BOWEN ENGINEERING, *Inc.*

SPECIALISTS IN SPRAY DRYING EQUIPMENT SINCE 1926

NORTH BRANCH · NEW JERSEY
TEL. RANDOLPH 5-3232

June 28, 1963

E. I. Du Pont de Nemours
Newport, Delaware

Attention: Mr. A. M. Auster

Gentlemen:

This is to report spray drying test LB-63-2173, conducted on the Bowen Conical Bottom Laboratory Spray Dryer, located at North Branch Station, New Jersey, on June 19, 1963. Mr. A. M. Auster represented your firm when your organic red pigment was processed.

The test objective was to conduct exploratory drying trials on this material, preparing samples of material for customer evaluation purposes. The powder was to contain a minimum amount of moisture and be unaffected by the spray drying operation. The organic red pigment dried quite readily, and samples of material were prepared for the customer at a variety of dryer inlet gas temperatures and outlet gas temperatures. Apparently, obtaining material at the specified moisture of under one-half of a per cent, can be done using dryer inlet gas temperatures up to 700°F. The pigment was diluted to approximately 19 1/2% solids from a concentration of about 35% as received. This is necessary in this small test unit in order to get uniform feed flows to the atomizing nozzle while using a small gear pump to transfer the material. It is felt that in larger equipment that higher solids concentrations in the feed stock, can be held without impairing the atomization in drying of this material. A full evaluation of all these powders will be made by the customer in his own laboratory, guiding us in future spray drying work on this material.

TEST DISCUSSION

Feed Handling

The filter cake was blended and diluted, using our Waring Blender, in order to get a uniformly pumpable material. Efforts were made initially, to pump the material at above a thirty per cent solids level using our small gear pump. Due to the small suction line leading to the feed pump, flow of the material to the pump was restricted at the higher solids level. In order to be sure of having good control of the feed flow to the nozzle atomizing device, it was decided to dilute and blend the material so it is readily pumpable. The material was pumped from our calibrated

feed flask to the nozzle atomizing device, using a three-eighths inch Viking gear pump.

Test run discussion:

Spray drying runs were made over a wide range of dryer inlet and outlet gas temperatures in order to prepare samples for customer evaluation purposes. The dryer air volume was restricted when using the high inlet gas temperatures so as to cut down on the feed flow to the atomizing nozzle and so as to not overload the atomizing device. In general, very good drying temperatures and chamber conditions were noted and it is felt that a more viscous higher solid paste could have been atomized, if it had been pumpable with our small pumping device. The total recovery was quite low, and it is suspected that this is due to escape of fines through the cyclone collecor of the drying unit. The final product moistures are plotted on the test data sheet and they indicate that very adequate drying was done in all of the instances where the final moisture was checked.

All of the dried material was returned. When you have completed your evaluation of the samples, we would appreciate your completing and returning to us, the enclosed questionnaire, keeping one copy for your files. This questionnaire will aid us in future test work or equipment design for your materials.

Enclosed with this report is a summary of data obtained during these runs.

We wish to thank you for the opportunity of rendering you this test service. Should you desire further information concerning the application of your product, please contact our Mr. R. W. Bayliss, or our representative in your area, T. E. Grimac Company, 302 Marlton Pike, P. O. Box 7, Cherry Hill, New Jersey, Telephone: NO-3-4900. Our representative will contact you within a short time to arrange a meeting to review the test results and discuss future steps that you may wish to take.

Very truly yours,

BOWEN ENGINEERING, INC.

Richard S. De Hoff, Manager
Test & Development Department

RSD:dgd
Enc.-questionnaires

Test No: LB-63-2173
For: E. I. Du Pont de Nemours

Material: organic red pigment
June:28, 1963

TEST DATA SHEET

RUN NO.	1	2	3	4	5	6	7	8
FEED CONDITIONS:								
Identification	Organic red pigment →							
Feed Make-Up	Diluted and blended →							
Type	Slurry →							
Wt. % Solids	20.0 →		19.5 →					
Spec. Gravity	1.05 →		1.02 →					
Temperature °F	Room →							
Pressure (PSIG)	→							
Feed Rate cc/min.	80	130	200	245	260	450	350	450
Product Moisture Wt. %	0.0	---	---	0.2	0.1	0.4	NR	NR
OPERATING CONDITIONS:								
Inlet Temp. °F	400	400	500	500	500	600	600	700
Outlet Temp. °F	250	200	225	200	185	225	250	250
Type Heat	Direct gas →							
Atomizer Type	co-current two fluid nozzle →							
Atomizer Description	SS#5 →							
Air Press. PSIG	100 →							
Cold Air Utilization	None →							
Chamber Conditions	Light, dry accumulation brushed off →							
MATERIAL BALANCE:								
Cyclone Collector, GMS	130	80	255	270	270	190	190	315
Chamber Wall, GMS	10	10	25	25	20	20	15	20
Total Collected, GMS	140	900	280	295	290	210	205	335
Total Feed,	1000	600	1900	1900	1900	1250	1400	1900
Total Solids Fed, GMS	210	126	400	400	400	262	294	400