, Art. 8.11.4.2 | | |
| **Requirements**<br>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 15502-1:2022, Art. 8.11.4.2.1 | + | |
| **Ignition devices** | ČSN EN 15502-1:2022, Art. 8.11.5 | | |
| **Manual ignition device for the ignition burner** | ČSN EN 15502-1:2022, Art. 8.11.5.1 | | |
| **Requirements**<br>Under the test conditions below, at least half the manual ignition attempts shall result in correct ignition of the ignition burner.<br>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.<br>The supply of gas to the main burner shall only be permitted after detection of the ignition burner flame. | ČSN EN 15502-1:2022, Art. 8.11.5.1.1 | 0 | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Automatic ignition system for the ignition burner and main burner** | ČSN EN 15502-1:2022, Art. 8.11.5.2 | | |
| **General**<br>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 15502-1:2022, Art. 8.11.5.2.1 | + | |
| **Ignition** | ČSN EN 15502-1:2022, Art. 8.11.5.2.2 | | |
| **Requirements**<br>Under the test conditions below, ignition devices shall ensure safe ignition.<br>The ignition systém shall be activated at the latest at the same time as the signal to open the valve(s).<br>The ignition shall continue at least to the moment flame is sensed but not exceeding the end of the $T_{SA}$ .<br>If flame sensing can be influenced by ignition, interruption of ignition is allowed to check availability of flame signal. | ČSN EN 15502-1:2022, Art. 8.11.5.2.2.2 | +<br>+<br>+<br>0 | |
| **Ignition burner** | ČSN EN 15502-1:2022, Art. 8.11.5.3 | | |
| **Requirements**<br>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.<br>The signal to open the gas valve(s) to the main burner shall only be given after the ignition burner flame has been detected. | ČSN EN 15502-1:2022, Art. 8.11.5.3.1 | 0 | |
| **Determination of the heat input of the permanent ignition burner $Q_3$**<br>The heat input of the ignition burner based on NCV is determined by supplying it with the reference gas or gases at the maximum test pressure given in EN 437:2021 for first family gases and at the normal pressure for second and third family gases. However, if the ignition burner has a gas rate adjuster this is adjusted as stated in the instructions for installation. | ČSN EN 15502-1:2022, Art. 8.11.5.3.2 | 0 | |
| **Flame supervision device** | ČSN EN 15502-1:2022, Art. 8.11.6 | | |
| **Thermoelectric device** | ČSN EN 15502-1:2022, Art. 8.11.6.1 | | |
| **Ignition opening time ($T_{1A}$)** | ČSN EN 15502-1:2022, Art. 8.11.6.1.1 | | |
| **Requirements**<br>Under the test conditions below, the $T_{IA}$ of a permanent ignition burner shall not exceed 30 s.<br>This time can be raised to 60 s if no manual intervention is required during it. | ČSN EN 15502-1:2022, Art. 8.11.6.1.1.1 | 0 | |
| **Extinction delay time ($T_{1E}$)** | ČSN EN 15502-1:2022, Art. 8.11.6.1.2 | | |
| **Requirements**<br>Under the test conditions below, the extinction delay time of a thermoelectric flame supervision device shall not exceed:<br>a) 60 s if $Q_n \leq 35$ kW;<br>b) 45 s if $Q_n > 35$ kW.<br>When a safety device acts on the thermoelectric flame supervision device, closure shall occur without delay. | ČSN EN 15502-1:2022, Art. 8.11.6.1.2.1 | 0 | |
| **Automatic burner control system** | ČSN EN 15502-1:2022, Art. 8.11.6.2 | | |
| **Ignition safety time ($T_{SA}$)** | ČSN EN 15502-1:2022, Art. 8.11.6.2.1 | | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Requirements**<br>The $T_{SA}$ is stated by the manufacturer. | ČSN EN 15502-1:2022, Art. 8.11.6.2.1.1 | + | |
| If the heat input of the ignition burner does not exceed 0,250 kW, there is no requirement in respect of the $T_{SA}$. | | 0 | |
| 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. | | 0 | |
| In all other cases, the $T_{SA}$ is chosen by the manufacturer in accordance with 8.11.6.2.5 (Delayed ignition)<br>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: $T_{SA} \leq \frac{5 \times 150}{Q_{ign}}$ seconds but without exceeding 10 s | | 0 | |
| where<br>Qn is the nominal input in kW;<br>$Q_{ign}$ 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 $T_{SA}$. | | 0 | |
| 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. | | 0 | |
| **Extinction safety time ($T_{SE}$)** | ČSN EN 15502-1:2022, Art. 8.11.6.2.2 | | |
| **Requirements**<br>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:<br>a) ≤ 70 kW 5 s<br>b) > 70 kW 3 s | ČSN EN 15502-1:2022, Art. 8.11.6.2.2.1 | +<br>0 | |
| **Spark restoration** | ČSN EN 15502-1:2022, Art. 8.11.6.2.3 | | |
| **Requirements**<br>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.<br>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 15502-1:2022, Art. 8.11.6.2.3.1 | 0 | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Recycling** | ČSN EN 15502-1:2022, Art. 8.11.6.2.4 | | |
| **Requirements**<br>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.<br>In this case, the $T_{SA}$ is the same as is used for ignition and starts when the ignition device is energised. | ČSN EN 15502-1:2022, Art. 8.11.6.2.4.1 | + | |
| **Delayed ignition** | ČSN EN 15502-1:2022, Art. 8.11.6.2.5 | | |
| **Requirements**<br>Under the test conditions below, there shall be no deterioration of the boiler, no hazard to the user. | ČSN EN 15502-1:2022, Art. 8.11.6.2.5.1 | + | |
| **Gas pressure regulator** | ČSN EN 15502-1:2022, Art. 8.11.7 | | |
| **Requirements**<br>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:<br>a) 7,5 % and – 10 % for first family gases;<br>b) + 5 % and – 7,5 % for second family gases without a pressure couple;<br>c) ± 5 % for second and third family gases with a pressure couple;<br>d) ± 5 % for third family gases without a pressure couple.<br>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 15502-1:2022, Art. 8.11.7.1 | 0<br>0<br>+<br>0<br>0 | |
| **Thermostats and flow temperature limiting devices** | ČSN EN 15502-1:2022, Art. 8.11.8 | | |
| **Water control thermostats** | ČSN EN 15502-1:2022, Art. 8.11.8.1 | | |
| **General**<br>For electronic temperature control systems, the terms:<br>a) fixed setting thermostat should be read as fixed control temperature setpoint;<br>b) adjustable thermostat should be read as adjustable control temperature setpoint. | ČSN EN 15502-1:2022, Art. 8.11.8.1.1 | 0<br>+ | |
| **Requirements**<br>Under the test conditions below,<br>a) the maximum water temperature of boilers fitted with a fixed setting thermostat shall be within ± 10 K of the flow temperature stated in the instructions for installation;<br>b) for boilers fitted with an adjustable thermostat, it shall be possible to select, to within ± 10 K, the flow temperatures stated in the instructions for installation;<br>c) the flow temperature shall not exceed the maximum flow temperature declared in the instructions for installation; 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 15502-1:2022, Art. 8.11.8.1.2 | 0<br>+<br>0 | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Flow temperature limiting devices** | ČSN EN 15502-1:2022, Art. 8.11.8.2 | | |
| **Inadequate water circulation** | ČSN EN 15502-1:2022, Art. 8.11.8.2.1 | | |
| **Requirements**<br>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 systém with an open expansion vessel. | ČSN EN 15502-1:2022, Art. 8.11.8.2.1.1 | + | |
| **Overheating of boilers of pressure classes 1 and 2** | ČSN EN 15502-1:2022, Art. 8.11.8.2.2 | | |
| **General**<br>For electronic temperature control systems, the terms:<br>a) control thermostat should be read as control temperature set point;<br>b) temperature limiter should be read as temperature limit set point;<br>c) overheat cut-out device should be read as overheat cut-out set point. | ČSN EN 15502-1:2022, Art. 8.11.8.2.2.1 | + | |
| **Requirements**<br>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).<br>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. | ČSN EN 15502-1:2022, Art. 8.11.8.2.2.2 | + | |
| **Overheating of boilers of pressure class 3** | ČSN EN 15502-1:2022, Art. 8.11.8.2.3 | | |
| **General**<br>For electronic temperature control systems, the terms:<br>a) control thermostat should be read as control temperature set point;<br>b) temperature limiter should be read as temperature limit set point;<br>c) overheat cut-out device should be read as overheat cut-out set point. | ČSN EN 15502-1:2022, Art. 8.11.8.2.3.1 | 0 | |
| **Requirements for Test no 1**<br>Under the test conditions below (Test no 1) the temperature limiter shall cause safety shutdown before the water flow temperature exceeds the preset value. | ČSN EN 15502-1:2022, Art. 8.11.8.2.3.2 | 0 | |
| **Requirements for Test no 2:**<br>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. | ČSN EN 15502-1:2022, Art. 8.11.8.2.3.4 | 0 | |
| **Requirements for Test no 3:**<br>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 15502-1:2022, Art. 8.11.8.2.3.6 | 0 | |
| **Air proving device** | ČSN EN 15502-2-1+A1:2017, Art. 8.11.101 | | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **General**<br>Depending on the principle of air proving, the applicable requirements are described in the clauses below.<br>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.<br>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.<br>The CO concentration is determined as stated in 8.12.1. | ČSN EN 15502-2-1+A1:2017, Art. 8.11.101.1 | + | |
| **Supervision of the combustion air rate or the combustion products rate**<br>Requirements<br>At a reduced flow rate the CO concentration (dry, air-free) may not exceed a specific value.<br>The following methods of flow reduction are to be examined:<br>a) Progressive blockage of the air inlet;<br>b) Progressive blockage of the combustion products evacuation ducts;<br>c) Progressive reduction of the fan speed, for example by reduction of the fan voltage.<br><br>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:<br>d) Continuous supervision: Shutdown before the CO concentration exceeds 0,2 %, or<br>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 | 0 | |
| **Gas/air ratio controls** | ČSN EN 15502-2-1+A1:2017, Art. 8.11.101.3 | | |
| **Leakage of control tubes**<br>Requirements<br>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**<br>Requirements<br>At a reduced flow rate the CO concentration may not exceed a specific value. The following methods of flow reduction are to be examined:<br>a) Progressive blockage of the air inlet;<br>b) Progressive blockage of the combustion products evacuation ducts;<br>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.<br>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 | ČSN EN 15502-2-1+A1:2017, Art. 8.11.101.3.2 | +<br><br>+<br>+<br><br>0 | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| reduced flow rate meet one of the following two requirements:<br>d) Continuous supervision:<br>Shutdown before the CO concentration (dry, air free) exceeds:<br>1) 0,20 % over the range of modulation specified in the installation instructions), or<br>2) $CO_{mes}$ x $Q$ / $Q_{KB}$ ≤ 0,20% below the minimum rate of the modulation range.<br>*where:*<br>— $Q$ is the instantaneous heat input, in kW;<br>— $Q_{KB}$ is the heat input at the minimum rate, in kW;<br>— $CO_{mes}$ is the measured CO concentration (dry, air free).<br>e) Start up supervision:<br>Not start if the CO concentration (dry, air free) exceeds 0,1 %. | | <br><br><br>+<br><br>0<br><br><br><br><br><br>+ | |
| **Adjustment of the gas/air ratio**<br>Requirements<br>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.<br>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 | +<br><br>+ | |
| **Functioning of the fan of a type $C_4$ boiler**<br>Requirements<br>For type $C_{42}$ and $C_{43}$ boilers, when controlled shutdown or safety shutdown occurs, the fan shall stop after any post-purge.<br>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<br><br>0 | |

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

**Measurement results:**

| Date of testing: 2022-05-24 | $t_{amb}$ = 20,2 °C | rel. humidity = 41,2 % | $p_a$ = 980,0 mbar |
|---|---|---|---|

| Required properties | Test result | Note |
|---|---|---|
| **Performance** ČSN EN 15502-1:2022, Art. 7.3.3 | | |
| **General** | | |
| ČSN EN 15502-1:2022, Art. 7.3.3.1.2 | + | EU Declaration of Conformity of 2019-06-04 for Automatic gas burner controller type S4962 made by Resideo |
| **Control thermostat – Endurance** | | |
| ČSN EN 15502-1:2022, Art. 7.3.3.2.2 | + | EU Declaration of Conformity of 2019-06-04 for Automatic gas burner controller type S4962 made by Resideo |
| **Water temperature limiting devices – Endurance** | | |
| **Temperature limiters** | | |
| ČSN EN 15502-1:2022, Art. 7.3.3.3.1.2 | 0 | |

| Required properties | Test result | Note |
|---|---|---|
| **Overheat cut-out devices** | | |
| ČSN EN 15502-1:2022, Art. 7.3.3.3.2.2 | + | EU Declaration of Conformity of 2019-06-04 for Automatic gas burner controller type S4962 made by Resideo |

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

| Operating conditions | Heat input | Fuel supply pressure (mbar) | Test gas | Results | Note |
|---|---|---|---|---|---|
| **Fuel pressure reduction** | | | | | |
| Test according to ČSN EN 15502-1:2022, Art. 8.7.1 | $Q_n$ | 14, 13 ... 0 | G20 | + | The boiler switches off after supply pressure drops below 10 mbar. |
| **Defective closure of the gas valve immediately upstream of the main burner** | | | | | |
| Test according to ČSN EN 15502-1:2022, Art. 8.8.2 | $Q_n$ | 20 | G20 | 0 | |

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

| Required properties | Test result | Note |
|---|---|---|
| **General** | | |
| Test according to ČSN EN 15502-2-1, Art. 8.9.101 paragraph i) point 1) | 0 | |
| Test according to ČSN EN 15502-2-1, Art. 8.9.101 paragraph i) point 2)i) | + | Measured pre-purge time was 15,5 seconds at the air rate at the nominal heat input ($Q_n$). Together are performed three consecutive automatic ignition attempts. |
| **Verification of protected combustion chamber** | | |
| ČSN EN 15502-2-1, 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, 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 15502-1:2022, Art. 8.10.2 | 0 | |
| **Adjustment, control and safety devices** | | |
| Test according to ČSN EN 15502-1:2022, Art. 8.11.2 | + | |
| **Safety of the domestic hot water circuit** | | |
| **Instantaneous and storage types** | | |
| **Soundness of parts containing domestic water** | | |
| ČSN EN 15502-1:2022, Art. 8.11.3.1.1.1 | + | |
| **Overheating of the domestic hot water by the heating circuit** | | |
| ČSN EN 15502-1:2022, Art. 8.11.3.1.1.2 | + | The temperature of the domestic hot water didn't exceed 95 °C. Domestic hot water has reached the temperature 66,5 °C. |
| **Failure of the domestic hot water temperature control device** | | |
| ČSN EN 15502-1:2022, Art. 8.11.3.1.1.3 | + | Domestic hot water has reached the temperature 70,1 °C. |

| Required properties | Test result | Note |
|---|---|---|
| **Instantaneous type** | | |
| **Maximum temperature of the domestic hot water** | | |
| ČSN EN 15502-1:2022, Art. 8.11.3.1.2.1 | + | The temperature of the domestic hot water didn't exceed 95 °C. The maximum measured value was 58,9 °C. |
| **Overheating of the domestic hot water** | | |
| ČSN EN 15502-1:2022, Art. 8.11.3.1.2.2 | + | The temperature of the domestic hot water didn't exceed 95 °C. The maximum measured value was 62 °C. |
| **Storage type** | | |
| **Maximum temperature of the domestic hot water** | | |
| ČSN EN 15502-1:2022, Art. 8.11.3.1.3.1 | 0 | |
| **Overheating of the domestic hot water** | | |
| ČSN EN 15502-1:2022, Art. 8.11.3.1.3.2 | 0 | |
| **Temperature of the domestic hot water** | | |
| ČSN EN 15502-1:2022, Art. 8.11.3.1.3.3 | 0 | |
| **Control devices** | | |
| Test according to ČSN EN 15502-1:2022, Art. 8.11.4.1.2 | 0 | |
| Test according to ČSN EN 15502-1:2022, Art. 8.11.4.2.2 | + | 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. |
| **Ignition devices** | | |
| **Manual ignition device for the ignition burner** | | |
| ČSN EN 15502-1:2022, Art. 8.11.5.1.2 | 0 | |
| **Automatic ignition system for the ignition burner and main burner** | | |
| **General** | | |
| ČSN EN 15502-1:2022, Art. 8.11.5.2.1 | + | EU Declaration of Conformity of 2019-06-04 for Automatic gas burner controller type S4962 made by Resideo |
| **Ignition** | | |
| ČSN EN 15502-1:2022, Art. 8.11.5.2.2.2 | + | Ignition devices ensures safe ignition.<br>EU Declaration of Conformity of 2019-06-04 for Automatic gas burner controller type S4962 made by Resideo |
| ČSN EN 15502-1:2022, Art. 8.11.5.3 | 0 | |
| **Flame supervision device** | | |
| **Thermoelectric device** | | |
| **Ignition opening time ($T_{IA}$)** | | |
| ČSN EN 15502-1:2022, Art. 8.11.6.1.1.2 | 0 | |
| **Extinction delay time ($T_{IE}$)** | | |
| ČSN EN 15502-1:2022, Art. 8.11.6.1.2.2 | 0 | |

| Required properties | Test result | Note |
|---|---|---|
| **Automatic burner control system** | | |
| **Ignition safety time ($T_{SA}$)** | | |
| ČSN EN 15502-1:2022, Art. 8.11.6.2.1.2 | + | Measured value of ignition safety time ($T_{SA}$) was 4,8 s. |
| **Extinction safety time ($T_{SE}$)** | | |
| ČSN EN 15502-1:2022, Art. 8.11.6.2.2.2 | + | Measured value of extinction safety time ($T_{SE}$) was 1,2 s. |
| **Spark restoration** | | |
| ČSN EN 15502-1:2022, Art. 8.11.6.2.3.2 | 0 | |
| **Recycling** | | |
| ČSN EN 15502-1:2022, Art. 8.11.6.2.4.2 | + | Recycling is preceded by an interruption of the gas supply; the ignition sequence restarts from the beginning. The ignition safety time $T_{SA}$ is the same as is used for ignition.<br>EU Declaration of Conformity of 2019-06-04 for Automatic gas burner controller type S4962 made by Resideo |
| **Delayed ignition** | | |
| ČSN EN 15502-1:2022, Art. 8.11.6.2.5.2 | + | There was no deterioration of the boiler, no hazard to the user.<br>EU Declaration of Conformity of 2019-06-04 for Automatic gas burner controller type S4962 made by Resideo |
| **Gas governor** | | |
| ČSN EN 15502-1:2022, Art. 8.11.7.2 | + | The gas rate of boiler didn´t differ from the gas rate obtained at normal pressure by more than fixed limits. |
| **Thermostats and water temperature limiting devices** | | |
| **Water control thermostats** | | |
| ČSN EN 15502-1:2022, Art. 8.11.8.1.3 | + | It is possible to select, to within ± 10 K, the water flow temperatures stated by the manufacturer. The maximum adjustable boiler flow temperature is 90 °C. The maximum measured boiler flow temperature at this adjustment was 89,8 °C. After the flow temperature had reached this value, the boiler switches off. |
| **Flow temperature limiting devices** | | |
| **Inadequate water circulation** | | |
| ČSN EN 15502-1:2022, Art. 8.11.8.2.1.2 | + | No boiler damage occured. The shut-down boiler flow temperature of heating water is set-up to 95 °C. The really measured shut-down boiler flow temperature of heating water was 97 °C (the maximum measured temperature). The boiler was permanently blocked. |
| **Overheating of boilers of pressure classes 1 and 2** | | |
| ČSN EN 15502-1:2022, Art. 8.11.8.2.2.3 | + | The overheat cut-out device caused non-volatile lockout of the boiler. The situation wasn't dangerous to the user and wasn't capable of damaging the boiler.<br>**The safety device** causes the boiler shut-down at **97 °C**. **Boiler was permanently blocked**. For unblocking it is necessary press button "RESET". Limiting thermostat is set up to 95 °C. |
| **Overheating of Boilers of pressure class 3** | | |
| ČSN EN 15502-1:2022, Art. 8.11.8.2.3.3, 8.11.8.2.3.5, 8.11.8.2.3.7 | 0 | |

| Required properties | Test result | Note |
|---|---|---|
| **Air proving device** | | |
| **General** | | |
| ČSN EN 15502-2-1, Art. 8.11.101.1 | + | |
| **Supervision of the combustion air rate or the combustion products rate** | | |
| ČSN EN 15502-2-1, Art. 8.11.101.2 | 0 | |
| **Gas/air ratio controls** | | |
| **Supervision of the combustion air rate or the combustion products rate** | | |
| ČSN EN 15502-2-1, Art. 8.11.101.3.2 | + | The fuel supply will close before the concentration of CO exceeds 0,20%.<br>a) The maximum concentration of CO was reached by 70% blockage of the air inlet. The maximum value of CO was 0,0043 % (at n=1).<br>b) The maximum concentration of CO was reached by 70% blockage of the combustion products evacuation ducts. The maximum value of CO was 0,0098 % (at n=1). |
| **Adjustment of the gas/air ratio** | | |
| ČSN EN 15502-2-1, Art. 8.11.101.3.3 | + | The fuel supply will close before the concentration of CO exceeds 0,20%. |
| **Functioning of the fan of a type $C_4$ boiler** | | |
| ČSN EN 15502-2-1, Art. 8.11.101.4 | 0 | |

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

| | |
|---|---|
| **Test objective:** | **Combustion efficiency** |
| **Exact name of the test procedure:** | T 001*<br>Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions |
| **Test method:** | ČSN EN 15502-1:2022, Art. 8.12.1.2, 8.12.2.1, 8.12.2.3, 8.12.3.1.2, 8.12.3.2.2, 8.12.3.3.2, 8.12.4.2, 8.12.5.2, 8.13.2, 8.13.2.1, 8.13.2.2, 8.13.2.6, 8.13.3<br>ČSN EN 15502-2-1+A1:2017, Art. 8.12.2.102, 8.12.3, 8.12.3.101, 8.12.3.101.1 |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |

**Test results:**

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Carbon monoxide** | ČSN EN 15502-1:2022, Art. 8.12 | | |
| **General** | ČSN EN 15502-1:2022, Art. 8.12.1 | | |
| **Requirements**<br>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 15502-1:2022, Art. 8.12.1.1 | + | |
| **Limit conditions** | ČSN EN 15502-1:2022, Art. 8.12.2 | | |
| **Requirements**<br>Under the test conditions below, the CO concentration shall not exceed 0,10 %. | ČSN EN 15502-1 :2022, Art. 8.12.2.2 | + | |
| **Boilers without gas/air ratio control**<br>Requirements<br>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**<br>Appliances using gas/air ratio control systems are subjected to the following tests. The CO and CO2 concentrations are measured:<br>a) The gas/air ratio control is adjusted in accordance with the technical instructions (or left as factory set if the control is not adjustable). The boiler or boiler module is operated at both maximum and minimum heat input allowed by the controls;<br>b) Simulate reasonable maladjustment of any adjustable "throttle" setting by adjusting the CO2 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 boiler or boiler module is operated at both maximum and minimum heat input allowed by the controls;<br>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 | ČSN EN 15502-2-1+A1:2017, Art. 8.12.2.102 | + | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| appliance is again operated at both maximum and minimum heat input allowed by the control system. The tests are repeated by adjusting the offset screw sufficiently to decrease the differential pressure by 5 Pa.<br>For each test condition it is checked that the requirement of 8.12.2.101 is met. | | | |
| **Special conditions** | ČSN EN 15502-1:2022, Art. 8.12.3 | | |
| **Incomplete combustion** | ČSN EN 15502-1:2022, Art. 8.12.3.1 | | |
| **Requirements**<br>Under the test conditions below, the CO concentration shall not exceed 0,20 %. | ČSN EN 15502-1:2022, Art. 8.12.3.1.1 | + | |
| **Supplementary test for fan assisted boilers** | ČSN EN 15502-1:2022, Art. 8.12.3.2 | | |
| **Requirements**<br>Under the test conditions below, the CO concentration shall not exceed 0,20 %. | ČSN EN 15502-1:2022, Art. 8.12.3.2.1 | + | |
| **Flame lift** | ČSN EN 15502-1:2022, Art. 8.12.3.3 | | |
| **Requirements**<br>Under the test conditions below, the CO concentration shall not exceed 0,20 %. | ČSN EN 15502-1:2022, Art. 8.12.3.3.1 | + | |
| **Special flue conditions** | ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101 | | |
| **Type $C_1$, $C_3$ and $C_9$ boilers**<br>The test is carried out as stated in the first and third test series in 8.6.3.102, as appropriate.<br>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.<br>It is checked that the above requirement is met. | ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.1 | + | |
| **Type $C_2$ boilers**<br>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**<br>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**<br>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 | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Type $C_6$ boilers**<br>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.<br>Type $C_6$ boilers are fitted with a restriction to simulate the minimum pressure loss stated in the installation instructions.<br>The air supply is fitted with a mixing device which permits adjustment of the recirculation of the products of combustion.<br>The mixing device is adjusted such that 10 % of the combustion products are recirculated to the air supply.<br>It is checked that the above requirement is met.<br>A supplementary test is carried out by adjusting the restric-tion such that the air proving device just fails to operate.<br>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.<br>For appliances with gas/air ratio controls the supplementary test is done at the minimum adjustable heat input.<br>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 | |
| **Type $C_7$ boilers**<br>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**<br>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 $C_{(10)}$ boilers**<br>The air supply is fitted with a mixing device which permits adjustment of the recirculation of the products of combustion.<br>The mixing device is adjusted such that 10 % of the combustion products are recirculated to the air supply.<br>A supplementary test is carried out by adjusting the restriction such that the air proving device just fails to operate.<br>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.<br>For boilers with gas/air ratio controls the supplementary test is done at the minimum adjustable heat input.<br>**Minimal safety pressure difference at maximum heat input:**<br>Under the test conditions of 8.6.3.109 at maximum heat input it is checked that the above requirement is met.<br>**Maximum safety pressure difference at minimum heat input:**<br>Requirements<br>Under the following test conditions at minimum heat input allowed by the controls it is checked that the above requirements are met. | ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.8 | 0 | |
| **Type $C_{(11)}$ boilers**<br>A recirculation as specified in the design documentation (see 8.105.2) is applied to the combustion air inlet duct.<br>**Minimal safety pressure difference at maximum heat input:** | ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.9 | 0 | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| Under the test conditions of 8.6.3.110 at maximum heat input it is checked that the above requirement is met.<br>**Maximum safety pressure difference at minimum heat input:**<br>Requirements<br>Under the following test conditions at minimum heat input allowed by the controls it is checked that the above requirements are met. | | | |
| **Type $B_2$ and $B_3$ boilers**<br>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. 8.12.3.101.10 | 0 | |
| **Type $B_5$ boilers**<br>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. 8.12.3.101.11 | 0 | |
| **Sooting** | ČSN EN 15502-1:2022, Art. 8.12.4 | | |
| **Requirements**<br>Under the test conditions below, no soot deposition shall be observed although yellow tipping is acceptable. | ČSN EN 15502-1:2022, Art. 8.12.4.1 | + | |
| **Condensate discharge blockage test** | ČSN EN 15502-1:2022, Art. 8.12.5 | | |
| **Requirements**<br>The formation of condensate shall not impair the correct operation of the boiler.<br>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:<br>when the condensate discharge is blocked, the gas supply of the boiler shall be shut off before the CO concentration exceeds 0,20 %, or<br>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.<br>In either case, there shall be no spillage of condensate from the boiler. | ČSN EN 15502-1:2022, Art. 8.12.5.1 | +<br>+<br>0<br>+ | |
| **$NO_x$** | ČSN EN 15502-1:2022, Art. 8.13 | | |
| **Requirement**<br>The requirement below is valid for boilers with a nominal heat output > 400 kW.<br>The NOx class of the boiler is to be stated in the instructions for installation according to Table 5. The test and calculation conditions below shall be applied. The permissible NOx concentration assigned to this class in the dry, air free products of combustion shall not be exceeded.<br>NOTE The conversion of NOx measured to dry, air free products of combustion is calculated in similarity with the formula for converting CO measurement under clause 8.12.1. | ČSN EN 15502-1:2022, Art. 8.13.1 | 0 | |

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

| Requirement | Specification of requirement | Evaluation | Note |
|---|---|---|---|
| **Requirements for emissions of nitrogen oxides** | Commission Regulation (EU) No 813/2013, Annex II Art. 4a) | + | |
| From 26 September 2018 emissions of nitrogen oxides, expressed in nitrogen dioxide, of heaters shall not exceed the following values: | | | |
| — fuel boiler space heaters and fuel boiler combination heaters using gaseous fuels: 56 mg/kWh fuel input in terms of *GCV* | | + | |

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

**Measurement results:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date of testing: | 2022-05-24 | $t_{amb}$ = 20,2 | °C | rel. humidity = 41,2 | % | $p_a$ = 980,0 | mbar |
| Date of testing: | 2022-05-24 | $t_{amb}$ = 20,9 | °C | rel. humidity = 49,1 | % | $p_a$ = 985,0 | mbar |

| Type of gas | Operating conditions | Gas pressure before the appliance (mbar) | $O_2$ (%vol.) | $CO_2$ (% vol.) | CO | | CO limit at n=1 (% vol.) |
|---|---|---|---|---|---|---|---|
| | | | | | Meas. (ppm) | At n=1 (% vol.) | |
| **Limit conditions** | | | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017 Art. 8.12.2.102, paragraph a) ($Q_n$) | 20 | 4,0 | 9,5 | 128 | 0,0158 | 0,10 |
| | Test according to ČSN EN 15502-2-1+A1:2017 Art. 8.12.2.102, paragraph a) ($Q_m$) | | 4,5 | 9,1 | 51 | 0,0066 | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017 Art. 8.12.2.102, paragraph b) ($Q_n$) | 20 | 2,8 | 10,2 | 225 | 0,0260 | 0,10 |
| | Test according to ČSN EN 15502-2-1+A1:2017 Art. 8.12.2.102, paragraph b) ($Q_m$) | | 3,9 | 9,6 | 52 | 0,0064 | |
| G31 | Test according to ČSN EN 15502-2-1+A1:2017 Art. 8.12.2.102, paragraph a) ($Q_n$) | 37 | 5,0 | 10,4 | 98 | 0,0129 | 0,10 |
| | Test according to ČSN EN 15502-2-1+A1:2017 Art. 8.12.2.102, paragraph a) ($Q_m$) | | 6,5 | 9,5 | 57 | 0,0083 | |
| G31 | Test according to ČSN EN 15502-2-1+A1:2017 Art. 8.12.2.102, paragraph b) ($Q_n$) | 37 | 4,3 | 10,9 | 150 | 0,0189 | 0,10 |
| | Test according to ČSN EN 15502-2-1+A1:2017 Art. 8.12.2.102, paragraph b) ($Q_m$) | | 5,7 | 10,0 | 59 | 0,0081 | |
| **Special conditions** | | | | | | | |
| **Incomplete combustion** | | | | | | | |
| G21 | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.1.2 ($Q_n$) | 20 | 2,8 | 10,6 | 235 | 0,0271 | 0,20 |
| | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.1.2 ($Q_m$) | | 4,6 | 9,5 | 58 | 0,0074 | 0,20 |
| G31 | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.1.2 ($Q_n$) | 37 | 5 | 10,4 | 98 | 0,0129 | 0,20 |
| | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.1.2 ($Q_m$) | | 6,5 | 9,5 | 57 | 0,0083 | 0,20 |
| **Supplemental test of boilers incorporating fan** | | | | | | | |
| G20 | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.2.2 ($Q_n$, 85 % of nominal voltage) | 20 | 3,8 | 9,6 | 124 | 0,0151 | 0,20 |
| | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.2.2 ($Q_m$, 85 % of nominal voltage) | | 4,7 | 9,1 | 52 | 0,0067 | |
| | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.2.2 ($Q_n$, 110 % of nominal voltage) | | 3,8 | 9,6 | 125 | 0,0153 | |
| | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.2.2 ($Q_m$, 110 % of nominal voltage) | | 4,7 | 9,1 | 50 | 0,0064 | |

| Type of gas | Operating conditions | Gas pressure before the appliance (mbar) | $O_2$ (%vol.) | $CO_2$ (% vol.) | CO | | CO limit at n=1 (% vol.) |
|---|---|---|---|---|---|---|---|
| | | | | | Meas. (ppm) | At n=1 (% vol.) | |
| G31 | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.2.2 ($Q_n$, 85 % of nominal voltage) | 37 | 5 | 10,4 | 95 | 0,0125 | 0,20 |
| | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.2.2 ($Q_m$, 85 % of nominal voltage) | | 6,5 | 9,5 | 54 | 0,0078 | |
| | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.2.2 ($Q_n$, 110 % of nominal voltage) | | 4,9 | 10,5 | 98 | 0,0128 | |
| | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.2.2 ($Q_m$, 110 % of nominal voltage) | | 6,6 | 9,4 | 55 | 0,0080 | |
| **Test of combustion level with the use of limit test gas for flame lift** | | | | | | | |
| G231 | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.3.2 | 20 | 6 | 8,2 | 55 | 0,0077 | 0,20 |
| G31 | Test according to ČSN EN 15502-1:2022, Art. 8.12.3.3.2 | 37 | 6,5 | 9,5 | 55 | 0,0080 | 0,20 |
| **Special draught conditions** | | | | | | | |
| **Boiler types $C_1$, $C_3$ and $C_9$** | | | | | | | |
| **Boilers type C fitted with a horizontal terminal on a vertical wall (concentric pipe 60/100 mm)** | | | | | | | |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 1 m/s)** | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0171 | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | |
| G20 | Plane 0° | Angle 0° | 20 | 1,9 | 10,7 | 206 | 0,0226 | 0,20 |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 2,5 m/s)** | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0222 | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | |
| G20 | Plane +30° | Angle 0° | 20 | 1,0 | 11,2 | 520 | 0,0546 | 0,20 |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 12,5 m/s)** | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0173 | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | |
| G20 | Plane 0° | Angle 0° | 20 | 2,0 | 10,6 | 207 | 0,0229 | 0,20 |
| **Boilers type C fitted with a horizontal terminal on a pitched roof (concentric pipe 60/100 mm)** | | | | | | | |
| **Roof at angle of 25°** | | | | | | | |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 1 m/s)** | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0193 | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | |
| G20 | Plane 0° | Angle 0° | 20 | 1,0 | 11,2 | 370 | 0,0389 | 0,20 |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 2,5 m/s)** | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0269 | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | |
| G20 | Plane 0° | Angle 0° | 20 | 0,8 | 11,3 | 890 | 0,0925 | 0,20 |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 12,5 m/s)** | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0176 | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | |
| G20 | Plane 0° | Angle 0° | 20 | 2,0 | 10,6 | 226 | 0,0250 | 0,20 |
| **Boilers type C fitted with a horizontal terminal on a pitched roof (concentric pipe 60/100 mm)** | | | | | | | |
| **Roof at angle of 55°** | | | | | | | |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 1 m/s)** | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0197 | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | |

| Type of gas | Operating conditions | | Gas pressure before the appliance (mbar) | $O_2$ (%vol.) | $CO_2$ (% vol.) | CO | | CO limit at n=1 (% vol.) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Meas. (ppm) | At n=1 (% vol.) | |
| G20 | Plane 0° | Angle 0° | 20 | 1,2 | 11,1 | 380 | 0,0403 | 0,20 |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 2,5 m/s)** | | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0249 | | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | | |
| G20 | Plane 0° | Angle 0° | 20 | 1,0 | 11,2 | 650 | 0,0683 | 0,20 |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 12,5 m/s)** | | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0176 | | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | | |
| G20 | Plane 0° | Angle 0° | 20 | 2,1 | 10,6 | 220 | 0,0244 | 0,20 |
| **Boilers type C fitted with a vertical terminal on a flat roof (concentric pipe 60/100 mm)** | | | | | | | | |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 1 m/s)** | | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0154 | | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | | |
| G20 | Plane +45° | Angle 0° | 20 | 3,2 | 9,9 | 139 | 0,0164 | 0,20 |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 2,5 m/s)** | | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0152 | | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | | |
| G20 | Plane +45° | Angle 0° | 20 | 3,4 | 9,8 | 129 | 0,0154 | 0,20 |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 12,5 m/s)** | | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0149 | | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | | |
| G20 | Plane 0° | Angle 0° | 20 | 3,7 | 9,7 | 125 | 0,0151 | 0,20 |
| **Boilers type C fitted with a vertical terminal on a pitched roof (concentric pipe 60/100 mm)** | | | | | | | | |
| **Roof at angle of 25°** | | | | | | | | |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 1 m/s)** | | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0172 | | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | | |
| G20 | Plane +45° | Angle 0° | 20 | 1,5 | 10,9 | 275 | 0,0296 | 0,20 |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 2,5 m/s)** | | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0163 | | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | | |
| G20 | Plane +45° | Angle 0° | 20 | 2,3 | 10,5 | 180 | 0,0202 | 0,20 |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 12,5 m/s)** | | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0159 | | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | | |
| G20 | Plane +45° | Angle 0° | 20 | 2,8 | 10,2 | 149 | 0,0172 | 0,20 |
| **Boilers type C fitted with a vertical terminal on a pitched roof (concentric pipe 60/100 mm)** | | | | | | | | |
| **Roof at angle of 55°** | | | | | | | | |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 1 m/s)** | | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0175 | | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | | |
| G20 | Plane +45° | Angle 0° | 20 | 1,4 | 11,0 | 285 | 0,0305 | 0,20 |

| Type of gas | Operating conditions | | Gas pressure before the appliance (mbar) | $O_2$ (%vol.) | $CO_2$ (% vol.) | CO | | CO limit at n=1 (% vol.) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Meas. (ppm) | At n=1 (% vol.) | |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 2,5 m/s)** | | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0163 | | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | | |
| G20 | Plane +45° | Angle 0° | 20 | 2,2 | 10,5 | 185 | 0,0207 | 0,20 |
| **Combustion level tests according to Art. 8.12.3.101.1 ČSN EN 15502-2-1+A1:2017 ($Q_n$ – wind 12,5 m/s)** | | | | | | | | |
| Arithmetic mean of CO concentrations: 0,0159 | | | | | | | | |
| Angle of incidence at which the greatest CO concentration comes into existence: | | | | | | | | |
| G20 | Plane -20° | Angle 0° | 20 | 2,9 | 10,1 | 151 | 0,0175 | 0,20 |
| **Boilers type $C_2$** | | | | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.2 (2 $m.s^{-1}$, $CO_2$ 1,6 %) | | Not applicable. | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.2 (3 $m.s^{-1}$, $CO_2$ 0,75 %) | | | | | | | |
| **Boilers type $C_4$** | | | | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.3 (0,5 mbar) ($Q_n$) | | Not applicable. | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.3 (0,5 mbar) ($Q_m$) | | | | | | | |
| **Boilers type $C_5$** | | | | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.4 (2,0 mbar) ($Q_n$) | | Not applicable. | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.4 (2,0 mbar) ($Q_m$) | | | | | | | |
| **Boilers type $C_6$** | | | | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.5 (10 % of combustion products ) ($Q_n$) | | Not applicable. | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.5 (10 % of combustion products ) Qm) | | | | | | | |
| **Boilers type $C_7$** | | | | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017 Art. 8.12.3.101.6 (up to 3 $m.s^{-1}$) | | Not applicable | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.6 (blocked flue) | | | | | | | |
| **Boilers type $C_8$** | | | | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.4 (2,0 mbar) ($Q_n$) | | Not applicable. | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.4 (2,0 mbar) ($Q_m$) | | | | | | | |
| **Boilers type $C_{(10)}$** | | | | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.8 ($Q_m$) | | Not applicable. | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.8 ($Q_n$) | | | | | | | |
| **Boilers type $C_{(11)}$** | | | | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.9 ($Q_m$) | | Not applicable. | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.9 ($Q_n$) | | | | | | | |
| **Boilers type $B_{23}$** | | | | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.10 test No.1 (underpressure 0,5 mbar); ($Q_n$) | | Not applicable. | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.10 test No.1 (underpressure 0,5 mbar); ($Q_m$) | | | | | | | |
| **Boilers type $B_{23}$** | | | | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.10 test No.2 (overpressure 50 Pa ); ($Q_n$) | | Not applicable. | | | | | |

| Type of gas | Operating conditions | Gas pressure before the appliance (mbar) | $O_2$ (%vol.) | $CO_2$ (% vol.) | CO | | CO limit at n=1 (% vol.) |
|---|---|---|---|---|---|---|---|
| | | | | | Meas. (ppm) | At n=1 (% vol.) | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.10 test No.2 (overpressure 50 Pa ); ($Q_m$) | | | | | | |
| **Boilers type $B_{23P}$** | | | | | | | |
| G20 | Test according to ČSN EN 15502-2-1+A1:2017, Art. 8.12.3.101.10 (overpressure 200 Pa ); ($Q_n$) | | | | | | |
| **Sooting** | | | | | | | |
| G21 | Test according to ČSN EN 15502-1:2022, Art. 8.12.4.2 ($Q_n$) | Sooting did not occur | | | | | |
| G32 | Test according to ČSN EN 15502-1:2022, Art. 8.12.4.2 ($Q_n$) | Sooting did not occur | | | | | |
| **Condensate discharge blockage test** | | | | | | | |
| G20 | Test according to ČSN EN 15502-1:2022, Art. 8.12.5.2 (condensate evacuation pipe blockage) | 20 | 3,5 | 9,8 | 225 | 0,0270 | 0,20 |

**$NO_x$**

| Gas type | Operating conditions | Gas pressure before the appliance (mbar) | $O_2$ (% of vol.) | $NO_x$ | | |
|---|---|---|---|---|---|---|
| | | | | Measured (ppm) | at $O_2$=0 % [mg/kWh] (based on NCV) | at $O_2$=0 % [mg/kWh] (based on GCV) |
| **Combustion level tests according to ČSN EN 15502-1:2022, Art. 8.13.1** | | | | | | |
| G20 | 70 % $Q_a$ | 20 | 4,4 | 15,0 | 30 | 25 |
| | 60 % $Q_a$ | | 4,4 | 13,0 | 26 | 22 |
| | 40 % $Q_a$ | | 4,7 | 9,0 | 18 | 14 |
| | 27,2 % $Q_a$ = $Q_{min}$ | | 5,0 | 6,0 | 13 | 9 |

Limit concentration of $NO_{x,0}$ at $O_2$ = 0 %: **18 mg/kWh (based on NCV)**
Limit concentration of $NO_{x,0}$ at $O_2$ = 0 %: **16 mg/kWh (based on GCV)** $NO_x$ class: **6**

**$NO_x$**

| Gas type | Operating conditions | Gas pressure before the appliance (mbar) | $O_2$ (% of vol.) | $NO_x$ | | |
|---|---|---|---|---|---|---|
| | | | | Measured (ppm) | at $O_2$=0 % [mg/kWh] (based on NCV) | at $O_2$=0 % [mg/kWh] (based on GCV) |
| **Combustion level tests according to ČSN EN 15502-1:2022, Art. 8.13.1** | | | | | | |
| G31 | 70 % $Q_a$ | 37 | 5,5 | 15,5 | 34 | 31 |
| | 60 % $Q_a$ | | 5,6 | 14,0 | 31 | 28 |
| | 40 % $Q_a$ | | 5,9 | 8,5 | 19 | 16 |
| | 27,2 % $Q_a$ = $Q_{min}$ | | 6,5 | 6,0 | 14 | 11 |

Limit concentration of $NO_{x,0}$ at $O_2$ = 0 %: **22 mg/kWh (based on NCV)**
Limit concentration of $NO_{x,0}$ at $O_2$ = 0 %: **20 mg/kWh (based on GCV)** $NO_x$ class: **6**

| | |
|---|---|
| **Test objective:** | **Formation of condensate** |
| **Exact name of the test procedure:** | T 001*<br>Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions |
| **Test method:** | ČSN EN 15502-1:2022, Art. 8.15.2 |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |
| **Date of test:** | 2022-05-23 |

**Test results:**

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Requirements**<br>When the boiler is installed in accordance with the test conditions for efficiency measurement under 9.3.2 and at the maximum flue length in the instructions for installation, under the conditions specified the condensate shall only form at the points intended for this purpose and shall be readily drained.<br>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 EN 15502-1:2022, Art. 8.15.1 | + | |

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

**Measurement results:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date of testing: | 2022-05-23 | $t_{amb}$ = 20,6 | °C | rel. humidity = 27,5 | % | $p_a$ = 982,5 | mbar |

| Test conditions | Time of the test (h) | Test result | Note |
|---|---|---|---|
| ČSN EN 15502-1:2022, Art. 8.15.2 | 4 | + | The condensate is drained properly. Condensate didn´t find its way to parts of the boiler which are not intended for formation, collection and discharge of condensate. The condensate didn´t cause any nuisance to the operation the boiler and the surroundings. |

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

| | |
|---|---|
| **Test objective:** | **Temperature of combustion products** |
| **Exact name of the test procedure:** | T 001*<br>Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions |
| **Test method:** | ČSN EN 15502-1:2022, Art. 8.16.2<br>ČSN EN 15502-2-1+A1:2017, Art. 8.16.102.1, 8.16.102.2 |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |
| **Date of test:** | 2022-05-23 |

**Test results:**

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **Temperature of combustion products** | ČSN EN 15502-1:2022, Art. 8.16 | | |
| **Requirements**<br>The temperature of the combustion products shall not exceed the maximum allowable working temperature for the materials of the combustion circuit and/or the flue materials, specified in the technical documentation.<br>If the boiler incorporates a device to limit the maximum temperature of combustion products (see 5.4.13.3) the operation of the device shall cause non-volatile lock-out of the boiler. | ČSN EN 15502-1:2022, Art. 8.16.1 | + | |
| **Designation and measurement of reference temperatures of flue systems** | ČSN EN 15502-2-1+A1:2017, Art. 8.16.102 | | |
| **Nominal working combustion products temperature**<br>Requirements<br>If the nominal working combustion products temperature is specified in the technical instructions, see (12.2.1.4), the specified value should be higher or equal to the temperatures recorded in the test below. | ČSN EN<br>ČSN EN 15502-2-1+A1:2017, Art. 8.16.102.1 | + | |
| **Overheat combustion products temperature**<br>Requirements<br>If the overheat combustion products temperature is specified in the technical instructions, see (12.2.1.4), the specified value should be higher or equal to the temperatures recorded in the test below. | ČSN EN<br>ČSN EN 15502-2-1+A1:2017, Art. 8.16.102.2 | + | |

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

**Measurement results:**

| | | | |
|---|---|---|---|
| Date of testing: 2022-05-23 | $t_{amb}$ = 20,6 °C | rel. humidity = 27,5 % | $p_a$ = 982,5 mbar |

| Required properties | Test result | Note |
|---|---|---|
| **Temperature of combustion products** | | |
| ČSN EN 15502-1:2022, Art. 8.16.2 | + | Maximum working temperature of combustion products declared in manual is higher than maximum temperature of combustion products measured during the test. |
| **Designation and measurement of reference temperatures of flue systems** | | |
| **Nominal working combustion products temperature** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.16.102.1 | + | Maximum working temperature of combustion products declared in manual is higher than maximum temperature of combustion products measured during the test. |
| **Overheat combustion products temperature** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.16.102.2 | + | Overheat combustion products temperature declared in manual is higher than maximum temperature of combustion products measured during the test. |

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

| | |
|---|---|
| **Test objective:** | **Mechanical resistance and stability of ducts, terminal and fitting pieces** |
| **Exact name of the test procedure:** | T 001*<br>Tests of tightness, pressure resistance, thermal technical parameters, combustion efficiency, safety functions |
| **Test method:** | - |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |
| **Date of test:** | - |

**Test results:**

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| **General**<br>Where the air supply and combustion products evacuation circuit is an integral part of the boiler - that is the circuit is supplied with or specified in the installation instruction - the ducts, terminal and fitting pieces shall meet the following requirements for mechanical resistance and stability. | ČSN EN 15502-2-1+A1:2017 Art. 8.101.1 | + | |
| **Compressive strength** | | | |
| **Duct sections and fittings**<br>Requirements:<br>Where compressive stresses occur in the air supply or combustion products evacuation ducts, due to the weight of the duct components, the ducts shall show no permanent deformation. | ČSN EN 15502-2-1+A1:2017 Art. 8.101.2.1 | + | |
| **Ducts support**<br>Requirements:<br>When tested, the maximum displacement of the ducts at the support shall not be greater than 5 mm in the direction of the load. | ČSN EN 15502-2-1+A1:2017 Art. 8.101.2.2 | + | |
| **Vertical terminals**<br>Requirements:<br>When tested the terminal shall show no permanent deformation. | ČSN EN 15502-2-1+A1:2017 Art. 8.101.2.3 | + | |
| **Lateral strength** | ČSN EN 15502-2-1+A1:2017 Art. 8.101.3. | | |
| **Flexural tensile strength**<br>Requirement<br>When, in the installation instructions, the air supply and combustion product evacuation ducts are declared to be suitable for non-vertical installation, these ducts are tested in accordance the test conditions below. The deflection of any part after mounting shall not be more than 2 mm per meter in distance between supports. | ČSN EN 15502-2-1+A1:2017 Art. 8.101.3.1 | + | |
| **Components subject to wind load**<br>Requirements<br>When the installation instructions specify a certain length of the air supply and combustion products evacuation ducts to be suitable for external installation, the ducts shall show no permanent deformations when tested in accordance with the test conditions below. | ČSN EN 15502-2-1+A1:2017 Art. 8.101.3.2 | + | |
| **Flexible metallic liners**<br>Requirement<br>Flexible metallic liners have to meet the requirements of EN | ČSN EN 15502-2-1+A1:2017 Art. | + | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| 1856-2:2009, 6.1.2.6. | 8.101.4 | | |
| **Requirements for plastic in the combustion product evacuation ducts, terminals and fitting pieces for boilers** | ČSN EN 15502-2-1+A1:2017 Art. 8.102. | | |
| **Thermal resistance**<br>Requirements<br>If the thermal resistance is not declared to be zero, the thermal resistance value declared in the installation instructions shall be verified by testing. | ČSN EN 15502-2-1+A1:2017 Art. 8.102.1 | + | |
| **Materials** | ČSN EN 15502-2-1+A1:2017 Art. 8.102.2. | | |
| **Characterization**<br>Requirements<br>The material shall be identified by the thermal, mechanical and physicochemical behaviour.<br>The characterization shall include the density and at least 5 more properties. At least one property has to be taken from each of the three groups of methods in Annex A of EN 14471:2005.<br>The characterization methods shall be chosen in such a way that the characterization includes the relevant properties of the material. Examples are given in Annex B of EN 14471:2005. | ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.1 | + | |
| **Long-term resistance to thermal load**<br>Requirements<br>The material shall be capable of withstanding exposure to the nominal working temperature as described under test conditions in this clause.<br>The tensile modulus and the yield stress shall be measured in all cases.<br>In case of thermosetting plastics the flexural modulus and flexural strength shall also be determined.<br>In the case of flexible tubes the ring stiffness shall also be determined.<br>Other relevant properties, such as the density or the impact strength, shall be measured in addition before and after the period of exposure, if they are relevant to evaluate the deterioration of the material.<br>The properties shall be determined in accordance with the methods of Annex CC.<br>Changes to the properties shall not exceed those set out in Table 104.<br>If these values are not met, it is allowed to do the test again using the same material after 24 h exposure in air at nominal working temperature (conditioning) to release processing pressures/effects.<br>The requirements for mechanical stability after exposure are covered by 8.101. | ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.2 | + | |
| **Long-term resistance to condensate exposure**<br>Requirements<br>The combustion products evacuation duct with the terminal and fitting pieces shall be so designed that no condensate is retained within them. The material shall be capable of withstanding exposure to condensate as described under test conditions.<br>The tensile modulus and the yield stress shall be measured in all cases.<br>In the case of thermosetting plastics the flexural modulus | ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.3 | + | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| and flexural strength shall also be determined.<br>In the case of flexible tubes the ring stiffness shall also be determined.<br>Other properties such as the density or the impact strength shall be measured before and after the period of exposure if they are relevant, by evaluation of the deterioration of the material.<br>The properties shall be determined in accordance with the methods of Annex CC.<br>Changes in the properties shall not exceed those set out in Table 106.<br>The requirements for mechanical stability are covered by 8.101.<br>If the air supply and combustion products evacuation duct has been tested previously, on an appliance with a higher nominal temperature and/or thermal load, this system will be deemed to meet these requirements. | ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.3 | + | |
| **Resistance to condensing/non-condensing cycling**<br>Requirements<br>Following application of the conditions given below, the soundness with respect to the room where the boiler is installed shall comply with 8.2.2.102.<br>Following the soundness test the flue duct is disassembled and visually examined. It shall not show any damage such as cracks and pinholes.<br>The dimensions of the sections and fittings shall not change more than 2 %.<br>The tensile modulus and the yield stress shall be measured in all cases.<br>In case of thermosetting plastics the flexural modulus and flexural strength shall also be determined.<br>In case of flexible tubes the ring stiffness shall also be determined.<br>Other properties such as the density or the impact strength shall also be measured before and after the period of exposure, if they are relevant to the evaluation of the deterioration of the material.<br>The properties shall be determined in accordance with the methods as given in Annex CC.<br>Changes to the properties shall not exceed those set out in Table 108.<br>If the values are not met, it is allowed to take new reference values obtained after 24 h exposure in air at nominal working temperature (conditioning) to release processing pressure/effects. | ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.4 | + | |
| **Resistance to ultraviolet radiation (UV)**<br>Requirements<br>Those parts of the air supply and combustion products evacuation ducts that are exposed to UV shall be tested in accordance with the test conditions.<br>After the exposure test the following requirements shall be met:<br>a) the impact strength, as given in Annex CC, shall not change more than 50 %;<br><br>b) in the case of thermosetting plastics the flexural modulus and flexural strength, as given in Annex CC, shall not | ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.5 | + | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| change more than 50 %.<br>The above tests shall be carried out in such a way that the maximum stress will occur at the radiated side of the test pieces.<br>Testing is not necessary in cases where the free end of the plastic flue duct (terminal) is not more than twice the diameter of the duct, and a maximum 0,4 m in length exposed to UV of the sun. | | | |
| **Geometrical stability**<br>Requirements<br>After exposure in accordance with the test conditions the change in internal diameter/length of the pipe shall not exceed 2 %.<br>For each size group of diameters one size shall be tested according to table 109 | ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.6 | + | |
| **Reaction to fire**<br>Requirements<br>The reaction to fire according to EN 13501-1 shall be declared in the installation instructions. The material shall meet the requirements of the classes of EN 13501-1 except class "F". | ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.7 | + | |
| **Requirements for elastomeric seals and elastomeric sealants in the combustion product evacuation ducts, terminals and fitting pieces** | ČSN EN 15502-2-1+A1:2017 Art. 8.103. | | |
| **Characterization**<br>Requirements<br>The material shall be characterised by determining the following properties in accordance with the methods as described in 6.2 of EN 14241-1:2005:<br>a) hardness;<br>b) density;<br>c) compression set;<br>d) tensile strength;<br>e) stress at 100 % of elongation. | ČSN EN 15502-2-1+A1:2017 Art. 8.103.1 | + | |
| **Long-term resistance to thermal load**<br>Requirements<br>The material shall be capable of withstanding exposure to the nominal working combustion products temperature.<br>After exposure the following requirements shall be met:<br>After 56 days of exposure the properties given in Table 110 should not deviate from the original value by more than the values as listed in Table 110 in column A.<br>If the change of a property is greater, then the deviation from the original value shall not be greater than the values as listed in column B. Furthermore the change in properties between 28 and 56 days of exposure shall be less than the change between the original value and 28 days of exposure (stabilisation of the material). | ČSN EN 15502-2-1+A1:2017 Art. 8.103.2 | + | |
| **Long-term resistance to condensate exposure**<br>Requirements<br>The material shall be capable of withstanding exposure to test condensate as described in Table 111.<br>The test condensate and its test temperature are dependent on the construction class as mentioned below:<br>a) Construction class K1, no direct exposure to the flue gas and/or condensate; | ČSN EN 15502-2-1+A1:2017 Art. 8.103.3 | + | |

| Requirement | Specification of requirement | Test evaluation | Note |
|---|---|---|---|
| b) Construction class K2, direct exposure to the flue gas and/or condensate.<br>After exposure the following requirements shall be met:<br>After 56 days of exposure the properties given in Table 111 should not deviate from the original value by more than the values as listed in Table 111, column A. If the change of a property is higher, then the deviation from the original value shall not be more than the values as listed in Table 110, column B. Additionally the change in properties between 28 and 56 days of exposure shall be less than the change between the original value and 28 days of exposure (stabilization of the material). | | | |
| **Cyclic condensate resistance test**<br>Requirements<br>After exposure in accordance with the test conditions the test pieces or seals are inspected. The seals shall not show damage e.g. cracks. The inspection shall be performed visually at approximately 100 % elongation. If the performance of the visual inspection is not applicable (depending on the properties of the test pieces e.g. diameter, hardness) or in case of any suspected change of the material, alternatively it shall be checked that the tensile strength and the stress at 100 % of elongation will not have changed by more than 30 % when tested in accordance with ISO 37 on a minimum of 6 test pieces. | ČSN EN 15502-2-1+A1:2017 Art. 8.103.4 | + | |
| **Relaxation behaviour**<br>Requirements<br>When tested in accordance with the test conditions the stress relaxation shall be lower than 50 %. | ČSN EN 15502-2-1+A1:2017 Art. 8.103.5 | + | |
| **Compression set**<br>Requirements<br>When tested in accordance with the test conditions below the compression set shall not exceed 25 %. | ČSN EN 15502-2-1+A1:2017 Art. 8.103.6 | + | |
| **Low temperature resistance**<br>Requirements<br>When tested in accordance with the test conditions the compression set shall not exceed 50%. | ČSN EN 15502-2-1+A1:2017 Art. 8.103.7 | + | |
| **Joints in elastomeric seals** | ČSN EN 15502-2-1+A1:2017 Art. 8.103.8. | | |
| **Durability**<br>Requirements<br>If an elastomeric seal has a joint, the requirements specified in "long term resistance to thermal load" and "long term resistance to condensate exposure" shall also be met for test pieces that include the joint. | ČSN EN 15502-2-1+A1:2017 Art. 8.103.8.1 | + | |
| **Strength**<br>Requirements<br>When tested in accordance with the test conditions, visual inspection of the test pieces that are still being elongated shall not reveal any cracks or fractures.<br>NOTE A joint in an elastomeric seal is always a risk, so seals should not have more than one joint. | ČSN EN 15502-2-1+A1:2017 Art. 8.103.8.2 | + | |

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

**Measurement results:**

| Test methods | Measurement result | Note |
|---|---|---|
| **General** | | |
| ČSN EN 15502-2-1+A1:2017, Art. 8.101.1 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Compressive strength** | | |
| **Duct sections and fittings** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.101.2.1 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Ducts support** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.101.2.2 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Vertical terminals** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.101.2.3 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Lateral strength** | | |
| **Flexural tensile strength** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.101.3.1 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Components subject to wind load** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.101.3.2 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Flexible metallic liners** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.101.4 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Requirements for plastic in the combustion product evacuation ducts, terminals and fitting pieces for boilers** | | |
| **Thermal resistance** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.102.1 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Materials** | | |
| **Characterisation** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.1 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Long-term resistance to thermal load** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.2 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip |

| Test methods | Measurement result | Note |
|---|---|---|
| | | Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Long-term resistance to condensate exposure** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.3 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Resistance to condensing/non-condensing cycling** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.4 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Resistance to ultraviolet radiation (UV)** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.5 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Geometrical stability** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.6 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Reaction to fire** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.102.2.7 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Requirements for elastomeric seals and elastomeric sealants in the combustion product evacuation ducts, terminals and fitting pieces** | | |
| **Characterisation** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.103.1 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Long-term resistance to thermal load** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.103.2 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Long-term resistance to condensate exposure** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.103.3 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Cyclic condensate resistance test** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.103.4 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Relaxation behaviour** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.103.5 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for |

| Test methods | Measurement result | Note |
|---|---|---|
| | | concentric air-flue-system chimneys made by Ant Kalip |
| **Compression set** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.103.6 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Low temperature resistance** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.103.7 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Durability** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.103.8.1 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |
| **Strength** | | |
| ČSN EN 15502-2-1+A1:2017 Art. 8.103.8.2 | + | Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip<br>Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip |

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

| | |
|---|---|
| **Test objective:** | **Electric auxiliary energy** |
| **Exact name of the test procedure:** | T 073<br>Test of electricity consumption |
| **Test method:** | ČSN EN 15502-1:2022, Art. 10.1.3.2, 10.1.4.2, 10.1.5.2, 10.2.3.2, 10.2.4.2, 10.2.5.2 |
| **Sample tested:** | ONGAS Compact 24-28 kW Domestic Condensing Boiler |
| **Measuring equipment used:** | see Chapter III |

**Test results:**

| Requirement | Requirement specification | Evaluation | Note |
|---|---|---|---|
| **Auxiliary energy consumption** | ČSN EN 15502-1:2022, Art. 10.1 | | |
| **General**<br>If the auxiliary energy consumption for boilers with nominal heat output <=400 kW is spepecified, then it has to be determined according to 10.1.2 till 10.1.5.<br>The electrical power consumption of boilers without a pump shall be assessed according to EN 15456:2008. | ČSN EN 15502-1:2022, Art. 10.1.1 | + | |
| **System boundaries**<br>The system boundary contains all electrical components between the manual shut-off device (for water and fuel) and the flue outlet of the combustion circuit, including the circulation pump. At the outlet, the pressure for the correct boiler operation has to be set.<br>The following components shall also be covered by measurement provided they are considered to be a component of the heating boiler required for the design operation:<br>a) Shut-off valves in the fuel supply;<br>b) Supply of combustion air (air fan) respectively flue gas removal (flue exhauster);<br>c) Control and monitoring devices (programming units, monitoring device/detector, etc.), if they are mandatory for the operation of the boiler;<br>d) Circulation pump. | ČSN EN 15502-1+A1:2017, Art. 10.2 | +<br><br>+<br>+<br>+ | |
| **Auxiliary energy at nominal heat output** | ČSN EN 15502-1:2022, Art. 10.1.3 | | |
| **Requirement**<br>Under the test conditions of 9.2.2, the electrical auxiliary energy consumption per hour expressed in kilowatt (kW) shall be recorded and the average shall be determined. | ČSN EN 15502-1:2022, Art. 10.1.3.1 | + | |
| **Auxiliary energy at part load** | ČSN EN 15502-1:2022, Art. 10.1.4 | | |
| **Requirement**<br>Under the test conditions of 9.3.2 the demand of auxiliary energy per hour expressed in kilowatt (kW) for a load corresponding to 30 % of the nominal heat input, shall be recorded and the average consumption determined. | ČSN EN 15502-1:2022, Art. 10.1.4.1 | + | |
| **Auxiliary energy at stand-by** | ČSN EN 15502-1:2022, Art. 10.1.5 | | |
| **Requirement**<br>During the measurement in stand-by the demand of auxiliary energy per hour, expressed in kilowatt (kW), shall be recorded. | ČSN EN 15502-1:2022, Art. 10.1.5.1 | + | |
| **Auxiliary electricity consumption measurements required for eco-design and labelling regulations** | ČSN EN 15502-1:2022, Art. 10.2 | | |

| Requirement | Requirement specification | Evaluation | Note |
|---|---|---|---|
| **General**<br>The auxiliary energy consumption values declared for boilers with a nominal heat output > 400 kW shall be determined according to 10.2.2 to 10.2.5. | ČSN EN 15502-1:2022, Art. 10.2.1 | + | |
| **System boundaries**<br>The system boundary contains all electrical components between the manual shut-off device (for water and fuel) and the flue outlet of the combustion circuit, excluding the circulation pump.<br>Energy consumption for all types of temperature control devices that are not mandatory for the operation of the boilers are excluded.<br>The following components shall also be covered by measurement provided they are considered to be a component of the heating boiler required for the design operation:<br>a) Shut-off valves in the fuel supply;<br>b) Mechanical supply of combustion air or flue gas removal respectively;<br>c) Control and monitoring devices (programming units, monitoring device/detector, etc.), if they are mandatory for the operation of the boiler | ČSN EN 15502-1:2022, Art. 10.2.2 | +<br><br>+<br>+<br>+ | |
| **Auxiliary electricity consumption [kW] at nominal heat input** | ČSN EN 15502-1:2022, Art. 10.2.3 | | |
| **Requirement**<br>The auxiliary electricity consumption ($el_{max}$) in kW, shall be recorded and the average shall be determined. | ČSN EN 15502-1:2022, Art. 10.2.3.1 | + | |
| **Auxiliary electricity consumption at part load [kW]** | ČSN EN 15502-1:2022, Art. 10.2.4 | | |
| **Requirements**<br>The auxiliary electricity consumption ($el_{min}$) in kW for a load corresponding to 30 % of the nominal heat input, shall be recorded and the average shall be determined. | ČSN EN 15502-1:2022, Art. 10.2.4.1 | + | |
| **Auxiliary electricity consumption at stand by [kW]** | ČSN EN 15502-1:2022, Art. 10.2.5 | | |
| **Requirement**<br>During the measurement in stand-by the auxiliary electricity consumption ($P_{SB}$) in kW, shall be recorded and the average shall be determined. | ČSN EN 15502-1:2022, Art. 10.2.5.1 | + | |

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

**Measurement results:**

| | | | |
|---|---|---|---|
| Date of testing: 2022-05-23 | $t_{amb}$ = 20,5 °C | rel. humidity = 27,6 % | $p_a$ = 982,4 mbar |

| Test methods | Measurement result | Note |
|---|---|---|
| **Auxiliary energy at nominal heat output** | | |
| ČSN EN 15502-1:2022, Art. 10.1.3.2 | + | The average consumption of auxiliary energy of the boiler ONGAS Compact 24-28 kW Domestic Condensing Boiler at the nominal heat input by burning natural gas G20 is **0,068 kW**. |

| Test methods | Measurement result | Note |
|---|---|---|
| **Auxiliary energy at part load** | | |
| ČSN EN 15502-1:2022, Art. 10.1.4.2 | + | The average consumption of auxiliary energy of the boiler ONGAS Compact 24-28 kW Domestic Condensing Boiler at the part load by burning natural gas G20 is **0,053 kW**. |
| **Auxiliary energy at stand-by** | | |
| ČSN EN 15502-1:2022, Art. 10.1.5.2 | + | The consumption of auxiliary energy of the boiler ONGAS Compact 24-28 kW Domestic Condensing Boiler in stand-by mode is **0,003 kW**. |
| **Auxiliary electricity consumption [kW] at nominal heat input** | | |
| ČSN EN 15502-1:2022, Art. 10.2.3.2 | + | The average consumption of auxiliary energy of the boiler ONGAS Compact 24-28 kW Domestic Condensing Boiler without circulation pump at the nominal heat input by burning natural gas G20 is **0,025 kW.** |
| **Auxiliary electricity consumption at part load [kW]** | | |
| ČSN EN 15502-1:2022, Art. 10.2.4.2 | + | The average consumption of auxiliary energy of the boiler ONGAS Compact 24-28 kW Domestic Condensing Boiler without circulation pump at the part load by burning natural gas G20 is **0,010 kW**. |
| **Auxiliary electricity consumption at stand by [kW]** | | |
| ČSN EN 15502-1:2022, Art. 10.2.5.2 | + | The average consumption of auxiliary energy of the boiler ONGAS Compact 24-28 kW Domestic Condensing Boiler in stand-by mode is **0,003 kW**. |

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


Photos of the boiler ONGAS Compact 24-28 kW Domestic Condensing Boiler

| | | | | | |
|---|---|---|---|---|---|
| Tested by: | Ing. Ondřej Ptáček | Date: | 2023-05-17 | Signed: | |
| Reviewed and approved by: | Ing. Bohdan Brázda | Date: | 2023-05-17 | Signed: | |

## V. A list of referenced documents

- Order No. B-76380 of 2022-05-09
- Contract No. B-76380/30
- ČSN EN 15502-1:2022 – 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 437:2021 – Test gases - Test pressures - Appliance categories
- Commission regulation (EU) No. 813/2013
- User´s manual ONGAS Compact 24-28 kW Domestic Condensing boiler
- Draft of nameplate
- Risk assessment of 2022-09-08 issued by manufacturer

- Drawing documentation:
  - general drawing of boiler ONGAS Compact 24-28 kW Domestic Condensing Boiler, no. OG COMPACT;
  - drawing of assembly of boiler ONGAS Compact 24-28 kW Domestic Condensing Boiler, no. OG COMPACT-0000,
  - drawing of heat exchanger, no. OG COMPACT-HEX ASS.;
  - detailed drawing of heat exchanger, no. OG COMPACT-0001;
  - drawing of plate to plate heat exchanger, no. T12A-093;
  - drawing of burner Polidoro, no. 108.2022.00;
  - drawing of burner, no. OG COMPACT-0009;
  - drawing of electrode, no. OG COMPACT-0018;
  - drawing of blower SIT, no. 0481209;
  - drawing of gas valve SIT, no. 0848106;
  - drawing of circulating pump Grundfos UPM3S, no. 99556023;
  - drawing of blower Ebm-Papst, no. 500000023917;
  - drawing of circulating pump DUCA, no. BPE15-8D;
  - drawing of pressure sensor GTE TCBAA00, without number;
  - drawing of 3-way valve, no. 3WV10100220;
  - drawing of hydraulic group Pakkens, no. HB-103-F1;
  - drawing of horizontal chimney Ø60-100, without number;
  - drawing of vertical chimney Ø60-100, without number;
  - drawing of siphon, no. T01.003.000020.22504A

- EU type examination certificate (GAR) no. 17GR0143/04 of 2021-01-26 for multi-functional control, type 84X Sigma, made by SIT S.P.A, issued by Kiwa Nederland B.V.
- EU declaration of conformity of 2019-11-28 for circulating pump, types GFNHB, GFNKB, GFNKC, GFNJB, GFNJC, GFNJD, GFNJF and GFNJG made by Grundfos
- EU Declaration of Conformity of 2021-06-15 for radial blower with EC-motor, type 55667.80270-VGM0100MSGBZ made by ebm-papst Landshut GmbH
- EC Declaration of conformity of 2022-07-29 for blower model NG40E, EF40 made by SIT S.p.A
- EU type examination certificate (GAR) no. 18GR0202/02 of 2018-08-02 for multi-functional control, type VK 42.., VK 82.. made by Pittway Sarl, issued by Kiwa Nederland B.V.
- EU Declaration of Conformity of 2019-06-04 for Automatic gas burner controller type S4962 made by Resideo
- EC Declaration of conformity of 2020-05-14 for sensors STD made by Enpi elektronik
- Certificate no. EMC-B-00323-22 of 2022-02-15 for Electronic Control board ECB 315 0009 made by Enpi Elektronik, issued by Engineering Test Institute Brno
- Certificate no. GAR-1015-00321-22 of 2022-02-15 for Electronic Control board ECB 315 0009 made by Enpi Elektronik, issued by Engineering Test Institute Brno
- Certificate no. LVD-B-00322-22 of 2022-02-15 for Electronic Control board ECB 315 0009 made by Enpi Elektronik, issued by Engineering Test Institute Brno

- Certificate attestation of Conformity of 2021-06-02 for Circulating pump type XPS25-7-180 made by DUCA, issued by CGS test services Technical control
- Attestation of conformity no. 3507070.01_AoC_EMC of 2020-05-29 for hall effect transducer, type TCBAA00 made by GTE Elettromeccanica s.r.l.
- Certificate of conformity no. 0432-CRP-00504 of 2019-01-10 for chimney system made by Ant Kalip
- Certificate of conformity no. 0432-CPR-00214-10 of 2020-08-10 for concentric air-flue-system chimneys made by Ant Kalip
- A set of required technical documentation according to standards ČSN EN 15502-1:2022, ČSN EN 15502-2-1+A1:2017 materials archived within the task: No. 30-16068

Test Report compiled by: Ing. Ondřej Ptáček

Test Report approved by: Ing. Bohdan Brázda

Accredited Testing Laboratory No. 1045.1
STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p.
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Milan Holomek
Head of Heating and Ecological
Equipment Testing Laboratory

- End of Test Report -