Foam Concrete for Geotechnical Structures, Insulation and Strengthening Fillings

Modification: **PBG 20 - 30** / CEM I 42,5R, **PBG 35 - 60** / CEM II 32,5R **Data Sheet No. 145**

Product: Foam concrete of the PBG 20-55 series is a liquid cement mixture lightened by technical foam with self-levelling properties to level any unevenness. It is produced in automatic MS1000 equipment on the construction site or at a concrete plant in standard truck concrete mixers, which need to be thoroughly washed in advance together with the mixing core of the concrete plant.

Utilisation: Modifications PBG 20-55 are ideal materials for geotechnical applications: 1. Restoration of excavations, 2. Foundations of structures, 3. Support, strengthening and insulating fillings, 4. Injections and filling of rings, cavities and pipes, 5. Filling and backfilling of large spaces. In geologically challenging locations, it facilitates the establishment of house and road structures. PBG replaces loose, compacted layers, gravel, soil with low bearing capacity, cement-fly-ash suspension or backfilling with soil. PBG speeds up, cheapens geotechnical app implementations and minimises the risk of settling over time, preventing surface deformations. Selection of PBG modification according to the type of application and substrate temperature.

Substrate: Cavities, pipes, construction subsoils and spaces of any material or separation geotextile for reinforcement of foundations.

Composition: Cement, clean water, technical foam, admixtures, and additives according to SIRCONTEC recipes and instructions.

Properties: The self-levelling, easily pumpable material with the ability to achieve flatness of ±5mm/2m is a thermal insulation that perfectly fills the unevenness of the substrate/subsoil and strengthens it without the need for extraordinary effort or vibrations.
In addition to gentle reinforcement after setting, PBG forms solid and incompressible vapour-permeable non-flammable (class A1) cohesive structures with high dynamic stiffness at low self-weight and zero lateral loads on adjacent structures.
As a rule, no expansion joints are necessary.
During setting, uncontrollable shrinkage cracks may occur in PsB, depending on the type of application and the curing method, even beyond the expansion fields. These do not affect the functionality of the layer or filling and are not considered a defect.

Technical specification: PBG 20-30 / **CEM I 42,5R**, PBG 35-55 / **CEM II 32,5R**

Modification of foam concrete	**PBG**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**
Minimum substrate&ambient temperature during app *	°C	20	20	15	15	12	8	5	5
Availability by pumps - Horizontally / Vertically	**m**	**80 / 10**	**150 / 30**	**250 / 100**	**250 / 100**	**300 / 100**	**300 / 100**	**300 / 80**	**300 / 50**
Min. / Max. PBG application thickness (approximate)	mm	60 / 200	50 / 300	50 / 400	50 / 400	40 / 300	40 / 300	40 / 300	40 / 300
Walkability at 20°C	hod	-	< 72	< 72	< 72	< 56	< 48	< 24	< 24
Plastic density	**kg/m³**	**290 - 330**	**350 - 400**	**410 - 460**	**460 - 520**	**520 - 570**	**570 - 620**	**620 - 670**	**680 - 730**
Consistency of fresh mixture - spill test	cm	17 - 19	17- 19	18 - 20	18 - 20	18 - 20	18 - 20	18 - 20	18 - 20
Density after 28 days	kg/m³	200 - 230	240 - 280	280 - 330	330 - 380	380 - 430	430 - 480	480 - 530	560 - 610
Natural humidity	% hm.	8 - 17	8 - 17	8 - 16	8 - 16	8 - 15	8 - 15	8 - 15	8 - 15
Min. compressive strength after 28 days/20° - f_c *1	**MPa**	**0.27**	**0.38**	**0.65**	**0.45**	**0.70**	**1.00**	**1.10**	**1.25**
f_c after 3 days / 20°C - Minimally	MPa	0.13	0.18	0.30	0.22	0.35	0.5	0.55	0.65
Maximum λ of dry material	**W/mK**	**0.078**	**0.080**	**0.083**	**0.090**	**0.110**	**0.120**	**0.130**	**0.150**
Calculation value of the coef. of thermal conductivity λ	W/mK	0.156	0.160	0.166	0.180	0:220	0.240	0.200	0.220

* Minimum external temperature for PBG production, transport and pumping is **-5**°C and Max. processing time from its production is **120** min.
***1** Requirement for higher compressive strength must always be consulted before starting foam concrete production.

Quality control:
On the construction site, the density in the fresh state and the consistency by spilling are checked according to the SIRCONTEC Control Procedures. The density and compressive strength are measured on test bodies at 28 days during the proving test.
The most frequently used modifications of foam concrete - PBG 35-50 are certified building materials - Technical Assessment TSÚS SK TP-14/0118 issued on 06.10.2014. The complete Technical Assessment is available upon request.

Installation & Processing:

1. Substrate: The substrate should be moistened (sprinkled) without standing water. Very absorbent substrates should be separated with foil, non-cohesive substrates with Geotextiles, and silicate substrates should be penetrated or moistened sufficiently

2. PBG installation:
The fresh PBG mixture is transported to the installation site by a pump or poured onto it directly from the chute of the truck mixer. As in processing a self-levelling screed, a shaking rod and a screed board are used to level the PBG surface.
Observing PBG's permitted processing and setting time is necessary when processing larger thicknesses.

3. Maturing: The surface of PBG needs to be protected from premature evaporation of mixing water caused by direct sunlight, drafts and wind, similar to other cement mixtures. Outdoors, PBG is treated by sprinkling or fogging as long as the daily maximum temperature exceeds 25°C and the relative humidity is less than 55%. The curing contributes to achieving the desired properties and must be started from the moment of sufficient strength and continued for 2-5 days after installation. Covering the walking material with geotextile is advisable, which helps maintain surface moisture. After 3 days at 20°C, the surface can be loaded with light construction mechanisation. PBG is not intended as a top layer of the composition.

4. Construction site features for PBG application when using MS 1000 or Truck mixers:

Electrical connection - MS1000:	400 V/50 Hz, the breaker according to MS1000 configuration - min. 25A-B or 32A-C
Drinking water source - MS1000:	min. 3/4" yielding min. 2 l/sec
Access:	the road must be passable at least for a light truck (MS1000) or a truck mixer with a weight of up to 25t, and a place for a pump with dimensions of about 4×2m must be available

Cleaning: Tools are cleaned with clean water. Dirty surfaces can be cleaned by wiping off the fresh mixture or removing the hardened mixture mechanically. Residues are disposed of as usual cement waste by recycling or landfilling.

Safety and hygiene:
In its fresh state, it reacts alkaline. When working, it is necessary to protect the eyes and skin. Immediately rinse the affected area with clean water. When complications occur, seek medical help immediately. Keep out of reach of children when it is fresh. After maturity, the mixture is hygienically harmless.

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