Designation: G 75 – 82

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Test Method for SLURRY ABRASIVITY BY MILLER NUMBER[1]

This standard is issued under the fixed designation G 75; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers a laboratory procedure for determining the slurry abrasivity of pumpable mixtures of liquid and solids. It is the intent of this test to produce a relative index or Miller Number that can be used to compare the effect of different slurries on the wear of the machinery and equipment used in the transportation of such material through pipelines.

1.2 Test results are used to calculate the rate of mass loss of duplicate standard metal blocks after having been run for a period of time in the slurry of interest.

1.3 A definite procedure to be followed is described so as to furnish reliable and reproducible results.[2]

2. Applicable Documents

2.1 *ASTM Standards:*

A 532 Specification for Abrasion-Resistant Cast Irons[3]

D 2240 Test Method for Rubber Property—Durometer Hardness[4]

E 11 Specification for Wire Cloth Sieves for Testing Purposes[5]

E 122 Recommended Practice for Choice of Sample Size to Estimate the Average Quality of a Lot or Process[5]

E 177 Recommended Practice for Use of the Terms Precision and Accuracy as Applied to Measurement of a Property of a Material[5]

G 40 Terminology Relating to Erosion and Wear[6]

2.2 *Standards of Other Organizations:*

MIL-R-6855C Rubber, Synthetic, Sheets, Strips, Molded or Extruded Shapes[7]

3. Summary of Method

3.1 The relative slurry abrasivity is determined by using the measured mass loss of a standard metal wear block, driven in a reciprocating motion by a rotating crank, riding in the bottom of a tray containing a slurry of 50 % by mass of the solids mixed in distilled water. A direct load is applied to the block. For each test, the bottom of the tray is equipped with a new piece of a sheet of neoprene[8] to act as a lap. The interior of the tray has a flat-bottomed V-shape formed by the filler, that confines the slurry particles to the path taken by the wear block. At one end of each stroke, the wear block is lifted off the lap by a cam action for sufficient time to allow fresh slurry material to flow under the block. The block holder is made of plastic, as are the trays, so that electrolysis inherent in certain slurries is eliminated.

4. Significance and Use

4.1 The Miller Number[9] is an index of the relative abrasivity of slurries. Experience has shown that slurries with a Miller Number of approximately 50 or lower are pumped with minimum abrasive damage to the system. Above a Miller Number of 50, precautions must be observed and greater damage from abrasion is to be expected. The Miller Number may be used to

[1] This test method is under the jurisdiction of ASTM Committee G-2 on Erosion and Wear and is the direct responsibility of Subcommittee G02.30 on Wear.

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[2] *Manual on Presentation of Data and Control Chart Analysis*, ASTM STP 15D, 1976.

[3] *1983 Annual Book of ASTM Standards*, Vol 01.02.

[4] *1983 Annual Book of ASTM Standards*, Vol 09.01.

[5] *1983 Annual Book of ASTM Standards*, Vol 14.02.

[6] *1983 Annual Book of ASTM Standards*, Vol 03.02.

[7] Available from Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, PA 19120.

[8] This is a registered trademark of E. I. du Pont de Nemours and Co., Wilmington, DE 19898.

[9] "The Miller Number—A New Slurry Rating Index," *AIME Paper 73-B-300*, SME Fall Meeting, Pittsburgh, PA, Sept 19–21, 1973.

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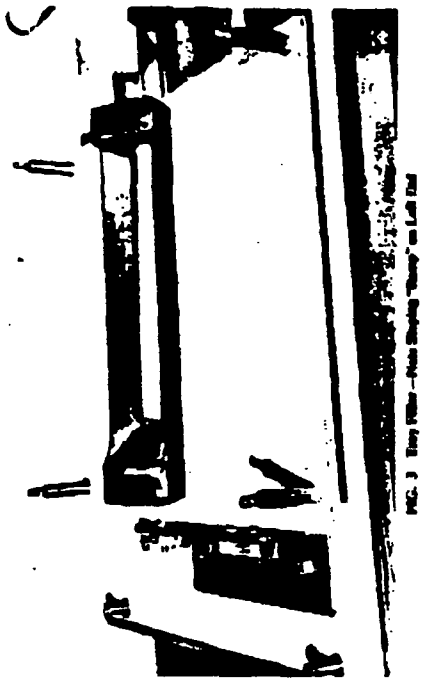

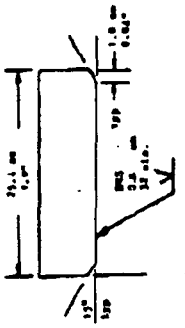

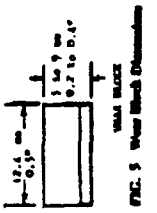

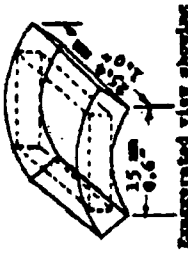

Exaggerated view showing how Wear Block is ground flat out of circular segment of cylinder, with abrading surface on original I.D. of cylinder.

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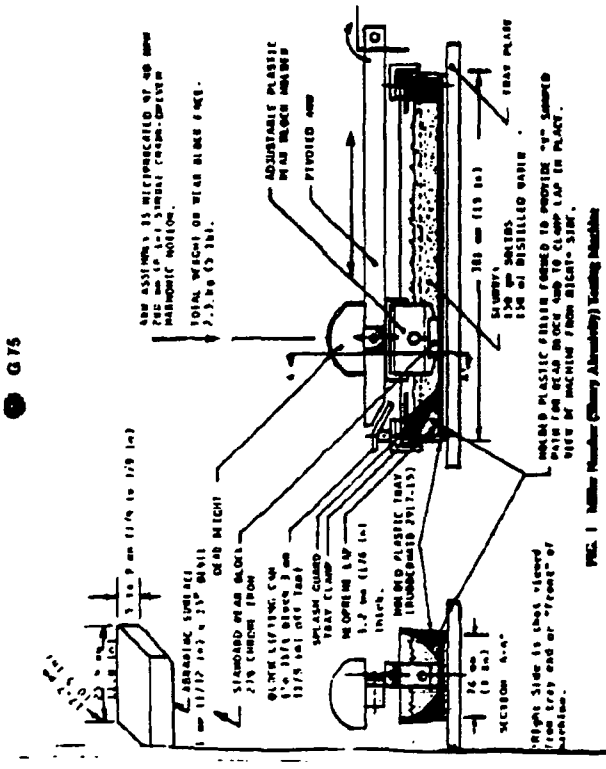

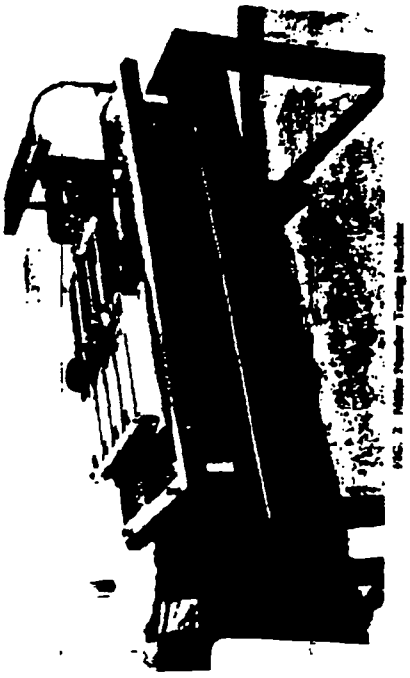

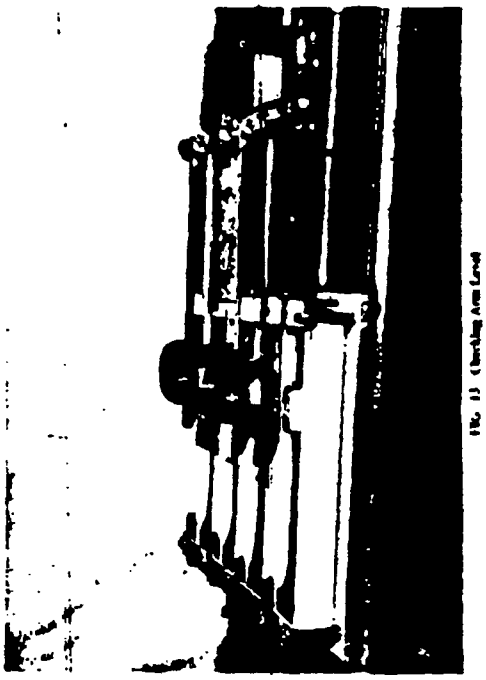

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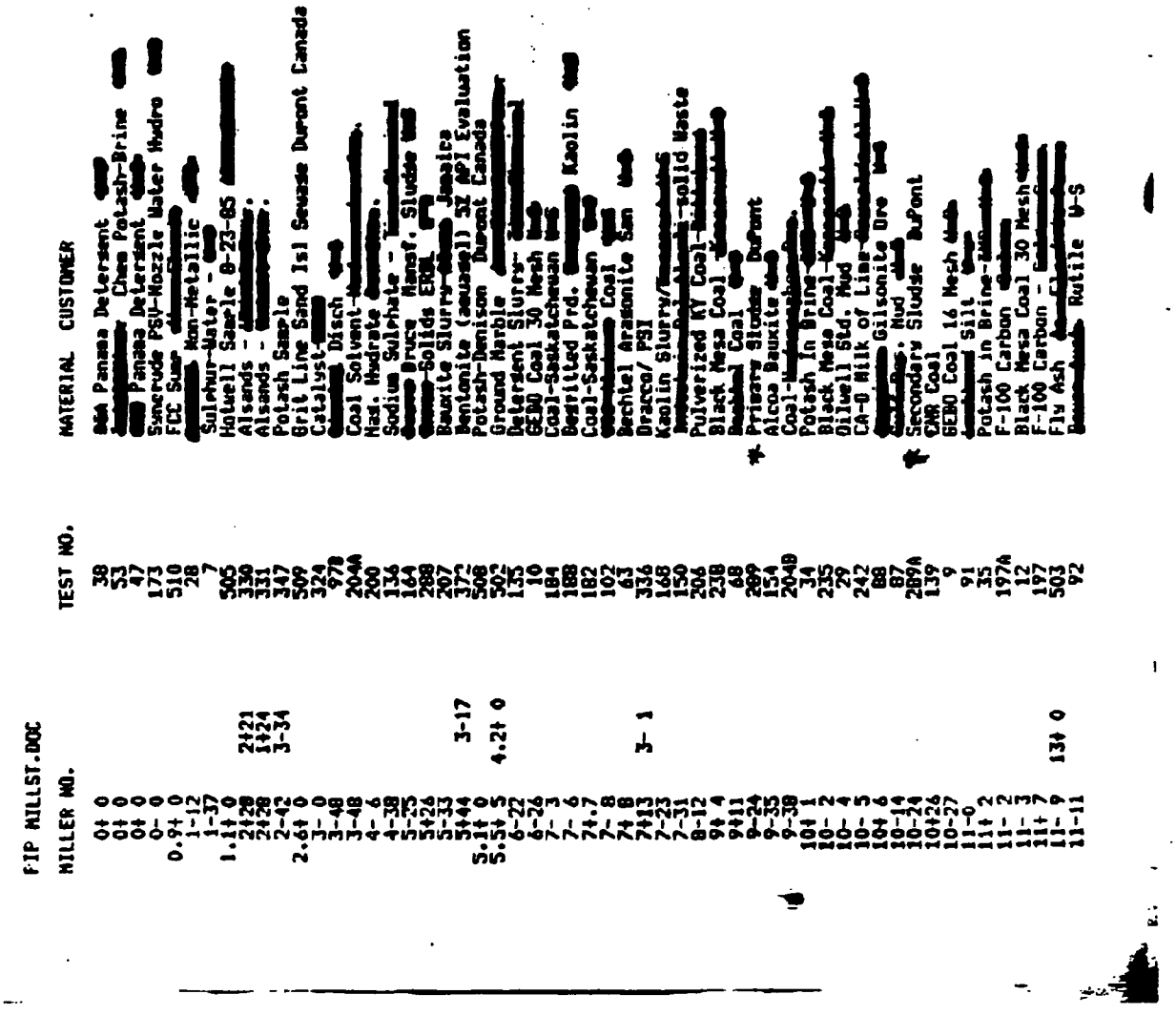

FIP MILLST.DOC MILLER NO.	TEST NO.	MATERIAL CUSTOMER
0+ 0	38	### Panama Detersent ###
0+ 0	53	### Chem Potash-Brine ###
0+ 0	47	### Panama Detersent ###
0- 0	173	Synerude PSV-Nozzle Water Hydro ###
0.9+ 0	510	FCC Sum ###
1-12	28	### Non-Metallic ###
1-37	7	Sulphur-Water - ###
1.1+ 0	305	Holwell Sample 8-23-85 ###
2+28	330	Alsands - ###
2421	331	Alsands - ###
2+28	347	Potash Sample
1+24	509	Grit Line Sand Isl Sewage Durant Canada
2-42	324	Catalyst-###
3-34	978	### Disch ###
2.6+ 0	2044	Coal Solvent-###
3- 0	200	Nat. Hydrate ###
3-48	134	Sodium Sulphate - ###
3-48	164	### Solids EDL ###
4- 6	288	Bauxite Slurry-### Jamaica
4-38	207	Bentonite (sausage)) 32 API Evaluation
5+25	177	Potash-Denison Durant Canada
5+26	508	Ground Marble
5-33	502	Detersent Slurry-
5+44	135	GEMO Coal 30 Mesh ###
3-17	10	Coal-Saskatchewan ###
5.1+ 0	184	Beneficted Prd. ### Kaolin ###
5.5+ 5	188	Coal-Saskatchewan ###
4.2+ 0	182	### Coal ###
6-22	102	Bechtel Arasonite San ###
6-26	63	Dracco/ PSI
7- 3	336	Kaolin Slurry/###
7- 6	168	###
7+.7	150	Pulverized KY Coal-###
7- 8	206	Black Mesa Coal ###
7+ 8	238	### Coal ###
3- 1	68	Primary Sludge DuPont
7+13	209	Alcoa Bauxite ###
7-23	154	Coal-###
7-31	2040	Potash In Brine-###
8-12	34	Black Mesa Coal-###
9+ 4	235	Dilwell Std. Mud ###
9+11	29	CA-Q Milk of Lime-###
9-24	242	### Gilsonite Ore ###
9-35	88	### Mud ###
9-38	87	Secondary Sludge DuPont
10+ 1	289A	CNR Coal
10- 2	139	GEMO Coal 16 Mesh ###
10- 4	9	### Silt ###
10- 5	91	Potash In Brine-###
10+ 6	35	F-100 Carbon ###
10-14	197A	Black Mesa Coal 30 Mesh ###
10-24	12	F-100 Carbon - ###
10+26	197	Fly Ash ###
10-27	503	### Rutile U-S
11- 0	92	
11+ 2		
11- 2		
11- 3		
11+ 7		
11- 9	13+ 0	
11-11		