

ZONOLITE LIGHTWEIGHT INSULATING CONCRETE

Description

Vermiculite is a form of mica that expands when heated. A principal derived from this material is **Zonolite** stabilized concrete aggregate. **Zonolite**, when mixed with a Portland cement binder, in lieu of sand gravel aggregate and gravel aggregate, produces a lightweight insulating concrete. Weight per cubic foot is reduced from 140 lbs. to the 18-37 pounds per cubic foot range. Insulation values are increased 20 or more times those of structural concrete.

Uses

- Levelling fills
- Perimeter insulation for floor slabs
- Insulation under concrete slabs on grade
- Insulation for below grade heating and cooling lines

Limitations

When used in floor construction, a hard wearing surface must be installed over the **Zonolite** prior to the installation of the finish floor material.

Zonolite Lightweight Insulating Concrete should not be used for freezer space insulation when operating temperatures are consistently below 32°F.

Materials

1. **Zonolite Stabilized Concrete Aggregate** shall conform to ASTM C332-66, Group I specification. The unit weight shall be not less than 5.5 pounds nor more than 10 pounds per cubic foot. NOTE: Air entraining agent has been added to stabilize **Zonolite Concrete Aggregate**.
2. Portland cement shall conform to ASTM C150-68, Type I, II or III, or to ASTM C175-68, Type IA, IIA, IIIA for air entrained Portland cement.

3. Water shall be clean and free from deleterious amounts of acid, alkali and organic materials.

Mixing

1. Introduce water and cement into mixer.
2. Add the proper number of bags of aggregate, rotating the mixer slowly until all the material is in the mixer.
3. Rotate approximately one minute after all the aggregates is in the mixer.
4. Do not rotate drum on the way to the job site. Mix at the job site until mix is uniform in color and consistency. Over mixing should be avoided.
5. Slump for **Zonolite Lightweight Insulating Concrete** should be 6" – 9".

Appearance of Good Zonolite Lightweight Insulating Concrete

1. Has uniform gray cement color
2. Has uniform air bubble distribution
3. No dry or unmixed material visible
4. Has consistency of heavy cream

Hints for Good Mixing and Placing Operation

1. Have a clean mixer.
2. Make sure the proper amounts of ingredients are placed in mixer.
3. Fill auxiliary water tank before leaving plant.
4. Do not over mix.
5. **Zonolite Lightweight Insulating Concrete** should flow freely from the mixer and screed to a smooth surface without tearing or pulling.
6. Should tearing occur, add water until proper slump and workability are obtained.
7. Properly mixed **Zonolite Lightweight Insulating Concrete** requires no finished troweling but will finish to a smooth surface behind the screed.

**Mixed Design Chart and Material Requirements Per Cubic Meter*
For Zonolite Lightweight Insulating Concrete**

Mix	Cement	Zonolite	Water	Physical Properties			
				Wet Density Kg/m ³	Dry Density Kg/m ³	Compressive Strength KN/m ²	R Value/In.
1:4	377 kg.	1m ³	415-450 ltrs.	850-1010	496-692	2000-3330	1.15
1:5	300 kg.	1m ³	415-450 ltrs.	790-970	400-490	1500-2200	1.35
1:6	252 kg.	1m ³	415-450 ltrs.	704-960	352-448	850-1500	1.49
1:8	188 kg.	1m ³	415-450 ltrs.	672-835	288-352	600-850	1.69

*Yield would be achieved by incorporating around 1 liter of AEA.

Notes:

1. Table based on ASTM C-332 coarse – Vermiculite stabilize concrete aggregate
2. Thermal resistance values of **Zonolite Concrete** are based on 40°F mean temperature. **Zonolite Concrete** properties are based on the material at minimum dry density. Actual dry density of place **Zonolite Concrete** is dependent upon application, design, and climactic conditions which will affect calculated R-values.
3. The R factors shown above are based on thermal conductivity data derived from laboratory testing dry materials in accordance with ASTM specification C-177. The values shown are affected by actual environment, installed and designed nuances and will be lower than calculated values. Actual placement conditions affect all types of insulation, and the R-values shown above should be used for the purposes of comparison with other system values.