

comes in metal drums or 100-pound paper lined bags. About 3700 pounds of powdered graphite is used per batch and one batch is made per day on an average. The graphite is dumped into the mixing kettle by men with an average service of seven years. This operation requires about forty minutes per batch per man on an average. Three men are usually engaged in this dumping. They wear respirators while handling and dumping graphite, which is not a particularly dusty operation. The average dust produced is 1,803,080 particles, ten microns or less, per cubic foot of air. All of these dust particles are rounded or slightly angular, black opaque, amorphous, sooty or dark grey in appearance under the Konimeter microscope, and three microns or less in size.

J - SLATE FLOUR: Slate flour (300 mesh) gives rigidity to asphalt on "fast surfaces" such as steep roofs and pipe lines, and prevents its running off. It also produces desirable weathering properties. Mixtures as low as 10% slate flour and as high as 40% are used. An average of two tons of slate flour is used to each still which averages about 800 barrels of steam reduced asphalt. Since the slate flour is introduced by the use of closed pipe lines and centrifugal pumps, the only dust produced is that which results during the unloading of the sacks and dumping them into the hopper. The slate flour comes in 50-pound paper bags, 750 bags to a railroad box car. Four men with an average service of about a year, open the bags and dump the slate flour directly into a hopper from which it is siphoned by compressed air to a storage tank holding about 15 tons. About four carloads a month are received and an average of about 5-1/2 hours is required to unload each car. About one and three-quarter million pounds were dumped during the last quarter period. The men wear MSA Comfo respirators. A screen analysis of this slate flour showed that 99.7% passed through a 200 mesh screen and 96.8% through a 325 mesh screen. Due to the fineness of slate flour and its low bulk density (1.04) considerable dust, an average of 12,007,680 particles, ten microns or less in size, per cubic foot of air, and counts as high as 16,538,880 particles per cubic foot, are produced during dumping the sacks and filling the storage tank. About 98% of these dust particles are slightly angular, transparent, crystalline in appearance under the Konimeter microscope, and five microns or less in size; 2% are semi-opaque, slightly angular. There were a few plate like particles which appeared to contain small air bubbles, and a large number of small black particles.

A petrographic examination made of a slate flour sample at the United States Bureau of Mines Experiment Station in Pittsburgh, Pennsylvania showed that it contained more than 1% Quartz (SiO_2), 30% Sericite ($\text{K}_2\text{O}-3\text{Al}_2\text{O}_3-6\text{SiO}_2-2\text{H}_2\text{O}$), 40% opaque and 30% five different unidentified constituents. A chemical analysis of slate granules and flour (Jour. Indust. Hyg. Vol. XV., No. 2, Mar. 1933, p. 67) reports these constituents:

Silicon Dioxide	59.27%	Magnesium Oxide.....	2.21%
Titanium Dioxide.....	0.99%	Potassium Oxide.....	3.75%
Aluminum Oxide.....	18.81%	Sodium Oxide.....	1.88%
Ferric Oxide.....	1.12%	Water below 110°C.	0.32%
Ferrous Oxide	6.58%	" above "	3.98%
Manganous Oxide.....	0.13%	Phosphoric Oxide.....	0.11%
Calcium Oxide.....	0.42%	Carbon Dioxide.....	0.21%
Barium Oxide.....	0.05%	Ferric Sulphide.....	0.15%

Specific Gravity - 2.795

"The silicon found, though expressed in the chemical analysis as silicon dioxide, is not differentiated chemically as to the forms present in the original minerals, whether free silica or silicate."

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