

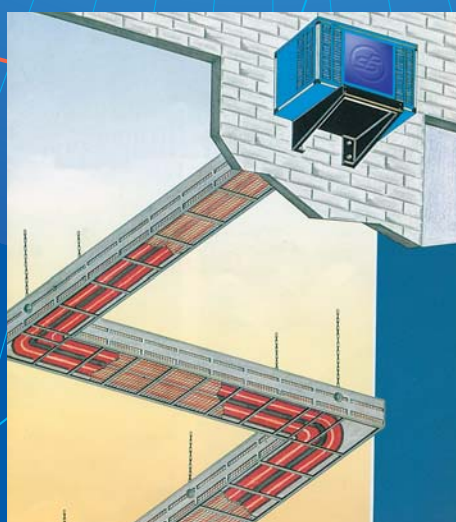
OHA

Radiant strips



CE

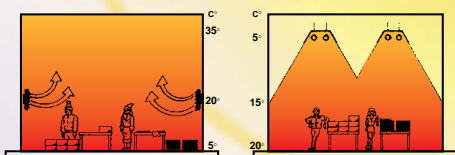
imitates nature



Radiant strips

THE ADVANTAGES OF HEATING BY RADIATION, JUST LIKE THE SUN

for INDUSTRIAL SHEDS, SHOPS AND GYMS



- Heat concentrated at floor level only
- No moving air in the room
- Fewer layers of air between floor and ceiling
- No suspended dust
- You can work at a comfortable temperature, breathing fresh air
- Healthier rooms
- Noise free



and that's not all

NO NEED TO BUILD A HEATING PLANT

LOWER THERMAL INERTIA IN THE WHOLE SYSTEM

INDIVIDUAL AREAS CAN BE HEATED AT DIFFERENT TEMPERATURES

MINIMUM MAINTENANCE

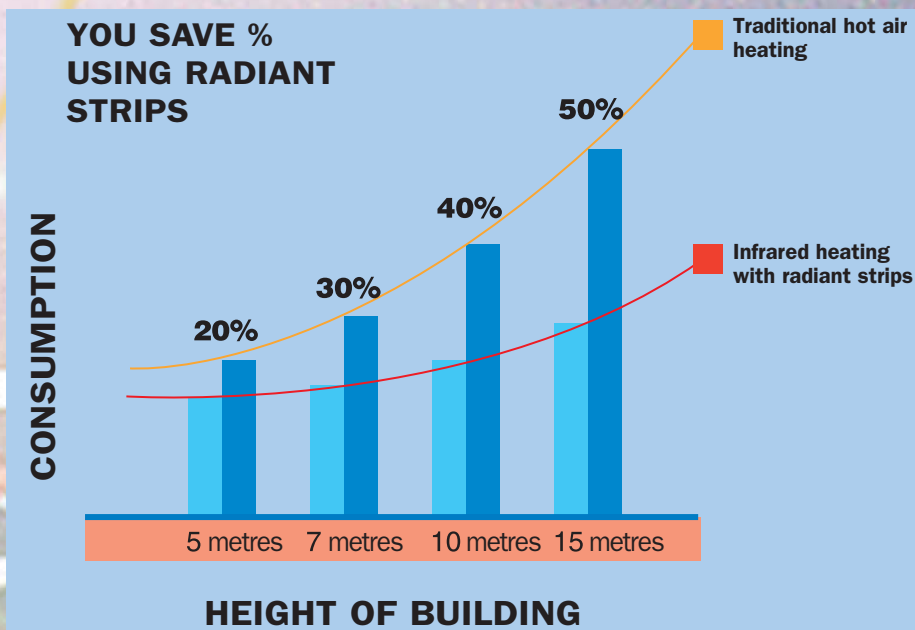
YOU CAN USE LIGHT OR HEAVY OIL

CUT DOWN ON FUEL CONSUMPTION

YOUR INVESTMENT PAID OFF IN 3 TO 5 YEARS



SYSTEMA



DESIGNING A CUSTOMER MADE CLIMATE

HOW TO SELECT THE RIGHT RADIANT STRIP

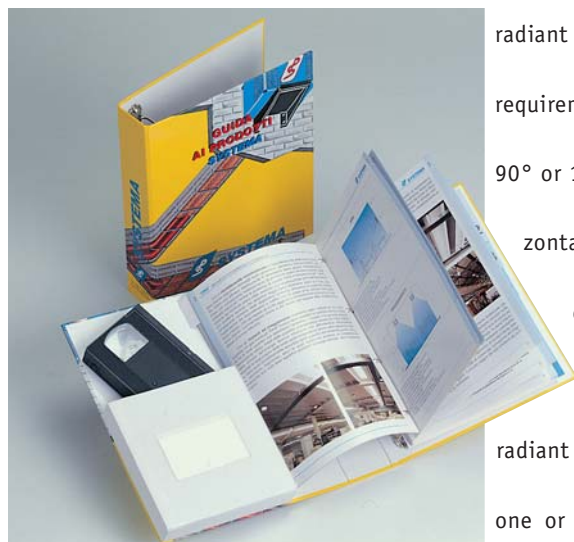
- The correct installation height for radiant strips depends mainly on the height of the room and on other factors such as bridge-cranes, lighting layout, shelving, pipes, electrical cables and so on.
- The intended position of the combustion unit is also important (inside, outside, wall-fitting or on the roof), as well as the fuel supply route to the burner.
- After defining installation height (H) for the strips, please look at the thermal



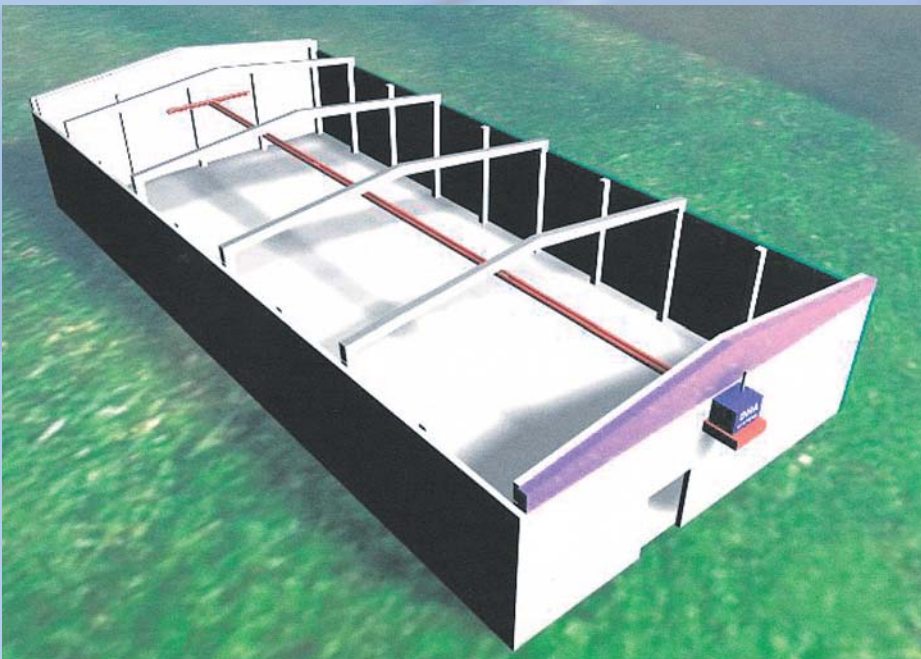
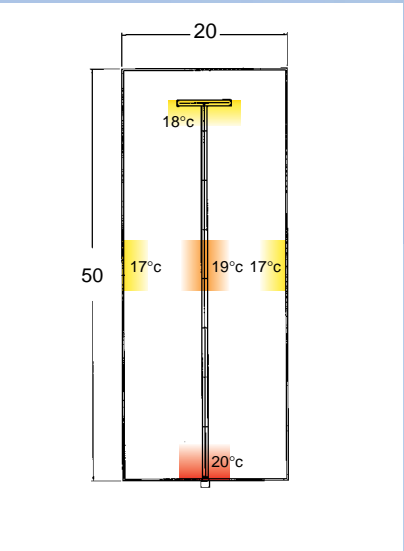
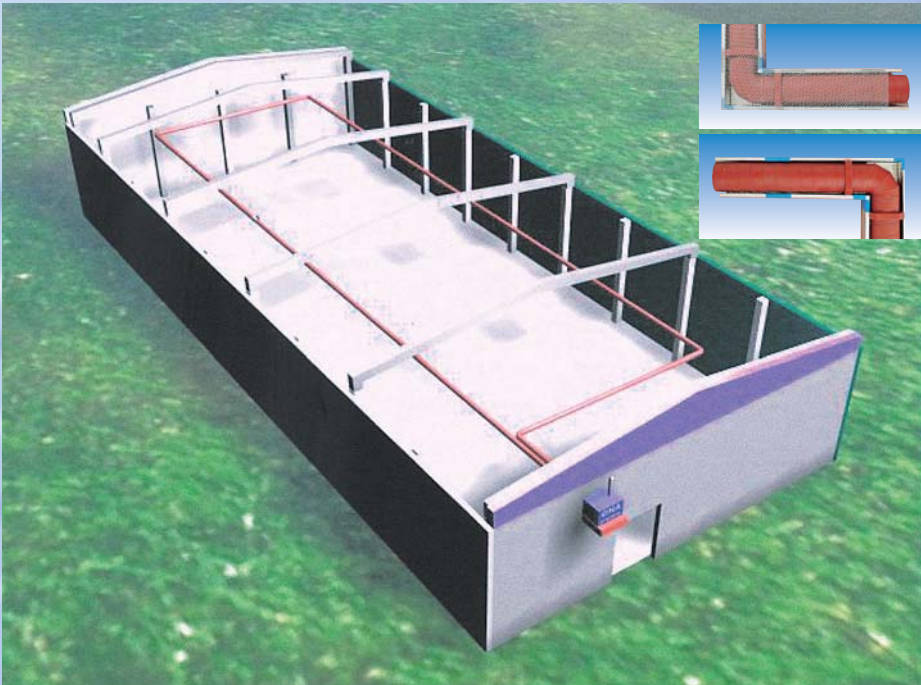
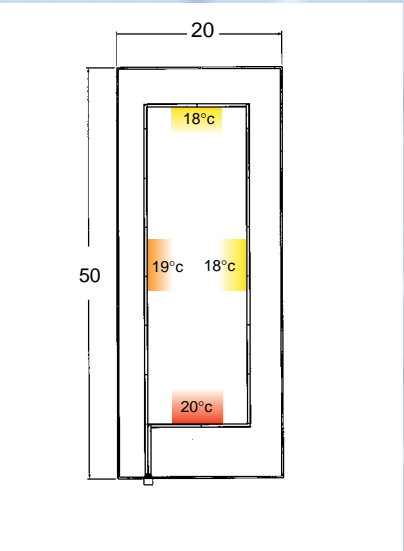
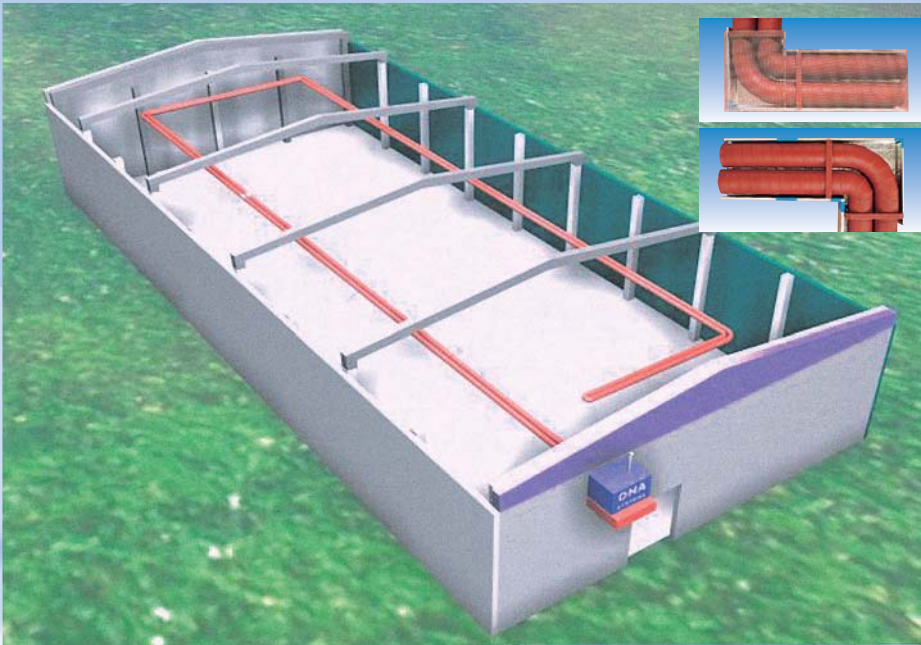
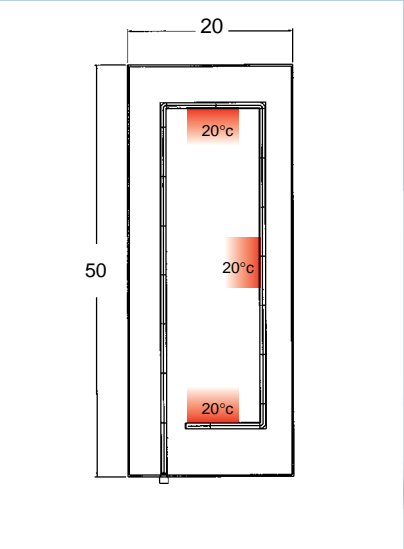
output tables (kW/metre) and establish its length, route, plus the thermal output (kW) for the combustion unit supplying the strips.

- The system's flexibility makes the radiant strips adaptable to any routing requirements inside the building, using 90° or 180° curves, as well as both horizontal and vertical "T" and "L" branches. Moreover, depending on heating requirements, the radiant strips can be configured along one or two tubes (Mod. U and Mod. M

respectively - see drawings). The route can reach a maximum length of 130 metres in the Mod. U (double tube) version, and 180 metres in the M version (single tube). In this respect, remember that every 90° or 180° curve equals an effective route length of 6 and 12 metres respectively.



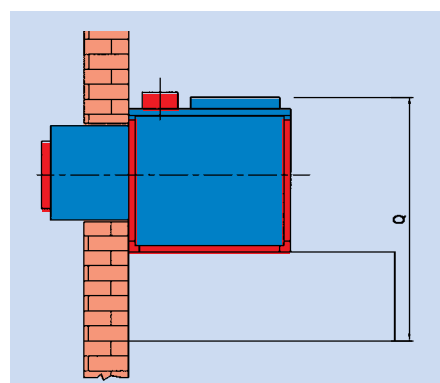
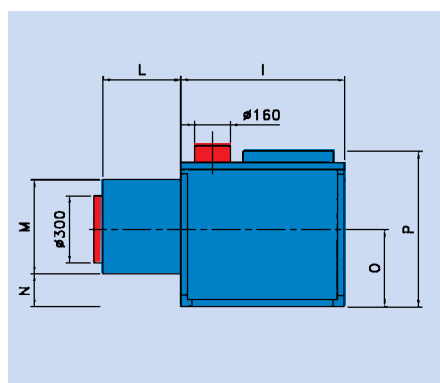
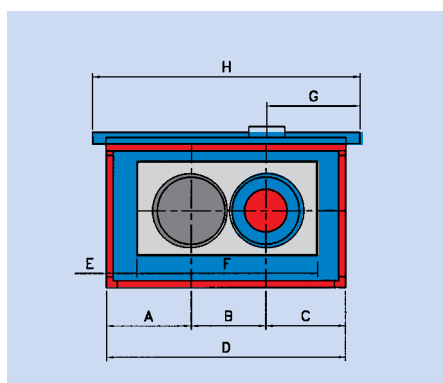
THREE TYPICAL
SOLUTIONS



WORKING PRINCIPLE

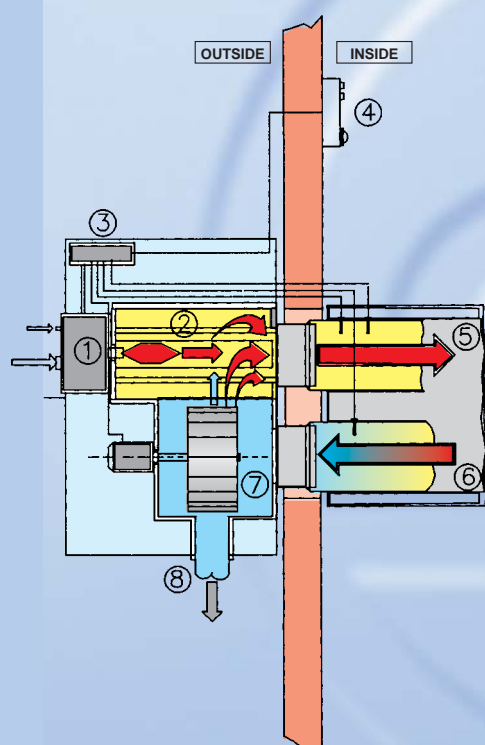
The combustion unit generates heat through a burner and by means of a fan continuously re-circulates carrying fluid. Inside a hermetically sealed radiant strip working in underpressure with respect to the heated area. The variable temperature carrying fluid consists of recycled burnt gasses which overheat as they reach the stainless steel combustion chamber where they mix up with new burnt gasses produced by the burner. Both of these stages occur outside the area being heated. A special pressurised manifold, located outside this area, eliminates through a chimney a part of the above burnt mixture at the burner input. The weight of this mixture is equal to the quantity of combustion air and gas.

The resulting heating up of the external surface of the radiant strips at a temperature range of 120° to 290°C according to requirements, causes emission of thermal energy. This energy, in the form of electromagnetic waves running along a straight line at the speed of light, reaches and heats both structures and people.



OVERALL SIZES

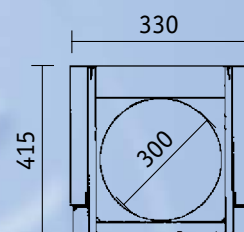
MODELS	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q
OHA 50/100	375	330	355	1060	150	775	414	1186	731	350	425	140	345	693	1093
OHA 150/200	375	330	355	1060	150	775	414	1186	731	350	425	140	345	693	1093



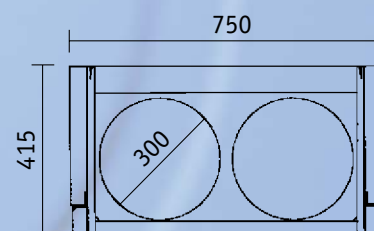
COMBUSTION UNIT

Generates heat through a burner and by means of a suction fan continuously recirculates a carrying fluid. Inside a hermetically sealed radiant strip.

- 1 - Burner
- 2 - Combustion chamber
- 3 - Electrical control panel
- 4 - Electrical control panel with globe temperature probe
- 5 - Carrying fluid inlet
- 6 - Return of carrying fluid
- 7 - Recirculation and exhaust fan
- 8 - Fumes from burnt products

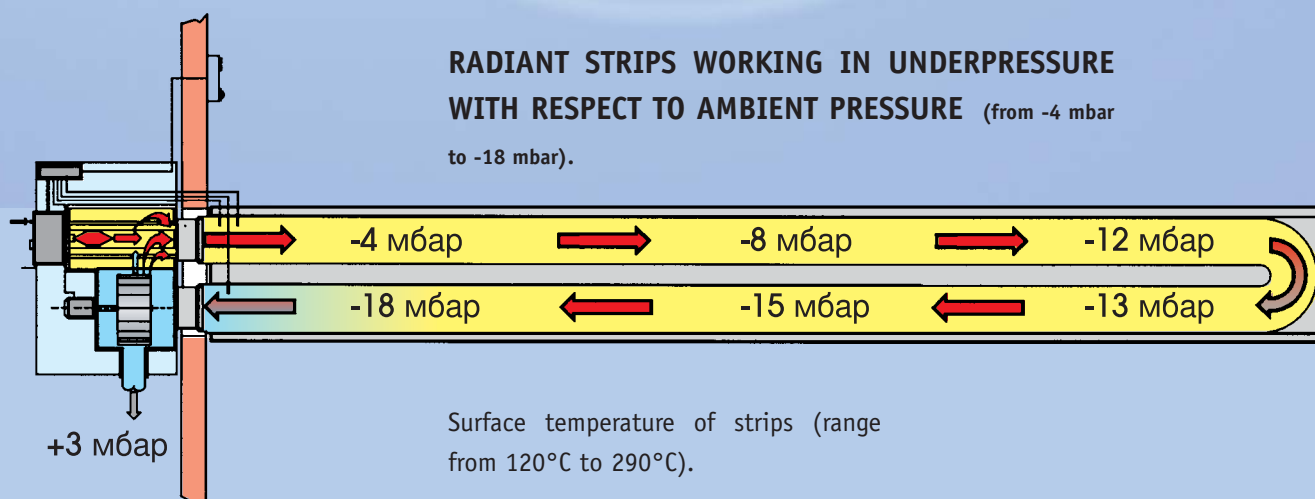


Mod. **M** radiant strip
Max length 180 m.



Mod. **U** radiant strip
Max length 130 m.

RADIANT STRIPS WORKING IN UNDERPRESSURE WITH RESPECT TO AMBIENT PRESSURE (from -4 mbar to -18 mbar).



Surface temperature of strips (range from 120°C to 290°C).

SYSTEM CONTROL AND MANAGEMENT

A electrical control system ensures, via suitable detection probes, the efficiency of the following processes: heat generation in the combustion unit, heat exchange and air tightness with respect to the inner ambient of the radiant strips, underpressure inside the entire radiant strip, and exhaust of burnt gases through the flue.

Globe-thermostat probes control environmental comfort, in terms of both air temperature and average radiation temperature. The probes - via the electrical control panel - control the operation of individual burners, modifying thermal capacity and controlling ignition and shut-down of the burners, according to external temperature and/or work time of personnel.

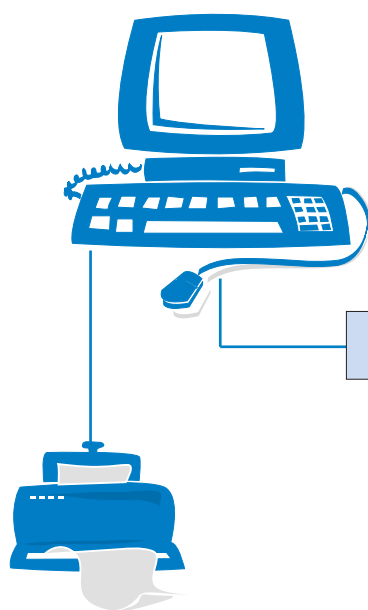


Globe-thermostat

CHARACTERISTICS OF SYS 1 COMPUTERISED PROCESSOR

- Command and control of two flame levels: ON/OFF and **Modulating by Derivative control**.
- Ambient temperature measuring **probe** with option to install 4 or 9 probes to optimise average **internal** measurement.
- **External** temperature measuring **probe**.
- **3 programmable temperature levels:** COMFORT, ECONOMY and ANTI-FROST.
- **4 programmable working programs:** Auto, Comfort, Economy and Anti-frost.

- **Daily and weekly programming** of comfort temperature.
- **Holiday program** to maintain anti-frost temperature.
- **"Optimising" Program** for pre-ignition of the system according to measured internal and external temperatures in order to obtain the required comfort temperature at a given time according to the needs.
- **Total accounting** of working hours at different flame level, based on minimum and maximum temperature peaks.
- **Limiting device of maximum surface temperature** of radiant strips.
- **Designed** for connection to a remote PC.



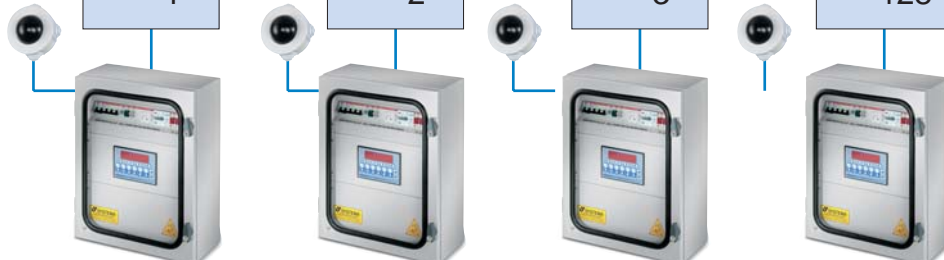
HLAN

H-BOX
= 1

H-BOX
= 2

H-BOX
= 3

H-BOX
= 128



RADIANT STRIPS
TECHNICAL CHARACTERISTICS OF "OHA" COMBUSTION UNITS
CE mark n° 0063 AS 4022 ACC. TO EEC STANDARDS 90/396

MODELS			OHA 50/100			OHA 150/200		
			1 ST STAGE	2 ND STAGE		1 ST STAGE	2 ND STAGE	
				MIN.	MAX.		MIN.	MAX.
RATED INPUT 2-stage flame		kW	85	108	151	113	162	215
		kcal/h	74.000	93.000	130.000	98.000	140.000	185.000
RATED THERMAL OUTPUT 2-stage flame		kW	77	100	141	102	148	200
		kcal/h	67.000	86.000	121.000	89.000	128.000	173.000
Average combustion EFFICIENCY		%	90	92	93	90	91	93
	Natural gas (H) - G20	Nmc/h	8,99	11,43	15,98	11,96	17,14	22,75
MAX. CONSUMPTION	Natural gas (L) - G25	Nmc/h	10,46	13,29	18,58	13,91	19,94	26,46
(15°C; 1013,25 mbar)	L.P.G. - Buthane - G30	kg/h	6,70	8,52	11,91	8,91	12,78	16,96
	L.P.G. - Propane - G31	kg/h	6,60	8,39	11,73	8,78	12,59	16,70
ELECTRICAL POWER SUPPLY		V / Hz	3-phase 380 + N / 50					
ELECTRICAL CONSUMPTION		A	4			11		
MAX CONSUMED ELECTRICAL POWER		kW	3			6		
GAS JOINT (male)		inches	1"			1"		
WEIGHT OF APPLIANCE		kg	210			235		
FUME EXHAUST TUBE (Ø 160 mm)		metres	6			9		
MAX LENGTH (with two 90° curves)								

RADIANT STRIPS Ø300 mm TO BE JOINED TO
"OHA" COMBUSTION UNITS

			OHA 50/100			OHA 150/200		
			1 ST STAGE	2 ND STAGE		1 ST STAGE	2 ND STAGE	
				MIN.	MAX.		MIN.	MAX.
RATED INPUT 2-stage flame	kW	85	108	151	113	162	215	
	kcal/h		74.000	93.000	130.000	98.000	140.000	185.000
RADIANT STRIPS Mod. U (2 tubes) Ø300 mm								
MAXIMUM TOTAL LENGTH (*)	MAX	metres	60	60	60	130	130	130
Average heat emission FACTOR (**)	MIN	kW/ml	1,42	1,80	2,52	0,94	1,35	1,79
MINIMUM TOTAL LENGTH (*)	MIN	metres	28	28	40	45	45	60
Average heat emission FACTOR (***)	MAX	kW/ml	3,04	3,86	3,78	2,51	3,60	3,58
WEIGHT per metre of Mod. U (2 tubes)		kg	21			21		
RADIANT STRIPS mod. M (1 tubes) Ø300 mm								
MAXIMUM TOTAL LENGTH (*)	MAX	metres	110	110	110	180	180	180
Average heat emission FACTOR (**)	MIN	kW/ml	0,77	0,98	1,37	0,63	0,90	1,19
MINIMUM TOTAL LENGTH (*)	MIN	metres	40	40	60	90	90	110
Average heat emission FACTOR (***)	MAX	kW/ml	2,13	2,70	2,52	1,26	1,80	1,95
WEIGHT per metre of Mod. M (1 tube)		kg		13			13	

(*) Every 90° e 180° curve is equal to an increase in effective route of 6 and 12 metres respectively.

(**) Rated thermal capacity divided by MAX length of radiant strips.

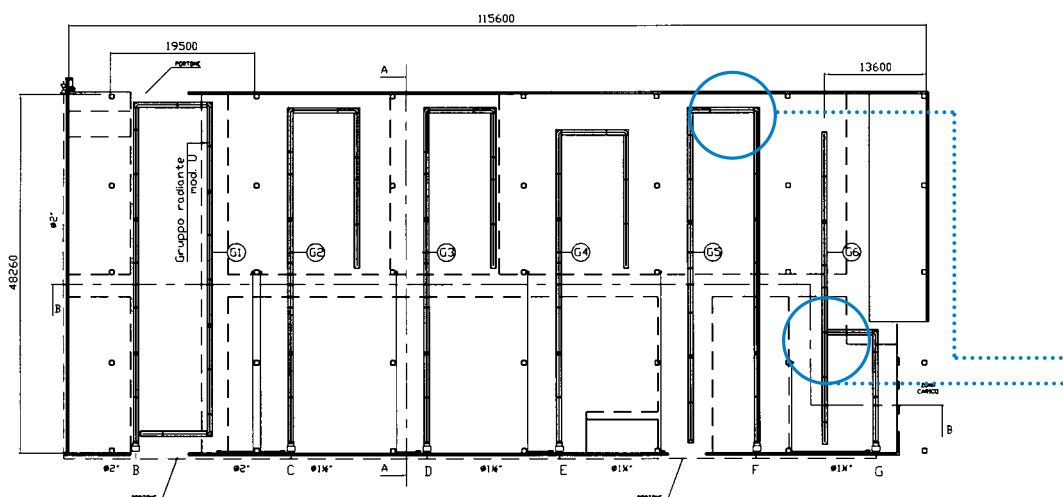
(***) Rated thermal capacity divided by MIN length of radiant strips.

CARRARO SpA

CARRARO SpA Group

Campodarsego (PD) - Italy

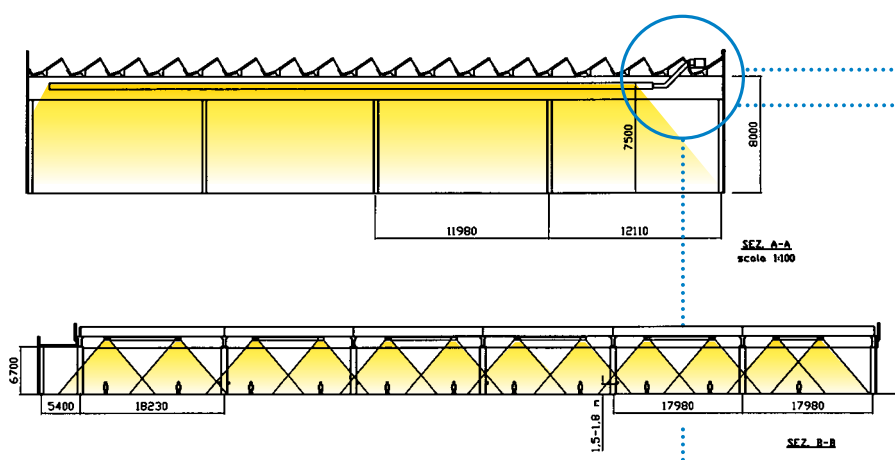
- Heated area: 5.500 m²
- Height of building: 8.5 m
- Installation height of radiant strips: 7.5 m
- Total length of Mod. U radiant strips: 490 m
- OHA 150/200 combustion units: six
- Total installed power 972 kW
(840,000 Kcal/h)



other plants of the CARRARO SpA Groups

AGRITALIA SpA (RO) - Italy

- Heated area: 20.000 m²
- Total length of Mod. U radiant strips: 1760 m
- OHA 150/200 combustion units: sixteen
- Total installed power 2590 kW
(2,230,000 Kcal/h)



CARRARO P.H.N. (GO) - Italy

- Total length of Mod. U radiant strips: 150 m
- OHA 50/100 combustion units: two
- Total installed power 200 kW
(172,000 Kcal/h)

D.P.F. (CH) - Italy

- Total length of mod. U radiant strips: 220 m
- OHA 150/200 combustion units: two
- Total installed power 300 kW
(258,000 Kcal/h)

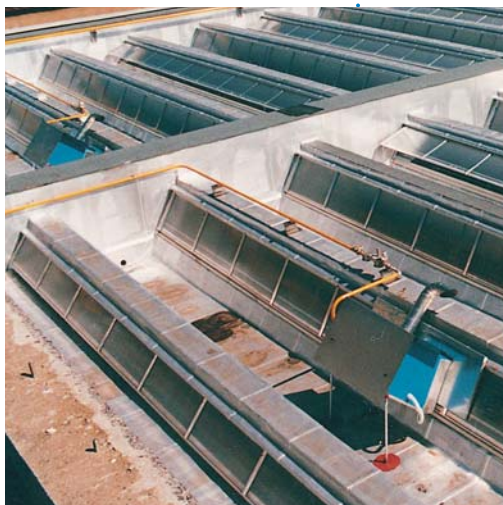
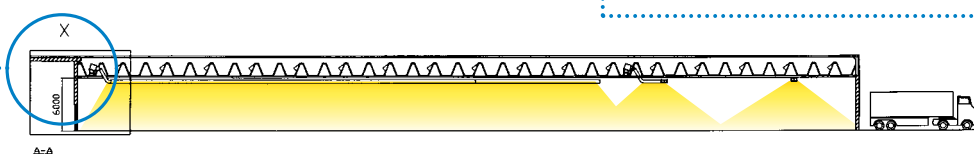
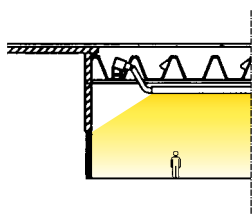
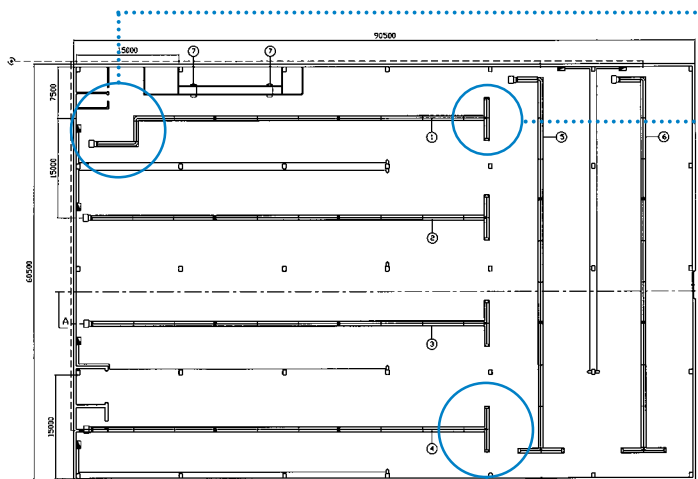




MICHELIN ITALIANA

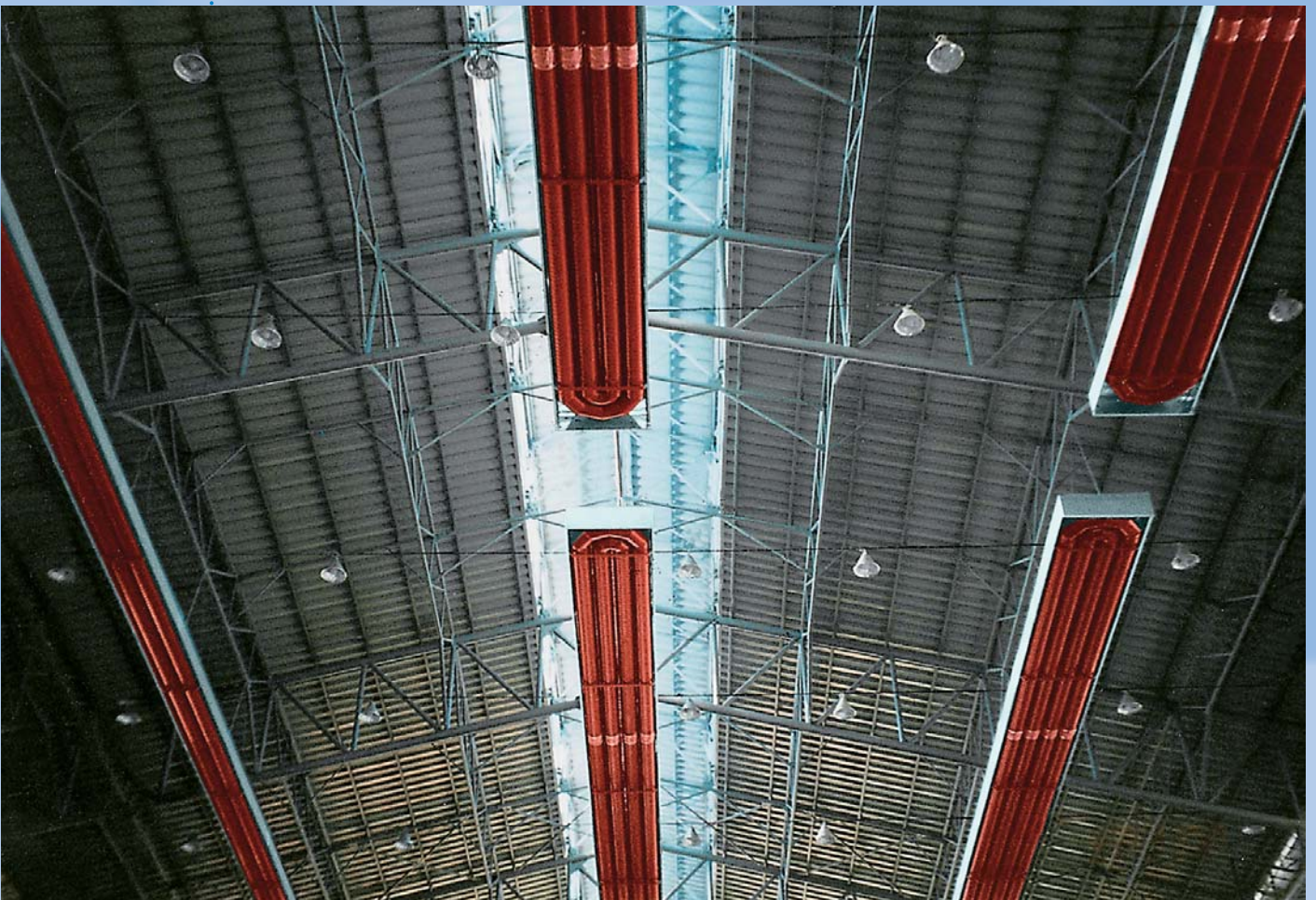
Fossano (CN) - Italy

- Heated area: 5.400 m²
- Height of building: 7.0 m
- Installation height of radiant strips: 6.0 m
- Total length of mod. U radiant strips: 380 m
- OHA 150/200 combustion units: six
- Total installed power 1290 kW
(1,100,000 Kcal/h)



HYUNDAI MOTOR COMPANY

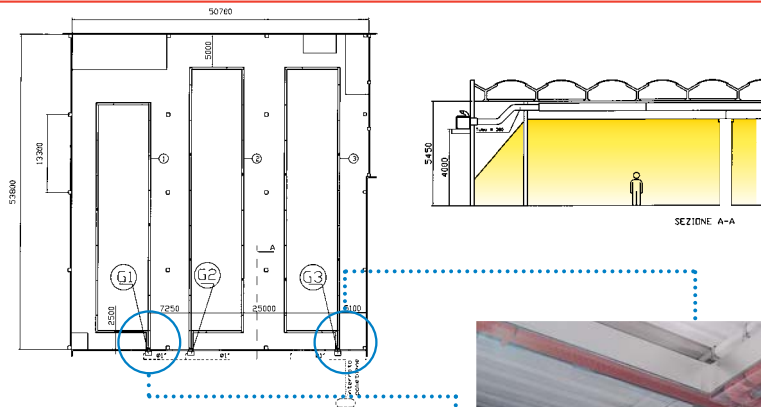
ULSAN - KOREA



ZOPPAS INDUSTRIES - IRCA

Divisione SEV (TV) - Italy

- Heated area: 2.700 m²
- Height of building: 5.5 m
- Installation height of radiant strips: 4.5 m
- Total length of mod. U radiant strips: 312 m
- OHA 150/200 combustion units: three
- Total installed power 453 kW (390,000 Kcal/h)



other plants of the ZOPPAS INDUSTRIES Groups

ZIR (ROMANIA)

- Heated area: 6.800 m²
- Total length of mod. U radiant strips: 552 m
- OHA 150/200 combustion units: six
- Total installed power 1290 kW (1,100,000 Kcal/h)



EXPAN

Resana (TV) - Italy

- Length of mod. U radiant strips: 110 m
- OHA 150/200 combustion units:



CIB UNIGAS

Campodarsego (PD) - Italy

- Total length of mod. U radiant strips: 300 m
- OHA 150/200 combustion units: three
- Total installed power 645 kW (554,000 Kcal/h)



MORETTO

Massanzago (PD) - Italy

- Total length of mod. M radiant strips: 260 m
- OHA 150/200 combustion units: two
- Total installed power 324 kW (280,000 Kcal/h)



REFERENCES

SOME REFERENCES FOR-INFRARED RADIANT STRIPS "OHA"

AGRITALIA S.P.A. ROVIGO	EUROCOIL S.P.A. VILLA FONTANA DI OPPEANO (VR)	I.D. EXPORT S.R.L. S. GIOVANNI AL NATISONE (UD)	MICHELIN ITALIANA S.P.A. FOSSANO (CN)	SERITECNICA S.R.L. GAMBALÒ (PV)
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ARZINI ERMANN & C. GHEDI (BS)	EUROGRAFICA S.R.L. PONTE CAFFARO (BS)	IL KWANG MACHINE INDUSTRY KWANGJU - KOREA	MORETTO P.A. S.R.L. MASSANZAGO (PD)	STIYL-COMP S.P.A. ZANICA (BG)
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CIMA S.R.L. TAVERNELLE DI ALTAVILLA (VI)	GRAS CALCE TREZZO D'ADDA (MI)	LUCCHESI STAMPI S.N.C. S. POLO DI PIAVE (TV)	S.A.M.I.S. SYSTEMS S.R.L. BIASSONO (MI)	
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SYSTEMA

imitates nature

- MANUFACTURER OF GAS-FIRED AIRTIGHT HEATING SYSTEMS
- RADIANT TUBES - RADIANT STRIPS - WARM AIR HEATERS
- GAS-FIRED CONVECTORS - INDUSTRIAL OVENS

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