MAGNESIUM SILICATE TALC

The designation "talc" covers a wide range of natural products. The given theoretical formula for talc mineral (hydrated magnesium silicate) corresponds to a weight ratio of magnesia (MgO) to silica (SiO2) of about 1:2 but in actual practice this ratio may reach or exceed 1:1.

For reporting purposes, talc, soapstone, steatite and Asbestine are considered as a group. Soapstone refers to a talclike material of variable composition containing sufficient impurities to prevent its use in applications requiring white color or chemical purity. Steatite refers to a particularly massive compact form of talc and differs from soapstone in terms of its relative purity (Soapstone may only contain 50% talc). To qualify as a steatite grade talc, it must contain less than 1.5% CaO, 1.5% Fe203, and 4% Al203. Asbestine is a fibrous form of talc that is mined in the northern section of New York State.

In view of the many composition variables associated with talc, it is understandable the talc of commerce may not always contain the mineral talc as a major constituent although this is usually the case. It also explains the many grades of talc that are offered as commercial pigments to Industry.

The types and amount of mineral impurities associated with talc are more or less indicative of the areas from which they are mined. Montana deposits are very nearly pure talc. New York talcs commonly contain only about 20% to 35% of mineral talc. Vermont talcs are high in magnesite, Texas talcs run high in dolomite, and California talcs vary in associated mineral content depending on their relative softness or hardness.

The five principal United States talc mining districts are California, Nevada, Montana, New York and Vermont. Texas, North Carolina, Georgia and Alabama, although not listed among the top five, are significant in talc mining.

The purest talcs that approach theoretical purity, are characterized by the whitest color, and command the highest price. Pure talc is the softest known mineral, exhibits hydrophobic surface properties, and has a slippery feel. Although pure talc is the standard for softness of 1 on the moh scale (diamond=10) commercial products may be less soft due to the presence of impurities or associated minerals such as calcite, tremolite and silicious materials.

Magnesium is the eighth most abundant element in the earth's crust, the sixth most abundant element in the sun's atmosphere, and in the form of magnesium silicate is the second most important component of meteorites.

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PLAINTIFF'S EXHIBIT
WCD-131

Magnesium Silicate Talc (continued)

The color of natural talc is white, gray, yellow, or a greenish shade and is characterized by a silvery or pearllike luster. It occurs in veins and/or masses formed from preexisting mineral aggregates. The entire talc vein can seldom be completely extracted because of ore dilution with detrimental adjacent rock.

Discounting minor yearly fluctuations the consumption of talc domestically produced has grown at an annual rate of 4% since 1960 and this trend is expected to continue.

About 40% of the talc sold in the past has been low cost and low quality product. Industry is looking more and more to the better grades of talc and their controlled physical and chemical characteristics.

Talc is probably used in a wider variety organic coatings than any other single extender pigment. This widespread utilization of talc pigment is well justified. Talc pigments are normally self-suspending in paint vehicles. Moreover, they assist in keeping associated pigments also suspended. Whatever settling occurs is generally soft and readily redispersed (platy talcs are especially effective for antisettling behavior).

Talcs disperse with relative ease in most paint vehicles. Certain grades are especially useful for incorporation in aqueous systems.

Since talcs chalk more readily than most extenders, they are frequently used in a compromise pigment combination (for instance with ground limestone) to provide controlled chalking (self cleaning exterior paints).

Most paint-grade talcs possess both a high specific surface area and a fairly high oil absorption capacity. Although these properties limit the amount of talc that can be incorporated in a paint, their presence in moderate amounts contribute to improved rehological properties (antisettling, brushability, satisfactory leveling and antisag).

Certain talcs impart a flatting effect that can be used to control the gloss of enamels (high-purity Montana talc is reported as ideal for this purpose). These talcs are generally lo-micron grades with a top size below 25 microns and readily dispersible stir-in extender pigments producing Hegman fineness values of 5 and above in high-speed paint mixing equipment. In wall paint formulations their use results in improved brushability and clean-up. The finest lo-micron talcs produce excellent flatting, good low-angle sheen, and good resistance to burnishing. In primers they exhibit excellent suspension, holdout, and sanding properties.

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Magnesium Silicate Talc (continued)

Both acicular and platy talcs improve the bonding properties, film toughness and durability of paints. Of the two, the platy talcs are claimed as more effective in upgrading the physical properties of a paint. Platy talcs also appear superior to fibrous talcs in improving the water and humidity resistance of a paint film (less permeable due to physical configuration). On the other hand fibrous talcs are preferred for imparting better blister resistance.

It is stated that talcs are equal or somewhat superior to other extenders in resisting corrosion influences.

The platy and granular talcs like the lo-micron grades are especially prized in metal primers due to their excellent sanding properties and in top coats due to their contribution to burnish resistance and good scrubability. All talcs exhibit outstanding holdout properties. However, the platy grades are by far superior.

The relatively coarse grades are utilized where residual surface roughness (tooth) is desirable such as for wall primers, undercoaters, and texture paints.

Talc is commonly used in white linseed oil house paints, traffic paints, latex paints, industrial undercoats, and structural steel primers.

Talcs tend to be commodity pigments in that products from different manufacturers are frequently used interchangeably. However in view of the many grades of talcs offered, the formulator should carefully evaluate the effect of the replacement talc on the performance of the end compositions before committing himself to this substitution.

Talcs are supplied in a broad range of particle sizes and distributions. Further diversifications arise from the fact that, depending on the talc source, talcs vary greatly in particle shape. Thus the talc pigment may be predominantly acicular, fibrous, granular, or platy. The method of reducing the crude ore to pigment particle size has little to do with the talc particle configuration, the origin of the talc being all important.

In view of this situation, it is understandable that a talc manufacturer may stock as many as 70 standard grades of talc for sale to industry, all of which are designed for definite end uses. It also suggests that consultation with the technical personnel of a talc manufacturer is in order when a customer introduces talc pigment into his product.

It is the policy of Whittaker, Clark & Daniels to make available talc products especially designed for use by the paint industry at strategic points throughout the country. Thus industry can have the advantage of not only a ready supply of a selected product, but also a product that is economically desirable.