

# Application Of Expanded Vermiculite In Lightweight Concretes And Concrete Intensity

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## Abstract

This article multiplied from vermiculite prepared light the optimal option for concrete choice and multiplied vermiculite light on concrete application about written.

## Introduction

Multiplied vermiculite mineral grinding and cooking way with taken silver – brass colored to the point granular ( grainy ) scattered heat insulation Natural vermiculite – chemical of the composition variability with separated standing complicated high hydrated aluminosilicate magnesium . Vermiculite structural parts order following at the borders in percentages vibration possible :  $\text{SiO}_2$  – 37–42%,  $\text{MgO}$  – 14–28%,  $\text{Fe}_2\text{O}_3$  – 5–17%,  $\text{FeO}$  – 1–3%,  $\text{Al}_2\text{O}_3$  – 10–13%,  $\text{H}_2\text{O}$  – 8 – 20%. Of this except for vermiculite less presence of  $\text{K}_2\text{O} + \text{Na}_2\text{O}$  in a small amount ( up to 1–2% ) Vermiculite is possible . the most wonderful feature this is his fast in the heat partially mutually united separately mica to the plates division is a feature of . Such a division as a result vermiculite grains strong is plural .

Natural in vermiculite of water following types there is :

- mineral molecular to the structure clear stoichiometric in quantity incoming constitutional ( hydrate );
- hard mixture in the form of zeolite , in this water soluble substance , mineral crystals and on the contrary solvent ;
- micaceous surfaces between interpacket without , in which case it is a mica merger on the surfaces solid adsorbed ;
- mineral grains on the surface mechanic caught standing hygroscopic .

Vermiculite when heated dehydration process in 3 steps to be possible :

1st stage – 200° C up to – hygroscopic humidity disappears , that is essence according to dries up;

Stage 2 – 200° C to 275° C until at the borders interpacket of water loss with characterized by this strong multiplication with related ;

Stage 3 – from 700° C to 1100° C until at the borders in the composition water disappears , this vermiculite grains size later to grow take is coming .

Multiplied vermiculite initial quality indicators these are grains size and volumetric is the weight . Multiplied vermiculite grains to the size according to 2 factions divided into : fine – from 0.15–0.25 to 3 mm and large – from 3

Up to 10–15 mm . Volume weight according to multiplied vermiculite grades 100, 150, 200, 250 and 300 correct arrival must . Multiplied vermiculite volumetric weight grains size with related : grains size decrease with volumetric weight increases . Multiplied vermiculite heat conductivity coefficient his/her volumetric to the weight and grains to size related . Multiplied vermiculite and from cement volume weighing more than 300 Up to 900  $\text{kg/m}^3$  in compression strength limit from 3 25  $\text{kg/m}^2$  until light concretes to take possible . Vermiculite and 1:1 weight

ratio of cement (600 grade ) in proportion volumetric weight  $500 \text{ kg/m}^3$  , in compression strength border  $5 \text{ kg/cm}^2$  and heat coefficient  $0.09 \text{ kcal /m} \cdot \text{hour} \cdot \text{degree}$  concrete Cement spend in the increase vermiculite concrete strength increases , but such of concrete of strength increase him/her to prepare gone cement expense to increase suitable will not come . Accordingly, cement 1.5 times the cost in increasing , strength by 20%, by 2.5 times – by 40%, only cement spending 4 times only when increased , concrete 2.4 times stronger increases and reaches  $12 \text{ kg/cm}^2$  . From this It seems that cement spending increase vermiculite concrete strength increase factor become service do cannot . This is multiplied vermiculite to oneself typical porosity feature reason is , it is vermiculite grains cement with hard to stick road will not let .

## **Conclusion**

Current on the day composition and heat insulating construction materials this with together light was concrete working release time demand . Our President as said energy effective construction materials working to release on the road our putting need . Multiplied vermiculite concrete composite and heat insulating material. Vermiculite raw material when cooked 10-25 times the size enlarges and this to us light concrete to take opportunity gives .

## **References**

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