

Haskell File

E. I. du Pont de Nemours and Co.
Haskell Laboratory for Toxicology and Industrial Medicine

cc: B. H. Perkins (6)

HASKELL LABORATORY REPORT NO. 2-62 MR NO. 582

Material Tested: Mica Flake Pigments coated with TiO_2 and Sb_2O_3
Mica Flake Pigments coated with TiO_2 and Cr_2O_3

Haskell No.: 2978
2979

Submitted by: B. H. Perkins, Research Division, Pigments Dept.

Other Codes: (A) NF-103-D,
(A) NF-105-D

ACUTE INHALATION TOXICITY TEST

Technique: Wright Dust-Feed Mechanism used at highest rate of administration possible. Dry air flow of 10 l/min. and 10 lbs./sq. in. used.

Haskell Number	Duration Exposure	Nominal Conc. (mg/lit)	Mortality Ratio	Clinical Signs	Histopathology
2978	4 Hours	18.6	0/4	Rats normal during and after exposure, though dusty. Killed at 14 days.	Changes in lungs, brain and liver.
2979	4 Hours	20.1	0/4	Rats showed slight discomfort during exposure; otherwise normal. Dusty post-exposure and initial wt. loss only in 2/4. Killed after 14 days.	Changes detected in lungs, brain, pancreas, thymus, adrenals. Mica deposits in spleen.

Comments:

The concentrations, in mg/lit, to which the rats were exposed, are similar to those in previous exposures of other mica flake pigments (Report No. 68-61). They are the highest which can be achieved by the Wright-Dust-Feed Mechanism.

Histopathological examination of rats exposed to the Sb_2O_3 coated flakes revealed slight to moderately severe residual pulmonary response. Particles characteristic of mica were found in all the phagocytes; and pulmonary edema, hyperemia, petechial hemorrhages, and focal emphysema were noted. Reactions were also found in the brain and liver. Less pronounced residual lung reactions were found in rats exposed to mica flakes coated with Cr_2O_3 . This produced, in addition, interstitial cellular infiltration and lipophage clusters in the lung. Tissue reactions in brain, pancreas, thymus and adrenal glands were found in rats exposed to this compound. The changes in the brain were more marked than those observed from Sb_2O_3 coated mica. Deposits characteristic of mica were found in the spleen which was otherwise unaffected.

N37257

Histopathological studies of mica flake preparations cited in Haskell Laboratory Report No. 68-61 demonstrated lung changes roughly similar to those found with the present samples, but no extra-pulmonary change. The TiO_2 coated flakes (hydrous and calcined) differed from all other samples in showing no phagocytised mica flakes in the lung, but the exposures to these flakes were at approximately one-third the concentration of the exposures to the other samples.

Summary:

The tests conducted on the various samples of coated mica flakes indicate a low order of acute inhalation toxicity in that the highest concentrations possible did not cause death to rats. However, all the materials are capable of producing at least lung changes on one exposure. Mica flakes coated with Sb_2O_3 and Cr_2O_3 caused detectable tissue reaction at other sites. Prolonged exposure of man to significant inhalation of these dusts is contraindicated. Guidance on safe atmospheric levels of mica flakes coated with Sb_2O_3 and Cr_2O_3 may be had from the concentrations in air considered safe for Sb_2O_3 and Cr_2O_3 , viz., 0.5 mg/ M^3 and 0.1 mg/ M^3 respectively.

Reported by: S. J. M. M.

Approved by: P. B. Ford

Date: January 26, 1962

JWC:ljm

cc: B. H. Perkins (6)

Haskell Laboratory J.L.

E. I. du Pont de Nemours and Co.
Haskell Laboratory for Toxicology and Industrial Medicine

HASKELL LABORATORY REPORT NO. 68-61 MR NO. 582-001

Material Tested: (a) Mica Flakes coated with Calcined TiO_2 (65/35)
(b) Mica Flakes coated with Hydrous TiO_2 (75/25)
(c) Mica Flakes coated with Carbon (98/2)
(d) Control, Concord "200/325" Mica Flakes

Haskell No.: (a) 2838
(b) 2837
(c) 2864
(d) 2840

Submitted by: B.H. Perkins, Research Division
Pigments Department

Other Codes: (a) Lot 12781
(b) Lot 12788
(c) 1680-54 L₁L₂L₃ Composite
(d) Concord "200/325" Mica

Methods: "De Vilbiss powder blower" method, modified by attaching blower to vibrator, was used on samples of H #2838 and H #2837. The test project on these materials was then cancelled (letter from B. H. Perkins to J. W. Clayton, 2-3-61) and work on them was discontinued. The "Wright Dust-feed Mechanism" was used on samples of H #2864 and H #2840, and the rate of administration of the material was the highest which can be achieved using this instrument. The concentrations are nominal, derived from the total amount administered and the air flow.

Haskell Number	Material	Nominal Conc. mg/lit	Air Flow lit/min	Period of Exp. hrs.	Mortality Ratio	Clinical Signs of Toxicity	Gross Pathology
2838	Mica flakes coated with Calcined TiO_2	6.6	2.5	4	0/4	During exp.: Irritation of eyes, nose and mouth, slight signs of labored breathing. After exp.: Dusty but normal.	3/4 slight irregular congestion in lungs.
2837	Mica flakes coated with Hydrous TiO_2	3.1	2.8	4	0/4	During exp.: Irritation of eyes, nose and mouth. After exp.: None	2/4 slight irregular congestion in lungs. 1/4 sl. focal atelectasis.
2864	Mica flakes coated with Carbon	22.3	10	4	0/4	During exp.: Discomfort & respiratory impairment for first 30 minutes. After exp.: None	2/4 moderate irregular congestion in lungs. 2/4 moderate regional atelectasis.
2840	Mica Control	24.4	10	4	0/4	During exp.: Initial discomfort & respiratory impairment, but recovery in 1.5 hours. After exp.: None	3/4 irregular congestion in lungs.

Summary: An approximation of the LC_{50} was not obtained from these studies; however, it appears that the test materials will have a very low order of acute inhalation toxicity. At the end of rats appeared normal although dusty. There was no interference with weight gain following exposure. No acute pulmonary reaction was observed either clinically or on gross pathological examination. It was indicated that carbon-coated mica might have a significantly greater effect than the uncoated mica as judged by the slight increase in lung weight. On the basis of this limited work, therefore, we assess the toxicity potential under conditions of repeated exposure, a more likely industrial hazard. Repeated exposures of the animals to the dust over a long period of time should be considered. Observance of the Threshold Limit of 20 MPPCF as defined by American Conference of Governmental Hygienists for inhalable mica dust should prevent a serious occupational hazard.

Report by: *Wadey Clay*

Date: November 20, 1961
JWC:bjd