Technical Literature of Pumice Stone *(HS Code 2513.11)*

What is pumice?

The description for pumice given in the Encyclopedia Britanica Concise is :"Very porous, frothlike volcanic glass that has long been used as an abrasive in cleaning, polishing, and scouring compounds. It is also used in precast masonry units, poured concrete, insulation and acoustic tile, and plaster. Pumice is igneous rock that cooled so rapidly there was no time for it to crystallize. When it solidified, the vapors dissolved in it were suddenly released, and the whole mass swelled up into a froth that immediately consolidated. Any type of lava may become pumiceous under favorable conditions."

How is it formed?

Deep in the earth's crust are magma pockets formed by a partial melting of basalt. Under high pressure conditions this magma absorbs substances that under normal conditions are fluid or gaseous (H2O, CO2, F)

At certain periods in time when the pressure above a magma pocket is relieved, as in the case in an earthquake, a volcanic eruption starts and these gases are released from the magma in an explosive outburst. Due to the liberation of the gases, the viscosity of the magma increases very rapidly and the solidifying temparature rises to that of the reigning pressure. Thus as the magma froths, it is fragmented and solidifies forming the cellular material we know as pumice.

This material is flung high up into the air together with an an enormous stream of gases from the crater and is carried out over the surrounding land.

The Chemical and physical characteristics of pumice

The general chemical analysis of pumice is:

SiO2	60-75%
Al2O3	13-17%
Fe2O3	1-3%
CaO	1-2%
Na2O-K2O	7-8%
TiO2	Trace
SO3	Trace

The high percentage of silisium oxide gives the pumice it's abrasive quality, thus it exhibits a chemical composition which can easily erode steel.
The Al2O3 in the structure makes the pumice highly resistant to fire and heat. Na2o and K2O are the minerals which give the pumice the reaction sought after by the textiles industry. As a result of acidic or basaltic activity the resulting pumice is also of acidic or basaltic nature.

Basaltic pumice, also known as scoria, is dark brown to black in colour and has a specific weight of about 1-2 gr/cm3. Acidic pumice, known simply as pumice, is white in colour, however due to the density of acidic magma being much lower than that of basaltic it's specific weight is also much lower, at about 0.5-1 gr/cm3. The high level of SiO2 gives this pumice it's white colour.

The physical properties of pumice are governed by the extremely cellular structure of the matrix. These cells are independent of each other, which means that the level of sound and heat conductivity are both extremely low. The hardness of pumice is approximately 5.5-6 on the mohs scale. It does not contain crystalised water in it's structure. It is chemically inert and possesses about 75% silisium oxide. Due to the microscopic size of the pores, which make up about 85% of the pumice grain volume, pumice is an extremely light rock which is able to float on the surface of water for a long time.

History of Pumice

The earliest known reference to the special properties of pumice are found in Vitruvio's compendium of architecture of the first century B.C.
Viturio describes artificial agglomerates lighter than water, and therefore buoyant, containing an inert pumice-like mass, and he lists among their qualities that "they are not hygroscopic, do not absorb water and only slightly weigh down the foundations of the structures".
At the time of the Ancient Romans, pumice was largely used in the construction of thermal baths and temples, many of which can still be seen today.
The two most notable examples of pumice used in construction from these times are the Pantheon of Rome, where granules of pumice were used in the construction of the dome and the St. Sophia Cathedrial built by the Byzantines in Istanbul in the forth century A.D.

From this time until the 1800's when the use of pumice reappeared in many Rhinenland cities in Germany, it seems that the use of pumice in construction was disregarded in Europe.
The use of pumice for construction in the USA seems to have started in California in 1851, since when it's use has expanded into 15 states and 103 workplaces.
Much more recently, within the last 20 years the uses of pumice has spread into many other industries with the development of technology and an awareness of environmental issues.

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