

**STEEL BOILERS**

# **RTQ 3S**

**INSTALLATION, OPERATION, MAINTENANCE  
AND SYSTEM MANAGEMENT MANUAL**



**RIELLO**



## CONFORMITY

**RTQ 3S RIELLO** boilers *conform* to the Efficiency Directive 92/42/CEE.  
When used in conjunction with a CE marked jet burner, they also  
*satisfy* the requirements of the Gas Directive 2009/142/CE and applicable sections of the  
Electromagnetic Compatibility Directive 2014/30/UE and Low Voltage Directive 2014/35/UE.  
When **RTQ 3S** boilers up to 400 kW are used in conjunction with a fuel oil burner,  
they conform to the Energy-Related Products Directive 2009/125/EC  
and to the EU Delegated Regulation 813/2013



## RANGE

MODEL	CODE
RTQ 91 3S	20024200
RTQ 115 3S	4032606.0
RTQ 166 3S	4032607.0
RTQ 217 3S	4032608.0
RTQ 255 3S	4032609.0
RTQ 318 3S	4032610.0
RTQ 349 3S	4032611.0
RTQ 448 3S	4032613.0
RTQ 511 3S	4032614.0
RTQ 575 3S	4032615.0
RTQ 639 3S	4032616.0
RTQ 766 3S	4032617.0
RTQ 896 3S	20008436
RTQ 1100 3S	20012427
RTQ 1300 3S	20008435
RTQ 1600 3S	20016656
RTQ 2100 3S	20016657
RTQ 2400 3S	20018817

MODEL	CODE
RTQ 166 3S COMPONIBILE	20040755
RTQ 217 3S COMPONIBILE	4032620.0
RTQ 255 3S COMPONIBILE	4032621.0
RTQ 318 3S COMPONIBILE	4032622.0
RTQ 349 3S COMPONIBILE	4032623.0
RTQ 448 3S COMPONIBILE	4032625.0
RTQ 511 3S COMPONIBILE	4032626.0
RTQ 575 3S COMPONIBILE	4032627.0
RTQ 639 3S COMPONIBILE	4032628.0
RTQ 766 3S COMPONIBILE	20042810
RTQ 896 3S COMPONIBILE	20042814

## PRODUCT DESCRIPTION

**MODELS UP TO 400 KW USED WITH FUEL OIL BURNERS CONFORM TO THE ENERGY-RELATED PRODUCTS DIRECTIVE 2009/125/EC AND TO THE EU DELEGATED REGULATION 813/2013**

**RTQ 3S RIELLO** steel boilers are high efficiency boilers with horizontal, flame reversal combustion chambers and concentrically arranged flue gas pipes. They are designed for central heating and, when used in conjunction with a suitable storage cylinder, for domestic hot water production too.

Because they operate at low pressure, they provide a gradual heating action without thermal shock.

The most important technical features of these boilers are:

- The combustion chamber and heat exchange system are specially designed and shaped to achieve the best possible volume ratio.
- Only top quality materials are used to ensure a long working life.

Stainless steel turbulators inside the flue gas pipes establish an ideal pressure inside the combustion chamber and an ideal flue gas temperature. Evenly distributed thermal load optimises the efficiency of the boiler-burner system.

The boiler body is thoroughly insulated with a layer of high density glass wool.

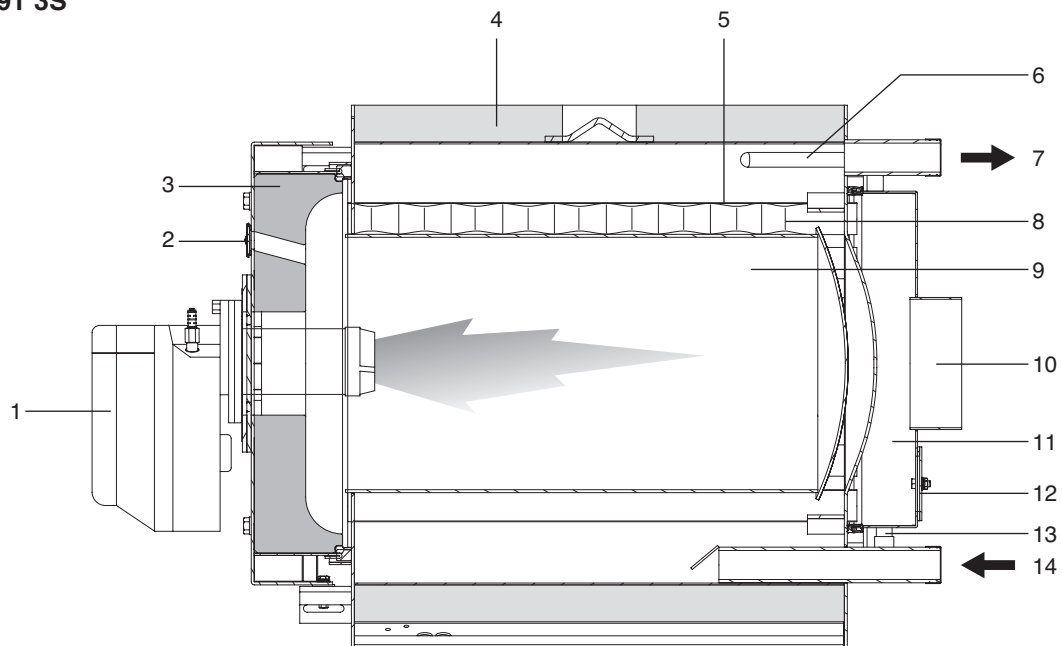
The boiler's front door and the flue gas box can be opened completely to facilitate the inspection, maintenance and cleaning of internal parts and to speed up servicing in general.

The front door can open in either direction, even without removing the burner.

Max. permissible return temperature with a gas burner: 50-55°C.

Max. permissible return temperature with a fuel oil burner: 37°C.

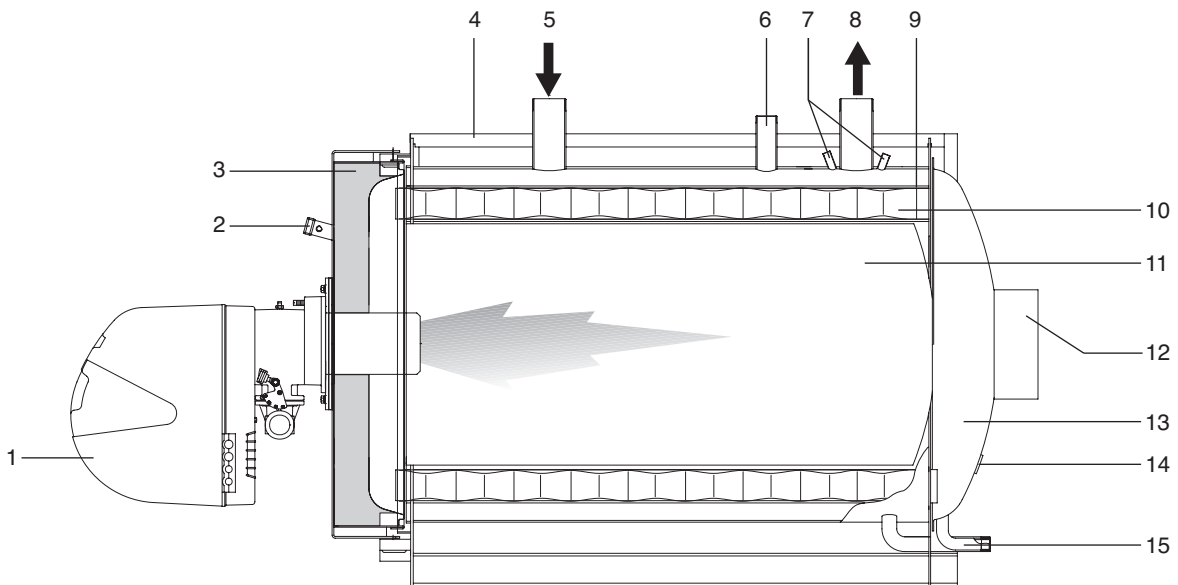
**RTQ 91 3S**



- 1 - Burner
- 2 - Flame inspection window
- 3 - Door
- 4 - Casing
- 5 - Flue gas pipes
- 6 - Instrument bulb/sensor sockets
- 7 - Central heating flow

- 8 - Turbulators
- 9 - Combustion chamber
- 10 - Flue gas exhaust
- 11 - Flue gas box
- 12 - Inspection window
- 13 - Condensate drain
- 14 - Central heating return

RTQ 115 - 2400 3S



- |   |                          |
|---|--------------------------|
| 1 - Burner  | 8 - Central heating flow |
| 2 - Flame inspection window with pressure measurement / cooling valve | 9 - Flue gas pipes       |
| 3 - Door  | 10 - Turbulators         |
| 4 - Casing  | 11 - Combustion chamber  |
| 5 - Central heating return  | 12 - Flue gas exhaust    |
| 6 - Safety device fitting   | 13 - Flue gas box        |
| 7 - Instrument bulb/sensor sockets                                    | 14 - Inspection window   |
|   | 15 - Condensate drain    |

## TECHNICAL DATA FOR BOILERS WITH FUEL OIL BURNERS <400 KW

DESCRIPTION	RTQ 3S							
	91	115	166	217	255	318	349	
Device type	Central Heating							
	B23							
Fuel	OIL							
Device category	See burner							
Maximum rated heat input HCV (LCV)	95,4 (90)	122 (115)	176,0 (166)	230,1 (217)	270,4 (255)	337,2 (318)	369,0 (348)	kW
Minimum rated heat input HCV (LCV)	74,2 (70)	95,4 (90)	122 (115)	176,0 (166)	230,1 (217)	270,4 (255)	337,2 (318)	kW
Maximum useful output (80°/60° C) P4	84,8	110,2	158,7	206,8	243,0	303,4	332,0	kW
Minimum useful output (80°/60° C) (Pn min)	66,9	86,6	110,4	159,2	208,8	244,3	304,0	kW
30% heat output with return at 37°C (P1)	25,7	33,1	47,6	62,0	72,9	91,0	99,9	kW
Seasonal energy efficiency $\eta_s$	89,0	89,0	89,0	89,0	90,0	90,0	90,0	%
Efficiency at rated heat input in high temperature mode $\eta_4$ (80-60°C) HCV (LCV)	88,8 (94,2)	90,3 (95,8)	90,2 (95,6)	89,9 (95,3)	89,9 (95,3)	90,0 (95,4)	90,0 (95,4)	%
Useful efficiency at min Pn (80-60°C) HCV (LCV)	90,1 (95,6)	90,7 (96,2)	90,5 (96,0)	90,4 (95,9)	90,7 (96,2)	90,3 (95,8)	90,1 (95,6)	%
Efficiency at rated heat input in low temperature mode $\eta_1$ with return at 37°C HCV (LCV)	94,0 (99,7)	94,0 (99,7)	94,0 (99,7)	94,0 (99,7)	94,0 (99,7)	94,1 (99,8)	94,1 (99,8)	%
Constant pressure drop	260	330	400	480	550	620	680	W
Flue gas temperature ( $\Delta T$ )	93	95 ÷ 108						°C
Flue gas mass flow rate	0,040	0,050	0,072	0,094	0,111	0,139	0,151	kg/sec
Furnace pressure	2,0	1,5	1,3	2,2	2,8	3,2	3,9	mbar
Furnace volume	97,4	91,0	138,4	199,1	199,1	298,9	298,9	dm <sup>3</sup>
Total volume of flue gas side	139,7	163,2	234,3	317,2	325,6	457,9	457,9	dm <sup>3</sup>
Total surface area for heat exchange	3,62	4,35	6,68	8,59	9,47	12,34	12,34	m <sup>2</sup>
Volumetric heat load	928	1264	1199	1090	1281	1064	1164	kW/m <sup>3</sup>
Specific heat load	24,1	25,2	23,8	24,1	25,7	24,6	26,9	kW/m <sup>2</sup>
Maximum operating pressure	6							bar
Maximum admissible temperature	110							°C
Maximum operating temperature	95							°C
Min. admissible water return temp.	37							°C
Pressure drop $\Delta T$ 10°C	42,0	15,1	42,0	76,5	144,0	148,0	162,0	mbar
Pressure drop $\Delta T$ 20°C	14,0	3,0	11,2	17,2	45,0	27,2	29,7	mbar
Water capacity	126	161	191	268	258	308	308	litri
Turbulators	22	22	30	34	39	44	44	n°
Consumption at full load (Elmax)	460	460	460	530	660	660	760	W
Consumption at part load (Elmin)	138	138	138	159	198	198	228	W
Electrical consumption in standby mode (Psb)	20	20	20	20	20	20	20	W

The stack must guarantee the minimum draught specified by applicable technical standards, assuming zero pressure at the connection to the flue gas exhaust.

Values obtained in combination with the reference burners (R) indicated in the combination table.

When used in conjunction with fuel oil burners, RTQ 3S boilers <400kW conform to:

- Energy-Related Products Directive 2009/125/EC
- EU Delegated Regulation 813/2013

## TECHNICAL DATA FOR BOILERS WITH GAS BURNERS <400 KW

DESCRIPTION	RTQ 3S									
	91(*)	115(*)	166(*)	217(*)	255(*)	318(*)	349(*)			
Fuel	GAS									
Rated heat input	min	70	90	115	166	217	255	318	348	kW
	max	90	115	166	217	255	318	348	348	kW
Rated useful heat output Pn	min	66,9	86,6	110,4	159,2	208,8	244,3	304,0	332,0	kW
	max	84,8	110,2	158,7	206,8	243,0	303,4	332,0	332,0	kW
Useful efficiency at minimum Pn		95,6	96,2	96,0	95,9	96,2	95,8	95,6	95,6	%
Useful efficiency at maximum Pn		94,2	95,8	95,6	95,3	95,3	95,4	95,4	95,4	%
Useful efficiency at 30% max. Pn		95,9	95,1	95,6	96,3	96,5	96,5	96,7	96,7	%
Constant pressure drop		< 1,5	< 1,4				< 1,2			
Flue gas temperature (ΔT)		93	95 ÷ 108						°C	
Flue gas mass flow rate		0,040	0,050	0,072	0,094	0,111	0,139	0,151	kg/sec	
Furnace pressure		2,0	1,5	1,3	2,2	2,8	3,2	3,9	mbar	
Furnace volume		97,4	91,0	138,4	199,1	199,1	298,9	298,9	dm3	
Total volume of flue gas side		139,7	163,2	234,3	317,2	325,6	457,9	457,9	dm3	
Total surface area for heat exchange		3,62	4,35	6,68	8,59	9,47	12,34	12,34	m2	
Volumetric heat load		928	1264	1199	1090	1281	1064	1164	kW/m3	
Specific heat load		24,1	25,2	23,8	24,1	25,7	24,6	26,9	kW/m2	
Maximum operating pressure		6								bar
Maximum admissible temperature		110								°C
Maximum operating temperature		95								°C
Min. admissible water return temp.		50	55						°C	
Pressure drop ΔT 10°C		42,0	15,1	42	76,5	144	148	162	mbar	
Pressure drop ΔT 20°C		14,0	3	11,2	17,2	45	27,2	29,7	mbar	
Water capacity		126	161	191	268	258	308	308	litri	
Turbulators		22	22	30	34	39	44	44	n°	

(\*) Heating appliance marketed before 1 January 2018, intended exclusively for replacement under the terms of EU Regulation 813/2013, article 1, section 2, letter (g).

## TECHNICAL DATA FOR BOILERS > 400 KW

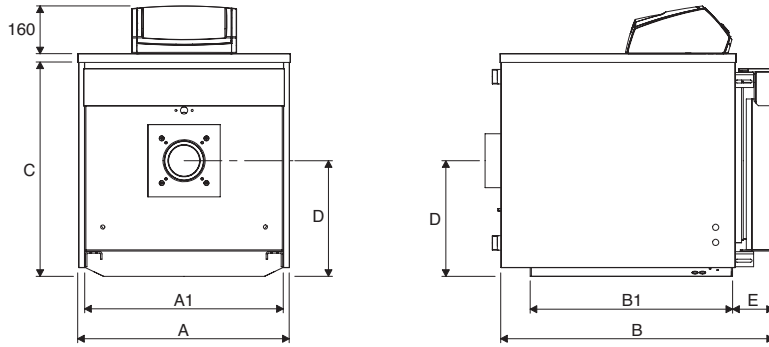
DESCRIPTION	RTQ 3S												
	448	511	575	639	766	896	1100	1300	1600	2100	2400		
Fuel	GAS / OIL												
Rated heat input	min	384	448	511	575	639	766	896	1020	1300	1600	2100	kW
	max	448	511	575	639	766	896	1100	1300	1600	2100	2400	kW
Rated useful heat output Pn	min	369,4	431,0	491,6	553,2	614,7	736,9	862,0	981,2	1250,6	1539,2	2020,2	kW
	max	427,4	487,5	548,6	609,6	730,8	854,8	1049,4	1240,2	1526,4	2003,4	2289,6	kW
Useful efficiency at minimum Pn		96,2	96,2	96,2	96,2	96,2	96,2	96,2	96,2	96,2	96,2	96,2	%
Useful efficiency at maximum Pn		95,4	95,4	95,4	95,4	95,4	95,4	95,4	95,4	95,4	95,4	95,4	%
Useful efficiency at 30% max. Pn		96,7	96,7	96,7	96,7	96,7	96,7	96,7	96,7	96,7	96,7	96,7	%
Constant pressure drop		< 1,2		< 1									%
Flue gas temperature (ΔT)		95 ÷ 108											°C
Flue gas mass flow rate		0,206	0,222	0,250	0,277	0,332	0,392	0,477	0,553	0,704	0,911	1,050	kg/sec
Furnace pressure		3,5	4,2	3,4	4,5	5,3	6,0	3,3	5,3	4,7	5,1	7,6	mbar
Furnace volume		410,5	410,5	548,0	548,0	695,0	912,1	1097,8	1479,7	1569,7	2066,2	2066,2	dm <sup>3</sup>
Total volume of flue gas side		676,8	676,8	888,3	888,3	1101,4	1388,9	1727,9	2162,7	2531,6	3243,5	3243,5	dm <sup>3</sup>
Total surface area for heat exchange		19,04	19,04	23,52	23,52	28,06	32,87	37,28	42,24	51,37	67,94	67,94	m <sup>2</sup>
Volumetric heat load		1091	1245	1049	1166	1102	982	1002	879	1020	1016	1162	kW/m <sup>3</sup>
Specific heat load		22,5	25,6	23,3	25,9	26,0	26,0	28,1	29,4	29,7	29,5	33,7	kW/m <sup>2</sup>
Maximum operating pressure		6											bar
Maximum admissible temperature		110											°C
Maximum operating temperature		95											°C
Min. admissible water return temp.		55											°C
Pressure drop ΔT 10°C		258,6	295,0	48,6	54,0	48,0	76,5	132,0	230,0	130,0	111,0	142,0	mbar
Pressure drop ΔT 20°C		64,7	73,8	8,1	9,0	11,7	15,3	30,5	60,0	30,5	30,0	35,0	mbar
Water capacity		593	593	758	758	839	1080	1350	1480	1716	2000	2000	litri
Turbulators		60	60	66	66	74	76	70	75	93	114	114	n°

The stack must guarantee the minimum draught specified by applicable technical standards, assuming zero pressure at the connection to the flue gas exhaust.

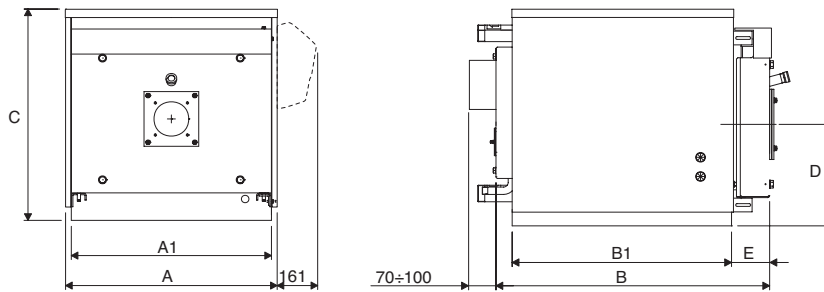
Values obtained with **RIELO** Models RL and GULLIVER RG with CO<sub>2</sub> = 12,5%; RS with CO<sub>2</sub> = 9,7%.

## OVERALL DIMENSIONS AND WEIGHTS

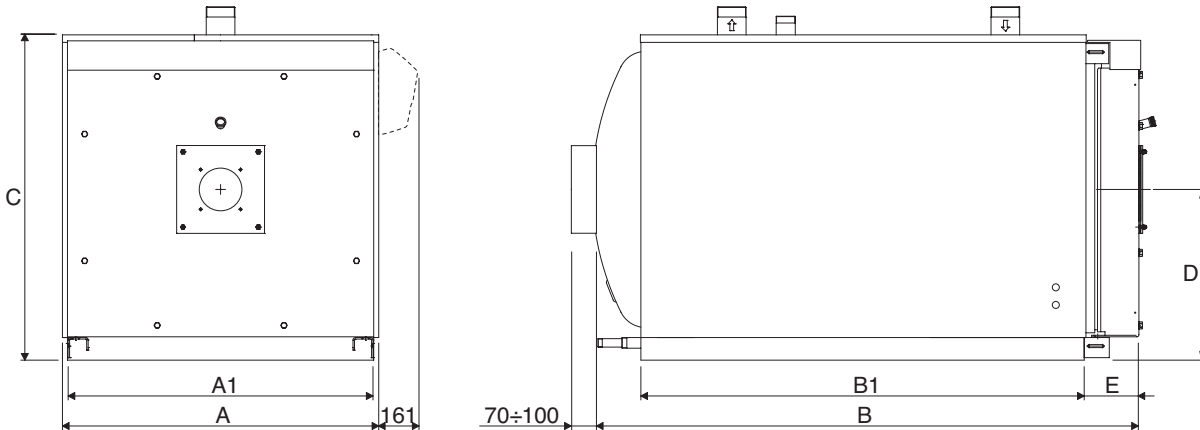
### RTQ 91 3S



### RTQ 115÷166 3S



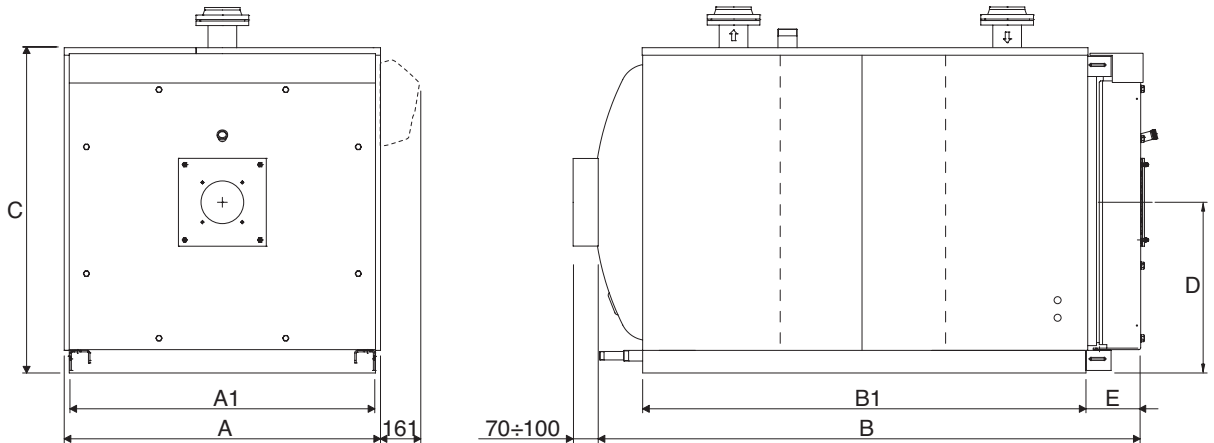
### RTQ 217÷349 3S



DESCRIPTION	RTQ 3S							
	91	115	166	217	255	318	349	
A - Width	705	805	853	925	925	975	975	mm
A1 - Base width	660	753	803	875	875	925	925	mm
B - Depth	1060	1130	1305	1480	1480	1710	1710	mm
B1 - Base depth	882	945	1110	1255	1255	1450	1450	mm
C - Height	740	790	840	980	980	1030	1030	mm
D - Burner and flue height	384	410	435	525	525	550	550	mm
E - Door depth	135	135	145	150	150	180	180	mm
Weight of boiler	201	258	325	420	438	568	568	kg
Weight of casing	24	25	30	35	35	42	42	kg



### RTQ 448-2400 3S



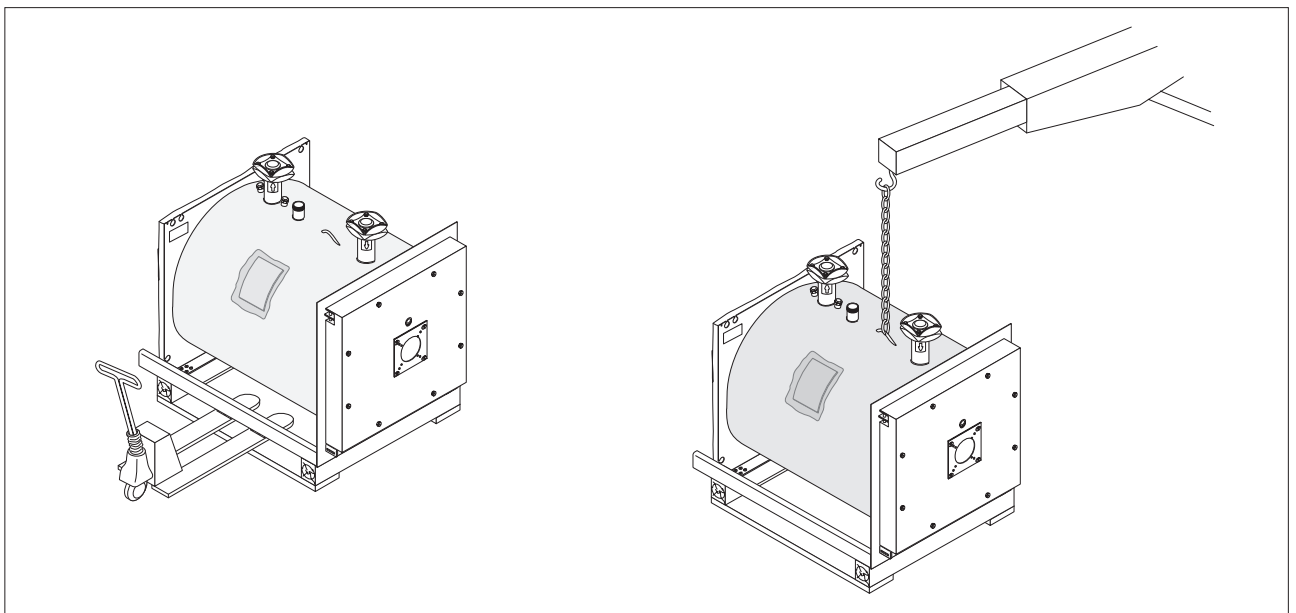
DESCRIPTION	RTQ 3S											
	448	511	575	639	766	896	1100	1300	1600	2100	2400	
A - Width	1150	1150	1220	1220	1285	1360	1450	1535	1610	1715	1715	mm
A1 - Base width	1100	1100	1170	1170	1235	1310	1400	1485	1555	1660	1660	mm
B - Depth	2040	2040	2310	2310	2450	2765	3030	3055	3135	3415	3415	mm
B1 - Base depth	1710	1710	1930	1930	2110	2375	2470	2580	2630	2890	2890	mm
C - Height	1210	1210	1280	1280	1335	1430	1530	1610	1680	1850	1850	mm
D - Burner and flue height	655	655	690	690	715	755	820	865	900	1000	1000	mm
E - Door depth	195	195	205	205	215	245	270	290	300	300	300	mm
Weight of boiler	920	920	1134	1134	1336	1730	2185	2670	3045	4170	4180	kg
Weight of casing	50	50	55	55	70	87	95	110	115	122	122	kg

## HANDLING

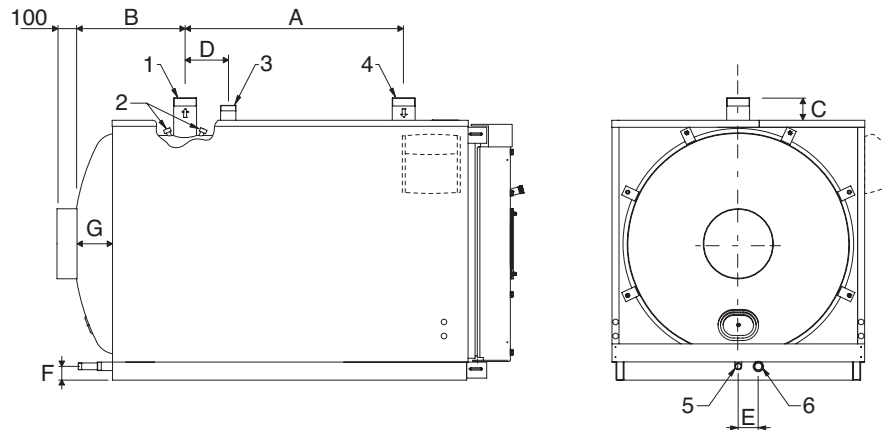
**RTQ 3S RIELLO** steel boilers are fitted with lifting attachments. Take great care when moving them and only use lifting equipment of adequate capacity.

Remove the fixing screws and remove the wooden pallet before positioning the boiler.

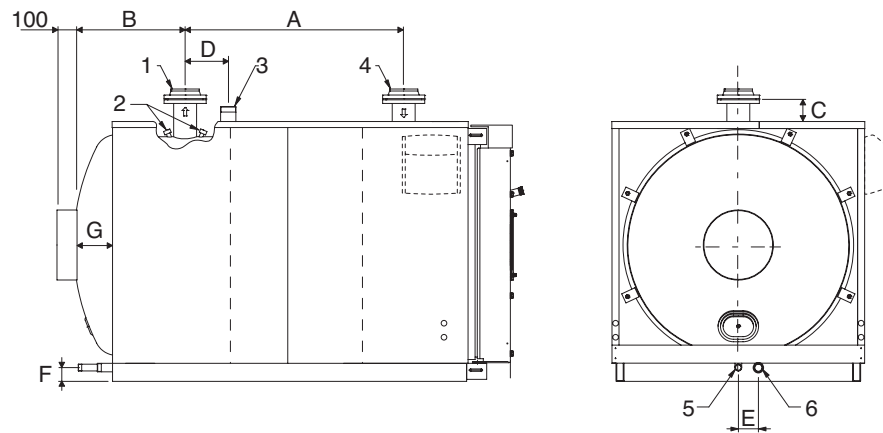
**⚠** Wear suitable personal protective equipment and use suitable safety devices.



### RTQ 217÷349 3S



### RTQ 448÷2400 3S

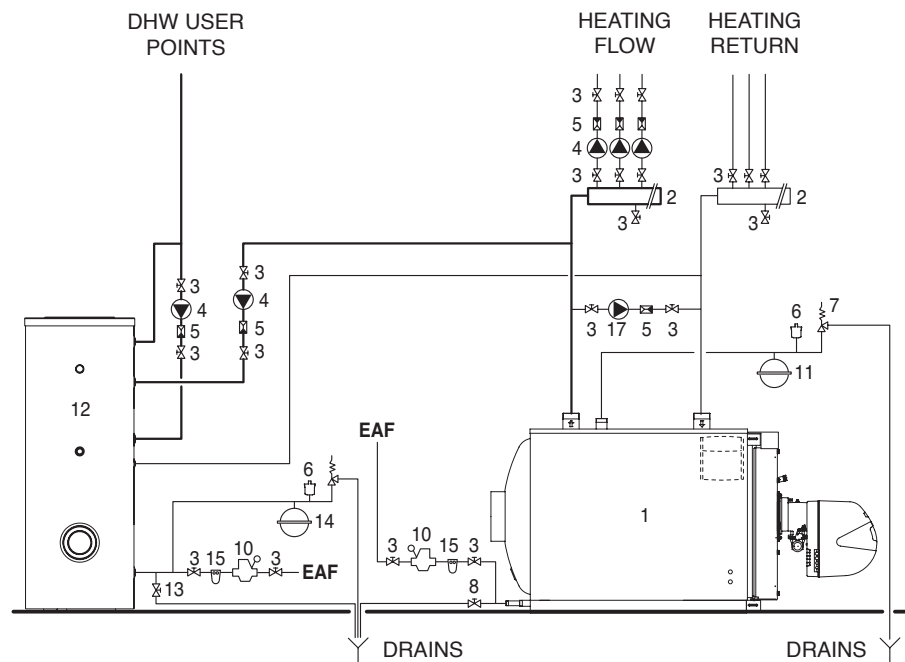


DESCRIPTION	RTQ 3S																Ø			
	91	115	166	217	255	318	349	448	511	575	639	766	896	1100	1300	1600		2100	2400	
1 - Central heating flow (*)	G1 1/4	G2"	G2"	G2 1/2	G2 1/2	G2 1/2	G2 1/2	DN80	DN80	DN100	DN100	DN100	DN125	DN125	DN125	DN150	DN175	DN175	Ø	
2 - Instrument bulb / sensor socket	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"	Ø
3 - Safety device fitting	-	G1 1/4	G1 1/4	G1 1/4	G1 1/4	G1 1/4	G1 1/4	G1 1/2	G1 1/2	G1 1/2	G1 1/2	G2 1/2	G2 1/2	G2 1/2	DN 80	DN100	DN100	DN100	Ø	
4 - Central heating return (*)	G1 1/4	G2"	G2"	G2 1/2	G2 1/2	G2 1/2	G2 1/2	DN80	DN80	DN100	DN100	DN100	DN125	DN125	DN125	DN150	DN175	DN175	Ø	
5 - Condensate drain	G1/2"	G3/4"	G3/4"	G3/4"	G3/4"	G3/4"	G3/4"	G1"	G1"	G1"	G1"	G1"	G1"	G1"	G1"	G1"	G1"	G1"	G1"	Ø
6 - Boiler drain	G1 1/4	G2"	G2"	G1"	G1"	G1"	G1"	G1 1/4	G1 1/4	G1 1/4	G1 1/4	G1 1/4	G1 1/4	G1 1/4	G1 1/2	G1 1/2	G1 1/2	G1 1/2	Ø	
A	110	577	628	750	750	850	850	1000	1000	1250	1250	1300	1540	1600	1650	1650	1910	1910	mm	
B	552	124	124	305	305	315	315	480	480	445	445	540	610	655	700	735	745	745	mm	
C	60	115	115	80	80	80	80	75	75	105	105	105	100	100	115	142	122	122	mm	
D	85	95	110	205	205	205	205	215	215	300	300	250	550	650	380	280	510	510	mm	
E	-	95	120	110	110	110	110	110	110	110	110	110	110	110	115	115	120	120	mm	
F	-	-	-	95	95	95	95	95	95	95	95	95	110	115	120	117	155	155	mm	
G	-	-	-	85	85	85	85	145	145	180	180	125	145	170	180	215	335	335	mm	

(\*) All flanged connections are PN6 according to EN 1092-1.

### Schematic diagram - central heating and domestic hot water production RTQ 115÷2400 3S

- 1 - Boiler
- 2 - Central heating manifolds
- 3 - Disconnect valves
- 4 - System pumps
- 5 - Non-return valves
- 6 - Automatic vent valve
- 7 - Boiler safety valve
- 8 - Boiler drain cock
- 9 - Storage cylinder safety valve
- 10 - System filling cock
- 11 - CH expansion vessel
- 12 - **RIELLO** 7200 storage cylinder
- 13 - Storage cylinder drain cock
- 14 - DHW expansion vessel
- 15 - Softener filter
- 16 - Pressure reducer
- 17 - Anti-condensate pump



**!** The choice of system components and the method of their installation are left up to the heating engineer installing the system. Installers must use their expertise to ensure proper installation and functioning in compliance with all applicable legislation.

**!** Circuits filled with anti-freeze must be fitted with water disconnectors.

**!** If needed, water supplies and recovery circuits must be conditioned by suitable treatment systems. See the table alongside for reference values.

REFERENCE VALUES	
PH	6-8
Electrical conductivity	below 200 $\mu\text{S}/\text{cm}$ (25°C)
Chlorine ions	below 50 ppm
Sulphuric acid ions	below 50 ppm
Total iron	below 0,3 ppm
Alkalinity M	below 50 ppm
Total hardness	35° F
Sulphur ions	none
Ammonia ions	none
Silicon ions	below 30 ppm

# **RIELLO**

**RIELLO S.p.A.**  
**37045 Legnago (VR)**  
**Tel. 0442630111 - Fax 0442630371 - [www.riello.it](http://www.riello.it)**

**As part of the company's ongoing commitment to perfecting its range of products,  
the appearance, dimensions, technical data, equipment and accessories  
may be subject to variation.**