

PERLITE PRODUCT GUIDE

Perlite Concrete *Lightweight/Insulating/Fireproof*

This product guide contains various mix designs for lightweight concrete, utilizing perlite as the primary aggregate. This guide provides some basic mix designs, which may be used as stated or as a starting point for your own custom mixes.

Perlite lightweight concrete is used in many different applications. These include lightweight tile mortar, garden sculpture, decorative brick, gas-fireplace logs and floor fills.

Some Perlite Concrete Applications

Chimney Lining	Statuary
Floor Systems	Tank Bases
Fuel Tanks	Tank Insulation
Pool Base	Tile Mortars
Sound/Firewalls	Underground Pipe

Perlite concrete, while not usually suited for structural or load bearing uses, offers many advantages beyond its lightweight. Perlite concrete provides sound deadening properties and is thermal insulating as well, depending on mix design. Generally speaking, the lighter the weight, the greater the insulative properties.



Gaia, by Earthborn Designs
Lightweight Garden Sculptures

Mix Designs

Cement (sack)	Perlite (ft ³)	Expanded Shale	Washed Concrete Sand (ft ³)	Water (Gal)	Admix (Fl. Oz.)	Dry Density	Wet Density	Compressive Strength (lb/in ²)	Thermal Conductivity ("k")	Yield (Cu. Ft.)
1	8	-	-	16	28 ^A	22	37	90-125	0.54	8
1	6	-	-	13	24 ^A	27	42	125-200	0.64	6
1	5	-	-	11	20 ^A	30	46	230-300	0.71	5
1	4	-	-	10	16 ^A	36	50	350-500	0.83	4
1	3	2 ¹	-	9	1 ^A & 3 ^B	54	72	1400-1700	n/a	3.8
1	3	2 ²	-	10	2 ^B & 3 ^B	62	78	2000-2100	n/a	3.5
1	3	2 ²	-	10	3 ^B	65	90	2500-2800	n/a	3.2
1	3	-	-	7.5	7	45	58	800-1100	n/a	3
1	1.6	-	2.5	9.2	3 ^A	82	98	1100-1300	n/a	5.1
1	2	-	-	5.5	3 ^A	60	74	1600-1900	n/a	2
1	1.1	-	2.1	7.8	3 ^A	88	105	2300-2500	n/a	3.5

EXPANDED SHALE

¹ 5/16"

² 1/2"

ADMIXTURE

^A Air Entrainment

^B Pozzoloth 300-N

Mix Instructions

Proper mixing will assure the maximum yield and uniformity. Low shear, low RPM mixers (similar to plaster mixers) are recommended for best results.

- 1) Add all materials except perlite to mixer; then mix until this slurry is fairly uniform. Two minutes will usually suffice.
- 2) Add all perlite; then mix again only long enough for a uniform mix, probably another two to three minutes.

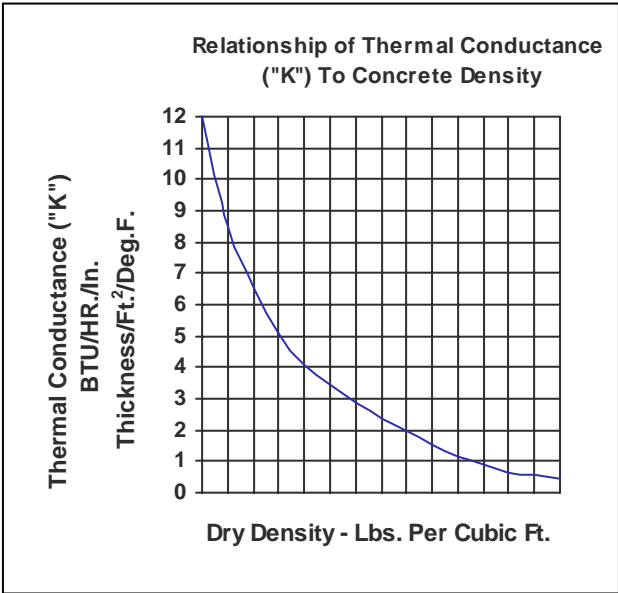
Excess water and under mixing may reduce yield and workability. Over-mixing may degrade the perlite and increase concrete density, reducing yield. Optimum mixing cycle can usually be determined with one or two trial batches.

General Considerations:

- Addition of limited mason sand to a perlite/cement mix increases the compressive strength (to a point) and also the weight by approximately 100 lbs per cubic foot of sand.
- Addition of expanded shale also increases the compressive strength (to a point) and weight, but at about 1/3 the weight of sand, at higher cost.
- Addition of fibers increases the tensile and flexural strength of perlite concrete, thereby reducing shrink cracking.
- Addition of air entraining agents reduce the weight and compressive strength of the mix, and improves freeze/thaw performance.
- A range of aggregate size is desirable for increasing compressive strength. Super-plasticizers and water reducers can also be used to increase strength.
- For detailed product finishes, finer aggregate particles can be used.

TYPICAL MIX DATA FOR PERLITE SAND CONCRETE		
Cement (sacks)	1	1
Perlite (ft ³)	3	2.4
Sand (ft ³)	2	1.5
AEA (oz)		
Water (gal/sack)	8.2	8.1
Cement (factor/yd-100% Yield)	5.87	7.44
Density (Wet)	83	84
Density (Dry)	69	74
Compressive Strength (28-day, lb/in ²)	1000	1200

* Air Entraining Agent as recommended by perlite manufacturer.



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**Standard Specification for
Lightweight Aggregates for Insulating Concrete**

Table 1 Grading Requirements for Lightweight Aggregates for Insulating Concrete

Size Designation	Weight Percent Passing Sieves									
	19.0-mm (¾-in.)	12.5-mm (½-in.)	9.5-mm (3/8-in.)	4.75-mm (No. 4)	2.36-mm (No. 8)	1.18-mm (No. 16)	600-µm (No. 30)	300-µm (No. 50)	150-µm (No. 100)	
Perlite	100	85 to 100	45 to 85	20 to 60	5 to 25	0 to 10	Group I			



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