

### Applications

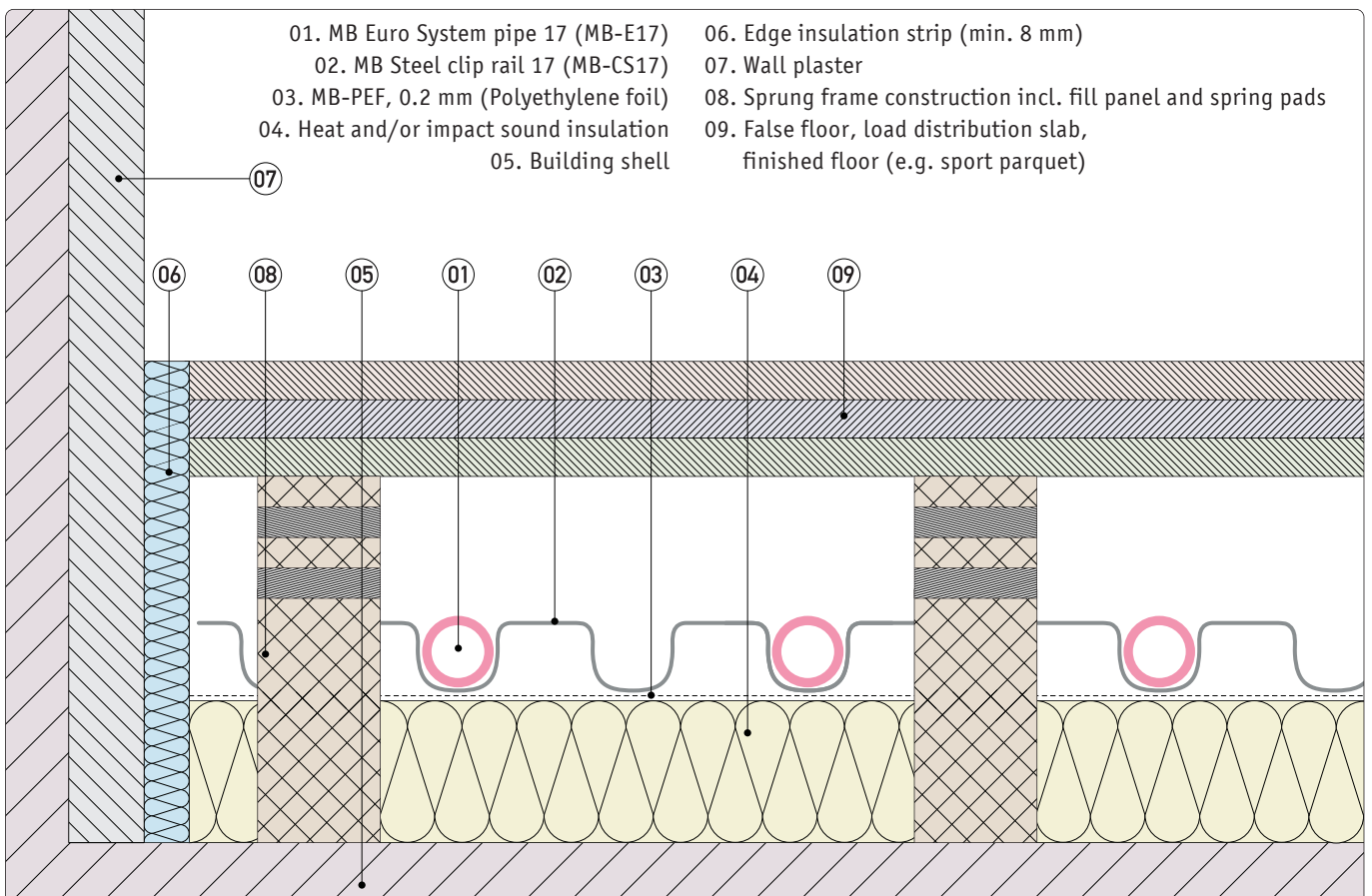
The MSB is a system for heating gymnasiums with an area-elastic sprung floor. A point-elastic sprung floor and a combination of both types can be implemented with the ESZ-65/60.

### General floor construction

MULTIBETON develops and produces energy-efficient heating and cooling systems for a vast variety of applications. Planning the floor construction includes the criteria for thermal and sound insulation along with structural requirements. Planning the floor construction must comply with the relevant laws, regulations, directives and standards. The MB Euro system pipes (MB-ER17) and the MB steel clip rail (MB-CS17) allow the planner to choose from two different sized and diffusion resistant heating and cooling components. The MB Euro system pipe (MB-ER17) is installed warm and therefore strainless and twist-free in the MB steel clip rail (MB-CS17).

### System installation

Installation follows the MULTIBETON plan. Then follow the MULTIBETON installation and technical guidelines. Planning and creating the MULTIBETON underfloor heating/cooling must further comply with the relevant laws, regulations, directives and standards. Additional instructions of manufacturers for other trades and the recognised rules of technology and proper trade workmanship must be observed.



The illustration and design are non-binding and only exemplary.

**Area-elastic sprung floor**

The area-elastic sprung floor consists of an approx. 10 cm thick void construction. Elastic pads are placed building's floor at a certain spacing. On these are filling blocks. Spring slats are nailed onto these rows of blocks. Over this is the false floor, which chipboard is later installed over (load distribution slab). Last, e.g. PVC or linoleum flooring is installed.

**Point-elastic sprung floor and hybrids**

Point-elastic rubber flooring with Trevira fabric and a PUR wear layer is often installed over screed. There are also combinations of point-elastic and area-elastic sports flooring. A typical screed system is usually installed. An optimal MULTIBETON underfloor heating system is selected in coordination with the manufacturer of the sports flooring.

**Heating screed**

When installing point-elastic sports flooring, the calcium sulphate flowing screed or cement screed must be heated according to the relevant standards. Ensure the top of the screed dries slowly to prevent warps during the curing process. This yields level sports flooring.

**Thermal and impact sound insulation**

The insulation requirements and insulation thickness must be specified by the planner in compliance with laws and standards.

**Edge insulation strip**

Edge insulation strips have the following important functions, among others: 1. Sound insulation, 2. Compensating expansion in the heated load distribution layer, 3. Insulation between cold building parts and the heated screed. Under the standard, the edge insulation strip must be secured to prevent shifting when the screed is laid. The edge insulation strip must have at least 5 mm to expand. The edge insulation strip is placed on the finished floor or, in the case of two-ply insulation, over the bottom insulation layer. Once the flooring has been laid, the protruding edge insulation strips are cut.

**State of construction**

Windows and exterior doors should be installed before installing MULTIBETON underfloor heating/cooling. Building service installations and wall plaster have been completed and pipe slits sealed.

**Joints**

When installing point-elastic sports flooring, remember floating screed has a typical contraction and expansion. Joints must be placed to allow for this expansion and contraction without damaging the screed. A joint plan showing the type and location of joints must be drawn. The joint plan is drawn by the building planner and must be submitted to the installer as part of the technical specifications. The manufacturer of the point-elastic sports flooring will seal the joints with polyurethane. Other manufacturers require a force-locked connection. The specific technology and implementation of the joints must therefore be coordinated with the manufacturer of the sports flooring beforehand.

**Load-bearing surface**

The load-bearing floor must be sufficiently dry to hold the load distribution layer and be even. The height reference point on the site which must be met must be checked to ensure the planned construction height is given throughout.

**Construction waterproofing**

Building parts in contact with the ground must be sealed in compliance with the standards. These are floors on the ground floor in buildings without basement, or basement floors. The need and form is determined by the structural design. This seal must be installed before the underfloor heating is installed.

**Levelling courses**

If the required flatness tolerances of the load-bearing floor are not met, it must be levelled with a levelling course. This requirement applies to all load-bearing floors in existing buildings and new constructions. The type of levelling course must be compatible with the planned underfloor heating system and room use.

**Flooring**

Attention: The top floor must be compatible with underfloor heating/cooling in terms of R and U values.

**Silent cooling**

MULTIBETON underfloor heating is ideal as "Silent cooling".

These systems are inexpensive, as they only require a cooling unit or a reversible heat pump with the corresponding control unit. The maximum output (30 - 50 W/m<sup>2</sup>) of "Silent cooling" comes from the dew point calculation, the calculated lowest cooling flow temperature and the user's comfort level.

The design of the cooling components, including the insulation of the heating circuit manifolds, must be carried out in proper trade workmanship.