



Gulf Perlite^{LLC}

PERLITE CONCRETE FLOOR FILLS

HIGH STRENGTH, DURABLE, LIGHTWEIGHT, INSULATING SCREED
READY IN FOUR DAYS TO APPLY ANY FINAL FLOORING

What is Perlite?








Perlite is a 100% natural siliceous volcanic glass mineral, which traps crystalline water into its mass. Perlite expands when rapidly heated in Gulf Perlite LLC's factory, in temperatures of 800°C–1,000°C. The abrupt, controlled rise of temperature forms a white mass of minuscule glass bubbles. Perlite melts and expands in an extremely porous surface and increasing its volume thirteen times. Gulf Perlite Construct lightweight aggregate has superior thermal and acoustic insulation properties, extreme lightness and it is non-combustible.

Gulf Perlite Construct Properties

Color: Pure white
Specific Gravity: 80-100 kg/m ³
pH (of water slurry, 20°C): 6.5 - 7.5
Moisture: 0.3%
Softening point: 850 –1,100°C
Melting Range: 1,260 –1,343°C
Thermal Conductivity: 0.032 W/mK
Non – flammable (class A1 - DIN 4102)
Explosion limits: None
Odorless, chemically inert
Asbestos contamination: None
SiO₂ Content: 76%

Perlite lightweight insulating Concrete Floor Fills

Gulf Perlite Construct, lightweight aggregate with grain sizes 0.5-3 mm and density of 80-100Kg/m³, mixed with cement, water, sand, Bentonite and Air Entraining Agent, is the best value–for–money advantaged lightweight insulating concrete for high resistance substrates to fill floors.

-  **ULTRA LIGHTWEIGHT**, Density av. 1,000 Kg/m³ (450 - 1,750 Kg/m³), the lightest of all lightweight concretes with aggregate, saves av.15 ton/100 m² of building, compared to the normal screed.
-  **STRONG**, Compressive strength up to 25 MPa. 7 MPa at 1,000 Kg/m³ 8 times higher than foam.
-  **SUPERIOR THERMAL INSULATION**, Thermal conductivity (K) value is λ10=0.2 W/m 0K (0.07-0.6 W/m0K). Perlite Concrete is the only thermal insulating concrete.
-  **ACOUSTIC SCREED**, Perlite Concrete provides cavities within the screed system, giving better acoustic insulating properties of mass/unit area values.
-  **DURABLE**, Perlite screed does not deteriorate, it is free of weeds and bacteria. It lasts for a lifetime.
-  **SELF-LEVELING**, Perlite Concrete forms a firm, monolithic surface, free from flaking and cracks that dries in four days and is suitable for any kind of final flooring (marbles, ceramic tiles, mosaics, carpet, wood, PVC, epoxy paint, etc.).
-  **NON-FLAMMABLE / NON-COMBUSTIBLE**, Up to 3 hours fire resistance rating.

Roof assembly design numbers and fire ratings

P405 - 3 Hours	P902 - 2 Hours	P231 - 1-1/2 Hours
P406 - 3 Hours	P905 - 2 Hours	P513 - 1-1/2 Hours
P215 - 2 Hours	P907 - 2 Hours	P919 - 1-1/2 Hours
P241 - 2 Hours	P908 - 2 Hours	P214 - 1 Hour
P251 - 2 Hours	P910 - 2 Hours	P216 - 1 Hour
P407 - 2 Hours	P913 - 2 Hours	P246 - 1 Hour
P410 - 2 Hours	P916 - 2 Hours	P509 - 1 Hour
P708 - 2 Hours	P920 - 2 Hours	P511 - 1 Hour
P810 - 2 Hours	P921 - 2 Hours	P678 - 1 Hour
P812 - 2 Hours	P922 - 2 Hours	P903 - 1 Hour
	P923 - 2 Hours	

Source: Perlite Institute INC, Harrisburg, USA.



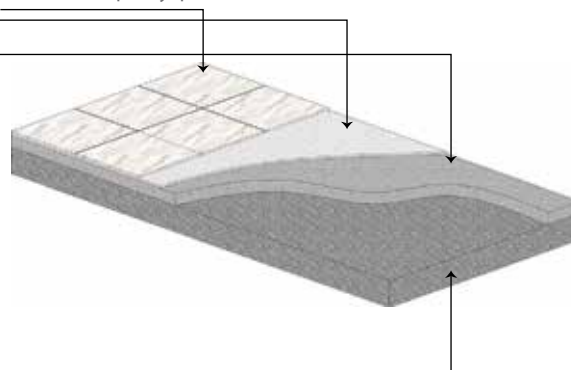
Member of Perlite Institute Inc.



PERLITE LIGHTWEIGHT INSULATING CONCRETE FLOOR FILLS APPLICATIONS

Perlite screed system at 1,150 Kg/m³ on concrete slab

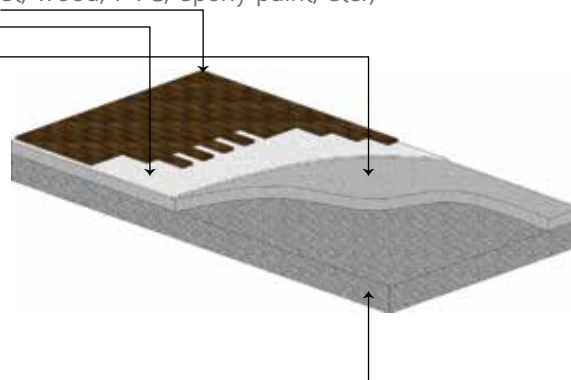
- Final flooring (marbles, ceramic tiles, mosaics, carpet, wood, PVC, epoxy paint, etc.)
- Adhesive layer.
- Perlite lightweight insulating Concrete
1/6 mix design with sand:
1 bag Cement + 1.5 bags Gulf Perlite Construct
+ 50 ltr 0-3 normal aggregate + Bentonite + A.E.A.
Wet density < 1,200 Kg/m³
Dry density < 1,150 Kg/m³
Load at 80mm is only 92 Kg/m²
Compressive strength 8 MPa
Thermal conductivity 0.20 W/m °K
Up to 150 mm in one construction phase.
- Concrete slab



Perlite Concrete forms a strong, monolithic & self-leveling surface that dries in only four days and is ideal for any kind of final flooring. It is a durable, natural, fire proofing, thermal and acoustic insulating screed that lasts for a lifetime.

Perlite screed system at 450 Kg/m³ on concrete slab

- Final flooring (gluing marbles, ceramic tiles, mosaics, carpet, wood, PVC, epoxy paint, etc.)
- Adhesive layer.
- Perlite lightweight insulating concrete
1/6 mix design:
1 bag cement+2 bags Gulf Perlite Construct+A.E.A.
Wet density < 650 Kg/m³
Dry density < 450 Kg/m³
Load at 100 mm is only 45 Kg/m²
Compressive strength 1.38 MPa
Thermal conductivity 0.08 W/m °K
U factor at 200mm = 0.40 W/m² °K
Up to 150 mm in one construction phase.
- Concrete slab



Thermal insulating system, ideal for ground floor screeds over non-chilled basements / garages, for floors over pilotis and in general where thermal insulation is the critical property, like roofs.

Perlite screed system at 1,150 Kg/m³ on structural steel

- Final flooring (gluing marbles, ceramic tiles, mosaics, carpet, wood, PVC, epoxy paint, etc.)
- Perlite lightweight insulating concrete
1/6 mix design with sand at 1,150 Kg/m³
with wire mesh reinforcement.
- Open-ribbed steel deck, corrugated steel deck, form board, etc.
- Steel beams.



MIX PROPORTIONS OF PERLITE LIGHTWEIGHT INSULATING CONCRETE

MIX DESIGNS							TECHNICAL PROPERTIES			
Cement to Aggregate Ratio (by vol.)	Cement (Kgs)	Gulf Perlite Construct (bags)	0-3 mm Sand (m ³)	Water (m ³)	Bentonite (Kgs)	A.E.A. (Ltr)	Wet Density Range (Kg/m ³)	Dry Density Range (Kg/m ³)	Compressive Strength Range (MPa)	Thermal Cond/ty (W/m ² K)
1/4.5	330	5	0.5	0.30	4	2	1,800+/-100	1,700+/-100	18.00-25.00	0.60
1/5	300	5	0.5	0.30	4	2	1,700+/-100	1,600+/-100	11.00-18.00	0.55
1/6	250	5	0.5	0.25	4	2	1,600+/-100	1,500+/-100	8.50-13.00	0.50
1/4.5	330	7.5	0.25	0.25	4	2	1,300+/-100	1,200+/-100	7.50-10.00	0.35
1/5	300	7.5	0.25	0.25	4	2	1,200+/-100	1,100+/-100	7.00-9.00	0.28
1/6	250	7.5	0.25	0.25	4	2	1,100+/-100	1,000+/-100	5.00-8.00	0.20

MIX DESIGNS				TECHNICAL PROPERTIES					
Cement to Perlite Ratio (by vol.)	Cement (Kgs)	Gulf Perlite Construct (bags)	Water (m ³)	Wet Density Range (Kg/m ³)	Dry Density Range (Kg/m ³)	Compressive Strength Range (MPa)	Thermal Conductivity K (W/mK)	U factor / 150mm (W/m ² K)	U factor / 200mm (W/m ² K)
1/4	375	10	0.30	808+/-100	640+/-100	2.41-3.45	0.10-0.12	0.66-0.8	0.50-0.60
1/5	300	10	0.29	728+/-100	544+/-100	1.59-2.35	0.09-.010	0.60-0.66	0.45-0.50
1/6	250	10	0.27	648+/-100	448+/-100	0.97-1.38	0.08-0.09	0.53-0.60	0.40-0.45
1/8	190	10	0.27	584+/-100	384+/-100	0.55-0.86	0.07-0.08	0.47-0.53	0.35-0.40

Impartial laboratory test data of Robert W. Hunt Co. Engrs under sponsorship of Perlite Institute Inc & Al Hoty Stanger Laboratories, UAE. Admixtures (BASF, K_screed, etc.) are used to increase compressive strength. Strength data based on ASTM Type I Portland cement. Neutralized vinsol resin or other air entrainment agent is used in all mix designs, according to manufacturer's recommendations. Exact quantity of water depends on mixer, pump and site conditions and can be adjusted to achieve the required density.

PERLITE LIGHTWEIGHT INSULATING CONCRETE FLOOR FILLS CONSTRUCTION

- Step 1.** Clean from dust and spray with water the floor surface.
- Step 2.** Apply a 5 mm expansion joint in the perimeter and fill it using bulk expanded Perlite or EPS.
- Step 3.** Mark level using laser levels and install aluminum straight edges, as when applying the cement mortar.
- Step 4.** First mix cement, sand, Bentonite, water and air entraining agent until a slurry is formed. Add Gulf Perlite Construct and mix manually or using a mixer for 3-4 minutes. Add as much water as necessary to produce a mix with required density. Use a pump to deliver a substrate of 250 - 300m² per shift
- Step 5.** Apply Perlite Screed in a continuous operation until a section is completed exactly as when applying the cement screed. Construct the screed on site in temperatures between 40C and 400C, like the common concrete. If screed width is up to 150 mm, apply the Perlite Concrete in one phase. For higher thickness, apply in two phases (after 2-3 hours within the same day).
- Step 6.** Level the Perlite Concrete when screeding using an aluminum straight edge.
- Step 7.** Separate large surfaces using construction joints in distances up to 3.5 meters in both directions, to avoid expansion cracks.
- Step 8.** On the next day, scratch in both directions the Perlite Concrete surface with an aluminum line scratcher to clean & level it. Use a small scratcher for the corners. Spray with water or cover with nylon for curing.
- Step 9.** After 3 - 4 days, when it dries, glue any type of flooring like marbles, tiles, carpet, wood, PVC, etc.
- Step 10.** Use ready mixer to deliver 250 -1,000m² per shift

MIXING ON SITE USING A MIXER, A SCREEDING PUMP OR READY MIXED



LEVELING



SCREEDING



PERLITE SCREED

PUMPING

AFTER 3 DAYS

Workability

- Easy to handle, transfer and install due to its ultra lightness. Lower labor costs.
- One instant construction phase up to 150mm thickness screed.
- All mix designs are pumpable up to 30 floors high.
- It can be nailed, sawed and worked with carpentry tools.
- Mixes with 36% to 43% less water than other aggregates.
- Mixing time is only 2-4 minutes.
- Dries within 3 days and forms a monolithic, self-leveled surface to apply any flooring.

References:

1. Perlite Institute, Inc. Harrisburg, Pennsylvania, USA (www.perlite.org).
2. The Schundler Company, New Jersey, USA (www.schundler.com).
3. ASTM C 332 -09 – Standard Specification for Lightweight Aggregates for Insulating Concrete.



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