Furnishing and bathroom radiators

BRAND NAME

NOVA FLORIDA

MADE IN ITALY

GENERAL CATALOGUE

E 017 - 01

BRAND NAME
NOVA FLORIDA

NOVA FLORIDA, brand of the Fondital Group, designs and manufactures heating systems in their company's plants. An international market leader in the field, the company from Brescia is known for the excellence of its products as well as for the constant innovation in the field.

The 750 people presently employed, the world leadership position in the manufacture of heating systems, and the 45.000 square meters in the new installation in Vobarno (province of Brescia), designated as a warehouse and manufacturing facility for boiler production, are numbers and facts that continue to demonstrate a dynamic reality, in continual expansion, aware of the challenges facing the market and capable of anticipating global scenarios.

NOVA FLORIDA offers a complete rage of heating systems that includes die-cast aluminum radiators, decorative extruded radiators, convection gas radiators and stoves, electric heaters, wall-mounted and underground boilers, solar panels and photovoltaic modules. Every product undergoes exhaustive internal checks that guarantee the highest level of quality without affecting the time to market.

The characteristics and the structure of the sales network and the elevated production capability have allowed NOVA FLORIDA to achieve a key position on a global level in the heating field since 1970, always bearing in mind the needs of the client.

The production SITES

1 Factory - Carpeneda 1
Via Provinciale, 49
25079 Carpeneda di Vobarno (Brescia) Italy
Total surface area m^2 131,000
Covered surface area m^2 32,500

2 Factory - Vestone 1
Via Mocenigo, 123
25078 Vestone (Brescia) Italy
Total surface area m^2 43,100
Covered surface area m^2 16,250

3 Factory - Vestone 2
Via Mocenigo, 125
25078 Vestone (Brescia) Italy
Total surface area m^2 9,500
Covered surface area m^2 7,710

4 Factory - Sabbio Chiese
Via XX Settembre, 39
25070 Sabbio Chiese (Brescia) Italy
Total surface area m^2 3,600
Covered surface area m^2 3,470

5 Factory - Carpeneda 2
Via Cerreto, 40
25079 Vobarno (Brescia) Italy
Total surface area m^2 75,695
Covered surface area m^2 21,445
Covered production area m^2 45,500

Despite being a world leader in the production of heating systems, the company has not stopped developing - it has launched a new expansion project as a further challenge.

The four original production plants have recently been flanked by an important new facility for producing and storing the new line of boilers, and the radiator production plant has been extended.

DIE-CAST RADIATORS IN LOW-TEMPERATURE PLANTS

Nova Florida aluminium radiators are particularly indicated for low-temperature use, using water at around 50°C, which makes best use of modern condensing boilers.

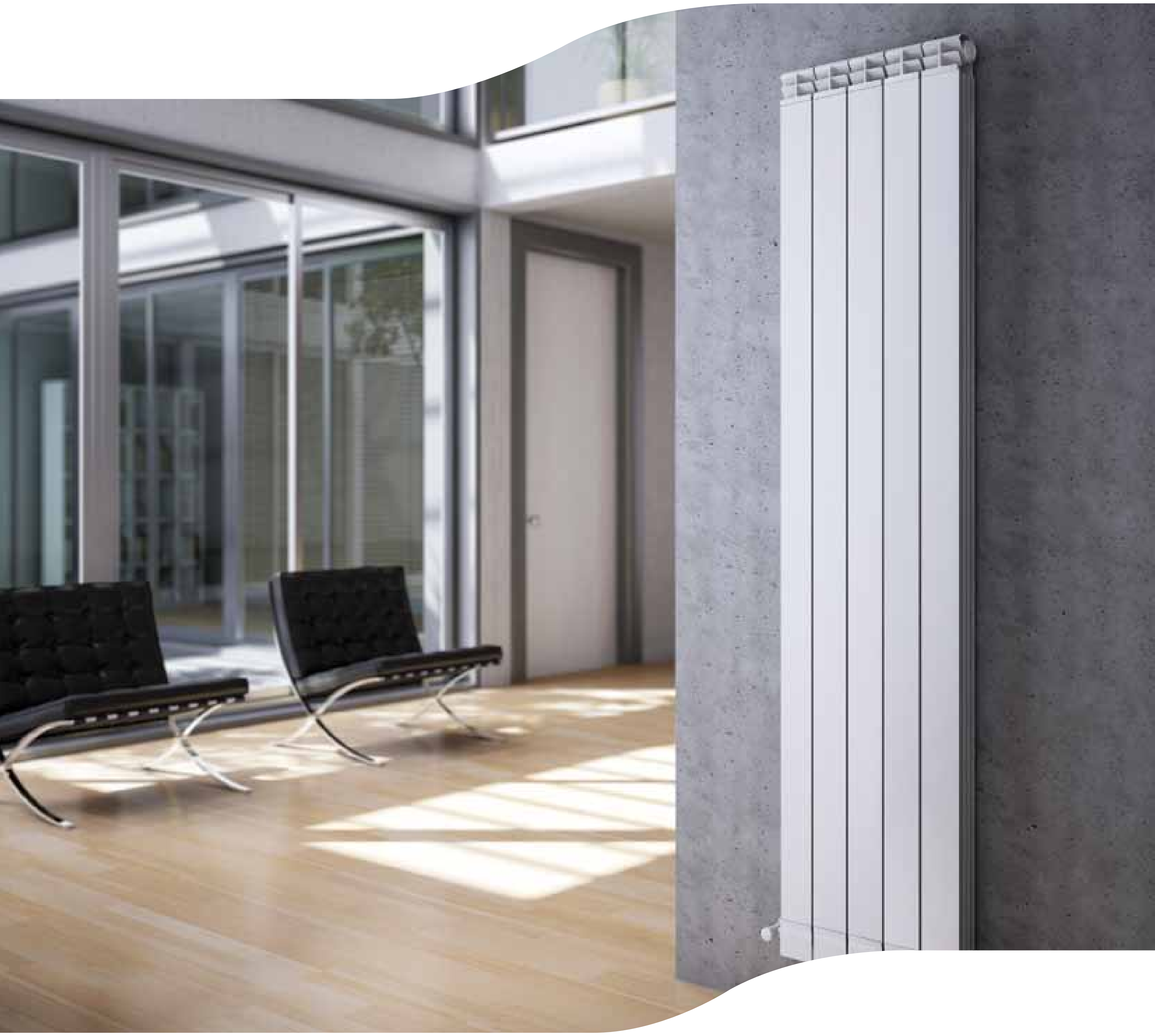
Low-temperature heating using aluminium radiators combines the known advantages of rapid response and enhanced overall use of the system with higher efficiency and optimised comfort. This method is comparable to under-floor radiant panel systems, but with lower installation costs and more versatile use.

Low temperature means:

- lower heating costs
- lower installation costs
- enhanced comfort
- reduced dust circulation
- uniform temperature in the room

Home-furnishing radiators

The natural result of technical research and aesthetic design, Nova Florida is a revolutionary new approach to heating the home.
This complete diverse range, harmonious and light in form, perfect for personalizing any household environment, the aesthetic versions of the Nova Florida household radiators are suited to any room, including bathrooms, regardless of the space available.
The radiators are made of extruded aluminium with two painting finishes (anaphoresis and epoxy polyester coatings).



Bathroom radiators and towel rails

Home-furnishing radiators

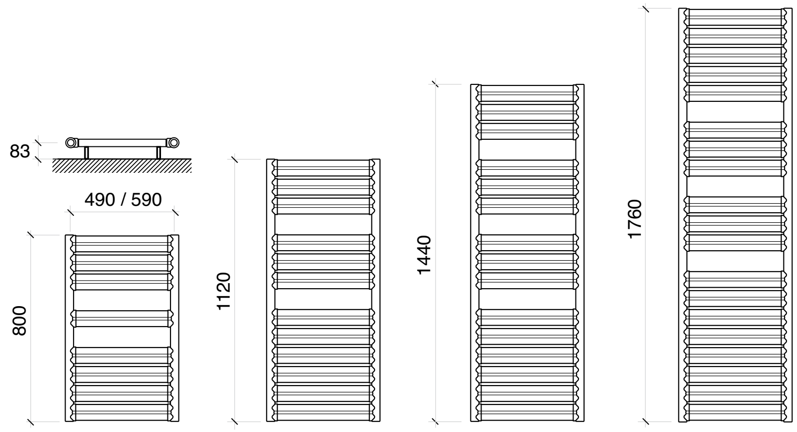
HORO

TOWEL RAIL

58/047

The ultimate in elegance and sophistication, lending your bathroom a certain atmosphere and refinement.

Nova Florida offers solutions for all tastes and styles, original in design and pleasing to the sight. They guarantee the perfect warmth for a bathroom of any size.



Technical characteristics

Model	Depth	Height	Centre distance	Width	Diameter	Water content	Weight	Heat output	Expon.	Coeff.
	mm	mm	mm	mm	inches	lt/sect.	Kg/sect.	W/sect.	n	K_m
8/450	40	800	450	490	G1	2.5	5.8	**363**	1.2207	3.0609
8/550	40	800	550	590	G1	2.9	6.3	**423**	1.2297	3.4475
12/450	40	1120	450	490	G1	3.8	8.3	**506**	1.2469	3.8517
12/550	40	1120	550	590	G1	4.2	9.1	**607**	1.2475	4.6073
15/450	40	1440	450	490	G1	4.6	10.5	**643**	1.2492	4.8494
15/550	40	1440	550	590	G1	5.3	11.6	**763**	1.2397	5.9716
19/450	40	1760	450	490	G1	5.8	13.1	**796**	1.2462	6.0784
19/550	40	1760	550	590	G1	6.7	14.5	**933**	1.2494	7.0312

Max working pressure: 600 kPa (6 bar)

Characteristic equation of the model $\Phi = Km \, \Delta T^n$ (reference EN 442-1)

The heat output values published, calculated with a ΔT 50 K, are in compliance with the European Standard EN 442-2.

10 WARRANTY TEN YEARS

COLOUR: Ral 9010 white

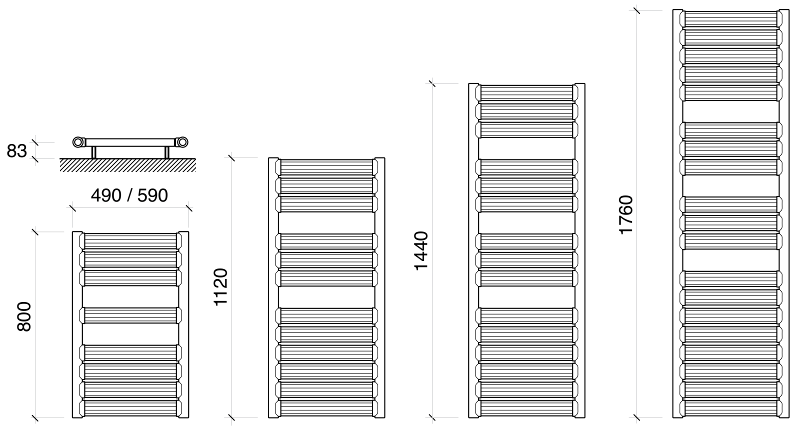
INCLUDED: Fixing system and adapters

SAMOA DUAL R

TOWEL RAIL

58/047

Nova Florida proposes a state-of-the-art radiator with reduced water content, suited to all tastes and styles.
This powerful new generation of radiators is state-of-the-art, elegant and perfectly adaptable to any home environment.
The Samoa Dual R radiators are the real thing, guaranteeing a safe source of heat in rooms of all sizes.



Technical characteristics

Model	Depth	Height	Centre distance	Width	Diameter	Water content	Weight	Heat output	Expon.	Coeff.
	mm	mm	mm	mm	inches	lt/sect.	Kg/sect.	W/sect.	n	K_m
8/450	40	800	450	490	G1	2.5	5.7	**362**	1.2266	2.9861
8/550	40	800	550	590	G1	2.8	6.3	**423**	1.2252	3.5087
12/450	40	1120	450	490	G1	3.6	8.3	**509**	1.2412	3.9652
12/550	40	1120	550	590	G1	4.1	9.1	**602**	1.2413	4.6872
15/450	40	1440	450	490	G1	4.6	10.7	**640**	1.1175	8.0822
15/550	40	1440	550	590	G1	5.2	11.6	**748**	1.2467	5.6963
19/450	40	1760	450	490	G1	5.7	13.4	**791**	1.2553	5.8268
19/550	40	1760	550	590	G1	6.6	14.5	**932**	1.2387	7.3298

Max working pressure: 600 kPa (6 bar)
Characteristic equation of the model $\Phi = Km\ \Delta T^n$ (reference EN 442-1)
The heat output values published, calculated with a ΔT 50 K, are in compliance with the European Standard EN 442-2.

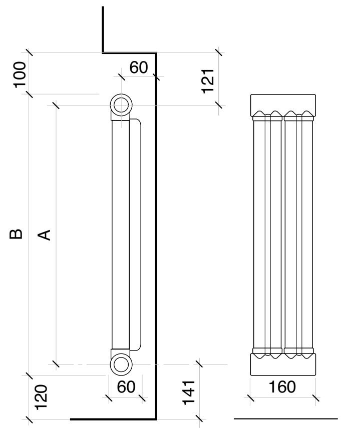
10 WARRANTY TEN YEARS

COLOUR: Ral 9010 white
INCLUDED: Fixing system and adapters

HORO R DECORATIVE

58/047 CE 05

Functionality and elegance, practicality and originality: these are the concepts at the heart of the Nova Florida aluminium radiators.
The Horo R radiators have pipe centres from 350 mm up to 2 metres.
They are supplied in blocks of 3, 4 or 5 sections that can, in their turn, be assembled into larger units by means of the practical nipple system.



Technical characteristics

Model	Depth	Height	Centre distance	Width	Diameter	Water content	Weight	Heat output	Expon.	Coeff.
	mm	(B) mm	(A) mm	mm	inches	lt/sect.	Kg/sect.	W/sect.	n	K_m
350	60	390	350	160	G1	0.480	1.460	**117**	1.3078	0.7019
500	60	540	500	160	G1	0.590	1.748	**152**	1.3104	0.9026
600	60	640	600	160	G1	0.678	1.990	**175**	1.3121	1.0323
700	60	740	700	160	G1	0.765	2.190	**197**	1.3139	1.1541
800	60	840	800	160	G1	0.850	2.396	**219**	1.3156	1.2741
900	60	940	900	160	G1	0.960	2.720	**241**	1.3174	1.3928
1000	60	1040	1000	160	G1	1.040	2.787	**262**	1.3191	1.5036
1200	60	1240	1200	160	G1	1.200	3.236	**305**	1.3226	1.7267
1400	60	1440	1400	160	G1	1.380	3.670	**348**	1.3261	1.9436
1600	60	1640	1600	160	G1	1.575	4.275	**390**	1.3296	2.1488
1800	60	1840	1800	160	G1	1.750	4.590	**432**	1.3331	2.3478
2000	60	2040	2000	160	G1	1.950	5.100	**475**	1.3365	2.5466

Max working pressure: 600 kPa (6 bar)
Characteristic equation of the model $\Phi = Km\ \Delta T^n$ (reference EN 442-1)
The heat output values published, calculated with a ←T 50 K, are in compliance with the European Standa**rd EN 442-2.**

COLOUR: Ral 9010 white

STANDARD SUPPLY: Blocks of 3, 4, 5 sections (350 ÷ 800) - Blocks of 2, 3 sections (900 ÷ 2000)

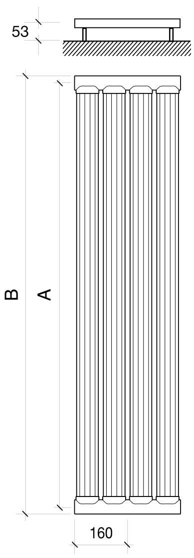
The water diaphragm (retainer cap) is included in the fixing system kit (accessory A 70).

10 WARRANTY TEN YEARS

SAMOA DUAL R
DECORATIVE

58/047

Nova Florida has broadened the horizons of the world of heating.
The Samoa Dual R radiators are synonymous with comfort and sophistication.
Easy to install, they come in units of two or three elements, each comprising two columns. The broad radiating surface ensures comfortable warmth.
Samoa Dual R can take additional sections thanks to its practical nipple system. It can be installed in a horizontal position as well.
The systems bring together all the main elements in a single product of cutting edge technology, maximum safety and top performance.



Technical characteristics

Model	Depth	Height	Centre distance	Width	Diameter	Water content	Weight	Heat output	Expon.	Coeff.
	mm	(B) mm	(A) mm	mm	inches	lt/sect.	Kg/sect.	W/sect.	n	K_m
900	40	940	900	160	G1	0.94	1.90	**173**	1.2807	1.1534
1000	40	1040	1000	160	G1	1.02	2.20	**191**	1.3009	1.1767
1200	40	1240	1200	160	G1	1.23	2.33	**226**	1.2905	1.4533
1400	40	1440	1400	160	G1	1.42	2.64	**260**	1.2963	1.6315
1600	40	1640	1600	160	G1	1.60	3.03	**295**	1.2850	1.9377
1800	40	1840	1800	160	G1	1.82	3.34	**326**	1.2917	2.0829
2000	40	2040	2000	160	G1	1.93	3.60	**358**	1.3288	1.9803

Max working pressure: 600 kPa (6 bar)
Characteristic equation of the model $\Phi = Km\ \Delta T^n$ (reference EN 442-1)
The heat output values published, calculated with a ←T 50 K, are in compliance with the European Standard **EN 442-2.**

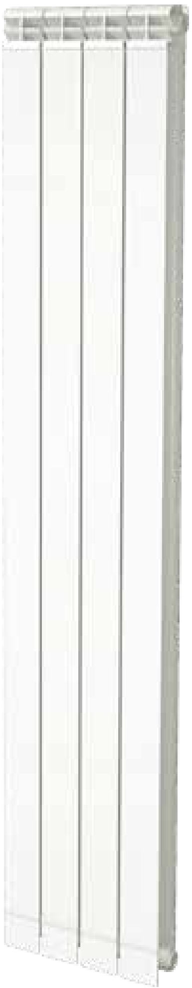
COLOUR: Ral 9010 white
STANDARD SUPPLY: Blocks of 2, 3 sections
The water diaphragm (retainer cap) is included in the fixing system kit (accessory A 71).

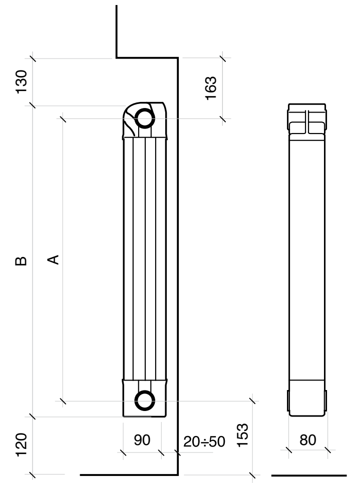
10 WARRANTY TEN YEARS

MAIOR S/90

96/047

Ideal for exploiting available space to the max whenever vertical length is more important than horizontal length, these radiators are the smartest and most flexible solutions for heating a modern home.
The Maior S/90 radiator comes in sets of 3, 4, 5 and 6 sections.





Technical characteristics

Model	Depth	Height	Centre distance	Width	Diameter	Water content	Weight	Heat output	Expon.	Coeff.
	mm	(B) mm	(A) mm	mm	inches	lt/sect.	Kg/sect.	W/sect.	n	K_m
900	90	966	900	80	G1	0.42	1.70	**183**	1.3669	0.8712
1000	90	1066	1000	80	G1	0.47	1.86	**195**	1.3740	0.9029
1200	90	1266	1200	80	G1	0.55	2.17	**223**	1.3711	1.0443
1400	90	1466	1400	80	G1	0.65	2.46	**249**	1.3682	1.1794
1600	90	1666	1600	80	G1	0.74	2.77	**275**	1.4005	1.1479
1800	90	1866	1800	80	G1	0.83	3.07	**298**	1.3623	1.4444
2000	90	2066	2000	80	G1	0.92	3.39	**323**	1.4007	1.3463

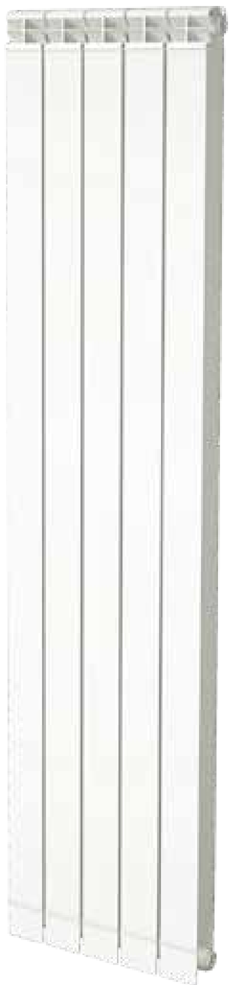
Max working pressure: 600 kPa (6 bar)
Characteristic equation of the model $\Phi = Km\ \Delta T^n$ (reference EN 442-1)
The heat output values published, calculated with a ΔT 50 K, are in compliance with the European Standard EN 442-2.

COLOUR: Ral 9010 white
STANDARD SUPPLY: Blocks of 3, 4, 5, 6 sections
INCLUDED: Water diaphragm

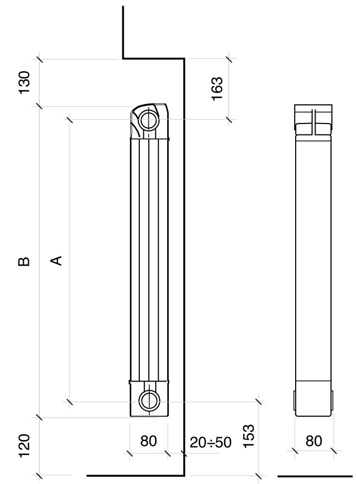
10 WARRANTY TEN YEARS

MAIOR Dual 80

96/047



The true epitome of Nova Florida, the Maior Dual 80 radiators can be up to two metres in height and just 80 cm in depth.
These radiators, emblematic of power, warmth and sophistication, perfectly suit all needs of style and space.
The Maior Dual 80 series comes in sets of 3, 4, 5 or 6 sections or can be assembled according to the required size by means of the practical nipple system.



Technical characteristics

Model	Depth	Height	Centre distance	Width	Diameter	Water content	Weight	Heat output	Expon.	Coeff.
	mm	(B) mm	(A) mm	mm	inches	lt/sect.	Kg/sect.	W/sect.	n	K_m
900	80	966	900	80	G1	0.42	1.70	**176**	1.3785	0.7990
1000	80	1066	1000	80	G1	0.47	1.86	**190**	1.3948	0.8110
1200	80	1266	1200	80	G1	0.55	2.17	**217**	1.3924	0.9350
1400	80	1466	1400	80	G1	0.65	2.46	**241**	1.3944	1.0303
1600	80	1666	1600	80	G1	0.74	2.77	**266**	1.4069	1.0829
1800	80	1866	1800	80	G1	0.83	3.07	**289**	1.3934	1.2403
2000	80	2066	2000	80	G1	0.92	3.39	**312**	1.3995	1.3075

Max working pressure: 600 kPa (6 bar)
Characteristic equation of the model $\Phi = Km \, \Delta T^n$ (reference EN 442-1)
The heat output values published, calculated with a ←T 50 K, are in compliance with the European Standard EN 442-2.

COLOUR: Ral 9010 white
STANDARD SUPPLY: Blocks of 3, 4, 5, 6 sections
INCLUDED: Water diaphragm

10 WARRANTY TEN YEARS

Accessories

Nova Florida offers a complete line of accessories for all needs. The valves and unions, available in different forms and finishes, can be used for any type of pipe, with 1/2" straight or angle radiator union.

Radiator valves and unions

ALFA series valves 1/2" radiator fitting

Type	Colour white/chrome	Colour chrome	Colorur gold
Description	Code	Code	Code
Square valve for iron pipe	**3051**	**3052**	**3053**
Straight valve for iron pipe	**3061**	**3062**	**3063**
Square lockshield-valve for iron pipe	**3031**	**3032**	**3033**
Straight lockshield-valve for iron pipe	**3041**	**3042**	**3043**
Square valve for copper/polyethilene/multilayer pipe	**3151**	**3152**	**3153**
Straight valve for copper/polyethilene/multilayer pipe	**3161**	**3162**	**3163**
Square lockshield-valve for copper/polyethilene/multilayer pipe	**3131**	**3132**	**3133**
Straight lockshield-valve for copper/polyethilene/multilayer pipe	**3141**	**3142**	**3143**

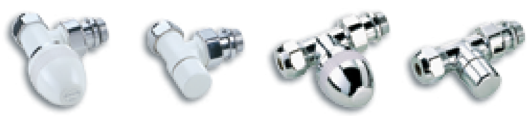
Valves supplied without fitting.

BETA series valves 1/2" radiator fitting

Type	Colour white/chrome	Colour **chrome**
Description	Code	Code
Square valve for iron pipe	**3351**	**3352**
Straight valve for iron pipe	**3361**	**3362**
Square lockshield-valve for iron pipe	**3531**	**3532**
Straight lockshield-valve for iron pipe	**3541**	**3542**
Square valve for copper/polyethilene/multilayer pipe	**3451**	**3452**
Straight valve for copper/polyethilene/multilayer pipe	**3461**	**3462**
Square lockshield-valve for copper/polyethilene/multilayer pipe	**3631**	**3632**
Straight lockshield-valve for copper/polyethilene/multilayer pipe	**3641**	**3642**

Valves supplied without fitting.

GAMMA series valves 1/2" radiator fitting



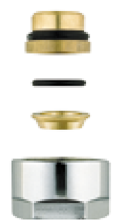
Type	Colour white/chrome	Colour **chrome**
Description	Code	Code
Square valve for iron pipe	**4351**	**4352**
Straight valve for iron pipe	**4361**	**4362**
Square lockshield-valve for iron pipe	**4531**	**4532**
Straight lockshield-valve for iron pipe	**4541**	**4542**
Square valve for copper/polyethilene/multilayer pipe	**4451**	**4452**
Straight valve for copper/polyethilene/multilayer pipe	**4461**	**4462**
Square lockshield-valve for copper/polyethilene/multilayer pipe	**4631**	**4632**
Straight lockshield-valve for copper/polyethilene/multilayer pipe	**4641**	**4642**

Valves supplied without fitting.

BRAND NAME NOVA FLORIDA

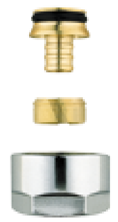
ALFA and BETA fittings for copper pipes

Pipe size (Ø mm)	Colour **chrome**	Colorur gold
	Code	Code
10	**3812**	**3813**
12	**3812**	**3813**
14	**3812**	**3813**
15	**3812**	**3813**
16	**3812**	**–**



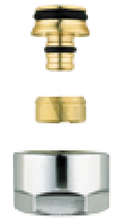
ALFA and BETA fittings for polyethylene pipes

Pipe size (int. Ø - ext. Ø)	Colour **chrome**	Colorur gold
	Code	Code
12-16	**3822**	**3823**
13-18	**3822**	**3823**
14-18	**3822**	**3823**



ALFA and BETA fittings for multi-layer pipes

Pipe size (int. Ø - ext. Ø)	Colour **chrome**	Colorur gold
	Code	Code
10-14	**3832**	**3833**
12-16	**3832**	**3833**

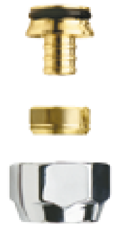


GAMMA fittings for copper pipes

Pipe size (Ø mm)	Colour **chrome**
	Code
10	**4812**
12	**4812**
14	**4812**
15	**4812**
16	**4812**

GAMMA fittings for polyethylene pipes

Pipe size (int. Ø - ext. Ø)	Colour **chrome**
	Code
12-16	**4822**
13-18	**4822**
14-18	**4822**



GAMMA fittings for multi-layer pipes

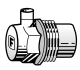
Pipe size (int. Ø - ext. Ø)	Colour **chrome**
	Code
10-14	**4832**
12-16	**4832**

Thermostatic head for BETA and GAMMA valves

Type	Colour white/chrome
	Code
With liquid sensor	**8480931**

Accessories common to all radiators **(continued on page 20)**

A 1/1	1"G automatic air valve, chromed, Rh or Lh
A 4/1	1"G zinc plated and paint-coated plug, Rh or Lh
A 6/1	Adapter, Rh or Lh, G1" to G 3/8" - G 1/2" - G 3/4"
A 8/1	Valve plug, Rh or Lh, G1" to G 1/4" - G 1/8"
A 13	Touch-up spray (White RAL 9010) cc 400
A 26/1	Nipple wrench 1"G
A 30/1	Rubber plug (water diaphragm)
A 33/1	1"G special nipple for extruded radiators
A 40/2	Plastic wrench for plugs and adapters

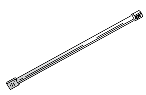

A 1/1


A 4/1

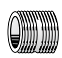

A 6/1

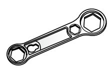

A 8/1


A 13


A 26/1


A 30/1

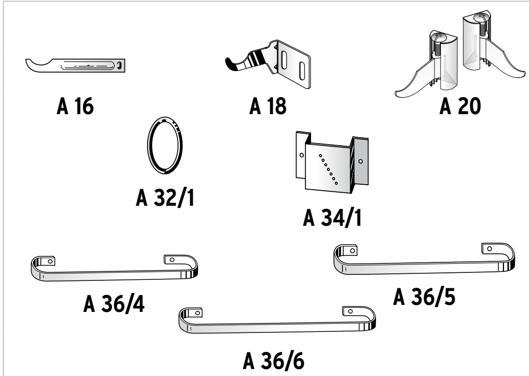

A 33/1


A 40/2

Special accessories for:

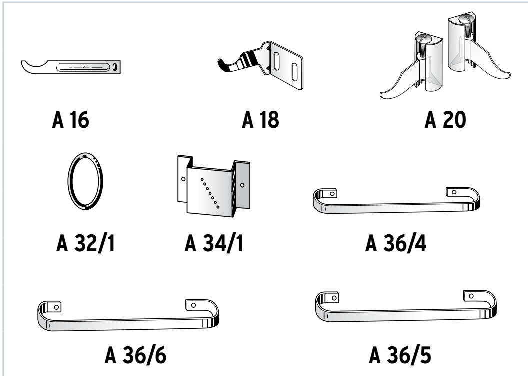
Maior S/90

A 16	Bracket to wall mm 175
A 18	Bracket to screw on to the wall, Rh or Lh
A 20	Installation kit with two adjustable, coated brackets
A 32/1	O-ring gasket for nipples, plugs and adapters for Maior radiators
A 34/1	Lower spacer support
A 36/4	Towel rack for Maior S/90 radiators, 4 sections, white 9010
A 36/5	Towel rack for Maior S/90 radiators, 5 sections, white 9010
A 36/6	Towel rack for Maior S/90 radiators, 6 sections, white 9010



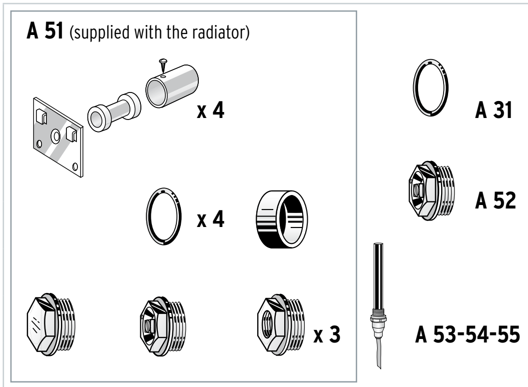
Maior Dual 80

A 16	Bracket to wall mm 175
A 18	Bracket to screw on to the wall, Rh or Lh
A 20	Installation kit with two adjustable, coated brackets
A 32/1	O-ring gasket for nipples, plugs and adapters for Maior radiators
A 34/1	Lower spacer support
A 36/4	Towel rack for Maior Dual 80 radiators, 4 sections, white 9010
A 36/5	Towel rack for Maior Dual 80 radiators, 5 sections, white 9010
A 36/6	Towel rack for Maior Dual 80 radiators, 6 sections, white 9010



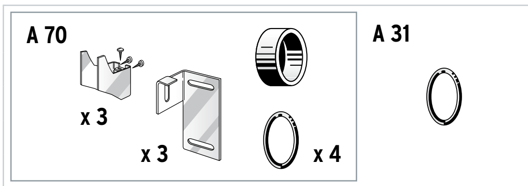
Horo R and Samoa Dual R towel rails

A 31	O-ring gasket for nipples, plugs and adapters
A 51	Blister pack of wall fixings containing: - 4 fixing units (see diagram) - adapters - seals - valve plug
A 52	1/2"G air valve, chromed (included in the supply)
A 53	350 W electric resistance for mixed version (models 8/450, 8/550)
A 54	500 W electric resistance for mixed version (models 12/450, 12/550, 15/450)
A 55	850 W electric resistance for mixed version (models 15/550, 19/450, 19/550)



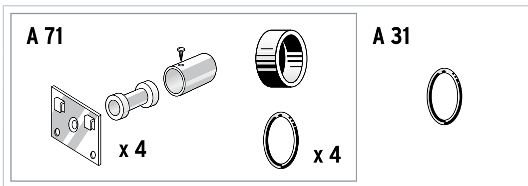
Horo R Decorative

A 31	O-ring gasket for nipples, plugs and adapters
A 70	Blister pack for wall fixings including: - 3 fixing units (see diagram) - 1 rubber plug (water diaphragm) - 4 special O-ring seals



Samoa Dual R Decorative

A 31	O-ring gasket for nipples, plugs and adapters
A 71	Blister pack for wall fixings including: - 4 fixing units, see diagram - 1 rubber plug (water diaphragm) - 4 special O-ring seals



RADIATOR SIZING and INSTALLATION

RADIATOR SIZING

To correctly determine the heat output of the radiators to be installed, you must comply with the rules in force.

To determine the number of sections required for each radiator, you must remember that their nominal heat output is associated with a ΔT (difference between the average water temperature and ambient temperature) of 50 K.

It is therefore advisable to ensure a ΔT of less than 50 K by decreasing the water outlet temperature (for example, a ΔT of 40 to 30 K). This will ensure energy savings as well as increase the degree of comfort.

The radiator heat output for different ΔT values is calculated using the formula:

$\Phi = K_m \times \Delta T^n$

For example: calculate the heat output of a Maior S/90, model 1800 radiator with water temperature: of 60°C at inlet, 44°C at outlet and ambient temperature at 20°C.

ΔT = [(inlet water temperature + outlet water temperature) / 2] - ambient temperature =

$[(60 + 44) / 2] - 20 = 32\ K$

$\Phi\ (32K) = K_m \times \Delta T^n = 1.4444 \times (32)^{1.3623} = 162.2\ W$

Heat output for different ΔT values can also be approximated by referring to the table of corrective coefficients calculated for an average value of n = 1.3: in this case the margin for error in determining the heat output is in the range of ± 4%.

Using the corrective coefficients, the required heat output is obtained by multiplying the power value at ΔT = 50 K by the coefficient of the required ΔT:

$\Phi\ (32\ K) = 298\ W \times 0.560 = 166.9\ W$

When determining the number of sections, remember that in the case of installations with water inlet and outlet at the base or installations with one-way or two-way valve, heat output may decrease by up to 10÷12% and 20% respectively, due to the particular water distribution in the radiators. If the radiator is installed under shelves, in niches or - worse - in the event of radiator covers, heat output may decrease by around 10-12 %.

RADIATOR INSTALLATION, USE AND MAINTENANCE

The heating systems must be designed, installed, operated and maintained according to the rules in force.

In particular, remember the following during installation:

- The radiators may be used with water and steam systems (max temperature of 120°C);
- The max operating pressure is 6 bar (600 kPa);
- The radiators must be installed according to the minimum permitted distances:
  - 12 cm above the floor
  - 2÷5 cm from the wall behind
  - 10 cm from any niches or shelves;
- If the wall at the back is not sufficiently insulated, fit any additional insulation to minimize dispersion of heat out through the wall;
- Each radiator must be fitted with a vent valve, preferably an automatic one (especially if the radiator has to be isolated from the system);
- The water must have a pH of 7 or 8 and must not have any properties that can corrode metal in general;
- As regards treating water in domestic heating systems, it is advisable to use specific products that are suitable for multi-metal plants, in order to optimize performance and safety, preserve these conditions over time, ensure regular operation of auxiliary equipment as well, and minimize energy consumption, in compliance with the applicable laws and standards.
  Compliance with this standard is a legal requirement.
  Use specific products suitable for multi-metal systems such as, for example, CILLIT HS 23 Combi, SENTINEL X 100 or FERNOX F1.

When using the radiator, remember:

- Never use abrasive products to clean the surfaces;
- Do not use humidifiers in porous materials such as terracotta;
- Avoid fully closing the valve and thereby isolating the radiator from the system;
- If the radiator requires excessive purging, this means there is a fault with the heating system. Contact a qualified technician or call the manufacturer's technical office directly.

Corrective coefficient values for ΔT other than 50 K calculated for n = 1.3

ΔT	0°C	1°C	2°C	3°C	4°C	5°C	6°C	7°C	8°C	9°C
30	0.515	0.537	0.560	0.583	0.606	0.629	0.652	0.676	0.700	0.724
40	0.748	0.773	0.797	0.822	0.847	0.872	0.897	0.923	0.948	0.974
50	1.000	1.026	1.052	1.079	1.105	1.132	1.159	1.186	1.213	1.240
60	1.267	1.267	1.323	1.350	1.378	1.406	1.435	1.463	1.491	1.520
70	1.549	1.578	1.606	1.636	1.665	1.649	1.723	1.753	1.783	1.812

Quality Marks

The quality certification guarantees that the heat output at ΔT 50 K was properly measured by private accredited laboratories in compliance with the rules in force, permitting quick and easy comparison with other products for transparent and loyal competition on the market.

The NF and N certification marks confirm the **NOVA FLORIDA** radiators' conformity to European regulations in force (UNI EN 442) and that the radiators were manufactured according to an ISO 9001:2008 certified quality management system.

The certification bodies inspect our premises on a regular basis and test samples of our products on the market to ensure the radiators always meet the required standards.

The truthfulness of the declared data is a guarantee for the user and designer, ensuring reliability and the correct thermal emissions of the heating system determined according to the effective needs of the end user without causing unnecessary waste or undersizing. Without reliable tested data the persons responsible for sizing run the risk of having their work compromised. Choosing products with NF or N certification is proof of professionalism.

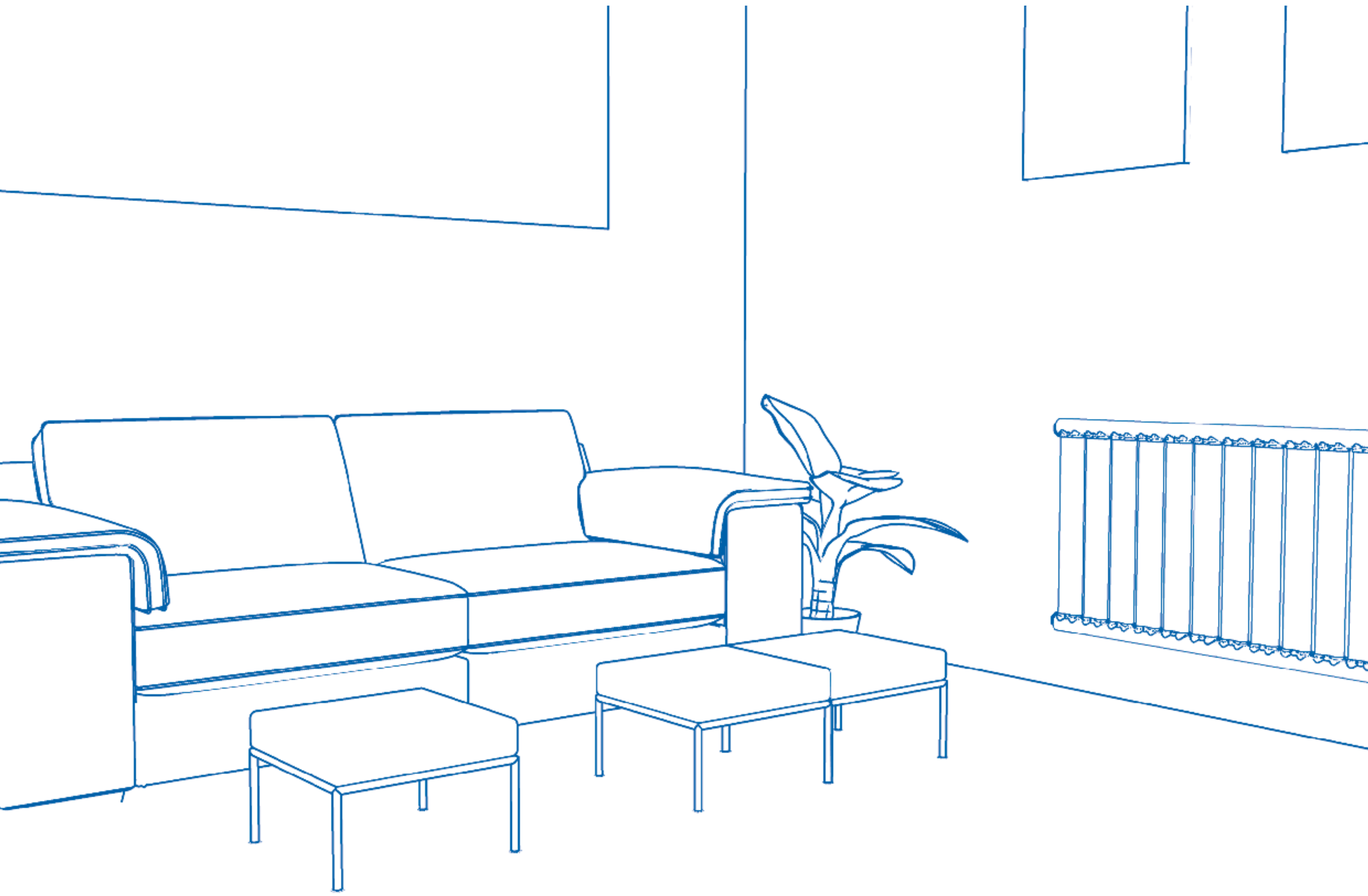
The CE mark applied to radiators as from 1/12/2004 and associated with European Directive 89/106 EEC is one that manufacturers apply of their own accord and is a form of product self-certification.

It confirms the product's compliance with community directives but, unlike voluntary quality certification, is not subject to inspections by independent bodies.

NOVA FLORIDA radiators bear the market's most prestigious quality marks: NF and N marks guarantee the outputs stated in the manufacturer's documentation.

Marks NF and N are issued by AFNOR and AENOR, recognised independent certifying bodies, and appear on each element and each package leaving our factories.

- **Climatic comfort**
- **Saving on heating plant costs**
- **Reduced installation costs**
- **Ideal coupling with condensing boilers and plants running on renewable energies**
- **Every room at the right temperature**
- **A simple but highly efficient heating plant**
- **The ideal temperature is obtained in a short time**
- **Space optimisation with under-window installation**



FROM TRADITIONAL TO LOW-TEMPERATURE HEATING SYSTEMS

In the early 1990s, in an attempt to increase efficiency and reduce energy consumption, western Europe started to change the temperatures used in heating systems. Design temperatures were lowered, to comply with the regulations and as a practical application, from an average water temperature of 80°C, (90°C flow and 70°C return) to 70°C (75°C flow and 65°C return).

- **Trends in heating system design**

The tendency to reduce water temperature in heating systems has continued as a result of the spread of low-temperature heat generation systems, with the introduction of condensation boilers, heat pumps and solar panels, all of which aim to save energy and reduce polluting emissions. The use of average heating water temperatures of 50°C or less is becoming increasingly common.
A vast amount of information is available on low-temperature water production systems, but limited and often misleading information is available on systems that emit heat under these conditions. It is a common conviction, for instance, that ordinary radiators are not suitable for low-temperature operation. This is not the case at all, as we will see later on.

The amount of heat required to keep a room warm depends solely on its constructional features, i.e. the degree of insulation from outside or adjacent rooms. This amount of heat is exactly the same, regardless of the emission system used.
The job of the emission system is to transmit to the room the amount of heat needed, as and when required. The only difference between one emission system and another is when and how the heat is supplied: the most suitable system is one that reduces wastage as far as possible and in which the environmental conditions are kept at the values set by the user.

Once the type of heat generation system has been chosen and the design temperatures have been established for optimal operation, the choice of the emission system must be supported by valid technical reasons that are documented in terms of overall efficiency, installation costs and running costs, in order to provide the buyer with adequate information to make a choice that comes up to his expectations.

Like other heat emission systems, radiators are the end point for emitting heat into the room; the heat is usually generated by a boiler and conveyed through pipes. The entire system is controlled by regulation devices such as ambient thermostats, thermostatic valves and temperature probes inside and outside the boiler.

That being stated and presuming that a low-temperature system has been adopted, using a condensation boiler for instance, let us see why and how a radiator system is perfectly compatible with this choice, and is actually one of the best applications possible.

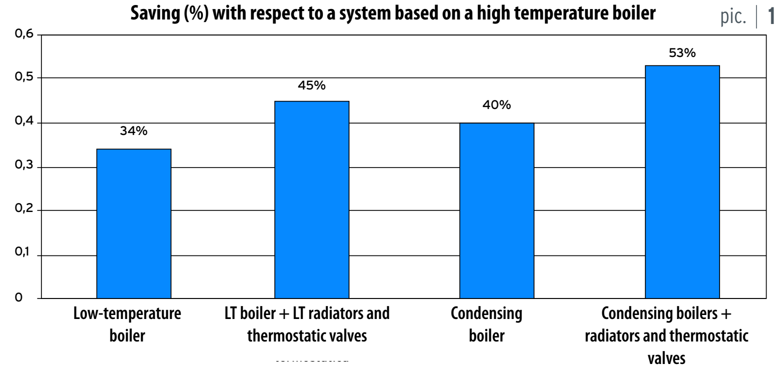
First we need to make a distinction between existing systems and new systems.
Virtually all existing systems use radiators and conversion to low-temperature operation requires them to be adapted. This involves increasing the size to make up for the drop in heat output due to the use of cooler water. In such cases it is advisable to check whether and to what extent the existing radiators are already oversized compared to the true requirements to prevent an excessive increase in size. Many existing radiators are the modular type, which are very easy to increase in size.

- **Installation with condensing boilers**

If the building is properly insulated, which allows a 55% tax deduction under the Budget Law, it will not even be necessary to increase the size of the radiators.

Condensation boilers can even be used without having to alter the size of the radiators. This can be done, for instance, by reducing the flow rate and allowing a higher thermal head inside the heating units, giving return temperatures low enough to

Saving (%) with respect to a system based on a high temperature boiler pic. | 1



guarantee condensation (below 50°C). It should be remembered that the return temperature is fundamental for condensation, whereas the flow temperature can be high. The use of modulating pumps in some cases may facilitate this type of application.

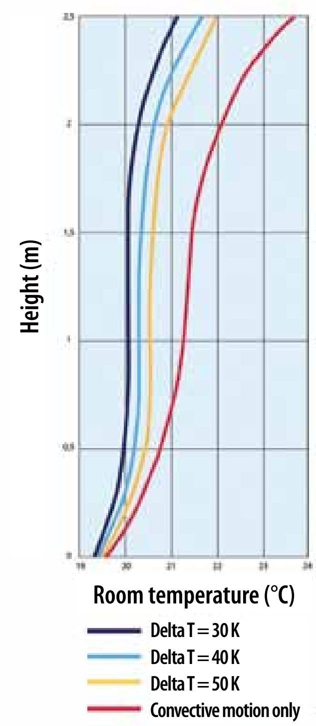
The chart in pic. 1 shows the advantages of switching from a low-temperature to a high-temperature system in a 135m^2 home built in 1970[1)]:
It can be seen that the use of low-temperature radiators with a condensation boiler and thermostatic valves gives a 53% saving in consumption compared to a high-temperature system using a traditional boiler.

- **Choosing a heating system**

In existing buildings the choice is restricted, but in new buildings it is – or should be – the designer who advises the occupant to help him choose from among the alternatives the market has to offer. There is no single system that always provides the best solution. Likewise, there are various reasons leading to the adoption of a particular system, including technical features, appearance or simply the latest fashion.

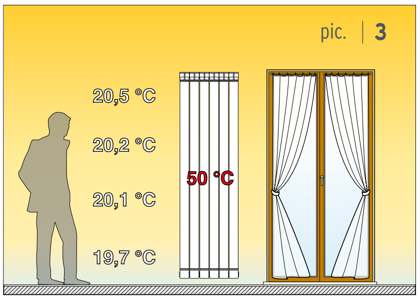
Now let us analyse the behaviour of low-temperature radiators, leaving aside the mistaken preconception that low temperature is a prerogative of a few systems only, such as under-floor heating systems, the best known example.

The aspects to analyze are the spatial distribution of temperatures in the heated room, comfort, running costs, installation costs, environmental impact and flexibility of use.



pic. | 2

When we talk about low temperature we refer to an average water temperature of around 50°C. With condensation boilers it can be higher as long as the return temperature is low enough to allow condensation. This means that the radiators operate at ΔT=40 K or ΔT=30 K, where ΔT is the difference between the average temperature of the radiator and the room temperature, which is normally taken as 20°C.
As the temperature of the water inside the radiators decreases, the temperature distribution in the room changes, with a net drop in stratification,



pic. | 3

the temperature gradient reduces and the temperature at occupant height is virtually constant.
Pic. 2 graph[2)] shows how the temperature in a heated room changes with different average water temperatures when the room temperature is set at 20°C. The graph also shows the temperature distribution for a convection system, which acts very differently from radiators, whose convective percentage is at most 70-75%, considering that heat emission by radiation is 25-30%.
In low-temperature radiators the thermal gradient is very limited, varying little from the typical distribution of other emission systems, in contrast with what is frequently reported. When the average water temperature is set from 70°C (ΔT=50 K) to 50°C (ΔT=30 K), the thermal gradient is reduced by 0.5°C. This means a reduction in the average temperature in a room with the same temperature perceived by the occupant, leading to a reduction in consumption. The temperature remains very close to the value required by the user. The slight increase in temperature in the upper part of the room will give a less than optimal situation but well below the loss suffered by under-floor heating systems due to downward dispersion.

To make the temperature in the room as even as possible, it is advisable to install radiators below the window. This saves about 5% and also intercepts the flows of cold air down from the window, which is impossible with other systems (pic. 3).
Reduced thermal gradient and low-temperature water lead to a reduction in convective motion; the movement of dust grains in the atmosphere is just the same as with under-floor systems, and no black marks form on the walls, the direct result of carbonisation of

dust coming into contact with high-temperature bodies. All this gives what is commonly known as “comfort”, which – we repeat – is not linked to the type of system used to transmit heat. When designed and used properly, various systems allow the same degree of comfort.

- **A rapid and flexible sollution**

As well as being able to function perfectly at low temperatures, radiators are much more flexible to use than other systems. In particular, radiators can be regulated, and switched on and off very quickly to adapt to climatic changes, including sudden changes in outdoor temperature, which are typical of spring and autumn, or linked to changing conditions during the day, when the amount of sun varies considerably, or to heat from internal sources such as household appliances, lights and cookers.
This phenomenon is referred to by the technical term “thermal inertia”. Low thermal inertia, with radiators for example, allows quick adaptation to heat demand, but without wasting fuel and avoiding unpleasant variations in the temperature of the room.
Imagine common situations such as switching on the oven in the kitchen, the heat of the sunlight entering the room or the simultaneous presence of several people in the room. If the heating system cannot adapt quickly to the changing conditions, the temperature will rise above the desired set value, the feeling of comfort will be lost and money will be wasted heating unnecessarily.

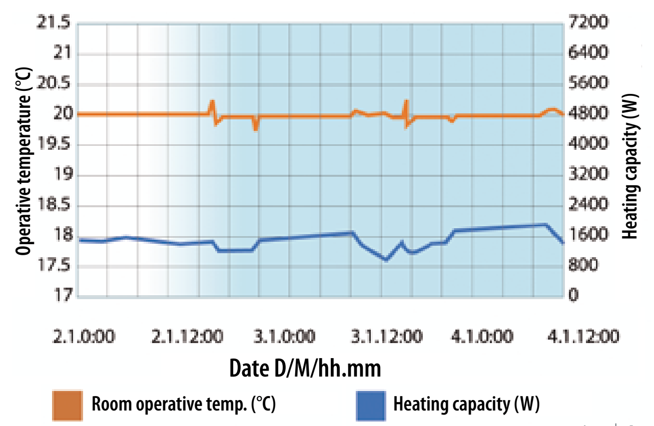
This situation will always be more critical in new homes, which, for legal or energy saving reasons, have a high degree of insulation and take much less to heat than before. It only takes a few hundred watts to heat an average size room, so the presence of free sources will have a significant effect on heat exchange economy. Switching on a light, or the simultaneous presence of two or three people will supply most of the need, so the heating system must be able to react immediately and reduce its contribution to what is strictly necessary. All this can only be guaranteed by systems with low thermal inertia, such as those using radiators.

Pic. 4 graph[3)] shows the radiator system’s ability to respond to changes in indoor and outdoor temperatures over three days in winter: the temperature in the room does not undergo any appreciable change.

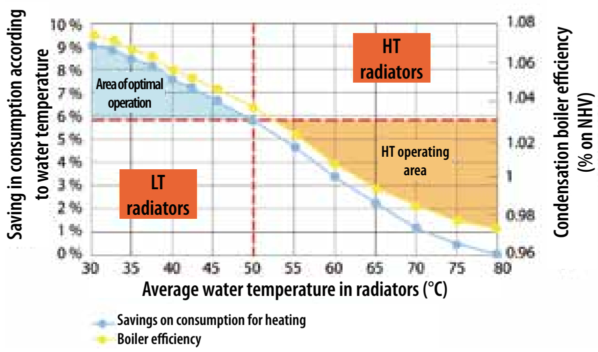
- **The economic factor**

Another aspect to be considered when using low thermal inertia systems is non-continuous use of the home. A building whose occupants are only present at certain times does not require a constant temperature round the clock. The result would be an increase in heating costs if the system does not react promptly to changes in the user’s requirements.
This is where the economic aspect comes into play, probably the most widespread misconception in the world of radiators. The conviction that radiators consume more than other systems is extremely common, arising from marketing data, backed up by vague and non-existent reasoning and often based on elaborate theoretical studies that are completed detached from applied practice.

The real situation is quite the opposite in fact.
Let us start from the assumption that the heating system must cover heat requirement, and the requirement is the same for any system as it is determined solely by the thermal insulation of the room to be heated.
The differences in consumption, which must be measured over an



pic. | 4



pic. | 5

entire season, can only originate from system's inadequacy in maintaining the user settings, its inability to exploit free heat contributions or drifts in the temperature settings.
It is evident that a low thermal inertia system adapts better to this; if such a system is operated at low temperature it can, as illustrated above, ensure temperature conditions very close to the set ones, which all helps reduce consumption. Studies conducted in Scandinavian countries, where high-inertia heating systems are common since they are theoretically more suitable for use in climates where the cold season lasts for a long time, show that fuel consumption in such systems is 15% higher than in systems using radiators.[4)]

The cost-to-benefit ratio can clearly not ignore the initial installation costs, which are much lower in radiator systems, the difference ranging from 20% to 40%, which is unjustifiable from a performance viewpoint.
Pic. 5 graph[5)] shows the main differences in terms of consumption between high-temperature and low-temperature radiators that use a condensation boiler.

- **Radiator sizing**

Correct sizing of radiators is of fundamental importance in a good heating system. Once the building's energy requirements, the design temperature, the installation layout and the type of radiator have been determined, it is extremely easy to calculate the size of radiator to install – it is merely a question of establishing which radiator provides the closest to the required output.
It must be remembered that heat output is measured accurately in accordance with European regulation EN 442-2, so there is no risk of misunderstandings or false statements, to the advantage of both designers and end users.

The dimensions of a radiator are therefore strictly linked with the energy requirement and the average water temperature. If the energy requirement is low, even very low temperature water temperature can be used and the radiators need not be overly large.

- **A few recommendations**

In radiator management, a few simple rules can lead to considerable saving in operating costs.
For example, installing thermostatic valves on radiators allows independent temperature regulation for each room, saving up to 15%. Whenever feasible, it is advisable to install the radiator below a window, the width being as similar as possible to that of the window span. It is also advisable to install a reflecting panel behind each radiator, keeping to the distances from the wall recommended by the manufacturer.
Connect the flow pipe at the top and the return pipe at the bottom. Low-low connections entail a slight reduction in output.

- **Normative references**

The stated heat output of radiators available on the market is determined by means of measurements made by approved independent test laboratories, in accordance with UNI EN 442-2, which specifies the laboratory instrumentation and test methods to be used, the admissible tolerances, and the criteria for selecting test specimens and verifying conformity of series production with the initially tested samples.

- **Conclusions**

Radiators are particularly suitable for low-temperature operation. A high standard of comfort and energy saving combine with flexible use, which other systems cannot offer, while keeping plant engineering costs reasonably low. Low-temperature operation exploits the features of the radiators, which are suitable for use with condensation boilers, heat pumps and all sources of renewable energy.

- **References**

1) Source: Pouget Consultant – CETIAT
2) Source: CETIAT
3) Source : Passiv Haus Institut
4) Peter Roots, Carl Eric Hagentoft Floor heating, heating demand Building Physics 2002
5) Source: CETIAT

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