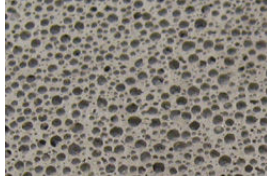


## LIGHTWEIGHT CONCRETE - GENERAL INFORMATION

Compared to “classical” procedures, substantial savings in incurred costs is an advantage on the side of lightweight concrete achieving mechanical and physical characteristics according to the purpose and place of use. The savings are achieved first of all by substantial reduction of the labour cost – lower number of workers and substantially shorter construction time.



**Foam concrete** – a lightweight concrete type – it has been known for more than thirty years in its principle. It is a building material with good mechanical strength, low thermal conductivity, simple but highly technological processing directly in the site. Foam concrete contains confined air pockets thus reducing its weight substantially and achieving savings in material inputs. As a building material, it meets all expectations to spread in a building practice first of all in the area of making floors of civic and industrial buildings. Variability of possible characteristics and a wet process in production offer a wide range of applications of foam concrete as a floor levelling layer and a filler of various dead spaces.



**Polystyrene concrete** — one of lightweight concrete types, like foam concrete, it has been known for a long period of time. Having the same density, its other physical characteristics (e.g. compression strength, thermal conductivity) are fully comparable to those of foam concrete. Taking the used raw materials into account, its processing is substantially worse compared to foam concrete – it is a thick pasty mixture in the fresh state. Gradient layers of roofs, possibly levelling layers of inclined roofs not exceeding 15° fitted with roofing material having trapeze or corrugated cross-section, are the main areas of its use.

## LIGHTWEIGHT CONCRETE - CHARACTERISTICS

<b>Composition:</b>	Binder:	cement water
	Filler:	technical foam in foam concrete, granulated polystyrene in polystyrene concrete
	Admixtures:	fine dust, flue ash
	Dosing of components is determined by respective SIRCONTEC Manufacturing Procedures	
<b>Properties:</b>	Compression strength:	from 0.45 MPa
	Density:	from 330 kg/m <sup>3</sup>
	Foam concrete:	liquid substance with processing similar to that of self-levelling screeds
	Polystyrene concrete:	thick pasty substance
	Fire rating:	non-flammable for foam concrete, hardly inflammable for polystyrene concrete
	Thermal conductivity:	from 0.085 W/mK
Other properties:	fully ecological product, resistant against acids, alkalis, moulds and animals	

### Advantages of foam concrete and polystyrene concrete:

- Reduces load of the structure
- Can be produced according to required weight and strength
- Liquid enough to fill cavities well
- Excellent workability enables making common finishes
- Excellent insulating protection against heat, frost and noise
- Exceptionally economical production - high productivity, low manipulation and delivery costs

## LIGHTWEIGHT CONCRETE - MAIN FIELDS OF APPLICATION

### Floor structures

**Foam concrete** is mainly designed for making filling and levelling layers of floors in civic and industrial buildings, while daily performance of as much as 1000 m<sup>2</sup> at material thickness of 3-15 cm can be achieved. This high labour productivity, together with optimizing thickness (levelling unevenness) of the bearing layer, bring substantial floor price reduction in comparison with floors made using common levelling materials. Due to self-levelling processing it is an ideal surface for further floor layers.

### Flat roofs

**Polystyrene concrete** is mainly designed for efficient construction of gradient and thermal insulating layers of flat roofs, especially for repairing existing roofs whereas the original layers usually need not be removed. Thermal-insulating properties of foam concrete, its low density, but also resistance against moulds and animals excel in roof structures. The use of polystyrene concrete as a gradient layer significantly reduces labour consumption in making inclination of flat roofs in comparison with other materials.

### Fillers in ground and transport structures

Due to wet production process and possible selection of required mechanical and physical properties, both lightweight concrete modifications can be used as fillers in various spaces – stabilization of vaults, abutment walls, pouring out dead spaces with complicated shape, pouring out outer walls of swimming pools etc. Foam concrete or polystyrene concrete perfectly fill entire space, lighten the structure, reliably transfer the load and function as a thermal insulating layer.

## SIRCONTEC LIGHTWEIGHT CONCRETE PRODUCT RANGE

### For floors:

Optimum PBG modification can be selected according to current conditions and requirements of the construction

PBG		35	40	45	50
Application temperature	°C	above +15	above +12	above +8	above +5
Walkability at 20°C	hours	max. 72	max. 56	max. 40	max. 24
Min./max. application thickness of PBG material	mm	45/400	40/400	35/400	30/400
Pumping head achieved by SIRCONTEC pumps	m	100			
Density after 28 days	kg/m <sup>3</sup>	330 - 380	380 - 430	430 - 480	480 - 530
Natural moisture content (% by weight)	%	8 - 12			
Compression strength after 28 days / 20°C	MPa	0,45	0,7	1,0	1,2
Thermal conductivity of the dry substance - λ	W/mK	from 0,085	from 0,09	from 0,10	from 0,11
Inflammability	class	A1- nonflammable			

Further information on SIRCONTEC PBG application see in DS 115.

### For roofs mainly:

PsB		40	50	60
Application temperature	°C	above +15	above +8	above +5
Walkability at 20°C	hours	max. 72	max. 36	max. 24
Min. / max. application thickness of PsB material	mm	60/1000	55/1000	50/1000
Ability to form gradient up to	%	2	5	10
Pumping head achieved by SIRCONTEC pumps	m	80		
Density after 28 days	kg/m <sup>3</sup>	380 - 450	450 - 550	550 - 650
Natural moisture content (% by weight)	%	8 - 12		
Compression strength after 28 days / 20°C	MPa	0,5	0,8	1,1
Thermal conductivity of the dry substance - λ	W/mK	from 0,10	from 0,12	from 0,14
Inflammability	class	B1 – hardly inflammable		

Further information on SIRCONTEC PsB application see in DS 125.

## PROPERTIES OF MATERIALS DESIGNED FOR FLOORS AND ROOFS – COMPARISON

Material	Designation (Type)	Compression strength (MPa)	Density (kg/m <sup>3</sup> )	Thermal conductivity (W/mK)	Step noise insulation index (dB)	Advantages	Disadvantages
SIRCONTEC foam concrete	PBG 50	0.8	~500	0.11	22	Self-levelling properties, wet process, highly technological processing (speed, quality), homogenous structure, price	Wet process, application only with special equipment
	PBG 35	0.45	~350	0.085	23	Self-levelling properties, wet process, highly technological processing (speed, quality), homogenous structure, price	Wet process, application only with special equipment, walkability after 24-72 hours
SIRCONTEC polystyrene concrete	PsB 50	0.8	~600	0.13	18 - 20	Wet process, application directly to the destination, homogenous structure	Wet process, application only with special equipment, instability of crushed material's properties
Other lightweight concrete	Perlite concrete	2.0 - 4.0	300 - 600	0.09 - 0.16	to 10	Relatively low density	Demanding transport to the site, difficult quality control, relatively low productivity
	Keramzite concrete	2.0 - 15.0	700 - 1700	0.28 - 1.3	to 10	Good compression strength	Demanding transport to the site, difficult quality control, relatively low productivity, price
Concrete screed	B 0	to 5.0	2200	1.2	N	Good compression strength, price	Demanding transport to the site, difficult quality control, relatively low productivity, price
Polystyrene board	EPS 80	to 0.2	min. 20	0.045	N	Low density, price	Work consuming upon placement, contact of flat surfaces, uneven base for next layer
Loose filler material	Keramzite	N	400	0.13	N	Low density	Work consuming upon placement, difficult application of next layer, price, demanding transport to the site
	Perlite	N	150	0,11	N	Low density	Work consuming upon placement, difficult application of next layer, price, demanding transport to the site

## MS 1000/m – MACHINE FOR PRODUCTION AND DELIVERY OF LIGHTWEIGHT CONCRETE

The machine is preferably made as a mobile one and is designed for operation directly in the site. Its design, proven in practice, is a guarantee of fault-free operation.

The MS 1000/m equipment can produce and deliver lightweight concrete based on technical foam – PBG 35-50 foam concrete and PsB 40-60 polystyrene concrete with density up to about 800 kg/m<sup>3</sup> in the fresh state.

The use of additives other than those recommended by the supplier is not assumed.

Machine description – see Data Sheet No. 011.1

### CHARACTERISTICS

#### Reliability

- A proven design providing a required service life and reliability—machines have been in fault-free operation for more than five years
- Use of components and parts by renowned manufacturers—service provided in EU
- Simple operation ensuring reduction of errors to minimum
- High safety of operation

#### Guarantee of stable quality of the produced foam concrete

- Unique (patented) equipment ensuring accurate dosing of components comparable to stationary concrete works
- Automated and reproducible mixing procedure – every batch is mixed in the same preset procedure ensuring stability of dosing of components and thus also stability of quality and parameters of the foam concrete

#### High level of mastering the technical foam production issues and our own foam concrete production recipes

- Our own unique recipes for foam concrete production
- Technical foam produced in MS 1000/m is produced in stable quality and its properties are adjusted to the purpose of use
- Foam concrete self-levelling properties are achieved

#### Economical Operation

- Minimum requirements for the number of operators
- Substantially increased labour productivity due to mastering the production technological procedure (i.e. input material in a silo connected to MS 1000 ensuring production while minimizing the number of operators)
- Foam concrete self-levelling properties reduce work load in the application
- Possible choice of a recipe according to required foam concrete properties (input material optimization)
- Incorporation of cheap recyclables into input material intended for foam concrete production
- Minimum energy requirements

#### Ecological Operation

- Use of fully harmless and ecological raw materials
- Processing of recyclables

### MS 1000/m Foam Concrete Centre

