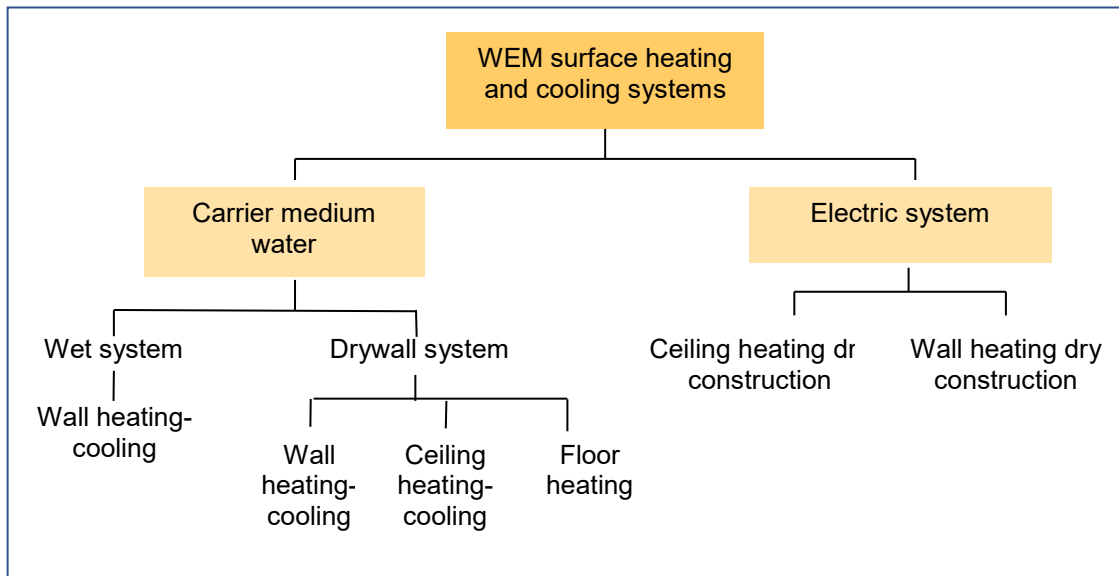


# Design

## Range of application

WEM panel heating and cooling systems are used in old and new buildings, both in timber and solid construction.

In buildings that require only a small amount of energy for heating and do not need a heating system, the electric WEM panel heating system is preferably installed as a drywall system for the walls or ceilings. In buildings with heating systems with a water-based system, WEM wall, ceiling or floor heating can be used. Depending on the requirements and area needed, they are used as a stand-alone system or in combination with each other. Both the WEM drywall system and the WEM wet system are used for wall or ceiling heating. The WEM floor heating system is a pure dry construction system with very low installation heights.



The water-bearing systems are suitable for all operating modes:

- Heating: Here they fulfil the requirements as a stand-alone heating system, but can also be installed in addition or in combination with other panel heating systems or conventional radiator systems.
- Heating and cooling as pre-cooling: Preferably ceiling or wall surfaces are used here. The heating/cooling surfaces are designed for the heating mode, based on a heat load calculation (DIN EN 12831).
- Heating and cooling as full cooling: Preferably ceiling surfaces are used here. The heating/cooling surfaces are designed for cooling, based on a cooling load calculation.

## Thermal protection

Thermal insulation must be complied with in accordance with the applicable regulations and appropriate insulation measures must be implemented. Increasing the thermal resistance through additional insulation measures helps to improve the efficiency of the surface heating and reduces transmission heat losses.

There are no thermal insulation requirements for interior components, e.g. interior walls, but uncontrolled heat emission should be avoided for interior walls to unheated rooms. Here too, it is advisable to increase the thermal resistance through insulation measures.

## Insulation of heat distribution pipes

In accordance with the Building Energy Act (GEG), the limitation of heat emission in heat distribution pipes is required for heating pipes, which must therefore always be observed. The following extract from the regulations applies to WEM panel heating systems:

Type of cables	Minimum thickness of the insulation (bei $\lambda=0,04$ W/mK)	Minimum insulation requirement
Pipes through unheated rooms and basements, pipes in external walls, external components, between an unheated and heated room, in shafts and ducts	26 mm	100 %
Cables in wall and ceiling openings, in the crossing area of cables, at cable connection points, at central cable distributors	13 mm	50 %
Pipes that are laid in components between heated rooms of different users	13 mm	50 %
Cables in the floor structure for footfall protection	4 mm	

## Fire safety

If fire protection requirements have to be met, this must be done through the entire component structure. These requirements are usually taken into account in the planning by the specialist planner and architect.

The WEM climate control elements and clay panels, filled with WEM clay plaster, are tested in accordance with DIN EN 13501-1 and assigned to fire behaviour class A2 (non-combustible).

### Sound insulation

If sound insulation requirements have to be met, this must be done through the entire component structure. The requirements are usually taken into account by specialist planners and architects during the planning stage.

The sound-insulating properties of WEM climate elements and clay panels were analysed as part of a collaboration with Koblenz University of Applied Sciences. The results can be found in the respective data sheets.

Information on the impact sound insulation of our flooring systems can be found in the corresponding data sheets for WEM Floor System 30 and WEM Floor System 40.

### Design, mass determination

The calculation of the required masses of the panel heating system to be installed is based on the standard heating load calculation in accordance with DIN EN 12831. The specifications from this calculation are used to design the system room by room and in accordance with the requirements for subsequent use.

If no heating load calculation in accordance with DIN EN 12831 is available, you can order one from WEM GmbH for a fee. Alternatively, we will be happy to prepare an estimate of the heating loads for your building project based on our many years of experience.

To prepare this calculation, please complete the 'Calculation questionnaire' on our website [www.wandheizung.de](http://www.wandheizung.de) under 'Service' and send it to us. Plans and other documents can be uploaded as files within the questionnaire.

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Bauvorhabent:	
Name:	Musterfamilie
Adresse:	Stadtzentral
Ort:	Musterstadt
Tel:	
eMail:	



Die angegebenen Heizleistungen gelten für die WEM Heizungssysteme in Verbindung mit den WEM Lehmputzen bzw. Kalkputzen und sind nicht auf andere Produkte übertragbar.

Wärmeverteilschicht aus 

Lehm
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Vorlauftemperatur 

45
----

 °C

Voraussetzungen: Altbau gut gedämmt.

#### Erdgeschoss

Pos.	Raum	Raumgröße in m²	Raumtemperatur in °C	Heizlast je m²	Heizlast in Watt	Trockenbau: Klimatelement Wand			Wandheizung Nasssystem: Klimaregister / Rohrsystem				Wand-Deckenheizfläche in m²	Heizleistung in W	Heizkreise	
						KE 200 in Stück	KE 160 in Stück	KE 80 in Stück	KR 200 in Stück	KR 160 in Stück	KR 80 in Stück	Zahnschienen in Stck				
1.1	Arbeiten	18,50	20	60	1110				2	3		1		5,5	1.100	1
1.2	Dusche	8,50	24	85	723				2	2		1		4,5	720	1
1.3	Wohnen	22,00	20	45	990				4			1		5,0	1.000	1
1.4	Küche Essen	23,00	20	55	1265				4	1	1	1		6,5	1.300	1
	Summe	72,0			4087,5				12	6	1	2		21,5	4120	4

#### Obergeschoss

Pos.	Raum	Raumgröße in m²	Raumtemperatur in °C	Heizlast je m²	Heizlast in Watt	Trockenbau: Klimatelement Wand			Wandheizung Nasssystem: Klimaregister / Rohrsystem				Wand-Deckenheizfläche in m²	Heizleistung in W	Heizkreise	
						KE 200 in Stück	KE 160 in Stück	KE 80 in Stück	KR 200 in Stück	KR 160 in Stück	KR 80 in Stück	Zahnschienen in Stck				
2.1	Kind 1	23,50	20	45	1058				3	1	1	1		5,3	1.050	1
2.2	Bad	6,50	24	75	488				1	2		1		3,3	520	1
2.3	Kind 2	22,00	20	40	880				2	2		1		4,5	900	1
2.4	Schlafzimmer	19,00	20	40	760				3			1		3,8	750	1
	Summe	71,0			3185				9	5	1	2		16,8	3220	4

#### Gesamt

Beheizte Wohnfläche in m²	Heizlast in Watt	KE 200 in Stück	KE 160 in Stück	KE 80 in Stück	KR 200 in Stück	KR 160 in Stück	KR 80 in Stück	Zahnschienen in Stck	Wand-Deckenheizfläche in m²	Heizleistung in W	Heizkreise
143,00	7272,50				21,00	11,00	2,00	4,00	38,25	7340	8,00

## Design temperatures

We recommend designing with maximum system temperatures of 45°C in the flow. Depending on the energy behaviour of the heat generator (heat pump), design temperatures of e.g. 35°C may be more appropriate for heat pumps.

For heating ceilings with a ceiling height lower than 2.7 m, flow temperatures of max. 35°C should be used.

## Positioning

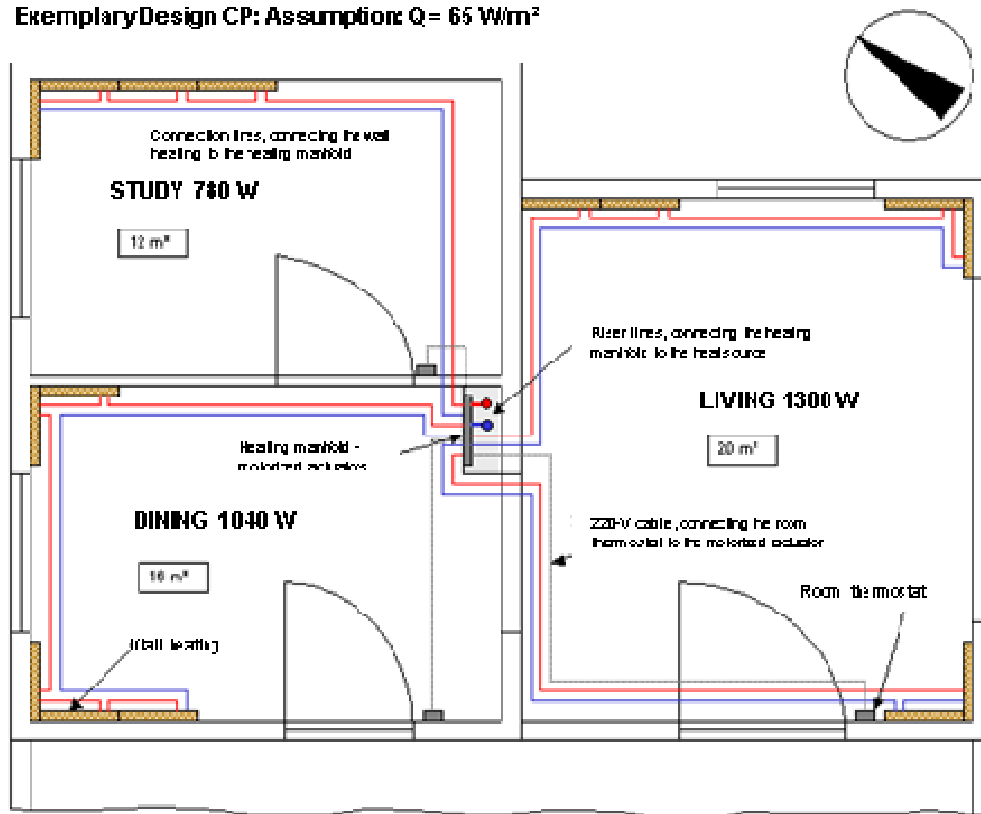
The positioning depends on the type of building, room utilisation and the selected surface heating and cooling system. With underfloor heating, 100 % of the surface area is usually covered. In older buildings, this is often not enough to heat the rooms sufficiently; in this case, the heating is supplemented with wall or ceiling heating. In internally insulated buildings, panel heating is preferably installed on the internal insulation.

In new buildings, the positioning of the wall or ceiling heating/cooling can usually be freely selected due to their insulation standard. If the focus is on cooling, ceiling installation is recommended.

When covering interior walls, comfort zones are primarily created, i.e. those zones in which, for example, seating areas, dining areas, desks or quiet zones are set up are equipped with WEM panel heating.

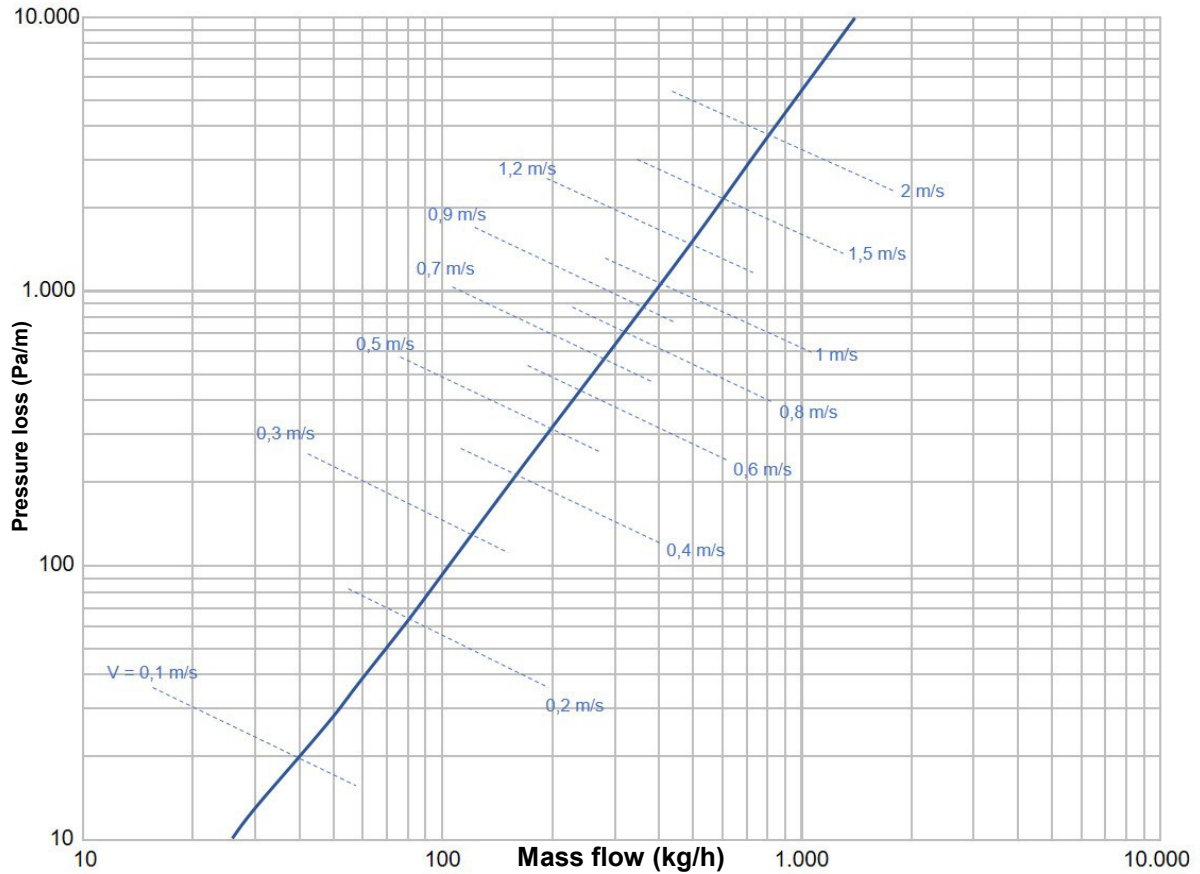
WEM GmbH supports planners and building owners and provides advice and suggestions on possible positioning.

Exemplary Design CP: Assumption:  $Q = 65 \text{ W/m}^2$



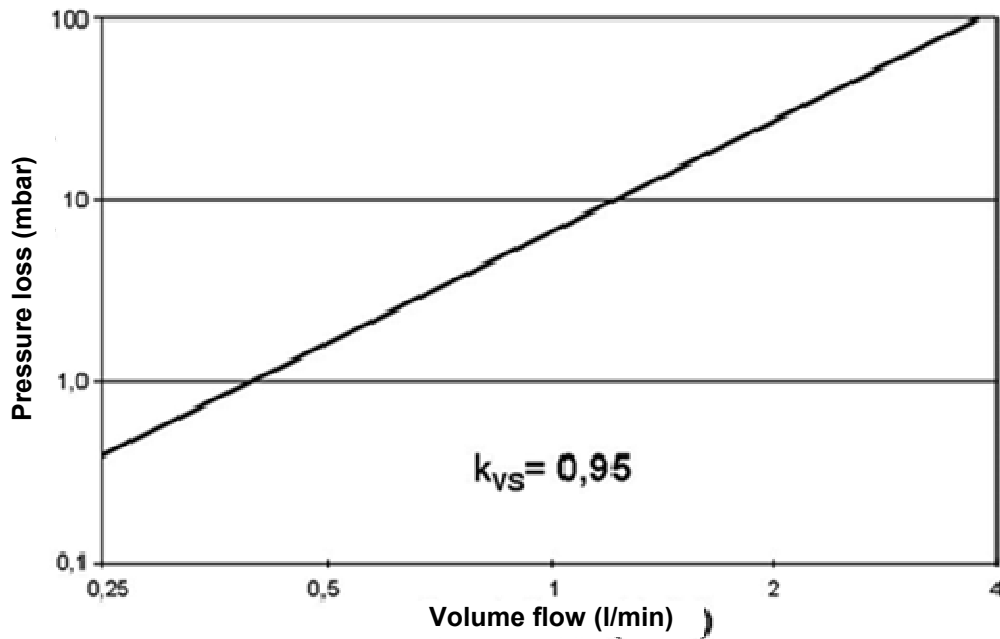
## Pressure loss

### Pressure loss WEM Multilayer composite pipe 16 x 2 mm



WEM Press-fit Fittings	Zeta-value $\zeta$	Equivalent pipe length
WEM Press-fit Coupler $\varnothing 16$ mm	3,1	1,5 m
WEM Press-fit Elbow $\varnothing 16$ mm	9	4,3 m
WEM Press-fit Junction R $\frac{1}{2}$ " AG, $\varnothing 16$ mm	3	1,5 m
WEM Press-fit Junction R $\frac{1}{2}$ " IG, $\varnothing 16$ mm	3	1,5 m
WEM Press-fit Screw Fitting (Euro cone), spigot nut R $\frac{3}{4}$ " IG, $\varnothing 16$ mm	3	1,5 m

**Pressure loss WEM Heating circuit manifold**



**Pressure loss Multibox K und K-RTL**

