

*the future of space conditioning*

## Modula 15

### heating panel



#### **Application**

Commercial, hospitals, hotels, schools, shops, sport halls, offices, laboratories, food industry etc.

#### **Installation**

Ceiling integrated  
Free hanging

#### **Capacity**

550W/m<sup>2</sup> at 55 dtK.

#### **Features**

Smooth finish.  
Technology proven over 50 years.  
Low construction depth.  
High capacity.  
Cost effective.  
Simple to install.

# Modula 15

## Heating Panel



### Description

Modula 15 is an unobtrusive modular heating cassette. The cassettes are manufactured from 1.0mm gauge smooth-faced steel panels and are designed to be integrated within a standard 24mm exposed grid ceiling system. Copper pipes are expanded under pressure into extruded aluminium pipe seats to give high metal-to-metal contact and the pipe seats are then securely fixed to the rear of the steel panels. Consequently, the arrangement delivers excellent heat transfer characteristics. Panels are insulated with 25mm thick class 'O' foil wrapped mineral wool insulation 45kg/m<sup>3</sup> density. The technology employed in the construction of the cassette results in very high heating capacity at low water mass flow rates.

Modula 15 has been specifically developed for use in schools and healthcare environments, where a smooth faced simple-to-install panel with high heating capacity is the preferred solution.

### Standard Features

- modular system to fit into 600mm exposed grid ceiling
- modular lengths; 0.6m, 1.2m, 1.8m, 2.4m, 3.0m
- panel depth 45mm
- smooth faced, unobtrusive design
- 550w/m<sup>2</sup> @ 55 dtK room (mwt - room temp)
- standard polyester finish RAL 9010 (20% gloss)

*water connections:* 15mm OD Copper, to EN12449

*weight:* less than 21kg/m<sup>2</sup>

### Connection Possibilities

*water:* vertical, same end for flow and return  
Alternative options available upon request.

### Maintenance

The unit has no moving parts, and therefore maintenance requirement is limited to periodic cleaning of the surface of the panel with a soapy sponge and drying with a cotton towel.

### Installation.

Standard fixing arrangement from the structural soffit using rigid or flexible wire hangers (supplied by others), suspended via pre punched keyhole slots.

For simplicity and flexibility we recommend that flexible stainless steel braided EPDM hoses are used to connect the Modula 15 panel.

# Function

With an output of **550w/m<sup>2</sup>** at 55 dtK. Modula 15 is one of the most efficient smooth-faced radiant heating panels currently available.

The secret to Modula 15's outstanding performance lies in it's unique method of expanding the water-carrying copper pipes within the heat radiating aluminium extrusions. The extrusions are then mechanically bonded to the aluminium panel face using a heat transfer adhesive. Due to the high metal-to-metal contact between the copper waterways and extrusions and the fact that the aluminium pipe seats are fully bonded to the panel face, the energy transport between the pipe and panel face is extremely efficient.

The manufacture of Modula is semi-automated in our purpose-built facility; consequently panels can be produced to very high tolerances. Furthermore, the processes employed and the standardised design means that the cost of Modula remains highly competitive.

Modula is so simple to install that it is most often fitted by the ceiling installer. Frenger can offer an installation service using our own engineers or on-site training to ensure that the installation is carried out to the very highest standard.



# Design

**Dimensions:** Modula is available in one width, as standard – 0.6m. The dimensions are reduced (minus 8mm on length and width) so that panels can be integrated within a traditional suspended ceiling using exposed T-bars (24mm wide) on a 600 x 600mm grid module. The depth of the Modula panel is just 45 mm.

**Lengths:** Modula is produced in module lengths of 0.6m, 1.2m, 1.8m, 2.4m and 3.0m.

**Water connection:** Modula is available with 15mm OD same end vertical water connections. Alternative options available upon request

**Surface finish:** Modula is polyester coated as standard in RAL 9010, gloss value 20%, emissivity 0.94.

**Insulation:** Modula is supplied with integrated 25mm thick 45kg/m<sup>3</sup> class 'O' foil wrapped mineral wool insulation within the panels returned flanges.



# Application

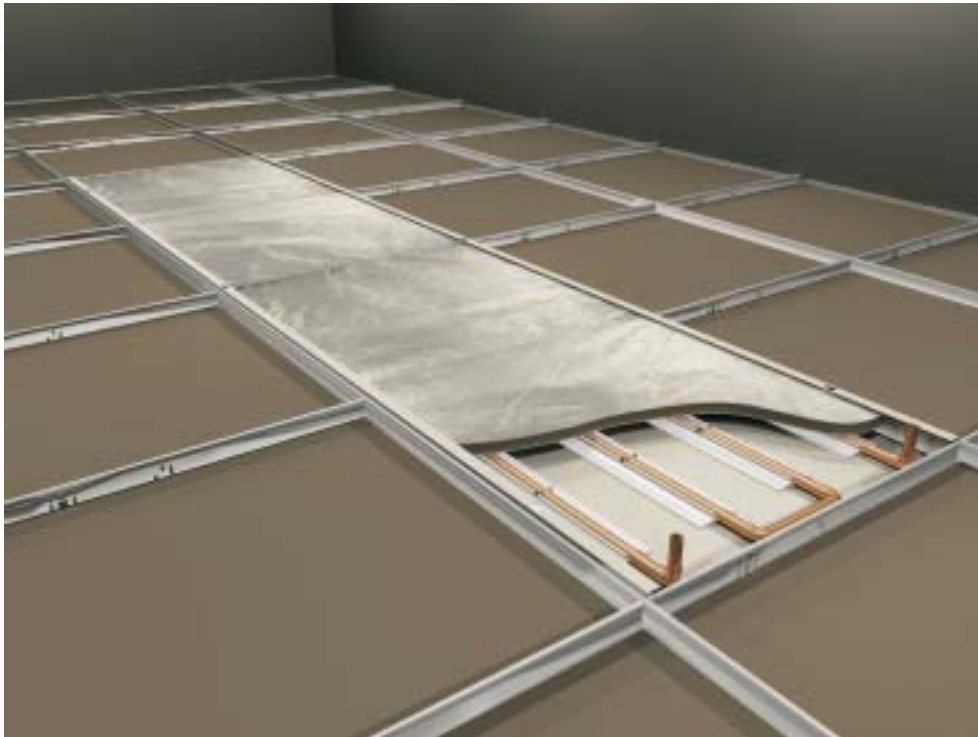
Modula is particularly suited for use in hospitals, schools, shops and offices; in fact wherever there is a need for a high-output radiant heating panel which is simple to install, easy to keep clean and comes at a very competitive price. Modula is the perfect solution for

# Installation

The Modula panels are designed to be fixed directly back to the structural soffit. Panels are supplied with pre-punched keyhole slot which are suitable for suspension using rigid or flexible wire hanging systems (by others). Four holes are required for each heating panel up to 2.4m long, each positioned no more than 1/4 panel length in from each end (e.g. maximum 0.3m from each end on a 1.2m panel). Panels 2.4m long or over require 6 No. fixings.

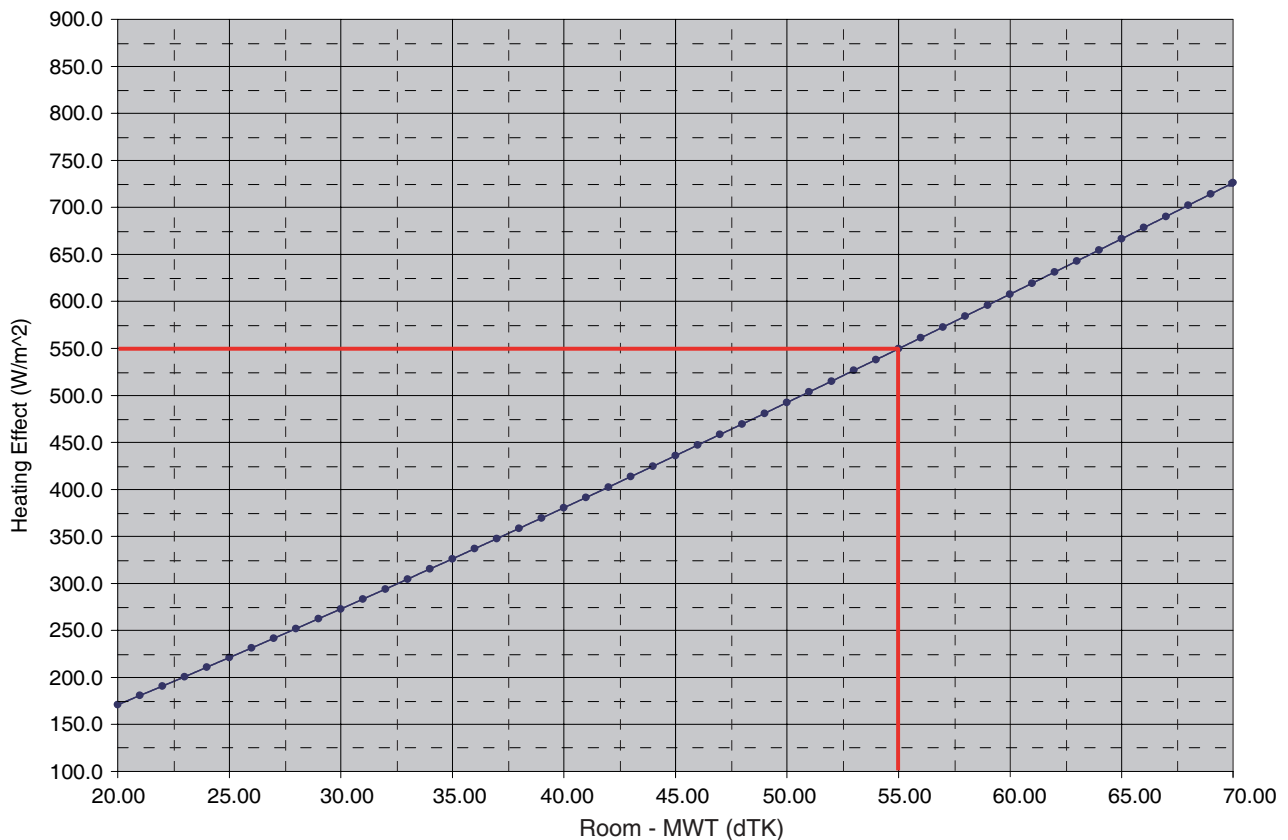
It should be remembered that the ceiling system “main runners” must be designed to run either side of the Modula panel and parallel to it’s long sides. Ceiling system “cross noggin” bayonets must be capable of being bent back so as not to clash with the Modula panel.

For simplicity and flexibility we recommend that flexible stainless steel braided EPDM hoses are used to connect the Modula panel.



# Heating Effect

Heating effect per panel (w)								
Mean water temperature - room temperature (°C)								
Width 0.3m								
Length (m)	48	50	52	54	56	58	60	62
0.6	85	89	93	97	101	105	109	114
1.2	169	177	185	194	202	210	219	227
1.8	254	266	278	291	303	316	328	341
2.4	338	354	371	387	404	421	438	454
3.0	423	443	464	484	505	526	547	568
Width 0.6m								
Length (m)	48	50	52	54	56	58	60	62
0.6	169	177	185	194	202	210	219	227
1.2	338	354	371	387	404	421	438	454
1.8	507	532	556	581	606	631	656	682
2.4	676	709	742	775	808	841	875	909
3.0	845	886	927	968	1010	1052	1094	1136



## Manifold Arrangement

Coupling Type	R
Manifold Type	10
Minimum flow rate (kg/sec) @ 76°C MWT	0.013
Maximum flow rate (kg/sec)	0.16*

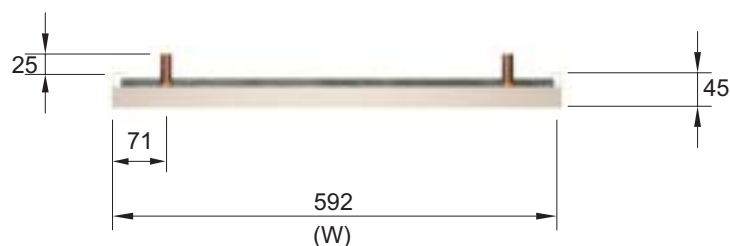
**Note**  
All flow and return connections for type '10' manifold with an R-Coupling are 15mm OD vertical.  
\*(1.5m/s) with  $\Delta P = 16.5\text{kPa}$  (3.0m long panel)

## Flow & Pressure Drop

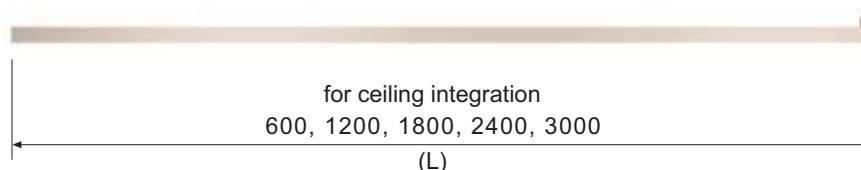
Pressure drop <5.0 kPa\*

\*Based on 3.0m panel with maximum flow rate of 0.08 kg/s

## Width & Depth mm



## Length mm



Modula is manufactured in standard module lengths (L) from 0.6m, up to 3.0m. Actual dimensions are less 8mm to fit into standard T-bars. All panels manufactured to a dimensional tolerance of +/- 1mm.

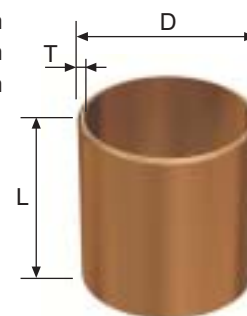
## Weight & Water Volume

Panel Weight (dry), kg/linear metre	12.8
Water content, litres/linear metre	0.71
Expansion at 55°C above ambient.	1.6 mm/m

## Copper Pipe Specification

The copper pipe used in the manufacture of the Modula heating panel is compatible with the European Standard for Copper Tubes EN12449 / BS EN1057. The dimensional specification are as follows;

Outside Diameter (D): 15 mm  
 Wall Thickness (T): 0.7mm  
 Minimum Straight Length (L): 35 mm



## Testing Protocols

Maximum working pressure	6.0 Bar (g)
Maximum test pressure	10.0 Bar (g)
Classification category	SEP
Pressure equipment directive 97/23/EC	

## Extrusion Specification

Section tolerances	BS 1474
Chemical properties	BS 1472
Heat treatment	BS 1490

# Thermal Insulation

Modula 15 panels are supplied with integrated 25mm thick 45kg/m<sup>3</sup> class 'O' foil wrapped mineral wool insulation within the panels returned flanges.



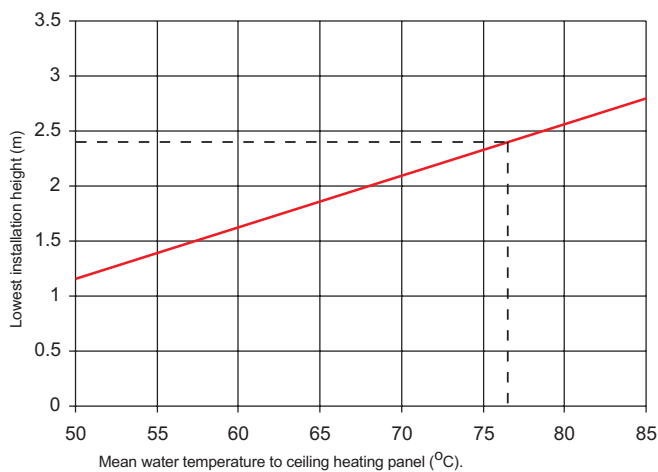
## Coupling Arrangement



Same end vertical connections

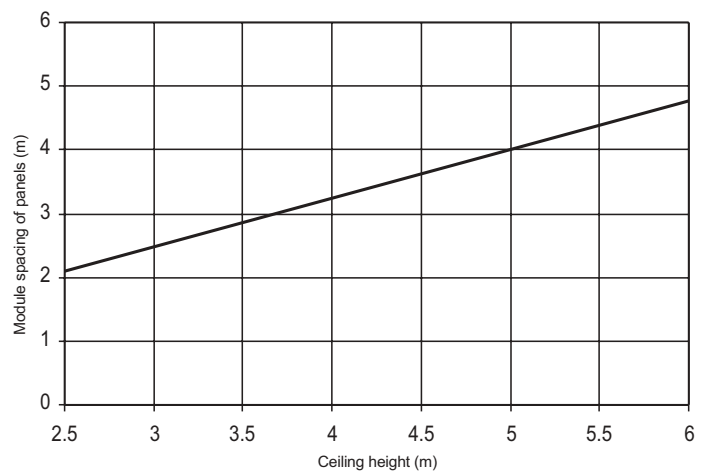
## Modula 15 Dimension Guidelines

Installation heights and temperature



Guide to lowest installation height for the ceiling heater with radiant temperature asymmetry of 5°C. Assumes panel installation adjacent to cold wall/window.

Panel Spacing



Recommended spacings between heating panels (centre-to-centre)

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