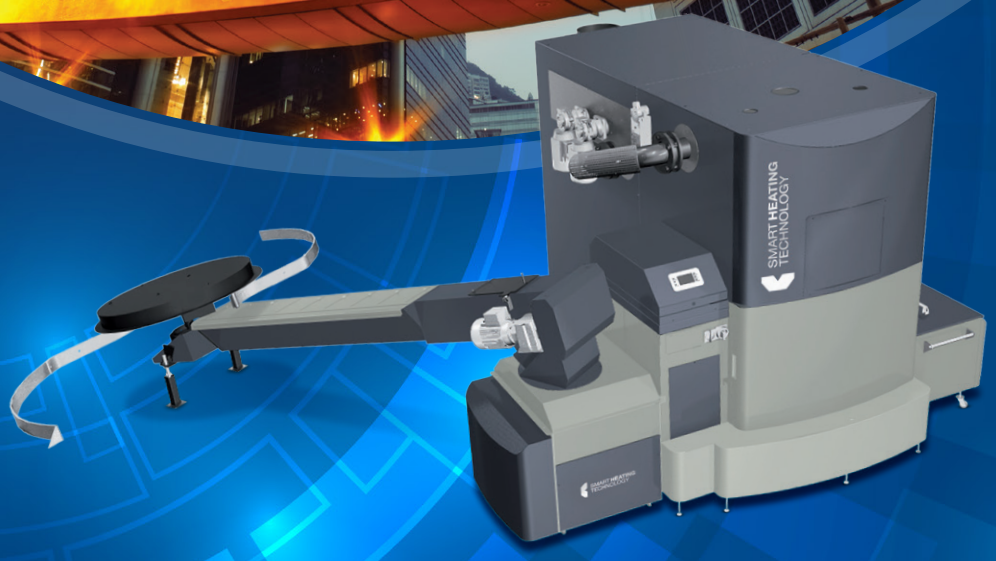
SMART **HEATING** TECHNOLOGY

Purity to Nature
Savings to Clients
Comfort to Users




AUTOMATIC BIOMASS BOILER

# SMART 350 kW

▪ Fully automatic, ecologic boiler with excellent features ▪ Technical solution flexibility ▪ Multiple fuel possibility ▪ Economical and ecological operation ▪ Efficiency 96 % ▪ Output modulation 30–100 % ▪ Lambda sensor ▪ Ceramic Burner Option ▪ Vibrating Burner Plate Option ▪ Low Maintenance & Service requirements ▪ Heating circuits regulation ▪ Cascade installation solutions ▪ Mobile phone control ▪ Internet control ▪ Mobile container solutions ▪ Special boiler accessories

AUTOMATIC BIOMASS BOILER

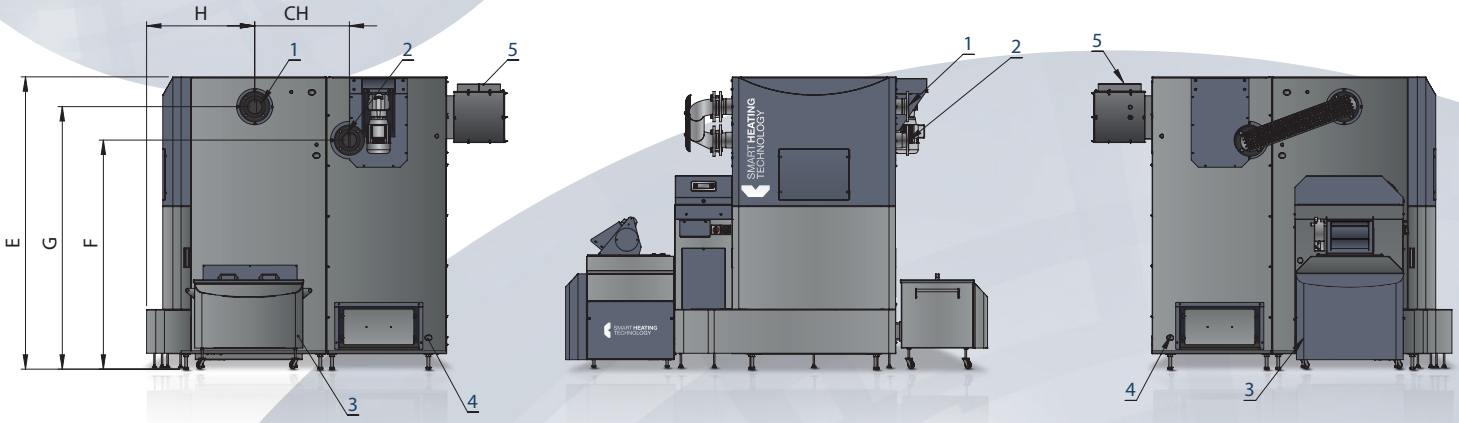
# SMART 350 kW

SMART HEATING TECHNOLOGY

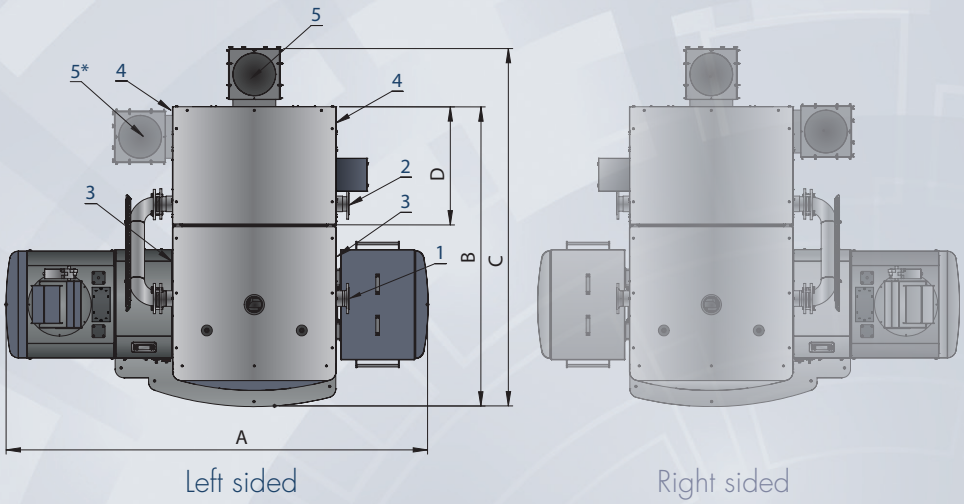
ČSN-EN 303.5/2013

ISO 9001:2009

## DIMENSIONS AND WEIGHTS OF TECHNOLOGY 350 kW




1. Water outlet DN100/PN6
2. Water inlet DN100/PN6
3. In/out water valve 3/4" of burning chamber
4. In/out water valve 3/4" of heat exchanger
5. Chimney outlet avg. 300 mm
* Option for limited spaces



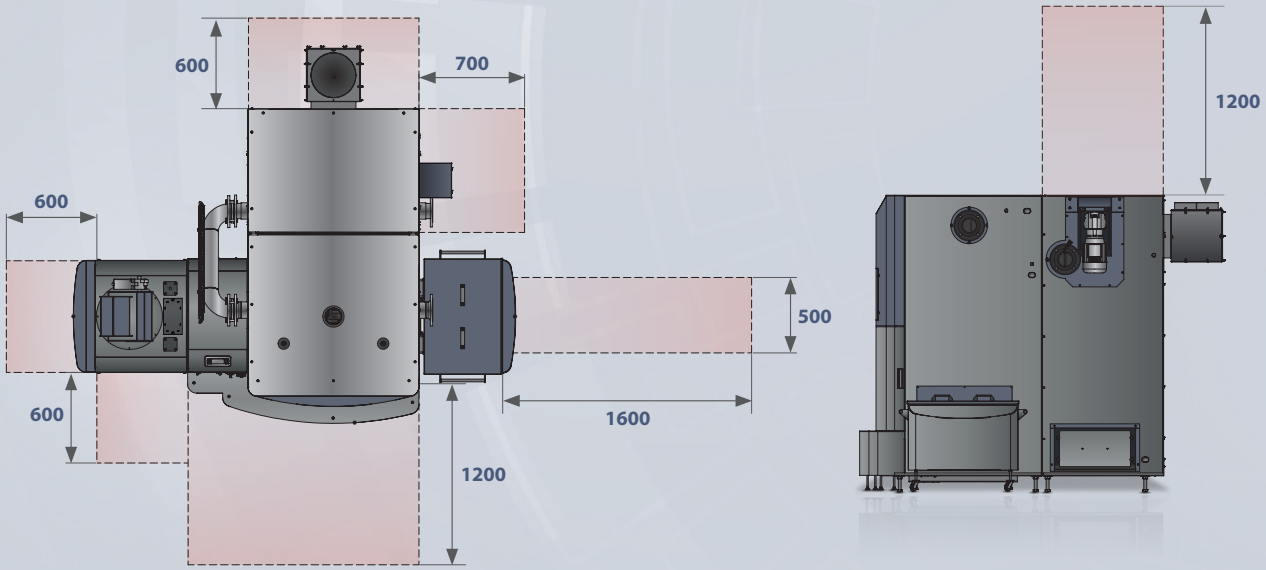

Left sided

Right sided

| A | B | C | D | E | F | G | H | CH |
|---|---|---|---|---|---|---|---|---|
| 2940 | 2200 | 2600 | 940 | 1995 | 1560 | 1790 | 750 | 655 |

| WEIGHTS | | |
|---|---|---|
| Burning chamber 350 kW | 1 550 kg | Total weight |
| Exchanger 350 | 1 600 kg | 3 150 kg |

## SERVICE ZONES OF TECHNOLOGY 350 kW



AUTOMATIC BIOMASS BOILER

# SMART 350 kW

SMART HEATING TECHNOLOGY

ČSN-EN 303.5/2013

ISO 9001:2009

## TECHNICAL SPECIFICATIONS 350 kW

| AUTOMATIC BIOMASS BOILER SMART 350 kW | | Wood pellets | | Wood chips | |
|---|---|---|---|---|---|
| | | Rated | Minimum | Rated | Minimum |
| **Measured values** | | | | | |
| Rated heat capacity | kW | 350 | 350 | 350 | 350 |
| Combustion product temperature | °C | 93,8 | 63,1 | 99,3 | 62,9 |
| Fuel consumption | kg/hour | 78,90 | 18,50 | 86,90 | 20,80 |
| Input water temperature | °C | 58,4 | 60,6 | 59,3 | 57,7 |
| Outlet water temperature | °C | 75,5 | 76,1 | 75,0 | 74,5 |
| Cooling water temperature | °C | 9,5 | 10,7 | 9,6 | 11,0 |
| Cooling water flow rate | $m^3$/hod | 17,272 | 4,492 | 19,438 | 4,428 |
| Draught behind boiler | Pa | 151,0 | 25,0 | 150,0 | 25,0 |
| Ambient temperature | °C | 26,0 | 23,0 | 27,0 | 24,0 |
| Relative air humidity | % | 37,0 | 38,0 | 41,0 | 41,0 |
| Barometric pressure | kPa | 99,20 | 99,30 | 99,07 | 99,22 |
| **Flue gas analysis** | | | | | |
| Oxygen $O_2$ | % | 7,59 | 10,37 | 7,17 | 11,20 |
| Carbon dioxide $CO_2$ | % | 11,46 | 9,61 | 12,15 | 8,88 |
| Carbon monoxide CO | ppm | 82 | 133 | 101 | 173 |
| Higher hydrocarbons OGC | ppm | 6 | 5 | 3 | 6 |
| Nitrogen dioxides Nox | ppm | 74 | 61 | 93 | 56 |
| Dust | $mg/m^3$ | 30 | 30 | 45 | 54 |
| **O2 = 10 %** | | | | | |
| Carbon monoxide CO | $mg/m^3$ | 87 | 182 | 101 | 246 |
| Higher hydrocarbons OGC | $mg/m^3$ | 3 | 3 | 2 | 4 |
| Nitrogen dioxides Nox | $mg/m^3$ | 124 | 129 | 153 | 128 |
| Dust | $mg/m^3$ | 24 | 32 | 25 | 48 |
| **Auxiliary combustion values (solid fuels)** | | | | | |
| Mass flow rate gases | kg/sec | 0,236 | 0,064 | 0,224 | 0,070 |
| Stoichiometric oxygen value | $m^3$/kg | 0,958 | 0,957 | 0,832 | 0,830 |
| Stoichiometric air value | $m^3$/kg | 4,560 | 4,558 | 3,962 | 3,951 |
| Stoichiometric volume of dry combustion products | $m^3$/kg | 4,449 | 4,447 | 3,882 | 3,872 |
| Stoichiometric air multiple | | 1,56 | 1,99 | 1,51 | 2,19 |
| Volume of dry combustion products, actual | $m^3$/kg | 7,388 | 8,843 | 6,191 | 8,481 |
| Volume of $H_2O$ in the combustion air | $m^3$/kg | 0,087 | 0,098 | 0,089 | 0,174 |
| Volume of $H_2O$ in the combustion produts | $m^3$/kg | 0,942 | 0,953 | 0,935 | 0,953 |
| Maximum volume $CO_2$ | % | 19,01 | 19,01 | 19,40 | 19,40 |
| **Calculated values - heat overview** | | | | | |
| Loss of sensible heat of combustion products (chimney) | % | 4,7 | 3,3 | 4,7 | 3,3 |
| Loss of gas underburning | % | 0,0 | 0,1 | 0,0 | 0,1 |
| Loss of mechanical underburning | % | 0,0 | 0,1 | 0,3 | 0,6 |
| Loss of heat transfer into the environment | % | 0,6 | 1,4 | 0,5 | 1,2 |
| Total loss | % | 5,3 | 4,9 | 5,4 | 5,1 |
| Efficiency – indirect method | % | 94,7 | 95,1 | 94,6 | 95,0 |
| Heat input | kW | 363,0 | 85,2 | 371,4 | 89,0 |
| Heat capacity | kW | 345,8 | 81,4 | 354,5 | 85,2 |
| Uncertainty of determining heat capacity | %+/- | 14,5 | 3,4 | 14,9 | 3,6 |
| **Efficiency – direct method** | **%** | **95,3** | **95,5** | **95,4** | **95,7** |
| Capacity / rated output | % | 98,8 | 23,3 | 101,6 | 24,7 |

*Boilers can be operated at 90 °C only when special conditions are met

## CERTIFIED OPERATING VALUES 350 kW

| SMART BOILER OPERATING DATA | | |
|---|---|---|
| **Technical data of the boiler** | | |
| Marking | | 350 |
| Nominal power Pn | kW | 350 |
| Partial load (power) Pp | kW | 90 |
| Boiler efficiency at Pn | % | >95 |
| Boiler class | | 5 |
| **Water** | | |
| Water volume | l | 740 |
| Diameter of water connection | " | 4 |
| Diameter of water connection | DN | 100 |
| Hydraulic-pressure drop of the boiler at the temperature fall 20° | mbar | 102 |
| Boiler temperature | °C | 60-90* |
| Minimal temperature of returnable water | °C | 55 |
| Maximal operational pressure | bar | 3,5 |
| Test pressure | bar | 6,5 |
| Temperature of furnace | °C | 900-1100 |
| Pressure of furmace | mbar | -0,04 |
| Required draught of the chimney | mbar | 0,2 |
| Requirement for the forced draught | | Yes |
| Combustion temperature at Pn | °C | 99,3 |
| Combustion temperature at Pp | °C | 62,9 |
| Diameter of flue gas duct | mm | 300 |
| Diameter of chimney | mm | 350 |
| **Fuel clasification according to norm EN 14961** | | |
| Wood pellets - C1 | Tested fuel | D6, M10, A1,5, DU90,0 |
| Wood chips - B1 | | P45, M30, A3.0 |
| **Electrical installation** | | |
| Electrical connection | | 3+N+PE 50Hz 230/400V TN-C-S |
| Conveyor engine | W | 550 |
| Feeding auger engine | W | 550 |
| Exchanger cleaning engine (s) | W | 2 x 550 |
| Ash-removing engine | W | 550 |
| Fan of primary air | W | 66 |
| Fan of secondary air 1 | W | 170 |
| Fan of secondary air 2 | W | 170 |
| Chimney exhaust fan | W | 1100 |
| Electrical ignition | W | 1600 |
| Separation flap valve | W | 6,5 |
| Total | W | 4762,5 |

▪ Measured ▪ Interpolace is in complience with EN303.5 coll. 5.3.1