



BOOKLET ON BOILER CHARACTERISTICS

Interreg
Alpine Space



EUROPEAN UNION



BB-CLEAN


European Regional Development Fund



Available biomass stoves and boilers in the EU market

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

- 
- 1 Introduction*
 - 2 Pellet stoves, pellet inserts and cookers – wood or pellet thermo-stoves (hydro)*
 - 3 Wood, pellet, wood chips boilers*
 - 4 Appliances classification systems*
 - 4.1 Italy appliances classification*
 - 4.2 France*
 - 4.3 Local policies*

01

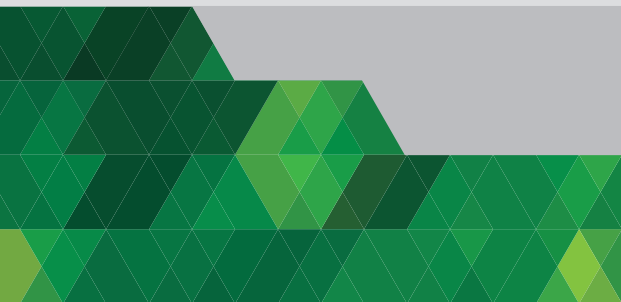
Introduction



BURNING WOOD WITH
GOOD RATES OF AIR
EMISSIONS IS POSSIBLE.

► Available biomass stoves and boilers in the EU market

Among energy technologies, burning wood involves big environmental issues, especially in the Alps Region, where customs, wood availability, energy needs often have to deal with pollution levels, such as PM concentration, and related regional environmental policies. Burning wood with good rates of air emissions is possible.



<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Among these four categories:

1. open fireplaces, closed fireplaces, wood inserts
2. wood burning stoves – wood cookers - wood storage stoves
3. pellet stoves, pellet inserts and cookers – wood or pellet thermo-stoves (hydro)
4. wood, pellet, wood chips boilers

The biomass appliances belonging to categories 3 and 4 present higher efficiencies and lower emission factors with respect to categories 1 and 2.. Fireplaces and similar can't reach optimal efficiency levels, at least they can't provide thermal needs as the main source for each customer, even if a good and constant maintenance is assured. In addition, they highly impact on PM pollution levels.

Focusing on the categories 3 and 4, in the EU market many products are available, with different levels of performance and implied technology.

Data mainly come from:

- Databases of Aosta Valley Region appliances, useful to give economic contributions to build new domestic thermal plants and to refurbish the existing ones;
- Databases of Slovenian National appliances.

We have calculated the following parameters as the average among those available for the listed products, that are almost available in Italy and in Slovenia until 2018.



<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

The average parameters for category 3 are:

Data	unit	Average value
Heat output	kW	17,7
Efficiency	%	92,6
PM emission factor	mg/m ³	13,8
CO emission factor	mg/m ³	129
O2 reference value for emission measurements	%	13

Emissions measurements are performed according to: EN 14785.

These products are mainly related to single domestic plants, with simple plant schemes, often placed directly in the houses. They need a low maintenance level and they are “user-friendly”.

In chapter 2 the complete list of category 3 generators is presented.

For wood boilers, belonging to category 4, we can find these average parameters:

Data	unit	average value
Heat output	kW	34,5
Efficiency	%	91,8
PM emission factor	mg/m ³	15,8
CO emission factor	mg/m ³	119
O2 reference value for emission measurements	%	13



<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme



For pellet boilers:

Data	measure unit	average
Heat output	kW	92,1
Efficiency	%	93
PM emission factor	mg/m ³	18,1
CO emission factor	mg/m ³	23,1
O2 reference value for emission measurements	%	13

Emission measurements are performed according to: EN 303-5 In chapter 3 the complete list of category 4 generators.

These biomass appliances are involved in thermal plants serving multiple customers, for heating and hot water production. The complexity of plants rises with respect to single domestic installations but the emission factors are lower. Actually, it is not possible to directly compare the two categories as their emissions are tested according to different methods, as shown by the different specified technical standards.

The aim of the following data is to help citizens in selecting a good device to burn biomass, among the categories 3 and 4:

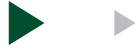
- pellet stoves, pellet inserts and cookers – wood or pellet thermo-stoves (hydro)
- wood, pellet, wood chips boilers

Acronyms:

Heat output	kW	Heating power
Efficiency	%	Appliance thermal efficiency
PM EF	mg/m ³	Particulate Matter emission
CO EF	mg/m ³	Carbon Monoxide emission

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme



02

Pellet stoves, pellet inserts and cookers – wood or pellet thermo-stoves (hydro)



<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		ALFA PLAM	ALFA PLAM	ALFA PLAM	AMG S.p.A	AMG S.p.A
Model		COMMO 15	COMMO 18	DINO	CENTROPELET ZV14	CENTROPELET ZV20
Heat output	kW	14,7	18,9	16,5	13,8	18,2
Efficiency	%	92,1	91,4	94	93,5	95,7
PM EF	mg/m ³	33	18,9	9	16,8	8,9
COEF	mg/m ³	136	62	60	231	55

Producer		AMG S.p.A	AMG S.p.A	AMG S.p.A	AMG S.p.A	AMG S.p.A
Model		CENTROPELET ZV24	CENTROPELET ZV32	CENTROPELET ZVB20	CENTROPELET ZVB24	CENTROPELET ZVB32
Heat output	kW	22	30,5	17,5	21,5	29,1
Efficiency	%	95	94	90,4	90,4	91,6
PM EF	mg/m ³	8,5	16,3	4,8	5,9	10,1
CO EF	mg/m ³	56	18	14	19	24

Producer		BIODOM	BIODOM	BPH BIOLOGIC	BPH BIOLOGIC	CADEL
Model		BIODOM H20	BIODOM H25	BIOLOGIC H20	BIOLOGIC H25	AQUOS3 16
Heat output	kW	18,3	25,6	18,3	25,6	16,3
Efficiency	%	94	93,1	94	93,1	93,3
PM EF	mg/m ³	14	19,5	14	19,5	18,6
CO EF	mg/m ³	104	75	104	75	74

Producer		CADEL	CALUX	CALUX	CALUX	CALUX
Model		AQUOS3 23	DAFNE IDRO PLUS 20 KW	DAFNE IDRO STEEL 20 KW	FORMA IDRO 12	FORMA IDRO 15
Heat output	kW	22,8	18	18	14,3	15,4
Efficiency	%	91,4	91,5	91,5	93,8	93,8
PM EF	mg/m ³	18,8	19	19	18,8	19,9
CO EF	mg/m ³	169	228	228	77	94

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		CAMINETTI MONTEGRAPPA	CAMINETTI MONTEGRAPPA	CAMINETTI MONTEGRAPPA	CAMINETTI MONTEGRAPPA	CAMINETTI MONTEGRAPPA
Model		AQ 21 (ATOLLO, ISOLA)	AQ 27 (ATOLLO, ISOLA)	AQ 32 (ATOLLO, ISOLA)	INSIDE W15	LW15
Heat output	kW	20,5	26,5	31,5	15	15
Efficiency	%	94,5	93	91,5	90,2	90,2
PM EF	mg/m ³	6	9	11	20	20
CO EF	mg/m ³	40	40	62	75	75

Producer		COLA	COLA	COLA	COLA	COLA
Model		TERMO BLITZ	TERMO ELLISSE	TERMO FOCUS HR (ACCIAIO, CERAMICA)	TERMO ORION (ACCIAIO, CERAMICA)	TERMO POWER
Heat output	kW	17,4	17,4	17,4	12,5	23,5
Efficiency	%	94	94	94	95,2	93,6
PM EF	mg/m ³	11,3	11,3	11,3	13,5	10,8
CO EF	mg/m ³	163	163	163	155	63

Producer		COLA	COOLWEX	COOLWEX	COOLWEX	COOLWEX
Model		TERMO POWER 30	CPK-W 10-B	CPK-W 10-I	CPK-W 10-R	CPK-W 15-B
Heat output	kW	28	10	10	10	18
Efficiency	%	93,1	91	91	91	91
PM EF	mg/m ³	10,6	19,8	19,8	19,8	18,8
CO EF	mg/m ³	143	198	198	198	210

Producer		COOLWEX	COOLWEX	COOLWEX	COOLWEX	COOLWEX
Model		CPK-W 15-I	CPK-W 15-R	CPK-W 23-B	CPK-W 23-I	CPK-W 23-R
Heat output	kW	18	18	23	23	23
Efficiency	%	91	91	92	92	92
PM EF	mg/m ³	18,8	18,8	18,6	18,6	18,6
CO EF	mg/m ³	210	210	203	203	203

Producer		CS THERMOS SRL	CS THERMOS SRL	CS THERMOS SRL	CS THERMOS SRL	CS THERMOS SRL
Model		THELMA 90	THELMA 120	VENEXIA 15	VENEXIA 18	VENEXIA 21
Heat output	kW	6,6	9	15,4	17	20,1
Efficiency	%	91,4	90,3	93,3	92,5	93,4
PM EF	mg/m ³	26	21,2	12,2	11,8	19,9
CO EF	mg/m ³	146	154	167	215	155

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		CS THERMOS SRL	EDILKAMIN	EDILKAMIN	EDILKAMIN	EDILKAMIN
Model		VENEXIA 25	BIJOUX	CAMEO	DAISY	IDROCHIP
Heat output	kW	22,9	15	15	22,1	11,5
Efficiency	%	93,3	91,9	91,9	91,3	90,1
PM EF	mg/m ³	23,9	19	19	20	16,2
CO EF	mg/m ³	196	196	196	190	163

Producer		EDILKAMIN	EDILKAMIN	EDILKAMIN	EDILKAMIN	EDILKAMIN
Model		IDROPELLBOX	IDROPOINT	MEG	MEG PIU	MONTREAL
Heat output	kW	15,7	11,5	25	30,4	24
Efficiency	%	92,2	90,1	94,5	92,2	93,3
PM EF	mg/m ³	17,8	16,2	6,9	7,4	15,3
CO EF	mg/m ³	176	163	182	80	143

Producer		EDILKAMIN	EDILKAMIN	EDILKAMIN	EDILKAMIN	EDILKAMIN
Model		NAOMY	NELLY	NELLY PIU	QUEBEC	STRASS
Heat output	kW	15	25	30,4	24	15
Efficiency	%	91,9	94,5	92,2	93,3	91,9
PM EF	mg/m ³	19	6,9	7,4	15,3	19
CO EF	mg/m ³	196	182	80	143	196

Producer		EDILKAMIN	EDILKAMIN	EDILKAMIN	EDILKAMIN	EDILKAMIN
Model		TORONTO	TRESOR	IDROSALLY	IDROPOLIS	MITOIDRO
Heat output	kW	24	15	16,2	16,2	16,2
Efficiency	%	93,3	91,9	91,6	91,6	91,6
PM EF	mg/m ³	15,3	19	19,5	19,5	19,5
CO EF	mg/m ³	143	196	123	123	123

Producer		EDILKAMIN	EDILKAMIN	EDILKAMIN	EDILKAMIN	EDILKAMIN
Model		FUJI	URAL	ALPEN	ANDE	VYDA H 18
Heat output	kW	18	18	18	18	18,7
Efficiency	%	90	90	90	90	93,3
PM EF	mg/m ³	20	20	20	20	14,3
CO EF	mg/m ³	200	200	200	200	163

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		EDILKAMIN	EDILKAMIN	EDILKAMIN	EDILKAMIN	EDILKAMIN
Model		KIRA H 18	BLADE H 18	VYDA H 22	KIRA H 22	KIRA H 18
Heat output	kW	18,7	18,7	22,5	22,5	18,7
Efficiency	%	93,3	93,3	92,7	92,7	93,3
PM EF	mg/m ³	14,3	14,3	14,4	14,4	14,3
CO EF	mg/m ³	163	163	147	147	163

Producer		EDILKAMIN	EDILKAMIN	EDILKAMIN	EKOLINE KOVAN	EVA STAMPAGGI
Model		BLADE H 22	CHERIE UP H	PRESTIGE	EKOLINE KAMIN	GIOVE 18 KW
Heat output	kW	22,5	16,2	18,4	7,5	16,5
Efficiency	%	92,7	91,6	91,9	91,4	90,5
PM EF	mg/m ³	14,4	19,5	23,6	17	15
CO EF	mg/m ³	147	123	189	127	235

Producer		EVA STAMPAGGI	EVA STAMPAGGI	EVA STAMPAGGI	EVA STAMPAGGI	EVA STAMPAGGI
Model		MARCUS 18 KW	HYDRO SLIM 16 KW	HYDRO 24	HYDRO 20	HYDRO KANTINA 24
Heat output	kW	16,5	14,5	23	18,5	22,5
Efficiency	%	90,5	90,5	90	91,5	91
PM EF	mg/m ³	15	19	12	12	12
CO EF	mg/m ³	235	123	196	247	121

Producer		EVA STAMPAGGI	EVA STAMPAGGI	EVA STAMPAGGI	EVA STAMPAGGI	EVA STAMPAGGI
Model		HYDRO KANTINA 20	TOSCA 24	TOSCA 20	HYDRO KANTINA 27	HYDRO 27
Heat output	kW	18,5	23	18,5	24,5	24
Efficiency	%	92	90	91,5	90	91
PM EF	mg/m ³	12	12	12	19	39
CO EF	mg/m ³	127	196	247	163	95

Producer		EVA STAMPAGGI	EVA STAMPAGGI	EVA STAMPAGGI	EVA STAMPAGGI	EVA STAMPAGGI
Model		TOSCA 27	HYDRO 15	FRIDA 13	FRIDA 17,5	SATURNO
Heat output	kW	24	14,5	11,3	16,3	22
Efficiency	%	91	91,5	91,3	91,9	90,5
PM EF	mg/m ³	39	16	10,8	10	13
CO EF	mg/m ³	95	166	41	97	167

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		EVA STAMPAGGI	GORENJE	GORENJE	GORENJE	HAPERO
Model		ILARIA	AQUA ECOLOG-IC 15	AQUA ECOLOG-IC 25	AQUA ECOLOGIC 25C	HP 02/W
Heat output	kW	16,3	18,3	25,6	25,6	14,9
Efficiency	%	91,9	94	93,1	93,1	97,1
PM EF	mg/m ³	9,6	14	19,5	19,5	10
CO EF	mg/m ³	97	104	75	75	37
Producer		IRC	IRC	IRC	ITALIANA CAMINI	ITALIANA CAMINI
Model		TREVI DOMUS 918	TREVI DOMUS 924	TREVI DOMUS 934	LAYMA IDRO 18	LAYMA IDRO 22
Heat output	kW	18	25	33	18,7	22,5
Efficiency	%	93,5	90,4	90,8	93,3	92,7
PM EF	mg/m ³	18	18	20	14,3	14,4
CO EF	mg/m ³	61	75	222	163	147
Producer		IWONA PELLETS	IWONA PELLETS	IWONA PELLETS	KALON	KALON
Model		ALEX AQUA (13; 14)	FELIX AQUA 13,5	LOUIS AQUA 15	KALISTA IDRO 15	KALISTA IDRO 24
Heat output	kW	13	13,2	15	15,7	23,5
Efficiency	%	90,7	90,3	91,7	94	93,2
PM EF	mg/m ³	18	18	19	21,7	19,2
CO EF	mg/m ³	150	155	150	220	180
Producer		KALON	KALON	KALON	KALON	KALON
Model		ALYSA 12 AIR	CLIPS 12 AIR	COVER 12 AIR	DOUBLE 12 AIR	KALISTA 12 AIR
Heat output	kW	10,9	10,9	10,9	10,9	10,9
Efficiency	%	91,9	91,9	91,9	91,9	91,9
PM EF	mg/m ³	2	2	2	2	2
CO EF	mg/m ³	136	136	136	136	136
Producer		KALON	KALON	KALON	KALON	KALON
Model		LAYER 12 AIR	ROLLING 12 AIR	ALYSA 10 AIR	CLIPS 10 AIR	COVER 10 AIR
Heat output	kW	10,9	10,9	9,3	9,3	9,3
Efficiency	%	91,9	91,9	92,6	92,6	92,6
PM EF	mg/m ³	2	2	3	3	3
CO EF	mg/m ³	136	136	123	123	123

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		KALON	KALON	KALON	KALON	KALON
Model		DOUBLE 10 AIR	KALISTA 10 AIR	LAYER 10 AIR	ROLLING 10 AIR	ALYSA 8 AIR
Heat output	kW	9,3	9,3	9,3	9,3	7,1
Efficiency	%	92,6	92,6	92,6	92,6	93,6
PM EF	mg/m ³	3	3	3	3	3
CO EF	mg/m ³	123	123	123	123	105

Producer		KALON	KALON	KALON	KALON	KALON
Model		CLIPS 8 AIR	COVER 8 AIR	DOUBLE 8 AIR	KALISTA 8 AIR	LAYER 8 AIR
Heat output	kW	7,1	7,1	7,1	7,1	7,1
Efficiency	%	93,6	93,6	93,6	93,6	93,6
PM EF	mg/m ³	3	3	3	3	3
CO EF	mg/m ³	105	105	105	105	105

Producer		KALON	KALON	KALON	KALON	KALON
Model		ROLLING 8 AIR	ALEYSA NEW 34 IDRO	CLIPS 34 IDRO	COVER E 34 IDRO	COVER U 34 IDRO
Heat output	kW	7,1	30,8	30,8	30,8	30,8
Efficiency	%	93,6	93,3	93,3	93,3	93,3
PM EF	mg/m ³	3	14	14	14	14
CO EF	mg/m ³	105	81	81	81	81

Producer		KALON	KALON	KALON	KALON	KALON
Model		DOUBLE 34 IDRO	FALCON 34 IDRO	KALIPSO 34 IDRO	KALIPSO 34 IDRO	KLEA 34 IDRO
Heat output	kW	30,8	30,8	30,8	30,8	30,8
Efficiency	%	93,3	93,3	93,3	93,3	93,3
PM EF	mg/m ³	14	14	14	14	14
CO EF	mg/m ³	81	81	81	81	81

Producer		KALON	KALON	KALON	KALON	KALON
Model		KLIZIA 34 IDRO	KLIZIA GLASS 34 IDRO	LAYERS 34 IDRO	ROLLING 34 IDRO	THOR 34 IDRO
Heat output	kW	30,8	30,8	30,8	30,8	30,8
Efficiency	%	93,3	93,3	93,3	93,3	93,3
PM EF	mg/m ³	14	14	14	14	14
CO EF	mg/m ³	81	81	81	81	81

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		KALON	KALON	KALON	KALON	KALON
Model		ALEYSA NEW 28 IDRO	CLIPS 28 IDRO	COVER E 28 IDRO	COVER U 28 IDRO	DOUBLE 28 IDRO
Heat output	kW	27	27	27	27	27
Efficiency	%	93	93	93	93	93
PM EF	mg/m ³	11	11	11	11	11
CO EF	mg/m ³	99	99	99	99	99

Producer		KALON	KALON	KALON	KALON	KALON
Model		FALCON 28 IDRO	KALIPSO 28 IDRO	KALIPSO 28 IDRO	KLEA 28 IDRO	KLIZIA 28 IDRO
Heat output	kW	27	27	27	27	27
Efficiency	%	93	93	93	93	93
PM EF	mg/m ³	11	11	11	11	11
CO EF	mg/m ³	99	99	99	99	99

Producer		KALON	KALON	KALON	KALON	KALON
Model		KLIZIA GLASS 28 IDRO	LAYERS 28 IDRO	ROLLING 28 IDRO	THOR 28 IDRO	BS 28 IDRO
Heat output	kW	27	27	27	27	27
Efficiency	%	93	93	93	93	93
PM EF	mg/m ³	11	11	11	11	11
CO EF	mg/m ³	99	99	99	99	99

Producer		KALON	KALON	KALON	KARMEK ONE	KARMEK ONE
Model		BSR 28 IDRO	NS 28 IDRO	NST 28 IDRO	AIR FORCE ONE 20 PLUS	OSAKA ACCIAIO
Heat output	kW	27	27	27	18,8	24,4
Efficiency	%	93	93	93	90,3	92,7
PM EF	mg/m ³	11	11	11	17,7	22,9
CO EF	mg/m ³	99	99	99	126	149

Producer		KARMEK ONE	KARMEK ONE	KARMEK ONE	KLOVER SRL	KLOVER SRL
Model		OSAKA CERAMICA	TOKYO ACCIAIO	TOKYO CERAMICA	BELVEDERE 28	DIVA SLIM; DIVA SLIM 12
Heat output	kW	24,4	29	29	23,7	18,4
Efficiency	%	92,7	92,3	92,3	94,8	93,1
PM EF	mg/m ³	22,9	23,8	23,8	14,5	14,9
CO EF	mg/m ³	149	131	131	56	33

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		KLOVER SRL	KLOVER SRL	KLOVER SRL	LAFAT KOMERC	LAFAT KOMERC
Model		SMART 120 PELLETE	PFP 18	PFP 22	KAMIN 25	KAMIN 20
Heat output	kW	19,1	15,8	24	25	20
Efficiency	%	91,8	93,6	94,4	93,1	92,4
PM EF	mg/m ³	18,9	16,5	14,4	11	19
CO EF	mg/m ³	82	127	138	69	20

Producer		LAFAT KOMERC	LAMINOX	LAMINOX	LAZAR	LINCAR
Model		KAMIN 15	ESTER IDRO	GRETA IDRO	SMART FIRE 12	SIRIA 840
Heat output	kW	15	14,5	17,5	12	18,6
Efficiency	%	91,9	91,6	91,5	90,5	93,8
PM EF	mg/m ³	10,3	16	18	10	17
CO EF	mg/m ³	20	166	208	29	243

Producer		LINCAR	LINCAR	LINCAR	LINCAR	LINCAR
Model		SIRIA 840/SA	SIRIA 841/SA	STELLA 740	STELLA 740/SA	STELLA 741/SA
Heat output	kW	18,6	14,4	18,6	18,6	14,4
Efficiency	%	93,8	94,7	93,8	93,8	94,7
PM EF	mg/m ³	17	17	17	17	17
CO EF	mg/m ³	243	241	243	243	241

Producer		MCZ	MCZ	MCZ	MCZ	MCZ
Model		ATHOS HYDRO (14kW)	ATHOS HYDRO (23,7kW)	CLUB HYDRO 15	CLUB HYDRO 22	EGO HYDRO
Heat output	kW	14	23,7	15,4	22,4	11,6
Efficiency	%	91	91,9	92,1	92,5	91,5
PM EF	mg/m ³	18	7	1,5	1,7	11
CO EF	mg/m ³	231	217	139	158	133

Producer		MCZ	MCZ	MCZ	MCZ	MCZ
Model		EGO HYDRO 12	FLUX HYDRO	INSERTO VIVO 80 PELLET HYDRO	MUSA HYDRO 15	MUSA HYDRO 22
Heat output	kW	11,8	16	16,9	15,4	22,4
Efficiency	%	91,8	95,6	90,1	92,1	92,5
PM EF	mg/m ³	17,3	14,3	20	1,5	1,7
CO EF	mg/m ³	133	177	144	139	158

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		MCZ	MCZ	MCZ	MCZ	MORETTI
Model		POLAR NOVA HYDRO VERSION 2.0	SUITE HYDRO	SUITE HYDRO 15	SUITE HYDRO 22	ELEGANCE ALL STYLE AQUA 10
Heat output	kW	21,5	15	15,4	22,4	13,2
Efficiency	%	91,9	90,8	92,1	92,5	93,5
PM EF	mg/m ³	7	18	1,5	1,7	14,8
CO EF	mg/m ³	217	106	139	158	174

Producer		MORETTI	MORETTI	MORETTI	MORETTI	MORETTI
Model		ELEGANCE STYLE AQUA 10	CLESSIDRA ALL STYLE AQUA 10	CLESSIDRA GLASS AQUA 10	ERGONOMIC GLASS AQUA 10	CLASSIC IRON AQUA 10
Heat output	kW	13,2	13,2	13,2	13,2	13,2
Efficiency	%	93,5	93,5	93,5	93,5	93,5
PM EF	mg/m ³	14,8	14,8	14,8	14,8	14,8
CO EF	mg/m ³	174	174	174	174	174

Producer		MORETTI	MORETTI	MORETTI	MORETTI	MORETTI
Model		CLASSIC STONE AQUA 10	PIRAMID STONE AQUA 10	TURBO GLASS AQUA 10	TURBO ALL STYLE AQUA 10	AQUA 9 ALL STYLE
Heat output	kW	13,2	13,2	13,2	13,2	13,2
Efficiency	%	93,5	93,5	93,5	93,5	93,5
PM EF	mg/m ³	14,8	14,8	14,8	14,8	14,8
CO EF	mg/m ³	174	174	174	174	174

Producer		MORETTI	MORETTI	MORETTI	MORETTI	MORETTI
Model		AQUA 9 STYLE	ELEGANCE ALL STYLE AQUA 12	ELEGANCE STYLE AQUA 12	CLESSIDRA ALL STYLE AQUA 12	CLESSIDRA GLASS AQUA 12
Heat output	kW	13,2	14,9	14,9	14,9	14,9
Efficiency	%	93,5	93,3	93,3	93,3	93,3
PM EF	mg/m ³	14,8	14,9	14,9	14,9	14,9
CO EF	mg/m ³	174	166	166	166	166

Producer		MORETTI	MORETTI	MORETTI	MORETTI	MORETTI
Model		ERGONOMIC GLASS AQUA 12	CLASSIC IRON AQUA 12	CLASSIC STONE AQUA 12	PIRAMID STONE AQUA 12	TURBO GLASS AQUA 12
Heat output	kW	14,9	14,9	14,9	14,9	14,9
Efficiency	%	93,3	93,3	93,3	93,3	93,3
PM EF	mg/m ³	14,9	14,9	14,9	14,9	14,9
CO EF	mg/m ³	166	166	166	166	166

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		MORETTI	MORETTI	MORETTI	MORETTI	MORETTI
Model		TURBO ALL STYLE AQUA 12	AQUA 11 GLASS	AQUA 11 IRON	AQUA 11 STONE	ELEGANCE ALL STYLE AQUA 14
Heat output	kW	14,9	14,9	14,9	14,9	17,7
Efficiency	%	93,3	93,3	93,3	93,3	92,3
PM EF	mg/m ³	14,9	14,9	14,9	14,9	14,4
CO EF	mg/m ³	166	166	166	166	139

Producer		MORETTI	MORETTI	MORETTI	MORETTI	MORETTI
Model		ELEGANCE STYLE AQUA 14	CLESSIDRA ALL STYLE AQUA 14	CLESSIDRA GLASS AQUA 14	ERGONOMIC GLASS AQUA 14	CLASSIC IRON AQUA 14
Heat output	kW	17,7	17,7	17,7	17,7	17,7
Efficiency	%	92,3	92,3	92,3	92,3	92,3
PM EF	mg/m ³	14,4	14,4	14,4	14,4	14,4
CO EF	mg/m ³	139	139	139	139	139

Producer		MORETTI	MORETTI	MORETTI	MORETTI	MORETTI
Model		CLASSIC STONE AQUA 14	PIRAMID STONE AQUA 14	TURBO GLASS AQUA 14	TURBO ALL STYLE AQUA 14	TURBO GLASS AQUA 14
Heat output	kW	17,7	17,7	17,7	17,7	17,7
Efficiency	%	92,3	92,3	92,3	92,3	92,3
PM EF	mg/m ³	14,4	14,4	14,4	14,4	14,4
CO EF	mg/m ³	139	139	139	139	139

Producer		MORETTI	MORETTI	MORETTI	MORETTI	MORETTI
Model		TURBO ALL STYLE AQUA 14	AQUA 15 ALL STYLE	ELEGANCE ALL STYLE AQUA 16	AQUA 15 STYLE	ELEGANCE STYLE AQUA 16
Heat output	kW	17,7	18,7	18,7	18,7	18,7
Efficiency	%	92,3	91,6	91,6	91,6	91,6
PM EF	mg/m ³	14,4	15,5	15,5	15,5	15,5
CO EF	mg/m ³	139	113	113	113	113

Producer		MORETTI	MORETTI	MORETTI	MORETTI	MORETTI
Model		CLESSIDRA ALL STYLE AQUA 16	CLESSIDRA GLASS AQUA 16	ERGONOMIC GLASS AQUA 16	CLASSIC IRON AQUA 16	CLASSIC STONE AQUA 16
Heat output	kW	18,7	18,7	18,7	18,7	18,7
Efficiency	%	91,6	91,6	91,6	91,6	91,6
PM EF	mg/m ³	15,5	15,5	15,5	15,5	15,5
CO EF	mg/m ³	113	113	113	113	113

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		MORETTI	MORETTI	MORETTI	MORETTI	MORETTI
Model		PIRAMID STONE AQUA 16	TURBO GLASS AQUA 16	TURBO ALL STYLE AQUA 16	AQUA 15 IRON	AQUA 15 STONE
Heat output	kW	18,7	18,7	18,7	18,7	18,7
Efficiency	%	91,6	91,6	91,6	91,6	91,6
PM EF	mg/m ³	15,5	15,5	15,5	15,5	15,5
CO EF	mg/m ³	113	113	113	113	113

Producer		MORETTI	MORETTI	MORETTI	MORETTI	NORDICA EX- TRAFLAME
Model		AQUA TURBO COMPACT GLASS 12	AQUA TURBO COMPACT GLASS 14	AQUA TURBO COMPACT GLASS 16	AQUA TURBO COMPACT GLASS 18	COMFORT IDRO
Heat output	kW	14,4	16,5	18,9	21,5	8
Efficiency	%	96,7	96,1	95,5	94,8	90,2
PM EF	mg/m ³	15	15	15	15	15
CO EF	mg/m ³	293	289	283	278	188

Producer		NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	NORDICA EXTRAFLAME
Model		COMFORT IDRO L80	DIADEMA ACS IDRO	DIADEMA IDRO	DUCHESSA IDRO	DUCHESSA IDRO STEEL
Heat output	kW	19	28,3	28,3	12	12
Efficiency	%	90,4	91,2	91,2	91,2	91,2
PM EF	mg/m ³	7	17,1	17,1	16	16
CO EF	mg/m ³	129	72	72	81	81

Producer		NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	NORDICA EXTRAFLAME
Model		MEGAN IDRO STEEL	ELISIR IDRO	EVELYNE IDRO	GIORDANA IDRO	ISIDE IDRO
Heat output	kW	12	12,7	17,5	20,5	20,5
Efficiency	%	91,2	91,7	93,5	91,7	91,7
PM EF	mg/m ³	16	5,1	14,1	15,4	15,4
CO EF	mg/m ³	81	57	167	47	47

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund
through the Interreg Alpine Space programme

Producer		NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	NORDICA EXTRAFLAME
Model		ISIDE IDRO 2.0	LILIANA IDRO	LUCREZIA IDRO 25	MELINDA IDRO	MELINDA IDRO 2.0
Heat output	kW	19	22,8	23,7	14	14,2
Efficiency	%	91,6	92,5	95,8	92	90
PM EF	mg/m ³	11,8	13,9	16	15,7	18,8
CO EF	mg/m ³	88	87	76	243	134

Producer		NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	NORDICA EXTRAFLAME
Model		MELINDA IDRO STEEL	MELINDA IDRO STEEL 2.0	RAFFAELLA IDRO	RAFFAELLA IDRO 2.0	FIANDRA IDRO
Heat output	kW	14	14,2	20,5	19	17,6
Efficiency	%	92	90	91,7	91,6	90
PM EF	mg/m ³	15,7	18,8	15,4	11,8	17
CO EF	mg/m ³	243	134	47	88	110

Producer		NORDICA EXTRAFLAME	NORDICA EXTRAFLAME	ORCA	ORCA	ORCA
Model		VIRNA IDRO	COSTANZA IDRO	CPK-W 10-B	CPK-W 10-I	CPK-W 10-R
Heat output	kW	14,5	17	10	10	10
Efficiency	%	93	91,9	91	91	91
PM EF	mg/m ³	17	9	19,8	19,8	19,8
CO EF	mg/m ³	73	64	198	198	198

Producer		ORCA	ORCA	ORCA	ORCA	ORCA
Model		(DREAM PREMIUM) OPK-W 8.5	(DREAM PREMIUM) OPK-W 14	(DREAM PREMIUM) OPK-W 18	CPK-W 15-B	CPK-W 15-I
Heat output	kW	8,5	14	18	18	18
Efficiency	%	91,5	93,5	91,5	91	91
PM EF	mg/m ³	11	12,5	9,5	18,8	18,8
CO EF	mg/m ³	94	94	67	210	210

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

	Producer		ORCA	ORCA	ORCA	ORCA	ORCA
	Model		CPK-W 15-R	CPK-W 23-B	CPK-W 23-I	CPK-W 23-R	CPK-W 15-R
	Heat output	kW	18	23	23	23	18
	Efficiency	%	91	92	92	92	91
	PM EF	mg/m ³	18,8	18,6	18,6	18,6	18,8
	CO EF	mg/m ³	210	203	203	203	210
	Producer		PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI
	Model		ECOFIRE ANITA IDRO 10 KW	ECOFIRE ANITA IDRO 13 KW	ECOFIRE ANITA IDRO 15 KW	ECOFIRE CAMILLA IDRO 10 KW	ECOFIRE CAMILLA IDRO 13 KW
	Heat output	kW	9,3	13,5	15,4	9,3	13,5
	Efficiency	%	95,3	94,7	95	95,3	94,7
	PM EF	mg/m ³	3	4,1	3,9	3	4,1
	CO EF	mg/m ³	19	18	49	19	18
	Producer		PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI
	Model		ECOFIRE CAMILLA IDRO 15 KW	ECOFIRE CARLA IDRO 10 KW	ECOFIRE CARLA IDRO 13 KW	ECOFIRE CARLA IDRO 15 KW	ECOFIRE CARLOTTA IDRO 10 KW
	Heat output	kW	15,4	9,3	13,5	15,4	9,3
	Efficiency	%	95	95,3	94,7	95	95,3
	PM EF	mg/m ³	3,9	3	4,1	3,9	3
	CO EF	mg/m ³	49	19	18	49	19
	Producer		PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI
	Model		ECOFIRE CARLOTTA IDRO 13 KW	ECOFIRE CARLOTTA IDRO 15 KW	ECOFIRE CRISTINA IDRO 10 KW	ECOFIRE CRISTINA IDRO 13 KW	ECOFIRE CRISTINA IDRO 15 KW
	Heat output	kW	13,5	15,4	9,3	13,5	15,4
	Efficiency	%	94,7	95	95,3	94,7	95
	PM EF	mg/m ³	4,1	3,9	3	4,1	3,9
	CO EF	mg/m ³	18	49	19	18	49
	Producer		PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI
	Model		ECOFIRE DA INSERIMENTO IDRO 12	ECOFIRE DA INSERIMENTO IDRO 16	ECOFIRE ELISABETH IDRO 12	ECOFIRE ERMIONE IDRO 20 KW	ECOFIRE ERMIONE IDRO 24 KW
	Heat output	kW	11,8	15,6	12,9	20,1	23,6
	Efficiency	%	92,5	92,6	93,4	93,2	92,6
	PM EF	mg/m ³	13,1	18,6	17,6	16,1	18,1
	CO EF	mg/m ³	88	113	119	96	108

<http://www.alpine-space.eu/projects/bb-clean.com>

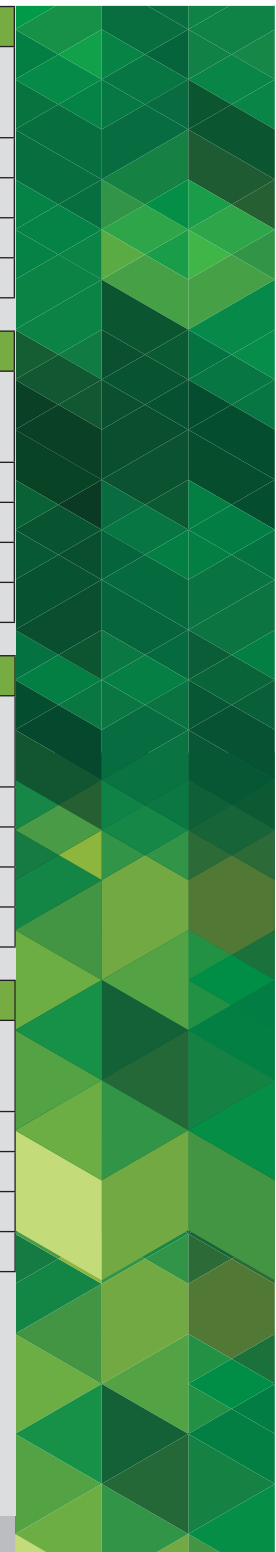
This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI
Model		ECOFIRE ERMIONE IDRO 26 KW	ECOFIRE GINGER IDRO 12	ECOFIRE MARTA IDRO 10 KW	ECOFIRE MARTA IDRO 13 KW	ECOFIRE MARTA IDRO 15 KW
Heat output	kW	26,7	12,9	9,3	13,5	15,4
Efficiency	%	92,1	93,4	95,3	94,7	95
PM EF	mg/m ³	19,8	17,6	3	4,1	3,9
CO EF	mg/m ³	118	119	19	18	49

Producer		PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI
Model		ECOFIRE MARTINA IDRO LUX 10 KW	ECOFIRE MARTINA IDRO LUX 13 KW	ECOFIRE MARTINA IDRO LUX 15 KW	ECOFIRE OLGA IDRO 20 KW	ECOFIRE OLGA IDRO 24 KW
Heat output	kW	9,3	13,5	15,4	20,1	23,6
Efficiency	%	95,3	94,7	95	93,2	92,6
PM EF	mg/m ³	3	4,1	3,9	16,1	18,1
CO EF	mg/m ³	23	18	49	96	108

Producer		PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI
Model		ECOFIRE OLGA IDRO 26 KW	ECOFIRE ROSA IDRO 10 KW	ECOFIRE ROSA IDRO 13 KW	ECOFIRE ROSA IDRO 15 KW	ECOFIRE SABINA IDRO 20 KW
Heat output	kW	26,7	9,3	13,5	15,4	20,1
Efficiency	%	92,1	95,3	94,7	95	93,2
PM EF	mg/m ³	19,8	3	4,1	3,9	16,1
CO EF	mg/m ³	118	19	18	49	96

Producer		PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI
Model		ECOFIRE SABINA IDRO 24 KW	ECOFIRE SABINA IDRO 26 KW	ECOFIRE MIRRELLA IDRO 10	ECOFIRE MIRRELLA IDRO 13	ECOFIRE MIRRELLA IDRO 15
Heat output	kW	23,6	26,7	9,3	13,5	15,4
Efficiency	%	92,6	92,1	95,3	94,7	95
PM EF	mg/m ³	18,1	19,8	3	4,1	3,9
CO EF	mg/m ³	108	118	19	18	49



<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI	PALAZZETTI
Model		ECOFIRE MAIDA IDRO 18T	ECOFIRE NOAH IDRO 12	ECOFIRE NOAH IDRO 15	ECOFIRE KARYN IDRO 12	ECOFIRE KARYN IDRO 15
Heat output	kW	19,3	12	16	12	16
Efficiency	%	90	93,4	91,1	93,4	91,1
PM EF	mg/m ³	13,8	17,6	20,9	17,6	22,8
CO EF	mg/m ³	219	119	97	119	97
Producer		PIAZZETTA	PIAZZETTA	PIAZZETTA	PIAZZETTA	PIAZZETTA
Model		MP973 TH	MP973 TH ACS	P 960 THERMO	P 961 THERMO	P 963 D THERMO
Heat output	kW	30,3	30,3	12	12	15,6
Efficiency	%	91,9	91,9	90,2	90,2	90,6
PM EF	mg/m ³	19,5	19,5	15	15	19,8
CO EF	mg/m ³	100	100	250	250	250
Producer		PIAZZETTA	PIAZZETTA	PIAZZETTA	PIAZZETTA	PIAZZETTA
Model		P 963 M THERMO	P 963 THERMO	P 965 M THERMO	P 965 T	P 966 T
Heat output	kW	15,6	15,6	20,5	20,5	28,5
Efficiency	%	90,6	90,6	93,2	93,2	92
PM EF	mg/m ³	19,8	19,8	11	11	19
CO EF	mg/m ³	250	250	84	84	153
Producer		PIAZZETTA	PUROS	PUROS	PUROS	PUROS
Model		P 966 T AS	DEDALO HYDRO 12	DEDALO HYDRO 15	DEDALO HYDRO 18	NEOS 22
Heat output	kW	28,5	11,3	13,7	16,3	20,4
Efficiency	%	92	93	91,7	90,3	93,8
PM EF	mg/m ³	19	13,2	15	17	15,9
CO EF	mg/m ³	153	65	75	85	249
Producer		PUROS	PUROS	RADIJATOR INŽENJERING	RADIJATOR INŽENJERING	RAVELLI
Model		NEOS 27	NEOS 32	BIOLUX 14	BIOLUX 20	HR100
Heat output	kW	25	30	11,9	20	14
Efficiency	%	93,5	93,2	93,5	91,7	90,9
PM EF	mg/m ³	15	14	13,2	17,9	18
CO EF	mg/m ³	203	153	157	90	211

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		RAVELLI	RAVELLI	RAVELLI	RAVELLI	RAVELLI
Model		HR200 HYDRO	HRB 120	HRB 160	HRB 150	HRB 200
Heat output	kW	23,5	12,9	21,5	18	23,5
Efficiency	%	92	92	92,5	92,5	91,8
PM EF	mg/m ³	11	18,9	6	13	11,4
CO EF	mg/m ³	119	123	221	60	23

Producer		RAVELLI	RAVELLI	RAVELLI	RAVELLI	RAVELLI
Model		HRV 160 HYDRO	HRV 100 TOUCH	HRV 100 GLOBE	HRV 120 GLOBE	HRV 120 TOUCH
Heat output	kW	20	12,1	12,1	15,7	15,7
Efficiency	%	91,5	91,2	91,2	90,7	90,7
PM EF	mg/m ³	11	13	13	13	13
CO EF	mg/m ³	221	121	121	123	123

Producer		RAVELLI	RAVELLI	RAVELLI	RAVELLI	RAVELLI
Model		HRV 140 TOUCH	HRV 140 GLOBE	HRV 160 TOUCH	HRV 200 TOUCH	HRV120
Heat output	kW	17,2	17,2	18,7	23,4	13,5
Efficiency	%	90	90	91,2	92,1	90,5
PM EF	mg/m ³	13	13	16,4	13,4	18
CO EF	mg/m ³	126	126	31	25	225

Producer		RAVELLI	RAVELLI	RAVELLI	RED	RED
Model		HR70	HR 160 SNELLA	HRV170	GARDENIA HYDRO	MARGHERITA HYDRO
Heat output	kW	9	20	21	11,6	11,6
Efficiency	%	95,5	93,1	90	91,5	91,5
PM EF	mg/m ³	14,7	13,3	12	11	11
CO EF	mg/m ³	144	130	153	133	133

Producer		RED	RED	ROYAL	ROYAL	ROYAL
Model		ORCHIDEA HYDRO	PRIMULA HYDRO	FABIANA IDRO 150	FLORIANA IDRO 150	IDRO 240
Heat output	kW	21	21	15,4	15,4	23,6
Efficiency	%	92,5	92,5	95	95	92,6
PM EF	mg/m ³	1,7	1,7	3,9	3,9	18,1
CO EF	mg/m ³	158	158	49	49	108

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		ROYAL	SENKO	SENKO	SENKO	SHT
Model		IDRO 270	P 12 SLIM WATER + AIR	P 12 WATER + AIR	P 20 WATER + AIR	EVO AQUA 15
Heat output	kW	26,7	13	13	19	15
Efficiency	%	92,1	94,2	95	94,5	93,9
PM EF	mg/m ³	19,8	9	12	11	14
CO EF	mg/m ³	118	88	86	33	37
Producer		SHT	SUPERIOR	TERMOMONT	TERMOMONT	TERMOMONT
Model		EVO AQUA 9	SABRINA THERMO	TOBY H15	TOBY H20	TOBY H24
Heat output	kW	10	15,6	14,1	20,3	23,4
Efficiency	%	92,8	90,6	90,4	90,6	91,2
PM EF	mg/m ³	17	19,8	15,8	16,2	16,7
CO EF	mg/m ³	46	250	388	382	378
Producer		THERMOFLUX	THERMOFLUX	THERMOFLUX	THERMOROSSI	THERMOROSSI
Model		INTERIO 14	INTERIO 20	MINITHERM 8 AQUA	ECOTHERM H2O 18	PIDRA 13
Heat output	kW	14	18	8,5	14,8	12,2
Efficiency	%	93,5	91,5	91,5	93,8	90,5
PM EF	mg/m ³	12,5	9,5	11	18	14,2
CO EF	mg/m ³	92	67	94	70	76
Producer		THERMOROSSI	WINDHAGER	WINDHAGER	WINDHAGER	WINDHAGER
Model		SLIMQUADRO IDRA 14	FIREWIN 120 (Exklusiv, Exklusiv-S, Premium, Klassik)	FIREWIN 120 UAM (Exklusiv, Exklusiv-S, Premium, Klassik)	FIREWIN 120 UAML (Exklusiv, Exklusiv-S, Premium, Klassik)	FIREWIN 90 (Exklusiv, Exklusiv-S, Premium, Klassik)
Heat output	kW	13,3	12	12	12	9
Efficiency	%	93,3	94,1	94,1	94,1	94,5
PM EF	mg/m ³	12,6	20	20	20	16
CO EF	mg/m ³	62	48	48	48	55
Producer		WODTKE	WODTKE	WODTKE	WODTKE	WODTKE
Model		BM 01 IVO. TEC	BM 01-2 IVO. SAFE	PO 04.5 E WW FRANK	PO 04.5-1 E WW RAY	PO 04.5-11 WW DAVE WATERPLUS
Heat output	kW	13	13	10	10	10
Efficiency	%	93,9	93,9	94,2	94,2	94,2
PM EF	mg/m ³	17	17	18	18	18
CO EF	mg/m ³	151	151	164	164	164

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		WODTKE	WODTKE	WODTKE	WODTKE
Model		PO 04.6 E WW PRIMÄROFEN EINSATZ	PO 04.6 E WW SMART	PO 04.7 E WW PRIMÄROFEN CW 21	PO 04.8 E WW TOPLINE
Heat output	kW	10	10	10	10
Efficiency	%	90,8	90,8	90,8	90,8
PM EF	mg/m ³	18	18	18	15
CO EF	mg/m ³	164	164	164	65



<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

03 Wood, pellet, wood chips boilers



<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		ALFA PLAM	ATMOS	ATMOS	ATMOS	ATMOS
Model		COMMO COMPACT	D 14 P	D 15 P	D 20 P	D 21 P
Heat output	kW	20	30	25	29	31
Efficiency	%	90,8	90,5	92,9	93,1	93,1
PM EF	mg/m ³	11	8	11	9,5	9,5
CO EF	mg/m ³	73	110	169	127	127

Producer		ATMOS	ATMOS	ATMOS	ATMOS	ATMOS
Model		D 25 P	D 30 P	D 31 P	D 40 P	D 45 P (D50P)
Heat output	kW	35	45	20	26	40
Efficiency	%	93,1	93,2	92,9	93,4	92,4
PM EF	mg/m ³	9,5	8	15	19	17
CO EF	mg/m ³	127	85	229	165	105.5

Producer		ATMOS	ATMOS	ATMOS	ATMOS	ATTACK
Model		D 14 PX	D 15 PX	D 20 PX	D 25 PX	PELLET 30 AUTOMATIC PLUS
Heat output	kW	49,9	49,9	15,6	22	25
Efficiency	%	92,4	91,3	92,6	92	92
PM EF	mg/m ³	17	15	25	31	31
CO EF	mg/m ³	105.5	46	50	34	34

Producer		BIODOM	BIODOM	BIODOM	BIODOM	BIODOM
Model		BIODOM 21	BIODOM 27 C5	BIODOM 27 C5 VALTER	BIODOM 27 E	BIODOM 33
Heat output	kW	34	38	20	30	30
Efficiency	%	91	90,9	92,3	90,4	90,2
PM EF	mg/m ³	29	21	10	12	14
CO EF	mg/m ³	109	79	33	36	41

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		BIODOM	BIODOM	BPH BIOLOGIC	BPH BIOLOGIC	BPH BIOLOGIC
Model		C-15	C-25	BIOLOGIC 21	BIOLOGIC 27	BIOLOGIC 27 E
Heat output	kW	22	30	30	35	22
Efficiency	%	93,4	92,4	92,4	91,8	93,4
PM EF	mg/m ³	10	15	15	15	10
CO EF	mg/m ³	42	47	39	23	42
Producer		BPH BIOLOGIC	BPH BIOLOGIC	CENTROMETAL	CENTROMETAL	CENTROMETAL
Model		BIOLOGIC 33	BIOLOGIC C-15	EKO-CK(B) P + Cm Pelet-set 14	EKO-CK(B) P + Cm Pelet-set 20	EKO-CK(B) P + Cm Pelet-set 25
Heat output	kW	30	30	32	22	40
Efficiency	%	92,4	92,4	92,8	92,4	93,8
PM EF	mg/m ³	15	15	12	15	20
CO EF	mg/m ³	47	39	185	248	70
Producer		CENTROMETAL	CENTROMETAL	CENTROMETAL	CENTROMETAL	CENTROMETAL
Model		EKO-CK(B) P + Cm Pelet-set 30	EKO-CK(B) P + Cm Pelet-set 35	EKO-CK(B) P + Cm Pelet-set 40	EKO-CK(B) P + Cm Pelet-set 50	PELTEC - LAMBDA 12
Heat output	kW	25	25	30	35	38
Efficiency	%	90,6	90,5	90,4	90,4	90,1
PM EF	mg/m ³	13,5	12	14	14	15
CO EF	mg/m ³	186,5	154	143,5	143,5	132,5
Producer		CENTROMETAL	CENTROMETAL	CENTROMETAL	CENTROMETAL	CENTROMETAL
Model		PELTEC - LAMBDA 18	PELTEC - LAMBDA 24	PELTEC - LAMBDA 36	PELTEC - LAMBDA 48	PELTEC 12
Heat output	kW	18	26	29	20	30
Efficiency	%	91,6	91,4	91,3	92	92,3
PM EF	mg/m ³	19,8	14,4	16,8	17,4	17,4
CO EF	mg/m ³	213	225	88,4	189,8	189,8
Producer		CENTROMETAL	CENTROMETAL	CENTROMETAL	CENTROMETAL	CTC
Model		PELTEC 18	PELTEC 24	PELTEC 36	PELTEC 48	ECOFLEX 15
Heat output	kW	19	25	29,8	40	50
Efficiency	%	90,3	90,5	90,9	90,6	93
PM EF	mg/m ³	12	11	10	9	15
CO EF	mg/m ³	152	97	73	100	163

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		ECO ENGINEERING 2050	ECO ENGINEERING 2050	EDER	EDER	EDER
Model		EASYPELL 16	EASYPELL 32	PELLEVENT M15 ECON/SPIRO/VACU	PELLEVENT M22 ECON/SPIRO/VACU	PELLEVENT M30 ECON/SPIRO/VACU
Heat output	kW	15	25	30	35	40
Efficiency	%	91,1	90,2	90,1	90,1	90,2
PM EF	mg/m ³	21	20	22	22	18
CO EF	mg/m ³	180	144	168	168	111

Producer		EG MULTIFUEL	EG MULTIFUEL	EG MULTIFUEL	EG MULTIFUEL	EG MULTIFUEL
Model		EG MULTIFUEL 27	EG MULTIFUEL 30	EG MULTIFUEL 40	EG MULTIFUEL 60	EG MULTIFUEL 80
Heat output	kW	45	20	25	30	35
Efficiency	%	90,2	91,8	91,6	91,7	90,3
PM EF	mg/m ³	18	12	13	12,5	15
CO EF	mg/m ³	111	148	91	119,5	122

Producer		EG MULTIFUEL	EG MULTIFUEL	EG MULTIFUEL	EG MULTIFUEL	EKOLINE KOVAN
Model		EG MULTIFUEL 150	EG MULTIFUEL 200	EG MULTIFUEL 250	EG MULTIFUEL 300	EKOLINE 20
Heat output	kW	40	45	50	55	25
Efficiency	%	90,4	90,4	90,3	90,1	93,1
PM EF	mg/m ³	14,5	14	14	14	13
CO EF	mg/m ³	107	92	89,5	87	159

Producer		EKOLINE KOVAN	EKOLINE KOVAN	ETA	ETA	ETA
Model		EKOLINE 35	EKOLINE 45	PC 20	PC 25	PC 32
Heat output	kW	34	45	22	41,5	15
Efficiency	%	93,2	93,3	91	92	92,5
PM EF	mg/m ³	13	13	8	22	9
CO EF	mg/m ³	122	84	53	163	109

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		ETA	ETA	ETA	ETA	ETA
Model		PC 33	PC 40	PC 45	PC 50	PE-K 32
Heat output	kW	22	29	34	42	48
Efficiency	%	93,6	92	92	92,3	92,6
PM EF	mg/m ³	7,8	10,2	10,2	13,9	17,6
CO EF	mg/m ³	44	77	77	63	49

Producer		ETA	ETA	ETA	ETA	ETA
Model		PE-K 50	PE-K 70	PE-K 90	PE-K 105	PE-K 110
Heat output	kW	26	34,8	60	20	30
Efficiency	%	92,6	92	91	92,9	93,4
PM EF	mg/m ³	15	17,4	35	15	19
CO EF	mg/m ³	111	369	370	229	165

Producer		ETA	ETA	ETA	ETA	ETA
Model		PE-K 140	PE-K 180	PE-K 199	PE-K 220	PU 7 PEL-LETSUNIT
Heat output	kW	40	50	60	25	35
PM EF	%	92,4	92,4	91,3	90,3	90,2
CO EF	mg/m ³	17	17	15	17	18
CO emission	mg/m ³	105,5	105,5	46	161	123

Producer		ETA	ETA	ETA	ETA	ETIKS
Model		PU 11 PEL-LETSUNIT	PU 15 PEL-LETSUNIT	HACK 130	HACK 200	BIOMATIK 25 P
Heat output	kW	50	70	15	20	15
Efficiency	%	90,2	91,1	92,5	92	92,6
PM EF	mg/m ³	18	31	11	15	25
CO EF	mg/m ³	85	249	102	75	50

Producer		ETIKS	ETIKS	ETIKS	ETIKS	EVA STAMPAGGI
Model		BIOMATIK 35 P	BIOMATIK 50 P	BIOMATIK 75 P	BIOMATIK 100 P	EV 14
Heat output	kW	22	28	34	40	50
Efficiency	%	92	92	91	90,9	90,7
PM EF	mg/m ³	31	31	29	21	29
CO EF	mg/m ³	34	34	109	79	45

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		EVA STAMPAGGI	EVA STAMPAGGI	EVA STAMPAGGI	FRÖLING	FRÖLING
Model		EV 20	EV 24	EV 34	P(E)1 PELLETT 7	P(E)1 PELLETT 10
Heat output	kW	60	22,5	20	25	30
Efficiency	%	90,7	91,1	90,8	90,1	92,2
PM EF	mg/m ³	29	11	11	19	10
CO EF	mg/m ³	45	133	147	118	91

Producer		FRÖLING	FRÖLING	FRÖLING	FRÖLING	FRÖLING
Model		P(E)1 PELLETT 15	P(E)1 PELLETT 20	P(E)1 PELLETT 25	P(E)1 PELLETT 30	P(E)1 PELLETT 35
Heat output	kW	36	40	45	25	30
Efficiency	%	90,1	93,5	92,1	90	90,5
PM EF	mg/m ³	19	11	26	20	13,4
CO EF	mg/m ³	118	69	86	105	355

Producer		FRÖLING	FRÖLING	FRÖLING	FRÖLING	FRÖLING
Model		P4 PELLETT 20	P4 PELLETT 25	P4 PELLETT 32	P4 PELLETT 38	P4 PELLETT 48
Heat output	kW	22	35	14	21,6	20
Efficiency	%	90,3	90,7	91	91,2	91,9
PM EF	mg/m ³	13,7	13,1	6	32	11
CO EF	mg/m ³	338	372	116	93	89

Producer		FRÖLING	FRÖLING	FRÖLING	FRÖLING	FRÖLING
Model		P4 PELLETT 60	P4 PELLETT 80	P4 PELLETT 100	T4 24	T4 30
Heat output	kW	50	30	40	50	20
Efficiency	%	91,7	92,6	92,3	92	93,8
PM EF	mg/m ³	24	8	11	15	11
CO EF	mg/m ³	FRÖLING	FRÖLING	FRÖLING	FRÖLING	FRÖLING

Producer		FRÖLING	FRÖLING	FRÖLING	FRÖLING	FRÖLING
Model		T4 40	T4 50	T4 60	T4 75	T4 90
Heat output	kW	30	40	50	24,7	32
Efficiency	%	93	94,3	94,3	91,5	91,8
PM EF	mg/m ³	9	6	6	12	13
CO EF	mg/m ³	40	67	67	124	148

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		FRÖLING	FRÖLING	FRÖLING	FRÖLING	FRÖLING
Model		T4 100	T4 110	TX 150	TX 200	TX 250
Heat output	kW	40	49	58	39	47
Efficiency	%	92,1	92,4	90,1	92,6	90
PM EF	mg/m ³	14	15	29	23	12
CO EF	mg/m ³	173	202	105	163	186

Producer		GALMET	GALMET	GALMET	GALMET	GALMET
Model		GENESIS PLUS KPP 10	GENESIS PLUS KPP 15	GENESIS PLUS KPP 20	GENESIS PLUS KPP 25	GENESIS PLUS KPP 30
Heat output	kW	18	18	18	20	20
Efficiency	%	91,7	91,7	91,7	91,8	91,8
PM EF	mg/m ³	19	19	19	16	16
CO EF	mg/m ³	135	135	135	235	235

Producer		GORENJE	GORENJE	GORENJE	GORENJE	GOTIMEX
Model		AQUA ECOLOGIC 15C	ECOLOGIC 30	ECOLOGIC 30 PREMIUM	ECOLOGIC 23	TN-E2 S
Heat output	kW	20	30	30	30	40
Efficiency	%	91,8	92,5	92,5	92,5	90,4
PM EF	mg/m ³	16	19	19	19	25
CO EF	mg/m ³	235	130	130	130	74

Producer		GREENHEAT	GREENHEAT	GREENHEAT	GREENHEAT	GREENHEAT
Model		BASIC 20	BASIC 20 CLEAN	BASIC 35	BASIC 35 CLEAN	BASIC 45
Heat output	kW	40	40	13	18,3	28,6
Efficiency	%	90,4	90,4	90	93,4	92,4
PM EF	mg/m ³	25	25	11	10	15
CO EF	mg/m ³	74	74	60	42	47

Producer		GREENHEAT	GUNTAMATIC	GUNTAMATIC	GUNTAMATIC	GUNTAMATIC
Model		BASIC 45 CLEAN	BIOCOM 30	BIOCOM 40	BIOCOM 100	BIOCOM 101
Heat output	kW	31,9	34,9	38	31,9	34,9
Efficiency	%	92,4	92,4	91,8	92,4	92,4
PM EF	mg/m ³	15	15	15	15	15
CO EF	mg/m ³	39	39	23	39	39

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		GUNTAMATIC	GUNTAMATIC	GUNTAMATIC	GUNTAMATIC	GUNTAMATIC
Model		BIOSTAR W 12	BIOSTAR W 15	BIOSTAR W 23	THERM 5	THERM 7
Heat output	kW	15	20	18,4	30,2	28
Efficiency	%	92,5	92	93,4	92,4	91,2
PM EF	mg/m ³	11	15	5	5	15
CO EF	mg/m ³	102	75	42	47	189

Producer		GUNTAMATIC	HARGASSNER	HARGASSNER	HDG	HDG
Model		THERM 10	NANO PK 32.2	EKO PK 120	HDG COMPACT 25	HDG COMPACT 35
Heat output	kW	27	18	27	36	49
Efficiency	%	91,3	94	92,6	92,8	94,1
PM EF	mg/m ³	16,8	8	18	16	18
CO EF	mg/m ³	88,4	158	198	232	97,5

Producer		HDG	HDG	HDG	HDG	HDG
Model		HDG COMPACT 50	HDG COMPACT 65	HDG COMPACT 80	HDG COMPACT 100	HDG COMPACT 200
Heat output	kW	60	20	27	24,8	34,2
Efficiency	%	94,4	93,2	91,3	90,5	90,8
PM EF	mg/m ³	16	19,8	16,8	12,8	12,3
CO EF	mg/m ³	125	80	88,4	300	230

Producer		HEIZTECHNIK	HEIZTECHNIK	HEIZTECHNIK	HEIZTECHNIK	HEIZTECHNIK
Model		HT DasPell GL12	HT DasPell GL20	HT DasPell GL37	HT DasPell GL60	Q Pellet GL 12
Heat output	kW	23	17	23	30	35
Efficiency	%	90,7	92,7	92,5	93,1	91,9
PM EF	mg/m ³	8	7	8	14	8
CO EF	mg/m ³	311	94	106	83	110

Producer		HEIZTECHNIK	HEIZTECHNIK	HERZ	HERZ	HERZ
Model		Q Pellet GL 20	Q Pellet GL 37	FIREMATIC 35	FIREMATIC 45	FIREMATIC 60
Heat output	kW	45	20	32	42	50
Efficiency	%	91,6	92,7	91,1	91,3	91
PM EF	mg/m ³	15	7,5	10,5	12	11
CO EF	mg/m ³	65	95	97,5	175	108,5

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		HERZ	HERZ	HERZ	HERZ	HERZ
Model		FIREMATIC 80	FIREMATIC 100	FIREMATIC 130	FIREMATIC 149	FIREMATIC 151
Heat output	kW	40	50	60	75	85
Efficiency	%	91,2	91,5	91,8	92,2	92,7
PM EF	mg/m ³	4	7	10	14	13
CO EF	mg/m ³	107	111	115	121	153

Producer		HERZ	HERZ	HERZ	HERZ	HERZ
Model		FIREMATIC 180	FIREMATIC 199	FIREMATIC 201	FIREMATIC 249	FIREMATIC 251
Heat output	kW	100	120	168,5	25	40,6
Efficiency	%	92,8	92,9	93,6	92,6	93
PM EF	mg/m ³	18	26	39	16,3	19,6
CO EF	mg/m ³	153	153	19	60,1	154

Producer		HERZ	HERZ	HERZ	HERZ	HERZ
Model		FIREMATIC 299	FIREMATIC 301	PELLETSTAR 10	PELLETSTAR 20	PELLETSTAR 30
Heat output	kW	60	80	100	18	25
Efficiency	%	91,2	91,3	91,4	91,5	90,7
PM EF	mg/m ³	28	29	30	19	25,4
CO EF	mg/m ³	325	301	277	171	144,2

Producer		HERZ	HERZ	HERZ	HERZ	HERZ
Model		PELLETSTAR 45	PELLETSTAR 60	PELLETSTAR 10 ECO	PELLETSTAR 20 ECO	PELLETSTAR 30 ECO
Heat output	kW	30	18	25	30	36
Efficiency	%	90,1	91,5	91,8	92	91,1
PM EF	mg/m ³	30	22	18	14	16
CO EF	mg/m ³	125	197	133,5	70	82,5

Producer		HERZ	HERZ	LAFAT KOMERC	LAFAT KOMERC	LAFAT KOMERC
Model		PELLETSTAR 45 ECO	PELLETSTAR 60 ECO	SM ECO 25 COMPACT	SM ECO 30 COMPACT	SM ECO 35
Heat output	kW	50	20	25	30	20
Efficiency	%	90,1	91,4	91,5	91,7	90
PM EF	mg/m ³	18	15	13,5	12	12
CO EF	mg/m ³	95	60	54,5	49	131

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		LAFAT KOMERC	LAFAT KOMERC	LAFAT KOMERC	LAZAR	LAZAR
Model		EDGE 15	EDGE 23	TERMAL INT 34	PELLET FOCUS 21 (lambda sonde)	PELLET FOCUS 21 (lambda sonde)
Heat output	kW	25	30	20	25	30
Efficiency	%	90,7	91,4	92,7	92,5	92,2
PM EF	mg/m ³	13	14	4	4	4
CO EF	mg/m ³	103	75	30	31	32

Producer		ETA	ETA	ETA	ETA	ETA
Model		HACK 200	eHACK 20	eHACK 25	eHACK 32	eHACK 45
Heat output	kW	195	20	25,4	32	45
Efficiency	%	92,3	94	94,6	94,6	94,7
PM EF	mg/m ³	15	13	5	6	7
CO EF	mg/m ³	13	21	67	51	19

Producer		ETA	ETA	ETIKS	ETIKS	ETIKS
Model		eHACK 70 EP	eHACK 80	BIOMATIK 25 S	BIOMATIK 35 S	BIOMATIK 50 S
Heat output	kW	69,9	79,9	25	35	50
Efficiency	%	91,9	94,6	90,1	90,1	90,1
PM EF	mg/m ³	1	11	28	19	17
CO EF	mg/m ³	44	7	101	72	42

Producer		ETIKS	ETIKS	GUNTAMATIC	GUNTAMATIC	HDG
Model		BIOMATIK 75 S	BIOMATIK 100 S	POWERCHIP 20/30	POWERCHIP 40/50	HDG COMPACT 25
Heat output	kW	75	100	30	48	25
Efficiency	%	90,1	90,2	91,7	92,5	93,2
PM EF	mg/m ³	16	16	13	31	17
CO EF	mg/m ³	46	27	11	15	62

Producer		HDG	HDG	HDG	HDG	HARGASSNER
Model		HDG COMPACT 35	HDG COMPACT 50	HDG COMPACT 80	HDG COMPACT 100	ECO-HK 20
Heat output	kW	35	50	80	100	20
Efficiency	%	93,2	91,7	92,2	91,4	93,9
PM EF	mg/m ³	17	15	19	27	4
CO EF	mg/m ³	62	105	12	11	12

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		HARGASSNER	HARGASSNER	HARGASSNER	HARGASSNER	HARGASSNER
Model		ECO-HK 30	ECO-HK 35	ECO-HK 40	ECO-HK 50	ECO-HK 60
Heat output	kW	30	35	40	50	60
Efficiency	%	94,4	94,6	94,8	95,3	95,8
PM EF	mg/m ³	6	6	7	8,5	10
CO EF	mg/m ³	10	8	7	5,5	4

Producer		HEIZOMAT	HEIZOMAT	HEIZOMAT	HERZ	HERZ
Model		HSK-RA 30	HSK-RA 50	HSK-RA 60	FIREMATIC 60	FIREMATIC 80
Heat output	kW	36,5	50	60	65	80
Efficiency	%	90,4	90,4	90,3	93	94
PM EF	mg/m ³	30	22	14	37	35
CO EF	mg/m ³	45	53	61	139	30

Producer		HERZ	HERZ	HERZ	HERZ	HERZ
Model		FIREMATIC 100	FIREMATIC 101	FIREMATIC 130	FIREMATIC 149	FIREMATIC 151
Heat output	kW	99	101	130	149	155
Efficiency	%	92,5	92,5	90,9	90,9	91,5
PM EF	mg/m ³	19	19	19	19	22
CO EF	mg/m ³	18	18	5	5	5

Producer		HERZ	HERZ	HERZ	HERZ	HERZ
Model		FIREMATIC 180	FIREMATIC 199	FIREMATIC 201	FIREMATIC 249	FIREMATIC 251
Heat output	kW	180	199	201	249	251
Efficiency	%	93	92,3	92,3	92,8	92,8
PM EF	mg/m ³	26	34	37	23	23
CO EF	mg/m ³	4	7	7	5	5

Producer		HERZ	HERZ	KWB	KWB	KWB
Model		FIREMATIC 299	FIREMATIC 301	MULTIFIRE 20	MULTIFIRE 30	MULTIFIRE 30
Heat output	kW	299	301	20	30	32,5
Efficiency	%	91,3	91,3	93	93,7	93,8
PM EF	mg/m ³	25	25	15	16	16
CO EF	mg/m ³	6	6	16	12	10

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Producer		KWB	KWB	KWB	KWB	KWB
Model		MULTIFIRE 40	MULTIFIRE 45	MULTIFIRE 50	MULTIFIRE 60	MULTIFIRE 65
Heat output	kW	40	45	49,5	60	65
Efficiency	%	94,3	94,3	94,3	94,3	94,2
PM EF	mg/m ³	17	17	18	19	19
CO EF	mg/m ³	7	7	7	7	7

Producer		KWB	KWB	KWB	KWB	KWB
Model		MULTIFIRE 70	MULTIFIRE 80	MULTIFIRE 100	MULTIFIRE 100	MULTIFIRE 100
Heat output	kW	69,5	80	99	100	101
Efficiency	%	94,2	94,2	94,3	94,3	94,3
PM EF	mg/m ³	19	20	20	20	20
CO EF	mg/m ³	7	7	7	7	7

Producer		KWB	KWB	KWB	KWB	KWB
Model		MULTIFIRE 108	MULTIFIRE 120	POWERFIRE TDS 150	POWERFIRE TDS 240	POWERFIRE TDS 300
Heat output	kW	108	120	150	239	278,1
Efficiency	%	94,3	94,4	90,4	92,7	92,9
PM EF	mg/m ³	19	19	28	36	33
CO EF	mg/m ³	7	7	16	32	55

Producer		SOLARFOCUS	SOLARFOCUS	SOLARFOCUS	VISSMANN	VISSMANN
Model		THERMINATOR II - 40	THERMINATOR II - 49	THERMINATOR II - 60	VITOLIGNO 300-H (50 kW)	VITOLIGNO 300-H (60 kW)
Heat output	kW	40	49	59	50	60
Efficiency	%	93,2	93,3	93,3	93,1	92,4
PM EF	mg/m ³	18	44	44	11	8
CO EF	mg/m ³	43	85	85	17	23

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme



Producer		VISSMANN	VISSMANN	VISSMANN	WINDHAGER	WINDHAGER
Model		VITOLIGNO 300-H (80 kW)	VITOLIGNO 300-H (99 kW)	VITOLIGNO 300-H (101 kW)	PUROWIN (24 kW)	PUROWIN (30 kW)
Heat output	kW	80	99	101	24	30
Efficiency	%	94,9	94,1	94,1	93,5	93,4
PM EF	mg/m ³	10	13	13	1	1
CO EF	mg/m ³	5	10	10		

Producer		WINDHAGER	WINDHAGER	WINDHAGER
Model		PUROWIN (40 kW)	PUROWIN (49 kW)	PUROWIN (60 kW)
Heat output	kW	40	49	60
Efficiency	%	93,8	94,2	94,7
PM EF	mg/m ³	1	1	1
CO EF	mg/m ³	5	4	2

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

04

Appliances classification systems

- ▶ After the appliances database, we introduce some examples of best practices and policies biased on pollutant emissions level reduction when burning wood. How to help citizens to choose the best performing generator? The national and local laws and regulations play a key role, in terms of restrictions and pollution levels.
The two represented approaches involve the direct action of citizens in particular circumstances, unfortunately not so impossible to happen, especially in winter.

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

04.1 Appliances classification systems

In Italy, from the end of 2017, the biomass generators are classified into five classes, due to “Decreto Ministeriale” n. 186/2017, classified from one to five stars classes, based on their emission factors and efficiency:

1 STAR: performances lower than 2 stars

2 STARS

Appliance	PP (mg/Nm ³)	TOC (mg/Nm ³)	NOx (mg/Nm ³)	CO (mg/Nm ³)	η (%)
Open fireplaces	75	150	200	2000	75
Closed fireplaces, wood inserts					
Wood burning stoves					
wood cookers					
wood storage stoves					
pellet stoves, pellet inserts and cookers wood or pellet thermo-stoves (hydro)	50	80		500	85
wood boilers	60	30			80
pellet and wood chips boilers	40	20			300



<http://www.alpine-space.eu/projects/bb-clean.com>

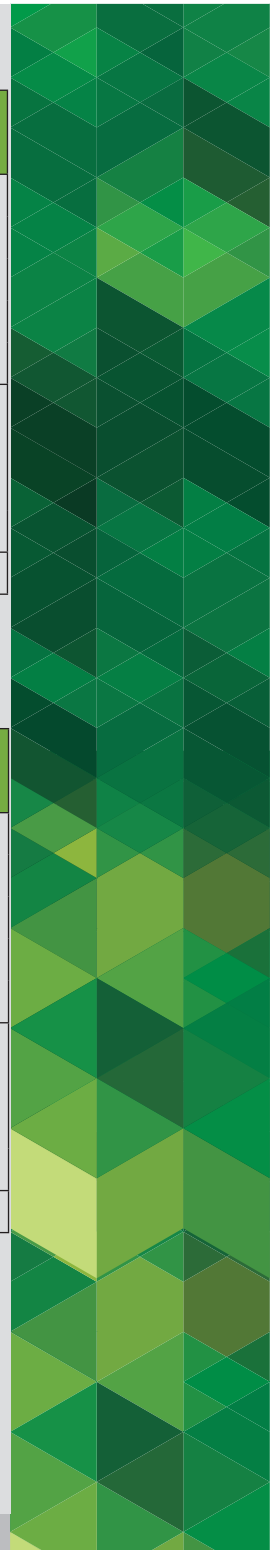
This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

3 STARS

Appliance	PP (mg/Nm ³)	TOC (mg/Nm ³)	NOx (mg/Nm ³)	CO (mg/Nm ³)	η (%)
Open fireplaces	40	100	200	1500	75
Closed fireplaces, wood inserts					
Wood burning stoves					
wood cookers					
wood storage stoves				1250	
pellet stoves, pellet inserts and cookers wood or pellet thermo-stoves (hydro)	30	50	150	364	85
wood boilers	15				
pellet and wood chips boilers		20	145	250	90

4 STARS

Appliance	PP (mg/Nm ³)	TOC (mg/Nm ³)	NOx (mg/Nm ³)	CO (mg/Nm ³)	η (%)
Open fireplaces	30	70	160	1250	77
Closed fireplaces, wood inserts					
Wood burning stoves					
wood cookers					
wood storage stoves				1000	
pellet stoves, pellet inserts and cookers wood or pellet thermo-stoves (hydro)	20	35	150	250	87
wood boilers	10				
pellet and wood chips boilers		15	130	100	91



<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

5 STARS

Appliance	PP (mg/Nm ³)	TOC(mg/Nm ³)	NOx (mg/Nm ³)	CO (mg/Nm ³)	η (%)
Open fireplaces	25	35	100	650	85
Closed fireplaces, wood inserts					
Wood burning stoves					
wood cookers					
wood storage stoves					
pellet stoves, pellet inserts and cookers wood or pellet thermo-stoves (hydro)	15	10	150	30	88
wood boilers	5				
pellet and wood chips boilers		10	5	120	25

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

04.2 France

A similar system is running in France, since 2010, with the “Flamme Verte” label, classifying the biomass appliances into categories, like stars for hotels. The higher the performance, more stars are on the label. Their number is established on the basis of three criteria:

- energy efficiency
- CO (carbon monoxide) emissions;
- VOCs (volatile organic compounds), only for domestic boilers.

year	application
January 2012	Eligible products: 4 and 5 stars
January 2015	Deleting the 4-star class
January 2018	Eligible products: 6 and 7 stars Deleting the 5-star class
January 2020	Eligible products: 7 stars Deleting the 6-star class

Only 6 and 7 star generators are rated as best performers in the French domestic wood heating market. The parameters to respect are:

Independent generators

fuel	energy class	energy efficiency %	CO emissions %*	PM (mg/Nm3)*
log wood	6 stars	≥ 75	≤ 0,15	≤ 50
	7 stars		≤ 0,12	≤ 40
pellet	6 stars	≥ 86	≤ 0,03	≤ 40
	7 stars	≥ 87	≤ 0,02	≤ 30

* Values expressed at 13% O2 according to the draft standard prEN 16510

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme



Domestic boilers

Loading system	energy class	energy efficiency %	CO emissions (mg/Nm3)**	PM (mg/Nm3)*	VOCs (mg/Nm3)**
manual	6 stars	> 87	≤ 600	≤ 40	≤ 30
	7 stars		≤ 500	≤ 30	
automatic	6 stars	> 87	≤ 450	≤ 30	≤ 20
	7 stars		≤ 300	≤ 20	

* As an indication, because the threshold is dependent on the nominal power.

** Values expressed at 10% O₂ and 1013 Mbar, according to EN 303.5.

List: Annex D, downloadable from: <http://www.flammeverte.org/fichs/13277.pdf>

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

04.3 Local policies

As all Italian Regions can regulate their environmental issues, it is possible to meet restrictions referring to this kind of classification.

In Lombardy, different specific permanent restrictions had been applied. In particular:

1) from October 2018 it is forbidden:

- to use wood biomass generators with environmental characteristics lower than 2 stars;
- to install wood biomass generators with environmental characteristics below 3 stars.

2) from January 2020 it is forbidden:

- to use wood biomass generators with environmental characteristics lower than 3 stars;
- to install wood biomass generators with environmental characteristics below 4 stars.

In addition, in the case of particular situations of accumulation of pollutants in the atmosphere:

- First level temporary measures, activated in the municipalities concerned on a provincial basis when PM10 daily average concentrations exceed the limit value set for 4 consecutive days, including the prohibition to use domestic wood biomass heat generators (in presence of an alternative heating system) with lower performance than the 3-star class.
- Second-level temporary measures, when the daily average PM10 concentration exceeds the limit value for 10 consecutive days. These measures, in addition to those of the first level, with regard to heating systems is the prohibition to use domestic wood biomass heat generators (in presence of an alternative heating system) with lower performance than the 4-star class.

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme





In France, in Arve Valley, it is mandatory to respect these limits of emitted PM:

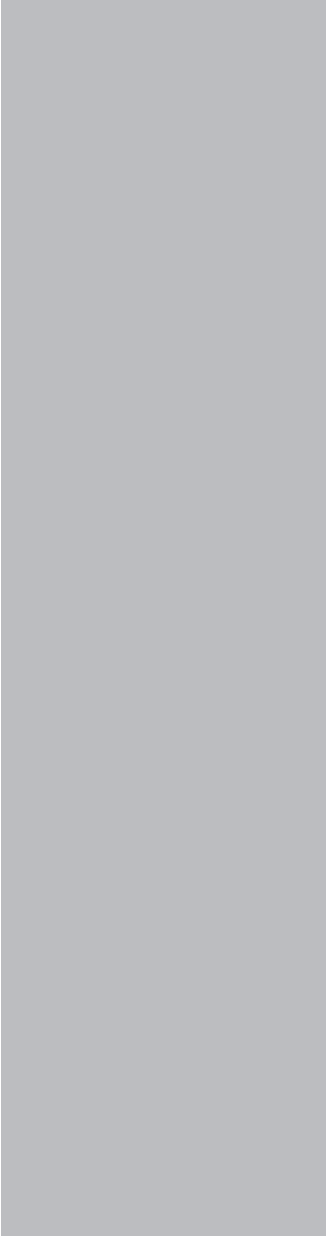
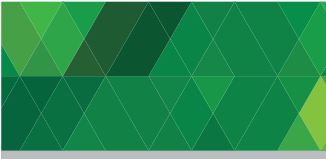
125 mg/Nm ³	30 mg/Nm ³
For all residential biomass burning systems installed after 2014	For all new classified installations for environmental protection (ICPE) using biomass burning

125 mg/Nm ³	50 mg/Nm ³
The use of residential biomass burning systems that do not respect this ELV is forbidden during a PM pollution peak	For all existing classified installations for environmental protection (ICPE) using biomass burning

The authorities have also developed a system of warning people about pollution peaks, that represents an interesting innovation.

<http://www.alpine-space.eu/projects/bb-clean.com>

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme



[http://www.alpine-space.eu/
projects/bb-clean.com](http://www.alpine-space.eu/projects/bb-clean.com)

This project is co-financed by the European Regional
Development Fund through the Interreg Alpine
Space programme

Interreg
Alpine Space

European Regional Development Fund

