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FUEL RESEARCH INSTITUTE OF SOUTH AFRICA.

TECHNICAL MEMORANDUM NO. 23 OF 1966.

REPORT ON THE RESULTS OBTAINED FROM
WASHABILITY DETERMINATIONS CARRIED OUT ON A BULK SAMPLE OF
NO.4 SEAM RUN-OF-MINE COAL TAKEN AT PHOENIX COLLIERY.

By
S.F. STREICHER.

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INTRODUCTION:

The Fuel Research Institute was requested by the Consulting Engineer, Phoenix Colliery Ltd., to conduct washability tests on a r.o.m. coal sample from Phoenix Colliery No. 4 Seam.

THE SAMPLE:

The sample was taken by officers of the Fuel Research Institute at the Colliery on the 24th May, 1966. The sample was obtained by stopping the raw coal conveyor belt at 5 minute intervals over a period of 6 hours, and by collecting an increment by clearing 3 ft, of the belt every time. In this way a bulk sample weighing about 5 tons was taken.

The sample was put into grain bags and was transported by road to the laboratories of the F.R.I., in Pretoria where it was analysed.

ANALYSIS OF THE SAMPLE:

The sample was air-dried and screened at 6". All the +6" lumps were then broken by hand to pass through the 6" screen.

A screen analysis was then carried out on the sample at the following apertures; 4", 2½", 1½", 7/8", and 3/8" (square apertures). Results of this screen analysis are reported in Table 1.

Representative sub-samples of all the size fractions arising from the screen analysis except the -3/8" size fraction, were then subjected to detailed float and sink analyses on a fractional basis at 0.05 intervals in the specific gravity range 1.40 to 1.75.

Ash determinations were carried out on all specific gravity fractions and cumulative ash values were calculated. Results of the float and sink analyses are reported in Table 2. Washability curves were then drawn as shown in Fig. 1-5.

On the $-\frac{3}{8}$ " size fraction only an ash determination and a calorific value determination were carried out.

Cumulative float samples were made up at S.G. 1.40, 1.45, 1.50, 1.55, 1.60 and 1.65 and calorific value determinations were carried out on these composite samples. These results are reported in Table 3.

(SIGNED) S.F. STREICHER.
PRINCIPAL RESEARCH OFFICER.

PRETORIA.
29th June, 1966.

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TABLE 1.
SCREEN ANALYSIS OF SAMPLE.

SIZE IN INCHES.	WEIGHT lb.	FRACT. %	CUM. %
6 x 4	1945 $\frac{1}{2}$	18.85	18.85
4 x 2 $\frac{1}{2}$	891 $\frac{1}{4}$	8.64	27.49
2 $\frac{1}{2}$ x 1 $\frac{1}{2}$	780 $\frac{1}{4}$	7.56	35.05
1 $\frac{1}{2}$ x $\frac{7}{8}$	862 $\frac{1}{2}$	8.36	43.41
$\frac{7}{8}$ x $\frac{3}{8}$	1546 $\frac{1}{2}$	14.98	58.39
$\frac{3}{8}$	4295 $\frac{1}{2}$	41.61	
TOTAL	10,321 $\frac{1}{2}$	100.00	100.00

Table 2/.....

TABLE 2.
FLOAT AND SINK DATA.

S.G. INTERVALS	6" x 4"				4" x 2½"				2½" x 1½"			
	YIELD		ASH		YIELD		ASH		YIELD		ASH	
	FRACT. %	CUM. %	FRACT. %	CUM. %	FRACT. %	CUM. %	FRACT. %	CUM. %	FRACT. %	CUM. %	FRACT. %	CUM. %
F1.40	4.22	4.22	11.1	11.1	8.33	8.33	10.0	10.0	17.70	17.70	9.5	9.5
1.40-1.45	20.14	24.36	13.7	13.25	21.47	29.80	12.5	11.80	25.44	43.14	12.9	11.51
1.45-1.50	20.79	45.15	17.4	15.16	23.24	53.04	16.5	13.86	19.80	62.94	16.8	13.17
1.50-1.55	13.66	58.81	20.4	16.38	9.28	62.32	20.9	14.91	8.85	71.79	21.5	14.20
1.55-1.60	9.05	67.86	26.5	17.73	6.36	68.68	26.2	15.95	4.89	76.68	25.8	14.94
1.60-1.65	6.47	74.33	30.6	18.85	4.18	72.86	29.3	16.72	2.31	78.99	31.7	15.43
1.65-1.70	5.67	80.00	33.5	19.89	7.35	80.21	34.4	18.34	5.75	84.74	35.0	16.75
1.70-1.75	1.55	81.55	43.3	20.33	2.37	82.58	41.5	19.00	2.65	87.39	39.6	17.45
S1.75	18.45	-	50.3	-	17.42	-	51.8	-	12.61	-	52.9	-
TOTAL	100.00	100.00	-	RAW COAL ASH % = 25.86	100.00	100.00	-	RAW COAL ASH % = 24.71	100.00	100.00	-	RAW COAL ASH % = 21.92

TABLE 2 (CONT.)
 FLOAT AND SINK DATA.

S.G. INTERVALS	1 1/2" x 7/8"			7/8" x 3/8"		
	YIELD			YIELD		
	FRACT. %	CUM. %	ASH FRACT. %	FRACT. %	CUM. %	ASH FRACT. %
F1.40	24.75	24.75	8.9	25.34	25.34	8.2
1.40-1.45	29.63	54.38	13.2	22.16	47.50	12.5
1.45-1.50	14.25	68.63	17.4	16.35	63.85	17.1
1.50-1.55	7.00	75.63	21.6	9.96	73.81	21.3
1.55-1.60	6.01	81.64	26.8	8.75	82.56	25.6
1.60-1.65	2.30	83.94	32.8	3.22	85.78	31.7
1.65-1.70	2.90	86.84	35.2	2.53	88.31	36.4
1.70-1.75	1.94	88.78	40.6	1.73	90.04	40.7
S1.75	11.22	-	52.8	9.96	-	53.7
TOTAL	100.00	100.00	-	100.00	100.00	-
			RAW COAL ASH % = 20.20			RAW COAL ASH % = 20.00

Ash content of -3/8" size fraction = 19.4%

TABLE 3.
ANALYSIS OF COMPOSITE SAMPLES.

S.G.	6" x 4"		4" x 2½"		2½" x 1½"		1½" x 7/8"		7/8" x 3/8"	
	ASH %	CAL. VAL. lb/lb	ASH %	CAL. VAL. lb/lb	ASH %	CAL. VAL. lb/lb	ASH %	CAL. VAL. lb/lb	ASH %	CAL. VAL. lb/lb
Fl. 40	11.1	12.66	10.00	12.85	9.5	12.98	8.9	13.14	8.2	13.25
Fl. 45	13.3	12.27	11.8	12.54	11.5	12.61	11.2	12.67	10.2	12.87
Fl. 50	15.2	11.94	13.9	12.17	13.2	12.33	12.5	12.44	12.0	12.52
Fl. 55	16.4	11.75	14.9	12.04	14.2	12.15	13.4	12.30	13.2	12.32
Fl. 60	17.7	11.52	16.0	11.82	14.9	12.02	14.4	12.13	14.5	12.08
Fl. 65	18.9	11.32	16.7	11.68	15.4	11.94	14.9	12.04	15.2	11.95

NOTE: Ash values calculated from washability data.
-3/8" size fraction Cal. Val. = 11.27 lb/lb.

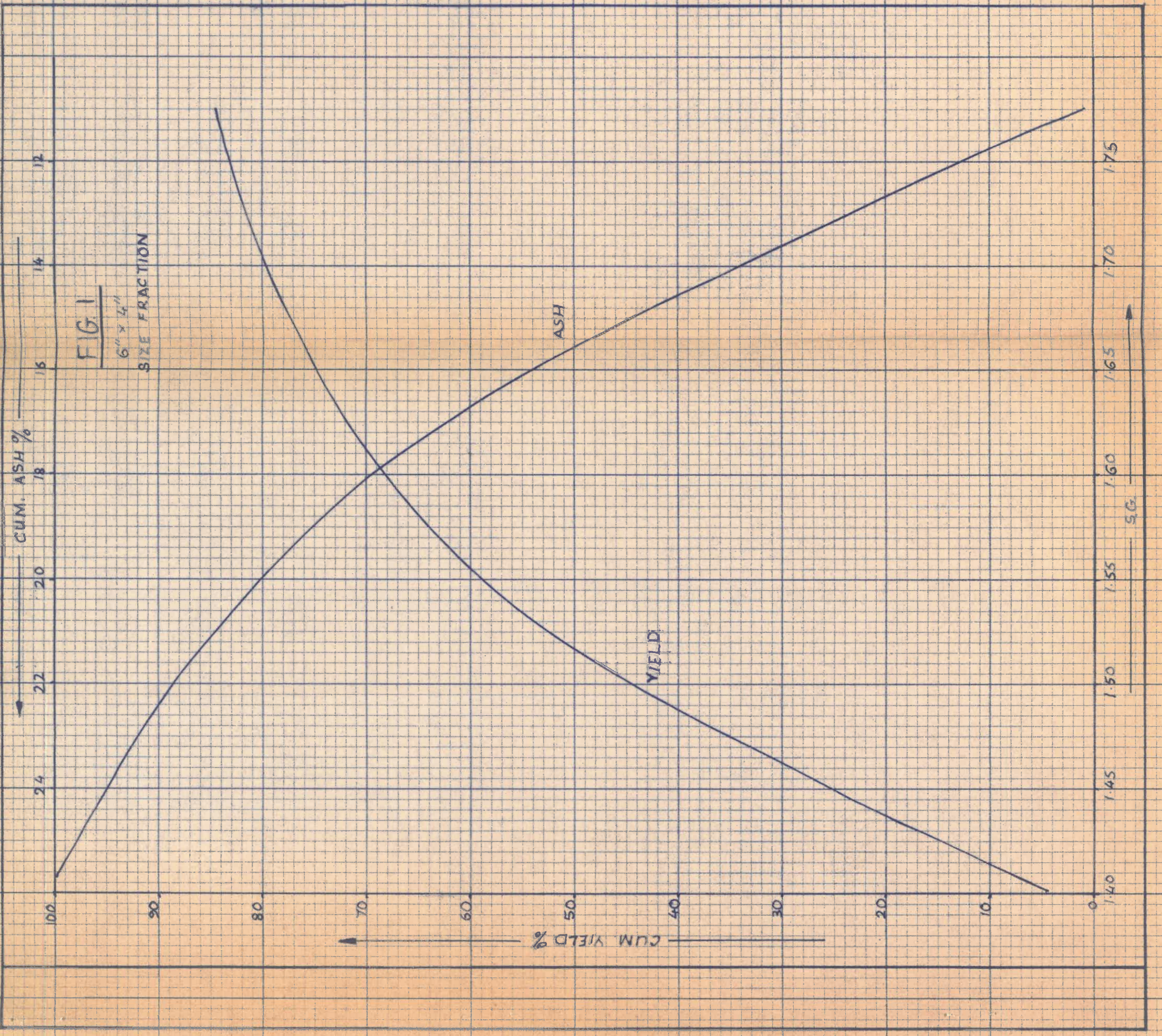
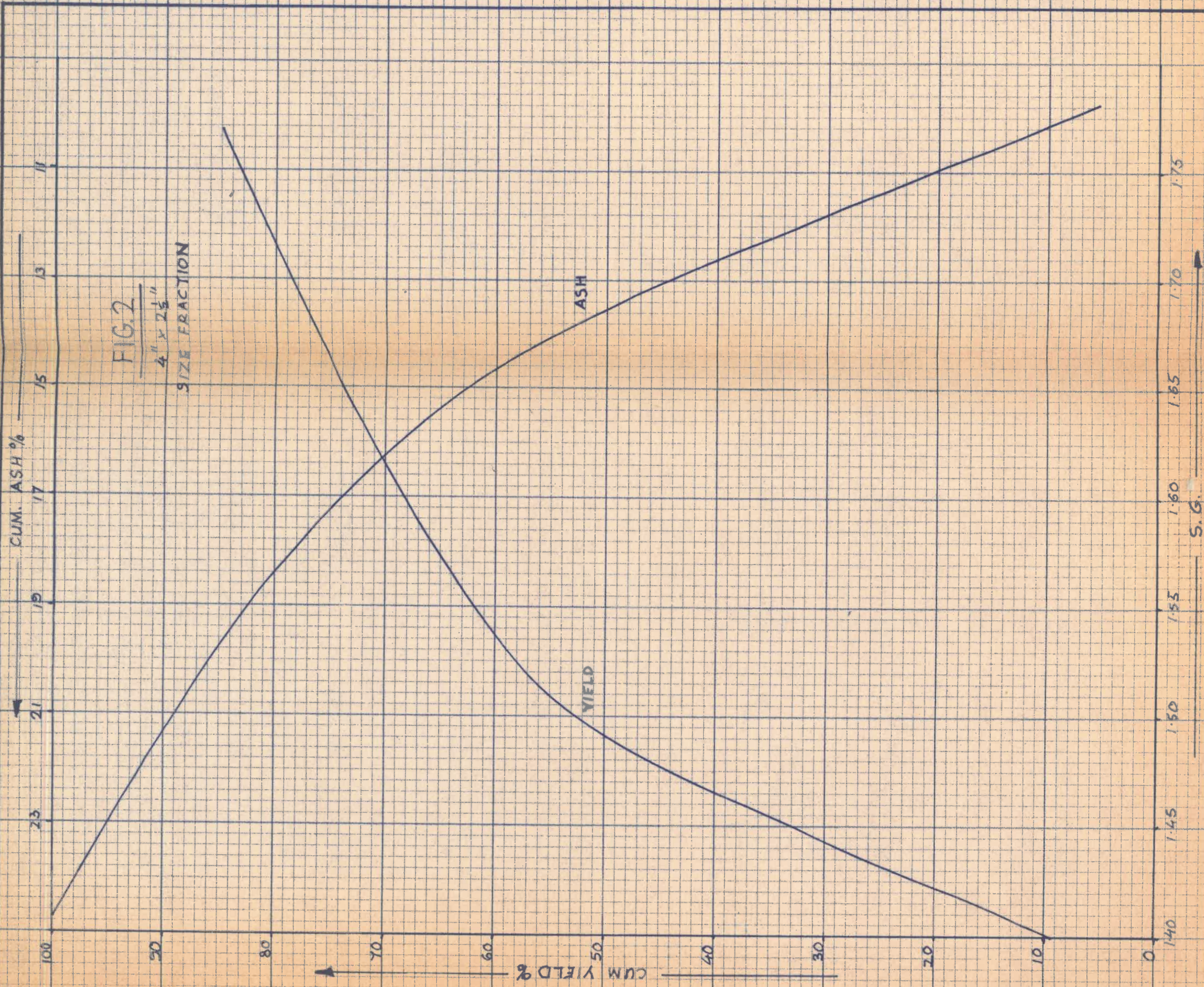
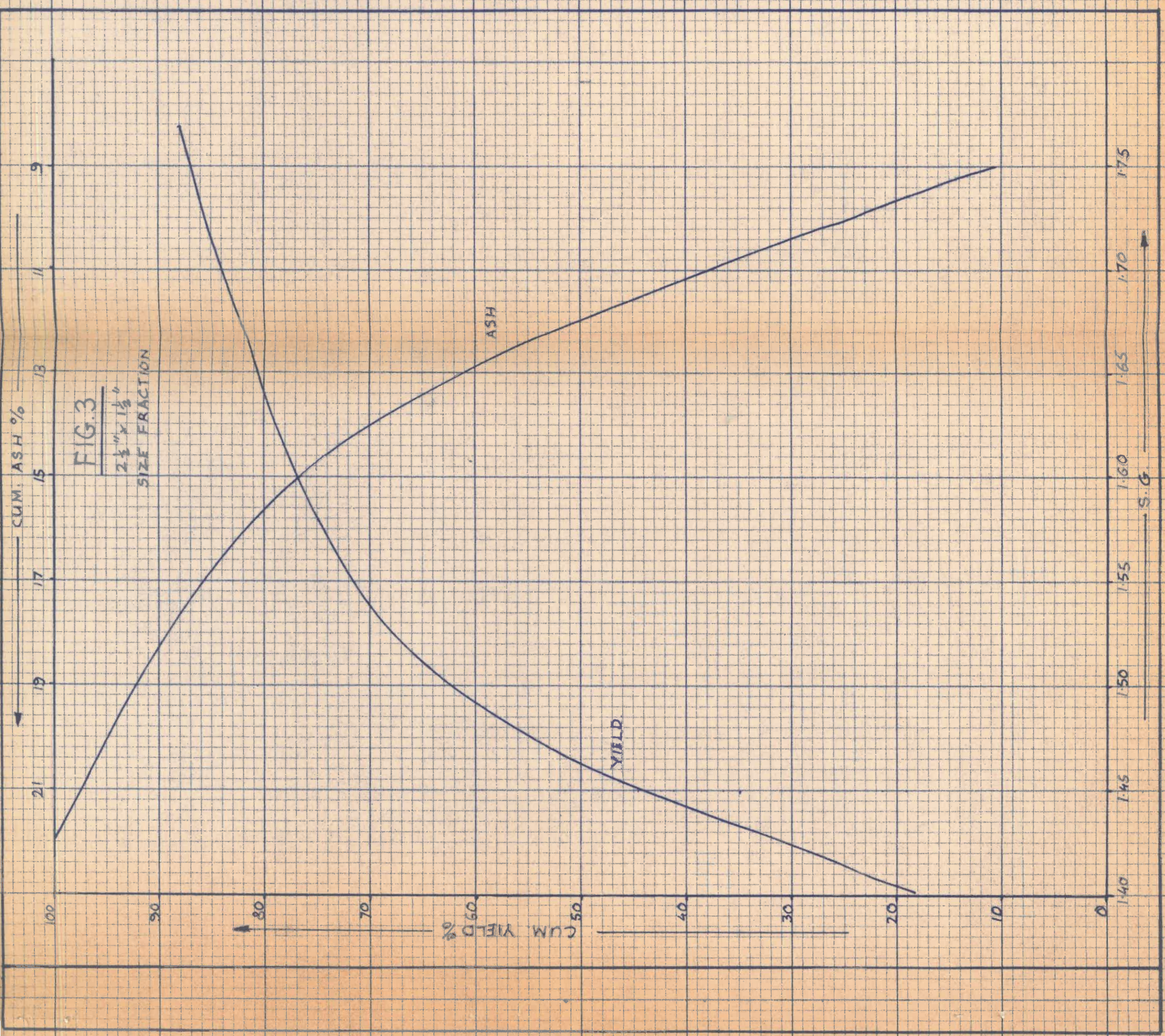


FIG. 2

4" x 2 1/2"

SIZE FRACTION





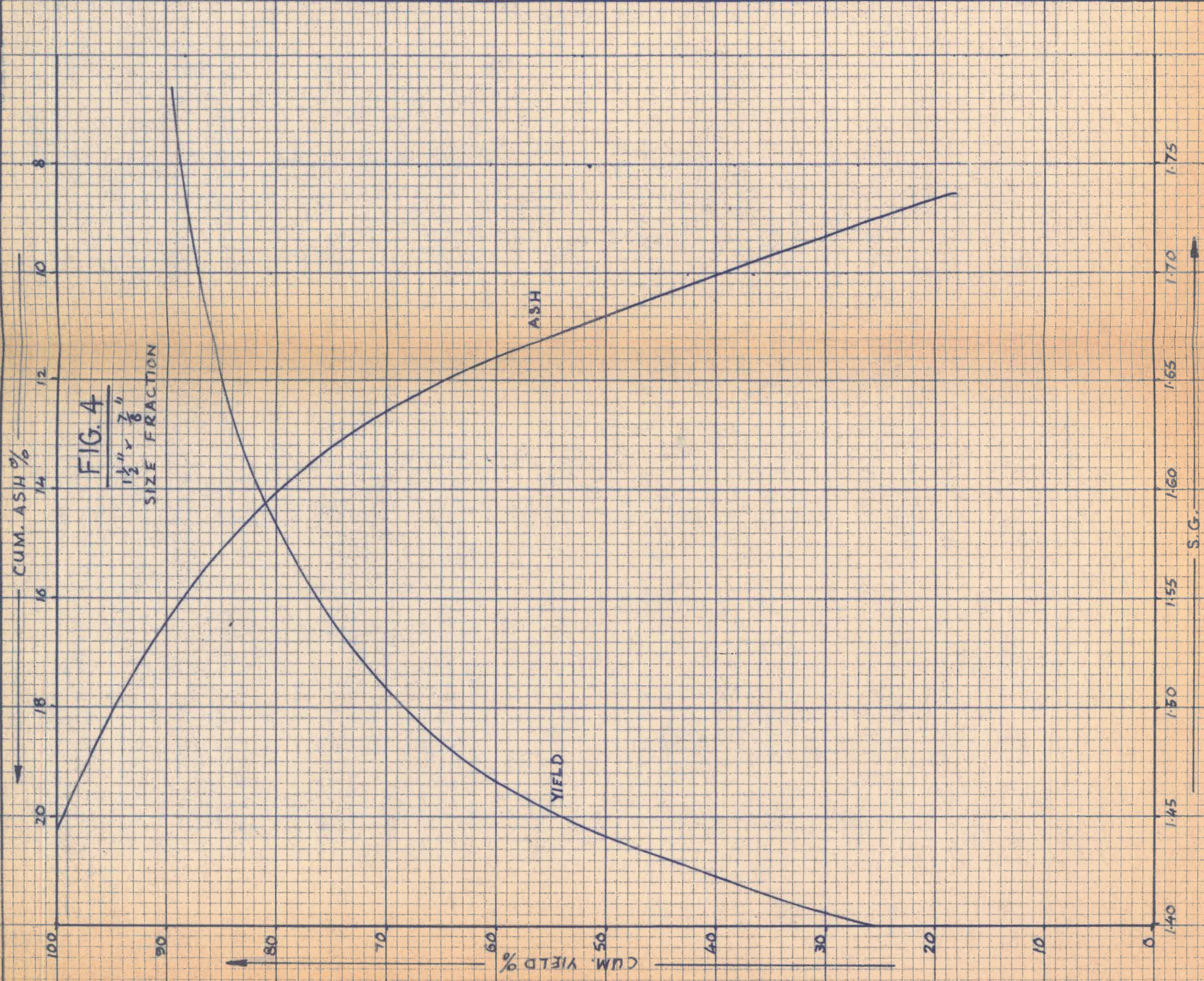


FIG. 5
 $\frac{7}{8}'' - \frac{3}{8}''$
 SIZE FRACTION

