

MSA

THE
CHARACTERISTICS
OF
EXTENDER PIGMENTS

CONFIDENTIAL

Prepared by
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1960

September 28, 1960

INTRODUCTION

The purpose of this brochure is to provide data describing all permanently coded extender pigments with respect to those physical and chemical characteristics which are related to end use performance and also to make it possible to draw direct comparisons between extender pigments.

This booklet, as an entire unit, is Confidential. It will be permissible, however, to discuss with suppliers any data pertaining to pigments with which they are directly concerned, except of course, packing index, its meaning and significance.

The following information is pertinent to the data presented herein:

1. The test methods used to determine all values are the same for every pigment and are as follows:

Top Particle Size	- TM-44-B and microscope
Particle Size Distribution	- TM-48-A
Oil Absorption	- TM-45-D
Water Absorption	- TM-45-D using H-508 in place of H-253
Reflectance	- TM-141-A using wet samples
pH	- TM-243-A using 10% slurry
Water Soluble Salts	- TM-300-A

2. The top particle size is not the largest particle found in a sample but the largest particle with significant influence on end use performance.

3. The particle size distribution data represents the coarsest acceptable material with respect to our purchasing specifications.

4. The oil absorption data are not as listed on the purchasing specifications but are on an absolute basis (1/1: pigment/oil) for direct and easy comparison.

5. The water absorption data are on the same basis as oil absorption except a solution consisting of H-508/H-657/Triton CF-10 at a ratio of 75/20/5 is used in place of H-253.

6. The reflectance values were determined in the wet using (A) H-508 and (B) H-514 as vehicles in order to

provide whiteness data for both water based and oil or alkyd based products. These data were obtained by placing the paste-like dispersions on glass slides, covering with a black box, and making a reading using only the green filter.

7. The pH values were obtained by taking readings on an H-508 solution containing 10% by weight of extender pigment.

8. The water soluble salts data were obtained on only one sample of each pigment, and therefore, are not absolute values but a general categorization for comparing one pigment against another.

9. The photomicrographs illustrate the general appearance or physical description of the pigments. Due to the practical difficulty in taking these photographs, they are not representative of particle size distribution nor do they always show the top particle size. The size of the particles can be determined by measuring their diameters in centimeters and converting to microns, one centimeter being equal to approximately 25 microns.

The information contained herein will be revised and supplemented from time to time as new information is developed or when natural and uncontrollable changes occur in the pigments. The Raw Materials and Minimum Cost "B" Group will be responsible for the maintenance of this brochure.

September 28, 1960

W-1, CHINA CLAY

CHEMICAL DESCRIPTION:

Complex Aluminum Silicate

PHYSICAL DESCRIPTION:

Irregular nodular and
lamellar shaped particles

TOP PARTICLE SIZE:

53 microns

PSD:

% finer than	
100% -	53 u
96.0 -	30
92.5 -	15
90.0 -	10
87.0 -	6
83.5 -	4
75.0 -	2

OIL ABSORPTION:

103 KU

WATER ABSORPTION:

96 KU

REFLECTANCE:

A : 74
B : 51

pH:

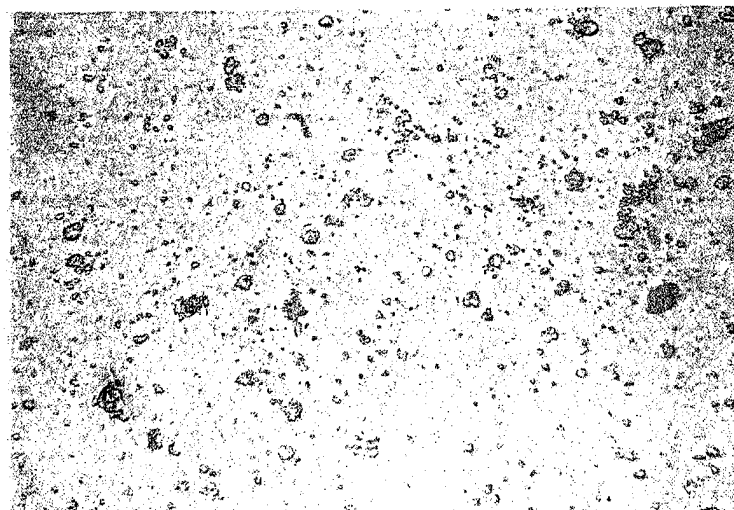
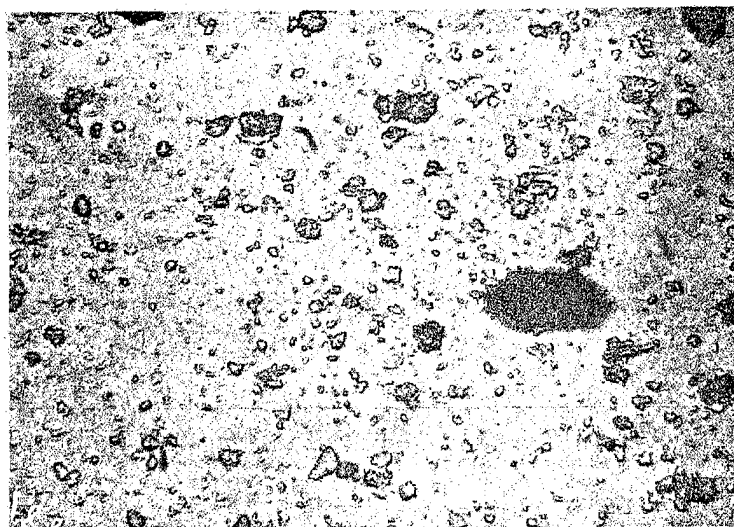
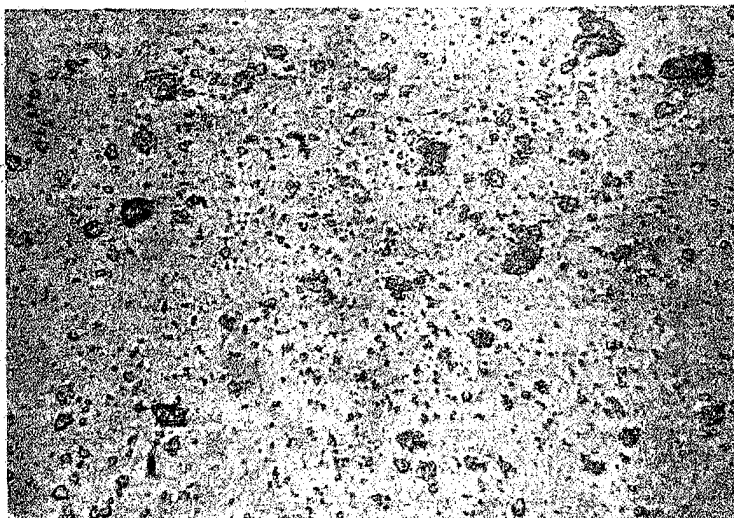
4.5 to 5.5

WATER SOL. SALTS

0.04%

PACKING INDEX:

0.59



September 28, 1960

W-4, MAGNESIUM SILICATE

CHEMICAL DESCRIPTION:

Complex Magnesium Silicate
(Talc)

PHYSICAL DESCRIPTION:

Acicular and lamellar
shaped particles

TOP PARTICLE SIZE:

220 microns

PSD:

% finer than	
100% - 220 u	
98.0 -	44
86.5 -	30
67.5 -	15
56.0 -	10
43.0 -	6
36.0 -	4
28.0 -	2

OIL ABSORPTION:

89 KU

WATER ABSORPTION:

61 KU

REFLECTANCE:

A : 80
B : 58

pH:

9.1 to 9.9

WATER SOL. SALTS

0.16%

PACKING INDEX:

0.54



September 28, 1960

W-6, CALCIUM SULFATE

CHEMICAL DESCRIPTION:

Hydrous Calcium Sulfate-
 $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

PHYSICAL DESCRIPTION:

Heterogenous, lamellar
shaped particles

TOP PARTICLE SIZE:

130 microns

PSD:

% finer than	
100% -	130 u
99.5 -	74
92.0 -	30
62.5 -	15
48.0 -	10
37.0 -	6
31.0 -	4
26.0 -	2

OIL ABSORPTION:

62 KU

WATER ABSORPTION:

52 KU

REFLECTANCE:

A: 77
B: 50

pH:

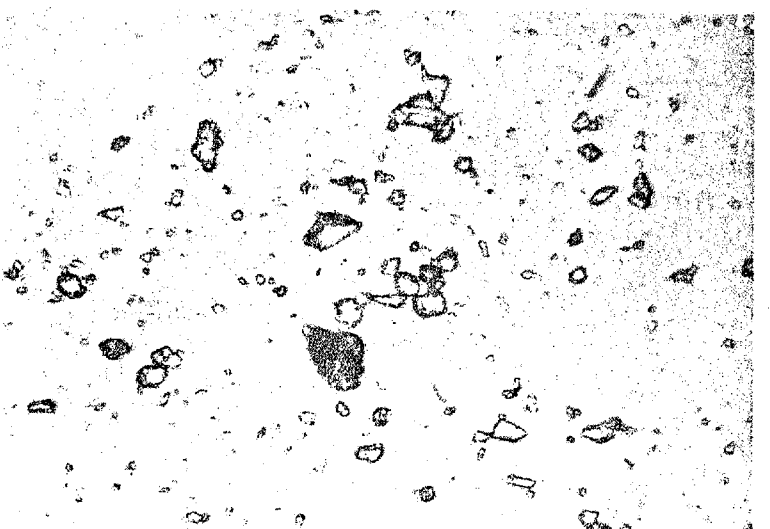
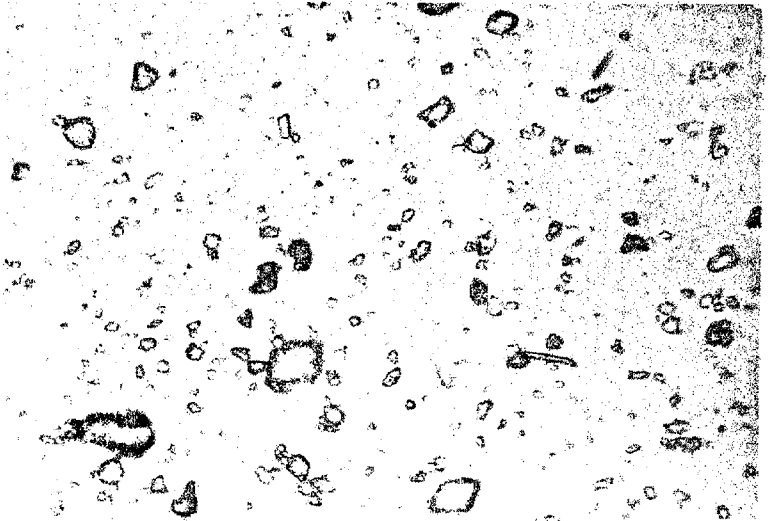
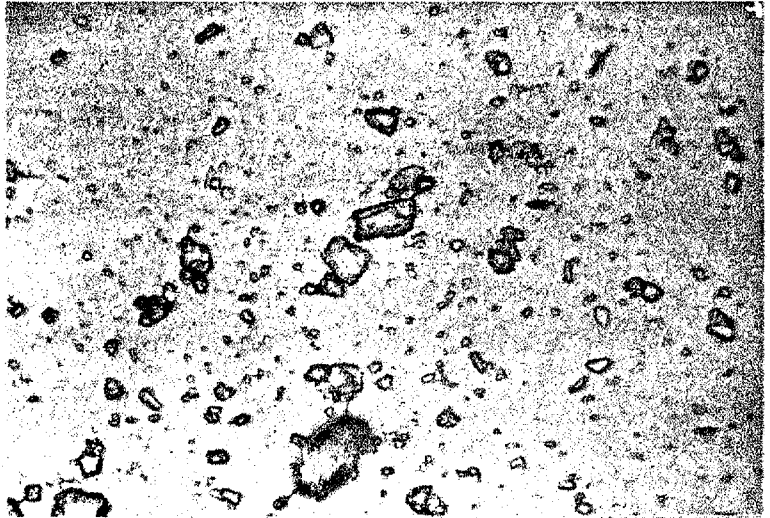
8.3 to 8.9

WATER SOL. SALTS:

2.65%

PACKING INDEX:

1.13



September 28, 1960

W-12, LOW MICRON BARYTES

CHEMICAL DESCRIPTION:

Barium Sulfate - BaSO_4

PHYSICAL DESCRIPTION:

Heterogenous, roughly
hewn particles

TOP PARTICLE SIZE:

20 microns

PSD:

% finer than
100% - 20 u
97.0 - 15
88.5 - 10
68.5 - 6
48.0 - 4
28.0 - 2

OIL ABSORPTION:

61 KU

WATER ABSORPTION:

47 KU

REFLECTANCE:

A: 92
B: 75

pH:

5.0 to 7.0

WATER SOL. SALTS:

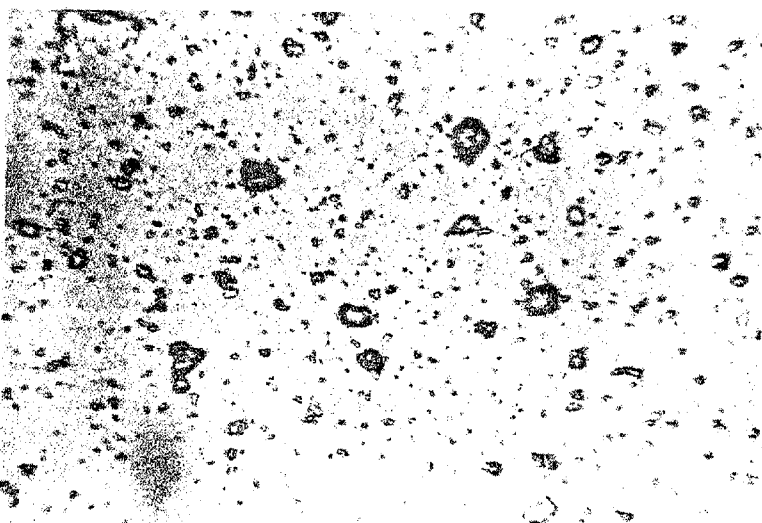
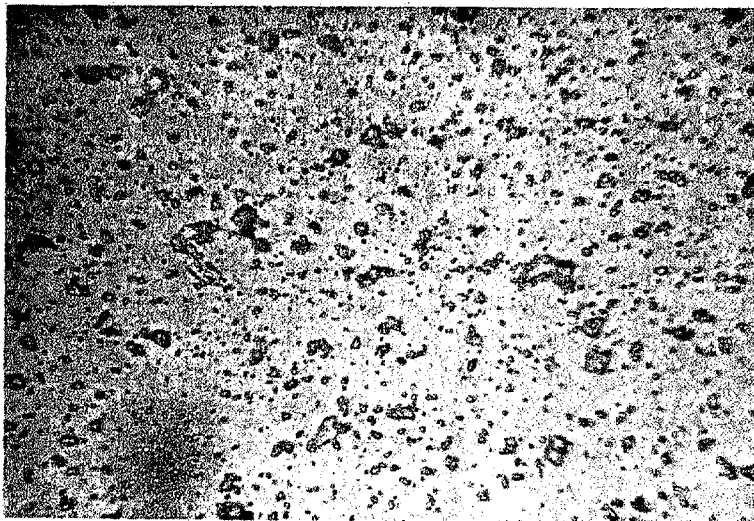
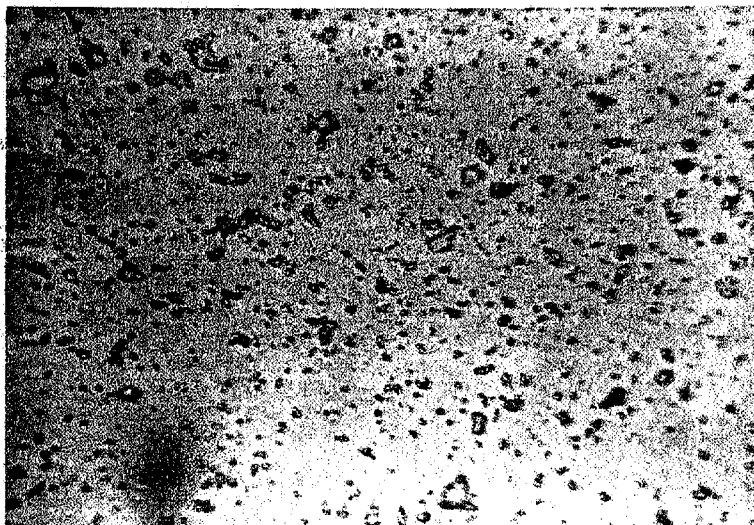
0.06%

SODIUM:

0.005% max.

PACKING INDEX:

1.28



September 28, 1960

W-31, CRYSTALLINE SILICA

CHEMICAL DESCRIPTION:

Silicon Dioxide-SiO₂

PHYSICAL DESCRIPTION:

Irregular shaped nodular-like particles

TOP PARTICLE SIZE:

110 microns

PSD:

% finer than	
100%	- 110 u
88.0	- 30
58.0	- 15
44.5	- 10
31.0	- 6
24.5	- 4
17.0	- 2

OIL ABSORPTION:

61 KU

WATER ABSORPTION:

49 KU

REFLECTANCE:

A: 75
B: 51

pH:

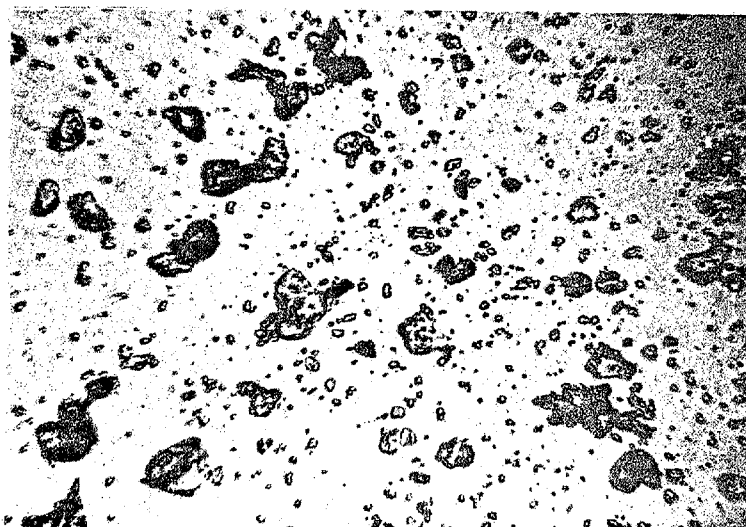
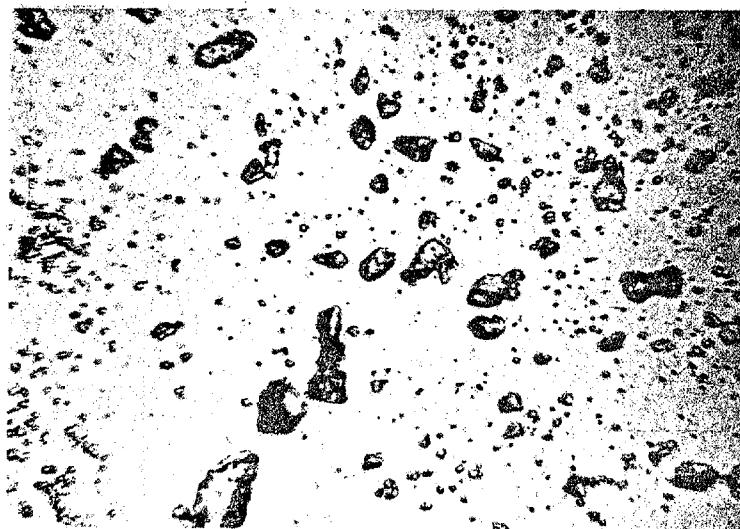
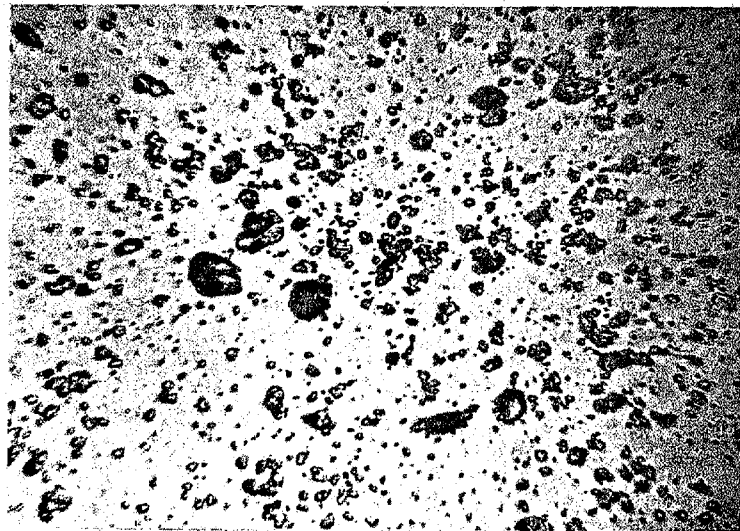
6.5 to 7.5

WATER SOL. SALTS

2.4%

PACKING INDEX:

1.21



September 28, 1960

W-44, DIATOMACEOUS EARTH

CHEMICAL DESCRIPTION:

Silicon Dioxide-SiO₂

PHYSICAL DESCRIPTION:

Acicular, nodular, and
lamellar particles includ-
ing many irregular shapes

TOP PARTICLE SIZE:

120 microns

PSD:

% finer than	
100% -	120 u
86.5 -	30
63.5 -	15
45.0 -	10
25.5 -	6
13.5 -	4
2.0 -	2

OIL ABSORPTION:

216 KU

WATER ABSORPTION:

193 KU

REFLECTANCE:

A: 75
B: 46

pH:

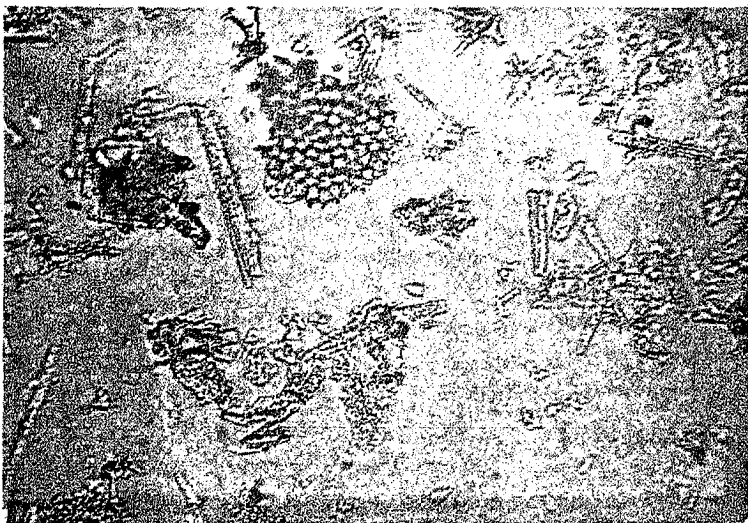
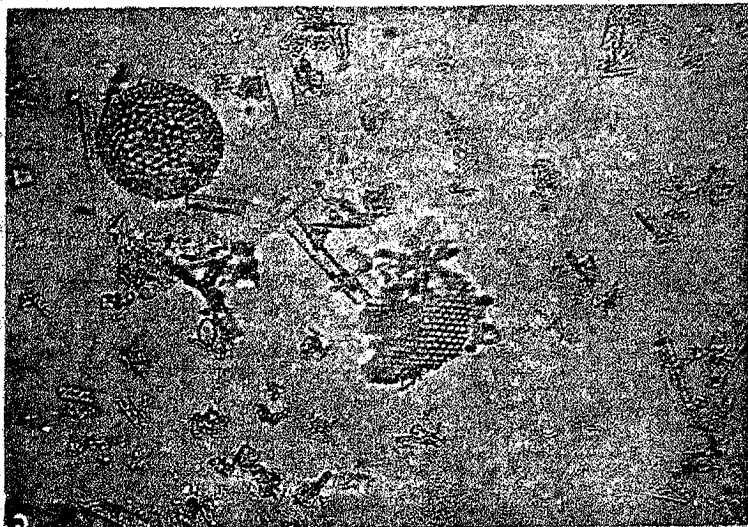
7.0 min.

WATER SOL. SALTS

0.24%

PACKING INDEX:

0.23



September 28, 1960

W-47, ENGLISH CHINA CLAY

CHEMICAL DESCRIPTION:

Complex Aluminum
Silicate

PHYSICAL DESCRIPTION:

Heterogenous lamellar
and tabular shaped
particles

TOP PARTICLE SIZE:

44 microns

PSD:

% finer than
100% - 44 u
98.8 - 30
96.5 - 15
91.0 - 10
81.5 - 6
73.0 - 4
61.0 - 2

OIL ABSORPTION:

101 KU

WATER ABSORPTION:

69 KU

REFLECTANCE:

A: 75
B: 50

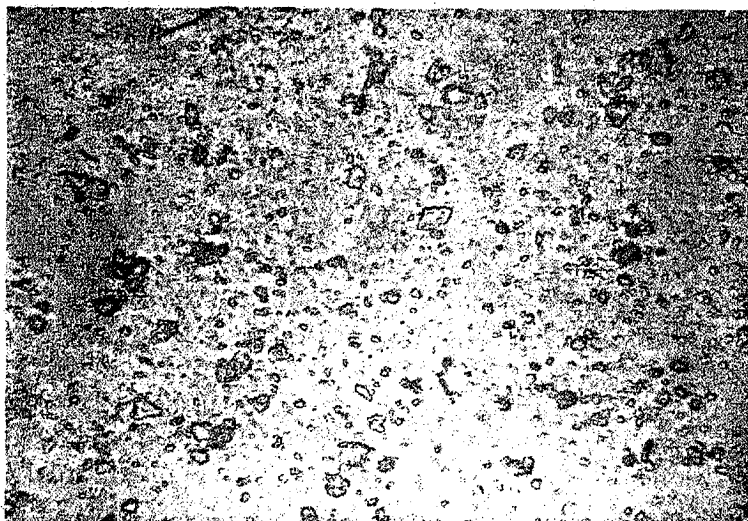
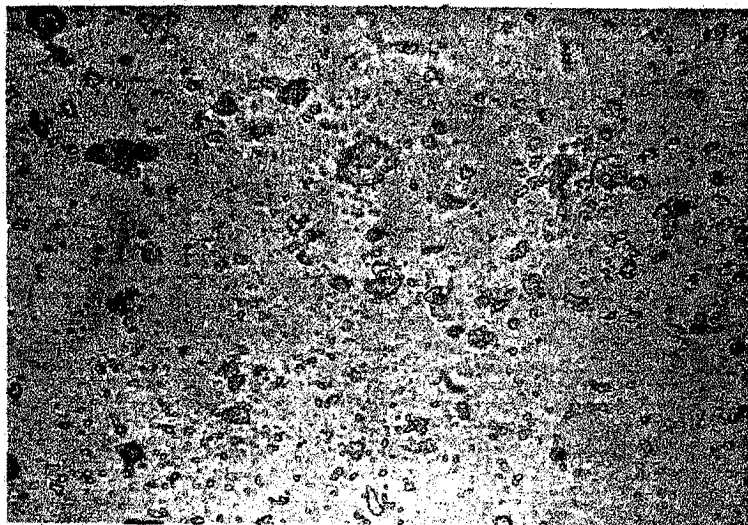
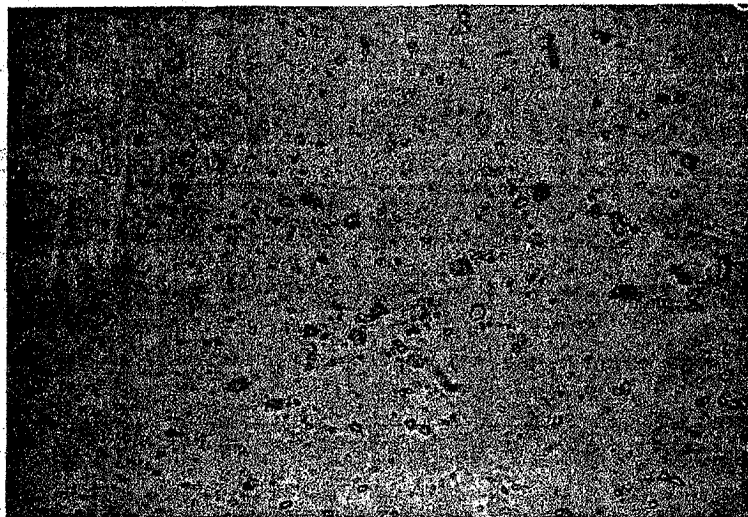
pH

5.0 to 6.0

WATER SOL. SALTS:

0.12%

PACKING INDEX:



September 28, 1960

W-71, MINERALITE #3-X

CHEMICAL DESCRIPTION:

Complex Potassium Aluminum
Silicate (Muscovite type
mica)

PHYSICAL DESCRIPTION:

Heterogenous mixture of
lamellar type particles

TOP PARTICLE SIZE:

175 microns

PSD:

% finer than	
100%	- 175 u
81.5	- 30
57.0	- 15
42.0	- 10
28.5	- 6
20.0	- 4
11.5	- 2

OIL ABSORPTION:

65 KU

WATER ABSORPTION:

52 KU

REFLECTANCE:

A: 58
B: 33

pH:

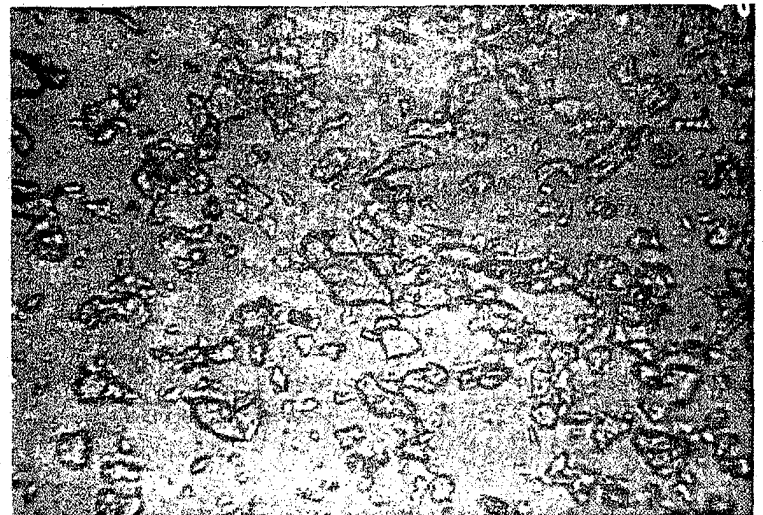
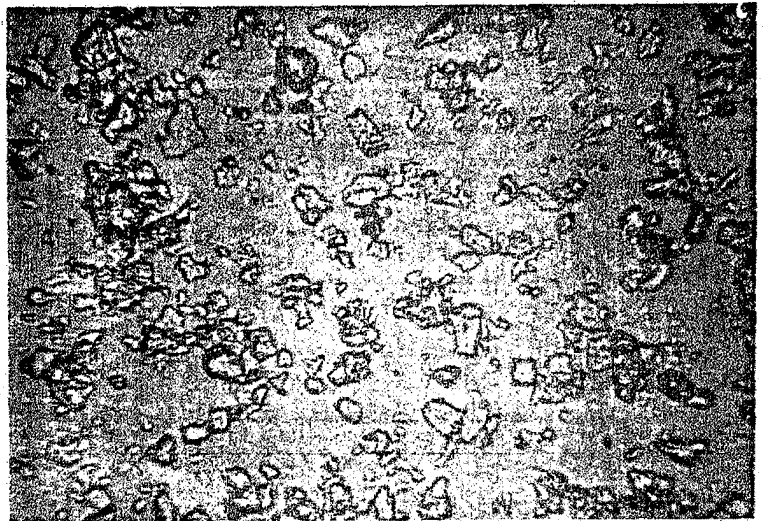
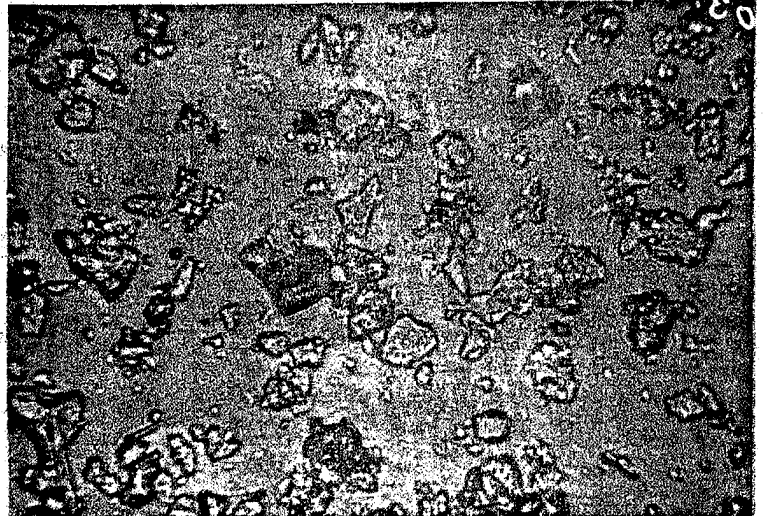
5.0 to 6.0

WATER SOL. SALTS:

0.02%

PACKING INDEX:

0.80



September 28, 1960

W-88, WET GROUND MICA

CHEMICAL DESCRIPTION:

Complex Potassium
Aluminum Silicate

PHYSICAL DESCRIPTION:

Very thin lamellar
type particles

TOP PARTICLE SIZE:

130 microns

PSD:

% finer than
100% - 130 u
91.5 - 30
86.0 - 20
80.0 - 15
65.0 - 10
38.0 - 6
25.0 - 4
12.0 - 2

OIL ABSORPTION:

123 KU

WATER ABSORPTION:

120 KU

REFLECTANCE:

A: 50
B: 30

pH:

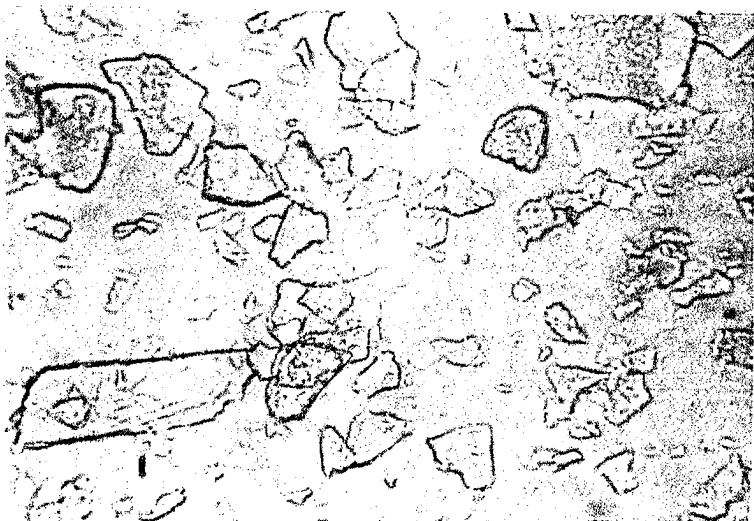
6.7 to 7.9

WATER SOL. SALTS:

0.17%

PACKING INDEX:

0.31



September 28, 1960

W-90, GILDER'S WHITING

CHEMICAL DESCRIPTION:

Calcium Carbonate -
 CaCO_3

PHYSICAL DESCRIPTION:

Roughly hewn nodular
and lamellar shaped
particles

TOP PARTICLE SIZE:

74 microns

PSD:

% finer than	
100%	- 74
82.5	- 30
50.5	- 15
35.0	- 10
22.5	- 6
16.5	- 4
10.0	- 2

OIL ABSORPTION:

61 KU

WATER ABSORPTION:

50 KU

REFLECTANCE:

A: 84
B: 69

pH:

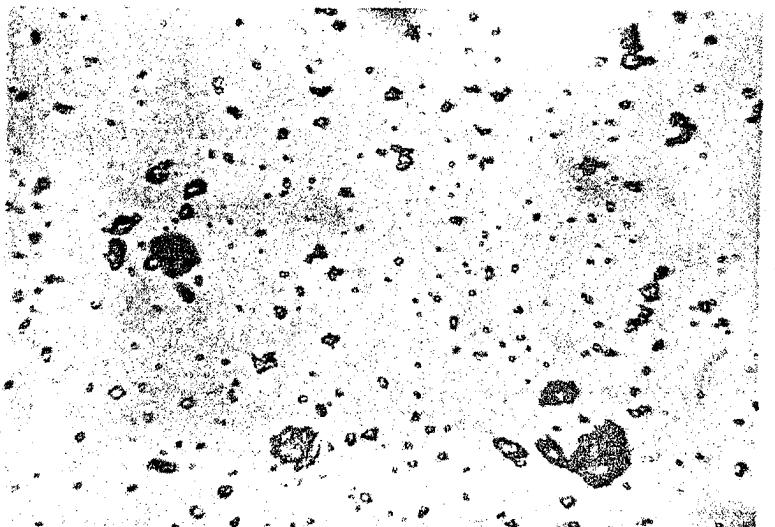
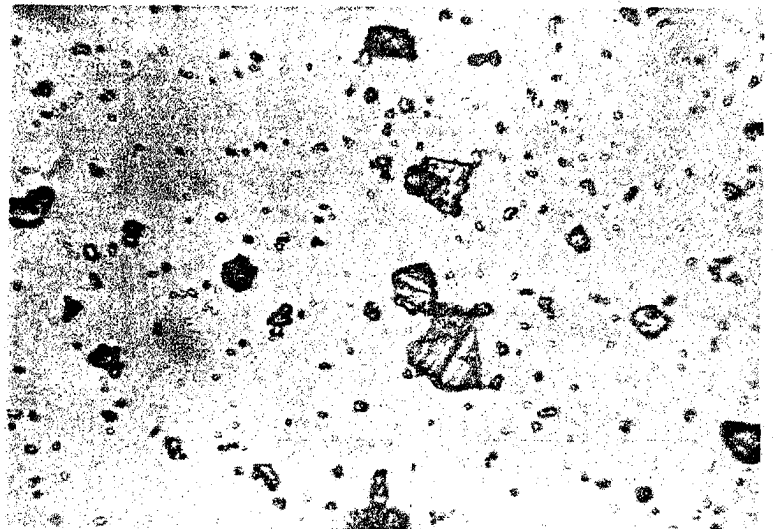
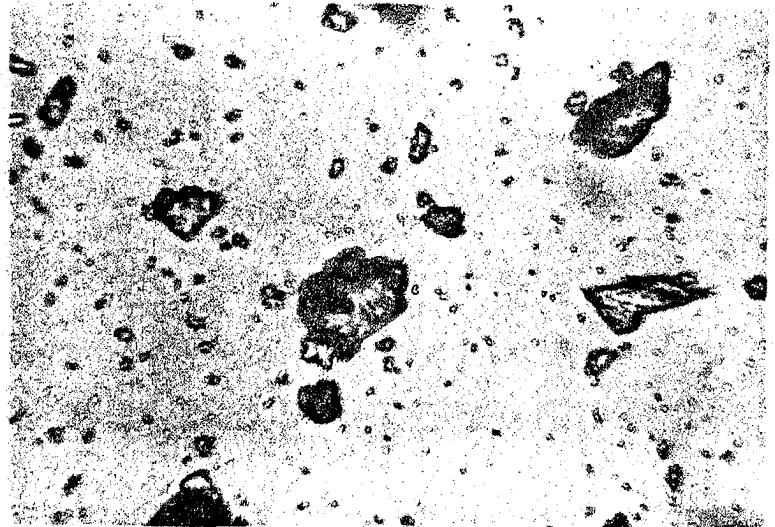
9.1 to 9.7

WATER SOL. SALTS:

0.06%

PACKING INDEX:

1.24



September 28, 1960

W-98, MAGNESIUM SILICATE

CHEMICAL DESCRIPTION:

Complex Magnesium Silicate
(Talc)

PHYSICAL DESCRIPTION:

Acicular and lamellar
shaped particles

TOP PARTICLE SIZE:

44 microns

PSD:

% finer than	
100%	- 44 u
96.0	- 30
78.0	- 15
63.0	- 10
41.5	- 6
31.0	- 4
20.0	- 2

OIL ABSORPTION:

72 KU

WATER ABSORPTION:

58 KU

REFLECTANCE:

A: 84
B: 64

pH:

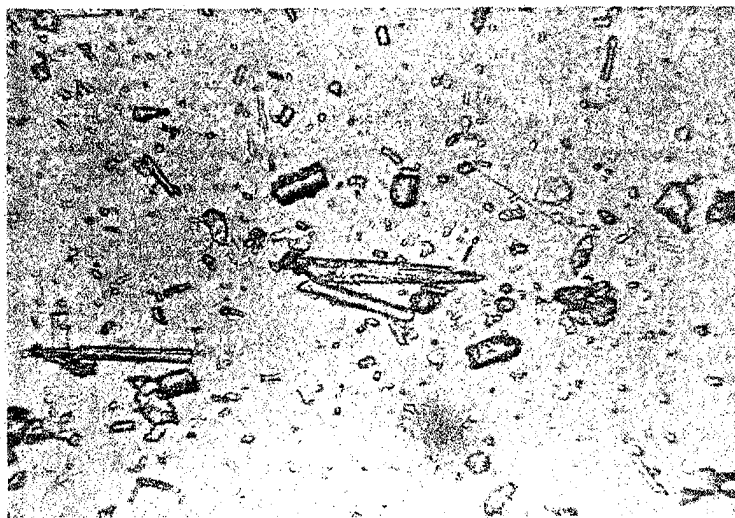
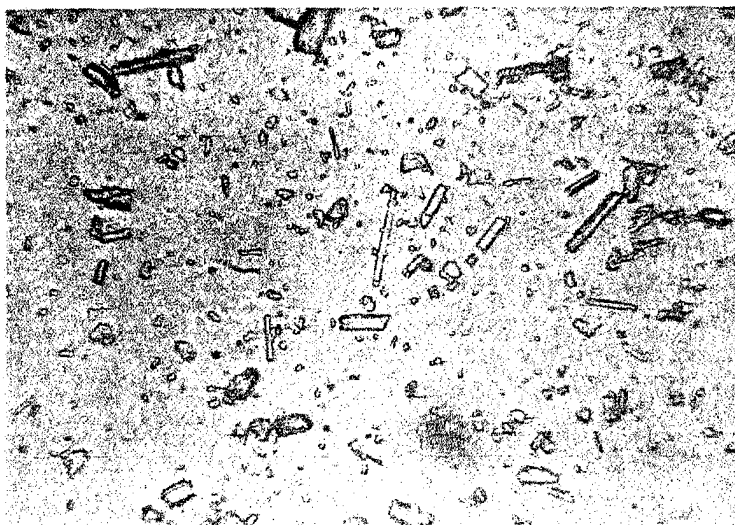
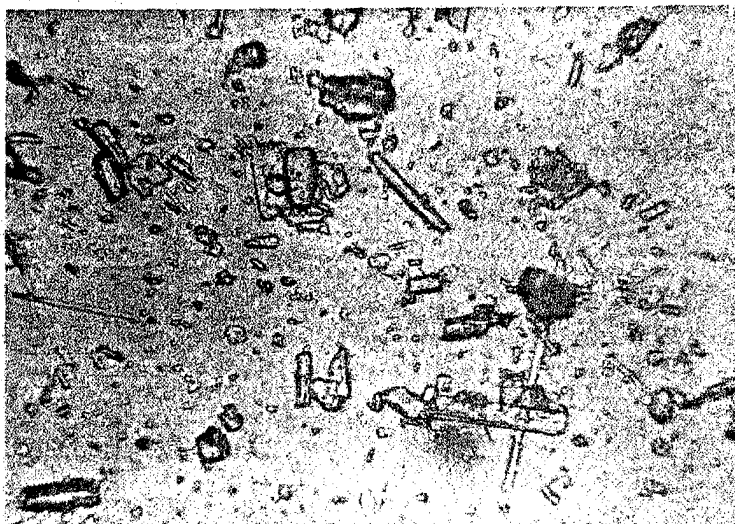
9.2 to 9.9

WATER SOL. SALTS:

0.15%

PACKING INDEX:

0.65



September 28, 1960

W-104, BARYTES

CHEMICAL DESCRIPTION:

Barium Sulfate, BaSO_4 ,
slightly contaminated
by Fe_2O_3

PHYSICAL DESCRIPTION:

Irregular shaped nodular
and lamellar particles

TOP PARTICLE SIZE:

53 microns

PSD:

% finer than
100% - 53
96.0 - 30
66.0 - 15
47.0 - 10
32.0 - 6
23.5 - 4
16.0 - 2

OIL ABSORPTION:

61 KU

WATER ABSORPTION

49 KU

REFLECTANCE:

A: 40
B: 19

pH:

7.8 to 8.6

WATER SOL. SALTS:

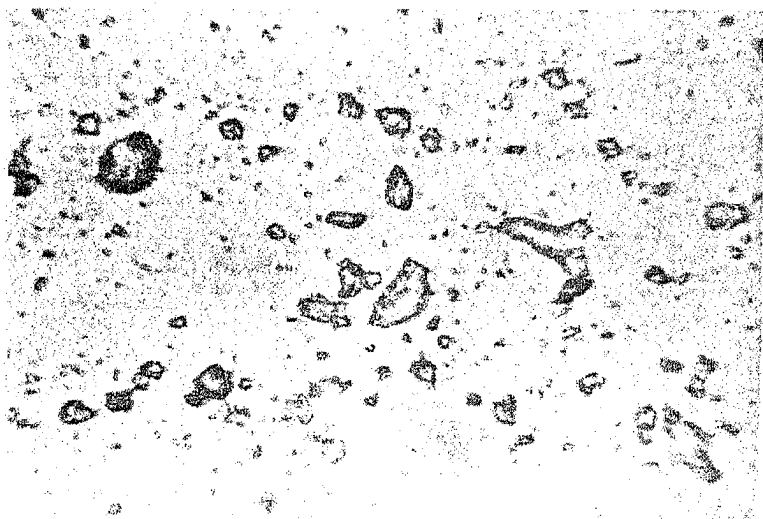
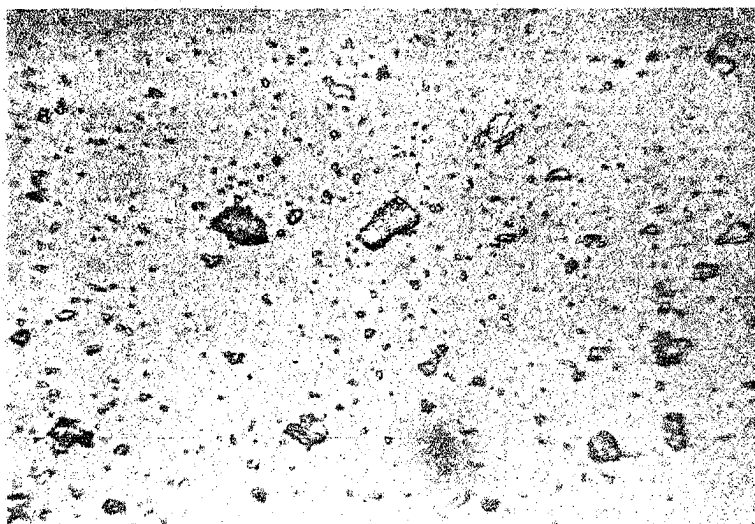
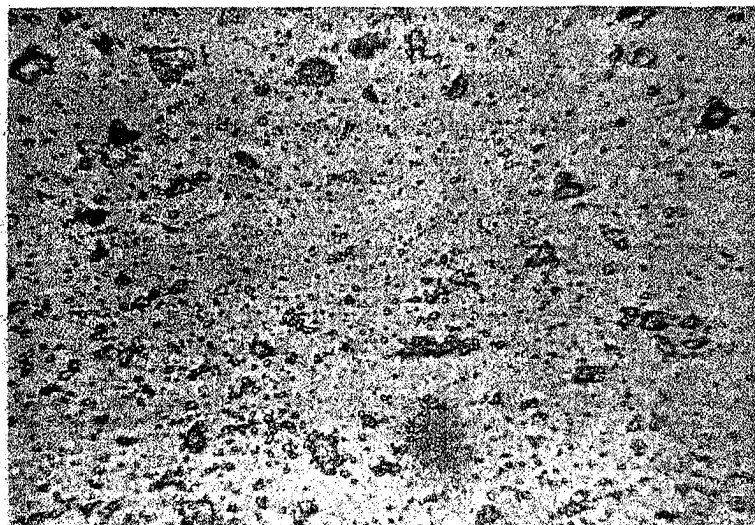
0.06%

SODIUM:

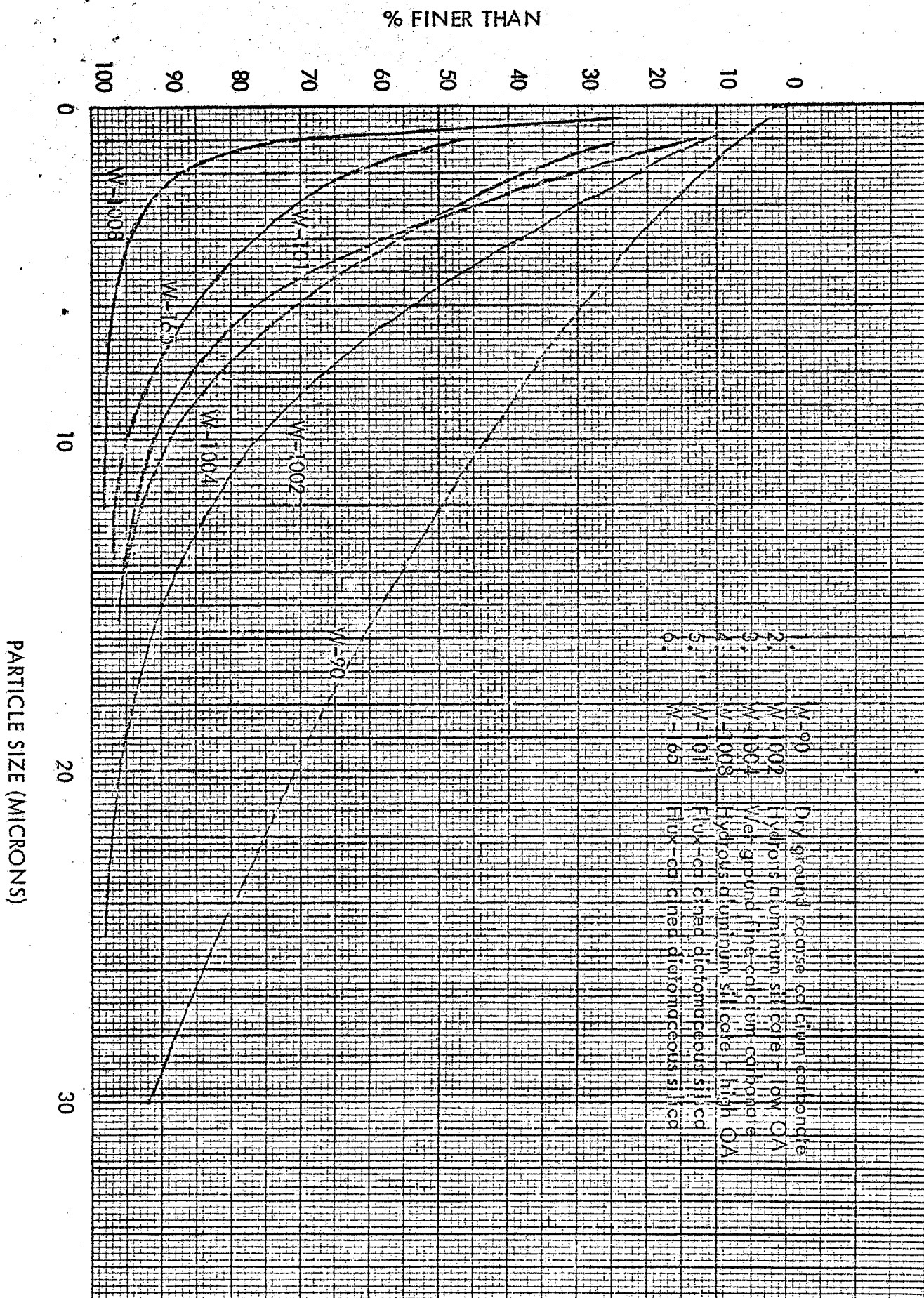
0.0035% max.

PACKING INDEX:

1.21



PARTICLE SIZE DISTRIBUTION OF SOME EXTENDERS



September 28, 1960

W-125, BLANC FIXE

CHEMICAL DESCRIPTION:

Barium Sulfate - BaSO_4

PHYSICAL DESCRIPTION:

Irregular, nodular-like particles

TOP PARTICLE SIZE:

44 microns

PSD:

% finer than	
100%	- 44 u
94.0	- 20
92.5	- 15
91.0	- 10
89.5	- 6
88.0	- 4
85.0	- 2

OIL ABSORPTION:

74 KU

WATER ABSORPTION:

61 KU

REFLECTANCE:

A: 98
B: 83

pH:

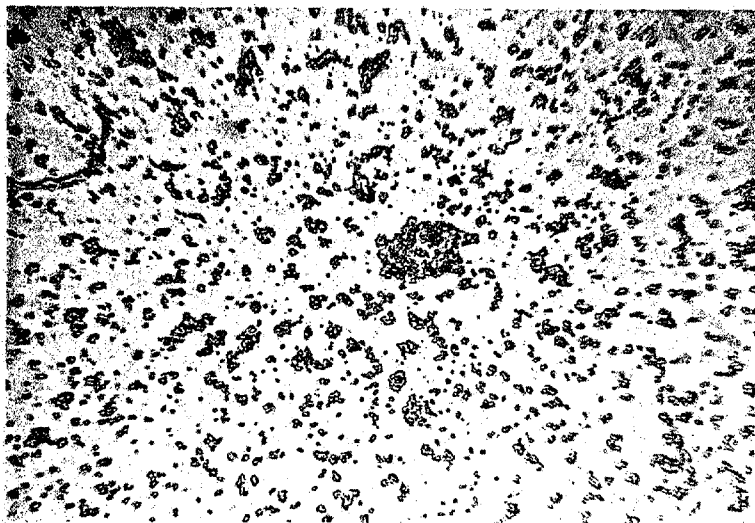
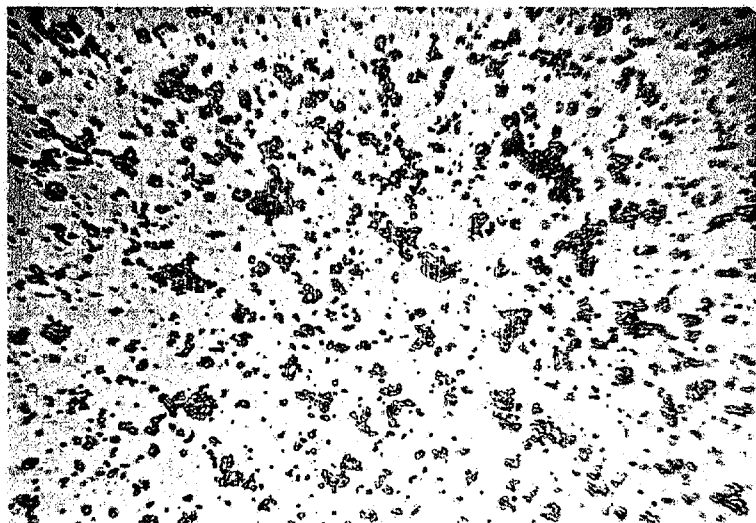
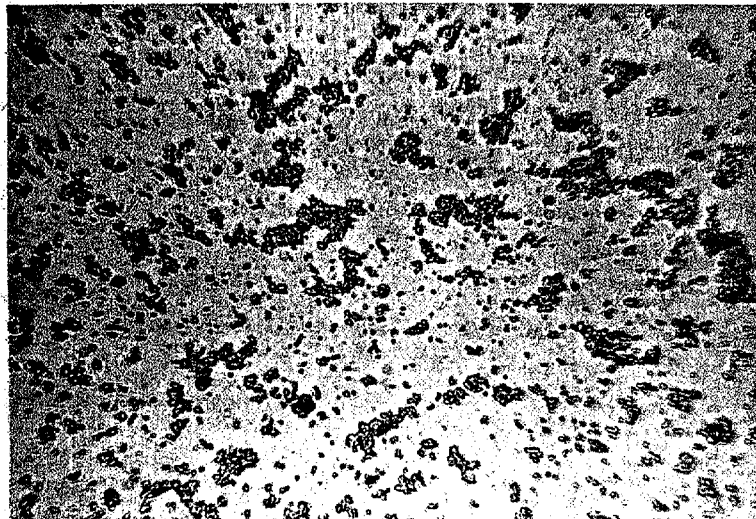
9.5 to 10.5

WATER SOL. SALTS:

0.09%

PACKING INDEX:

1.25



September 28, 1960

W-132, TALC

CHEMICAL DESCRIPTION:

Complex Magnesium
Silicate
(Talc)

PHYSICAL DESCRIPTION:

Heterogenous, lamellar
shaped particles

TOP PARTICLE SIZE:

74 microns

PSD:

% finer than
100% - 74
88.5 - 30
56.0 - 15
39.5 - 10
26.0 - 6
18.0 - 4
10.0 - 2

OIL ABSORPTION:

80 KU

WATER ABSORPTION:

61 KU

REFLECTANCE:

A: 56
B: 32

pH:

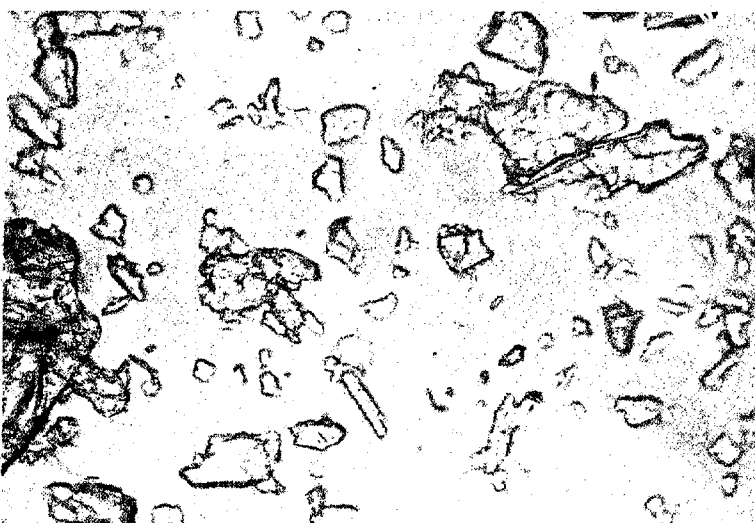
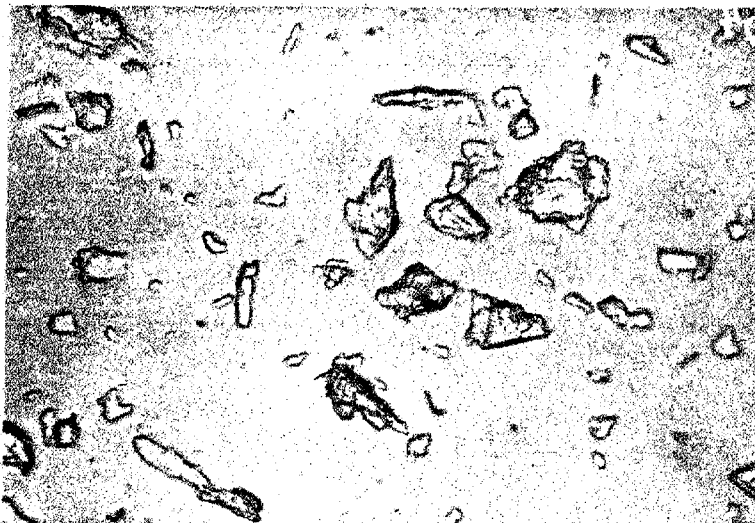
9.0 to 9.6

WATER SOL. SALTS:

0.11%

PACKING INDEX:

0.54



September 28, 1960

W-135, LOW MICRON TALC

CHEMICAL DESCRIPTION:

Complex Magnesium Silicate

PHYSICAL DESCRIPTION:

Heterogenous, lamellar shaped particles

TOP PARTICLE SIZE:

44 microns

PSD:

% finer than	
100%	- 44 u
97.5	- 30
95.0	- 15
86.5	- 10
68.0	- 6
48.5	- 4
26.5	- 2

OIL ABSORPTION:

104 KU

WATER ABSORPTION:

75 KU

REFLECTANCE:

A: 67
B: 42

pH:

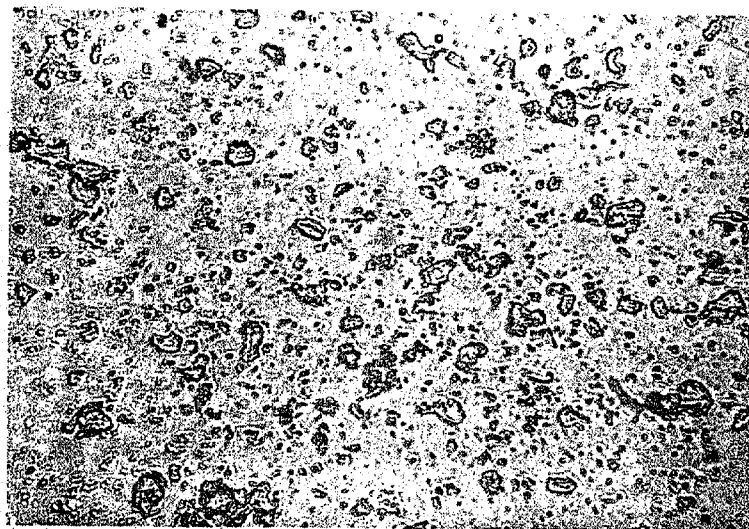
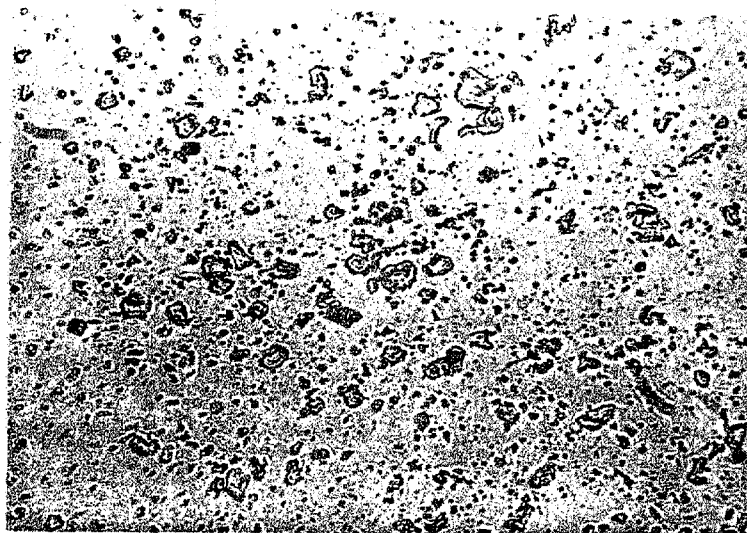
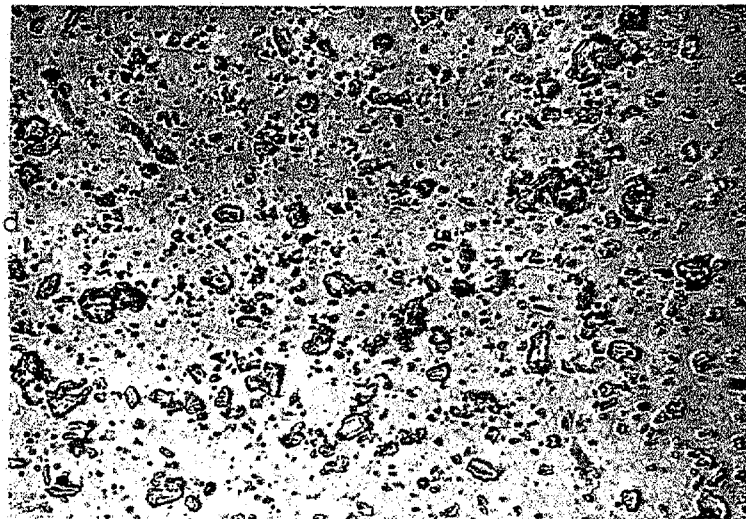
9.3 to 9.8

WATER SOL. SALTS:

0.24%

PACKING INDEX:

0.43



September 28, 1960

W-138, MICRONIZED TALC

CHEMICAL DESCRIPTION:

Complex Magnesium Silicate
(Talc)

PHYSICAL DESCRIPTION:

Heterogenous, lamellar
shaped particles

TOP PARTICLE SIZE:

30 microns

PSD:

% finer than	
100% -	30 u
97.0 -	15
95.0 -	10
86.0 -	6
73.0 -	4
48.0 -	2

OIL ABSORPTION:

144 KU

WATER ABSORPTION:

104 KU

REFLECTANCE:

A: 78
B: 55

pH:

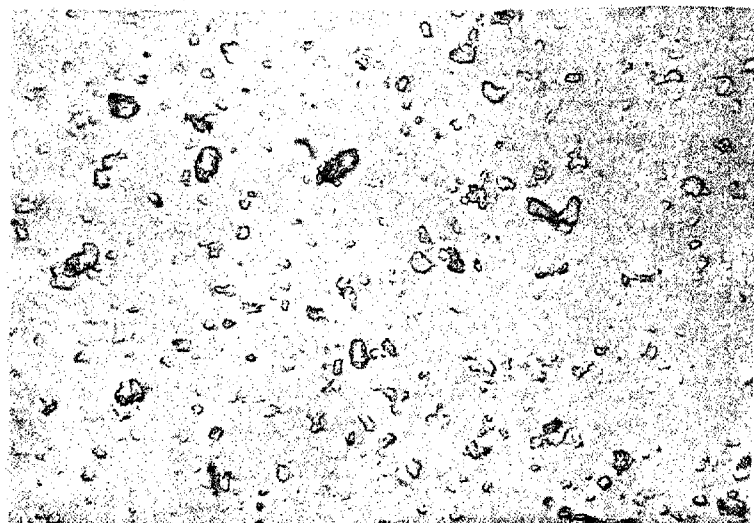
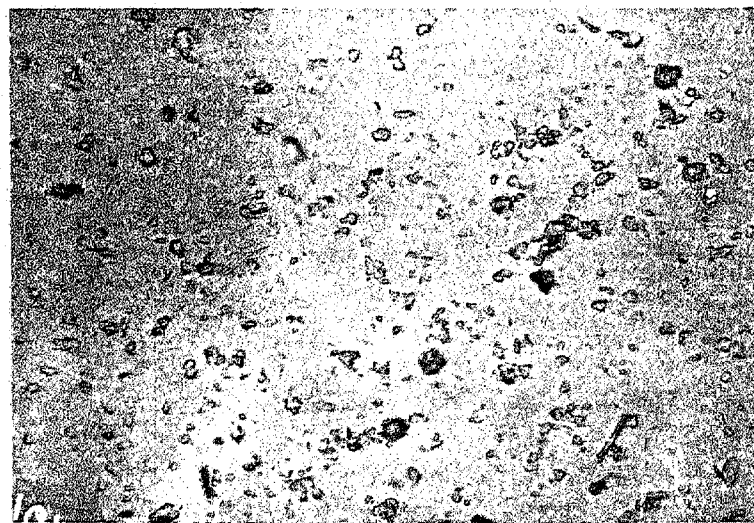
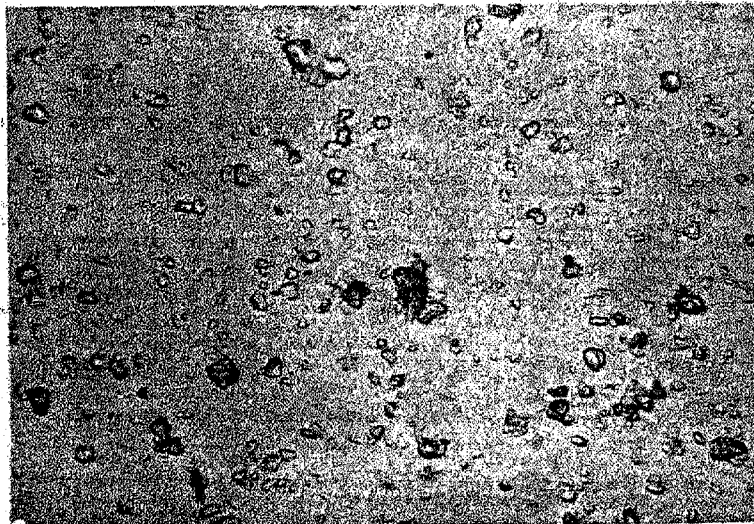
8.8 to 9.8

WATER SOL. SALTS:

0.66%

PACKING INDEX:

0.32



September 28, 1960

W-139, AMORPHOUS SILICA

CHEMICAL DESCRIPTION:

Amorphous Silica-99% SiO_2

PHYSICAL DESCRIPTION:

Irregular shaped nodular
and lamellar particles

TOP PARTICLE SIZE:

53 microns

PSD:

% finer than	
100%	53 u
91.0%	30
81.5	20
71.5	15
57.5	10
45.0	6
34.0	4
22.0	2

OIL ABSORPTION:

63 KU

WATER ABSORPTION:

54 KU

REFLECTANCE:

A: 75
B: 49

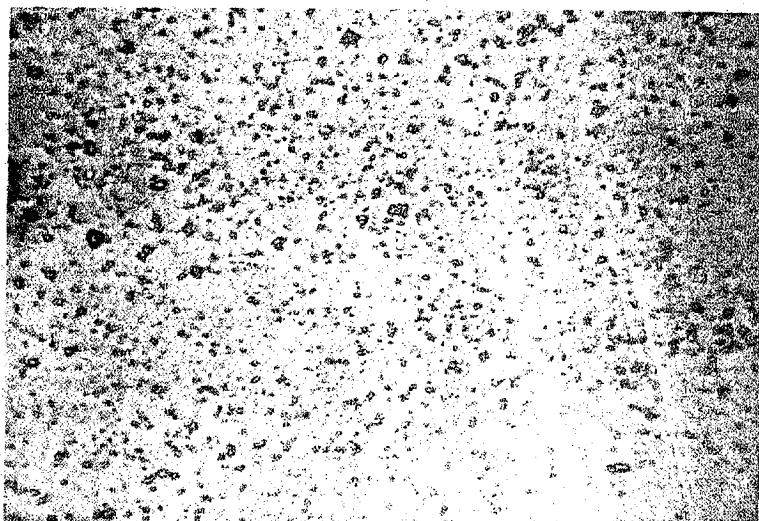
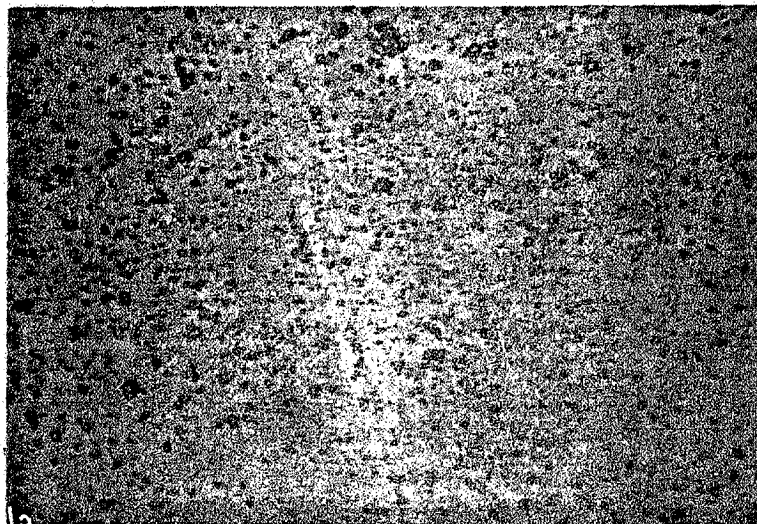
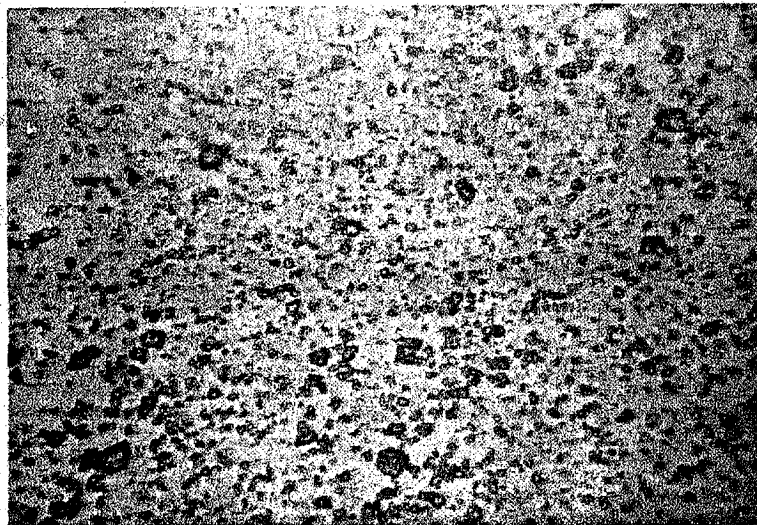
pH:

6.5 to 7.5

WATER SOL. SALTS:

0.54%

PACKING INDEX:



September 28, 1960

W-144, WOLLASTONITE P-1

CHEMICAL DESCRIPTION:

Complex Calcium Silicate

PHYSICAL DESCRIPTION:

Acicular and lamellar
shaped particles

TOP PARTICLE SIZE:

200 microns

PSD:

% finer than	
100% -	200 u
99.9 -	74
88.0 -	30
53.0 -	15
37.0 -	10
23.0 -	6
16.0 -	4
9.0 -	2

OIL ABSORPTION:

63 KU

WATER ABSORPTION:

52 KU

REFLECTANCE:

A: 86
B: 68

pH:

9.7 to 10.3

WATER SOL. SALTS:

0.48%

PACKING INDEX:

0.87



September 28, 1960

W-165, DIATOMACEOUS EARTH

CHEMICAL DESCRIPTION:

Silicon Dioxide-SiO₂

PHYSICAL DESCRIPTION:

Acicular, nodular, and
lamellar particles plus many
irregular shapes

TOP PARTICLE SIZE:

53 microns

PSD:

% finer than	
100%	- 53 u
97.5	- 15
95.0	- 10
85.0	- 6
78.0	- 4
62.0	- 2

OIL ABSORPTION:

188 KU

WATER ABSORPTION:

162 KU

REFLECTANCE:

A: 35
B: 7

pH:

5.0 to 7.0

ASH CONTENT:

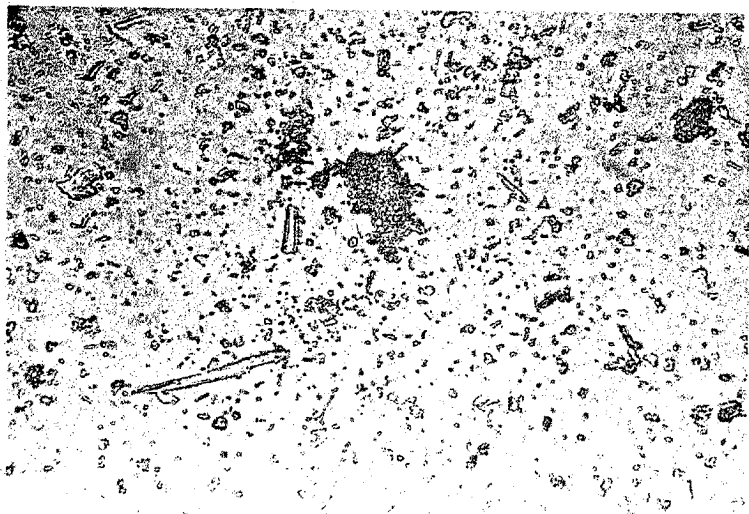
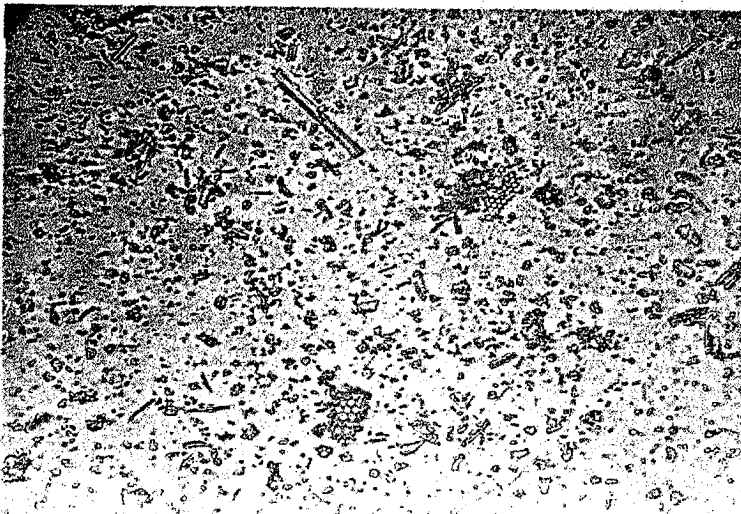
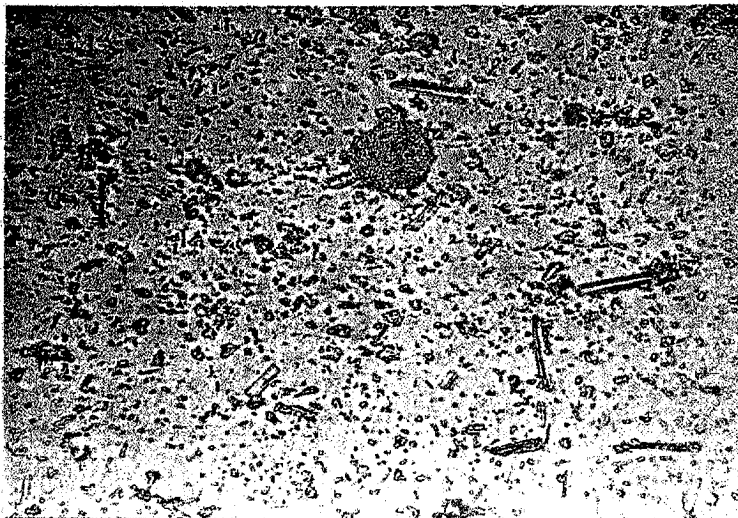
80% min.

WATER SOL. SALTS:

0.39%

PACKING INDEX:

0.38



September 28, 1960

W-1002, ALUMINUM SILICATE

CHEMICAL DESCRIPTION:

Complex Aluminum Silicate

PHYSICAL DESCRIPTION:

Lamellar and tabular
particles including
laminated plates

TOP PARTICLE SIZE:

53 microns

PSD:

% finer than
100% - 53 u
98.0 - 30
90.0 - 15 -
77.0 - 10
53.0 - 6 -
38.0 - 4
21.0 - 2

OIL ABSORPTION:

68 KU

WATER ABSORPTION:

59 KU

REFLECTANCE:

A: 74
B: 53

pH:

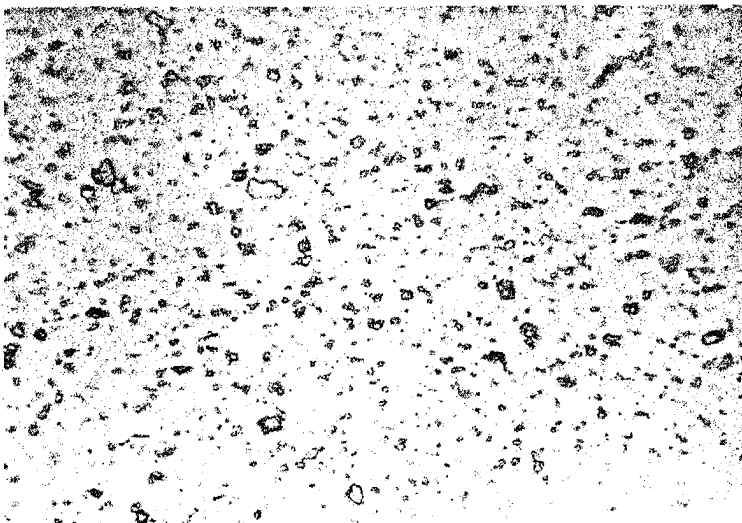
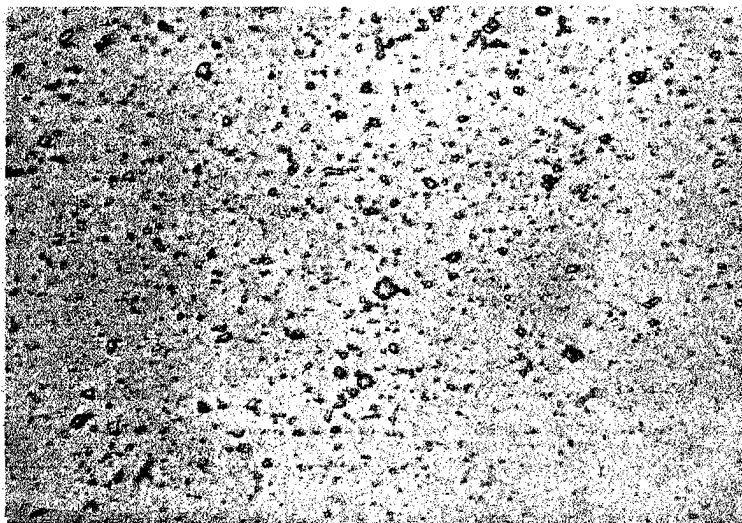
3.8 to 4.6

WATER SOL. SALTS:

0.09%

PACKING INDEX:

0.80



September 28, 1960

W-1004, GAMACO

CHEMICAL DESCRIPTION:

Water ground Calcium
Carbonate- CaCO_3

PHYSICAL DESCRIPTION:

Nodular and lamellar
shaped particles

TOP PARTICLE SIZE:

40 microns

PSD:

% finer than	
100%	- 40 u
99.0	- 30
96.5	- 15
89.5	- 10
71.0	- 6
55.0	- 4
36.0	- 2

OIL ABSORPTION:

70 KU

WATER ABSORPTION:

54 KU

REFLECTANCE:

A: 94
B: 74

pH:

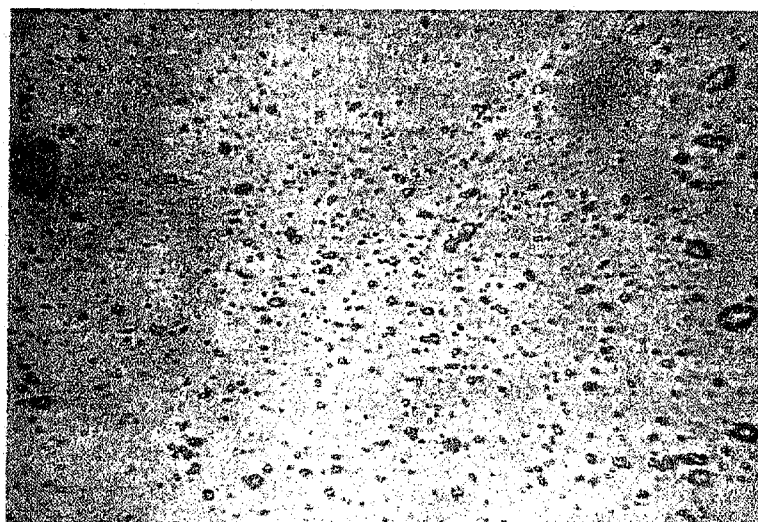
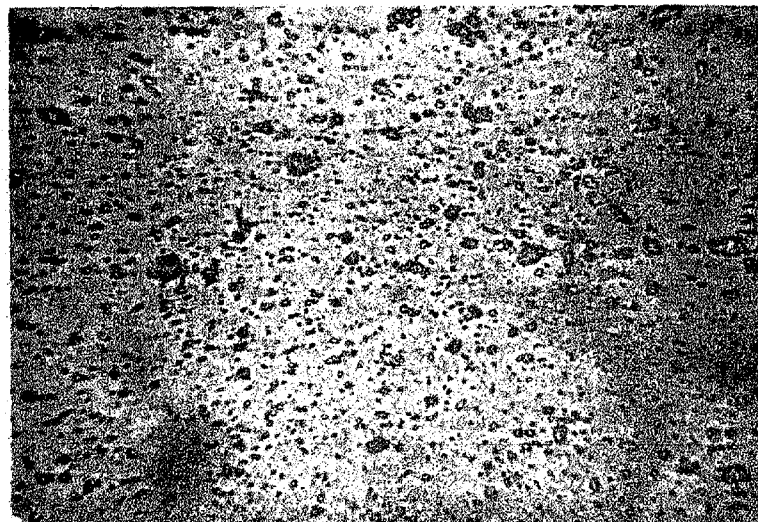
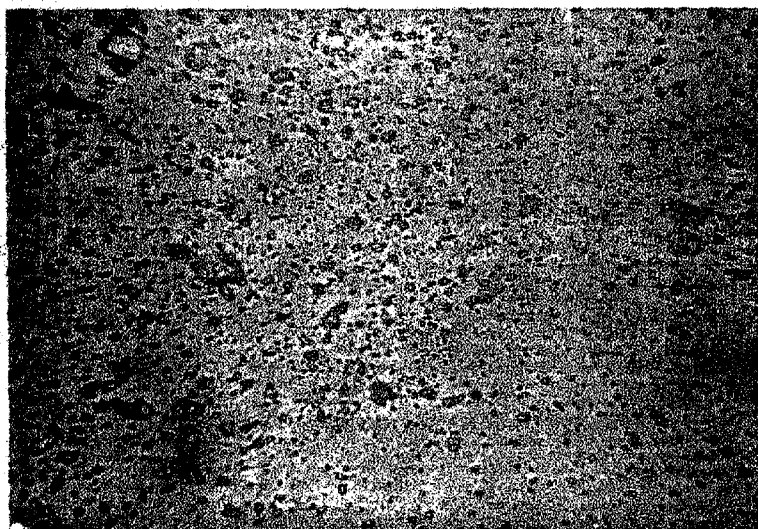
8.7 to 9.5

WATER SOL. SALTS:

0.09%

PACKING INDEX:

1.52



September 28, 1960

W-1005, KALMAC

CHEMICAL DESCRIPTION:

Water ground Calcium
Carbonate - CaCO_3

PHYSICAL DESCRIPTION:

Nodular and lamellar
shaped particles

TOP PARTICLE SIZE:

44 microns

PSD:

% finer than	
100%	- 44 u
94.0	- 30
74.0	- 15
58.0	- 10
40.0	- 6
32.0	- 4
23.0	- 2

OIL ABSORPTION:

67 KU

WATER ABSORPTION:

52 KU

REFLECTANCE:

A: 92
B: 74

pH:

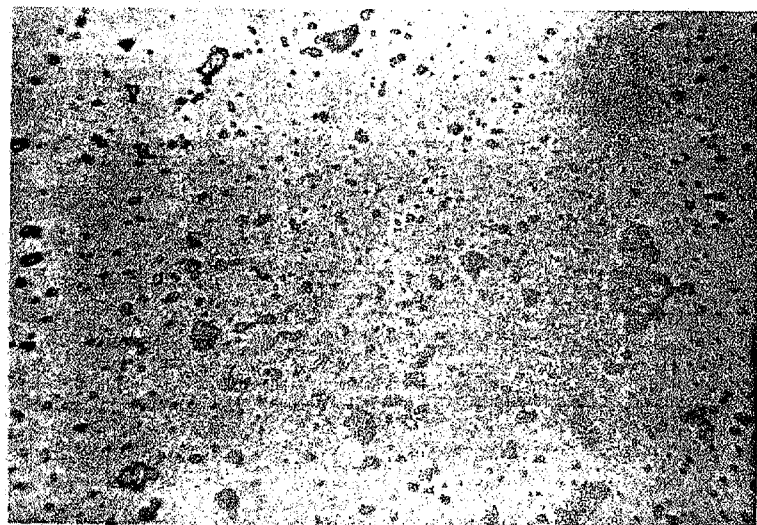
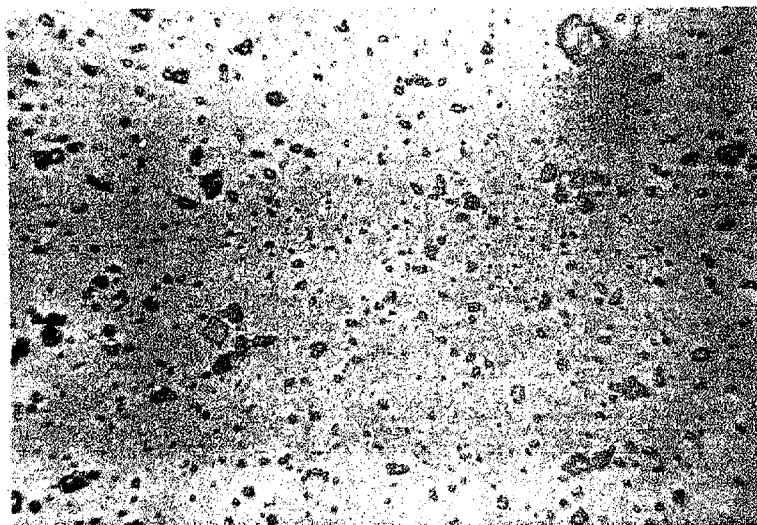
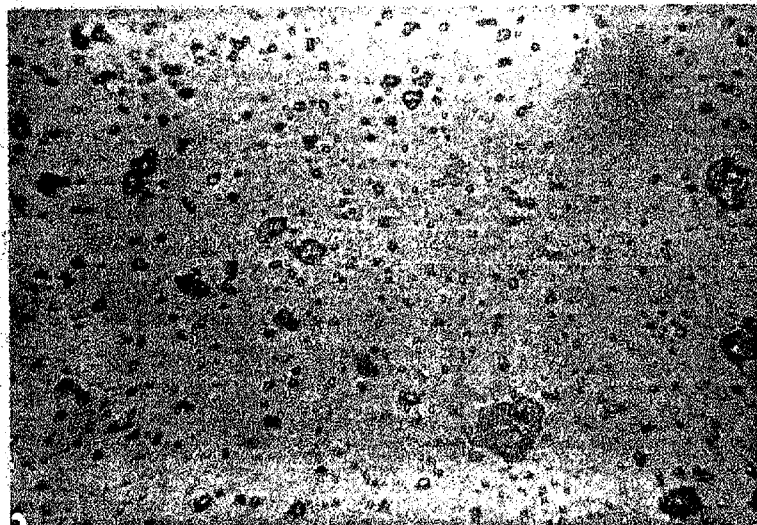
9.2 to 9.4

WATER SOL. SALTS:

0.04%

PACKING INDEX:

1.43



September 28, 1960

W-1008, ALUMINUM SILICATE

CHEMICAL DESCRIPTION:

Complex Aluminum Silicate

PHYSICAL DESCRIPTION:

Lamellar and tabular
shaped particles

TOP PARTICLE SIZE:

44 microns

PSD:

% finer than	
100%	- 44 u
99.2	- 30
98.8	- 15
98.5	- 10
97.0	- 6
95.0	- 4
89.0	- 2

OIL ABSORPTION:

108 KU

WATER ABSORPTION:

94

REFLECTANCE:

A: 84
B: 65

pH:

3.8 to 4.6

WATER SOL. SALTS:

0.14 %

SODIUM:

0.005% max.

PACKING INDEX:

0.74

