

24/15

Secretary

F.R.I. 47

VERSLAG NR. 24

REPORT NO. 24

VAN 1975

OF 1975



FRI 24 / 1975

U11E1215

**BRANDSTOFNAVORSINGSINSTITUUT  
VAN SUID-AFRIKA**

**FUEL RESEARCH INSTITUTE  
OF SOUTH AFRICA**

REPORT NO 24 OF 1975

ONDERWERP: CHAR PRODUCTION FROM BANK COAL FOR GAS PRODUCER  
 SUBJECT: .....

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AFDELING: ENGINEERING/PILOT PLANT  
 DIVISION: .....

NAAM VAN AMPTENAAR: J J MYBURGH  
 NAME OF OFFICER: .....

AUTHOR : J J MYBURGH

LEADER OF PROJECT : DR T C ERASMUS

TITLE : CHAR PRODUCTION FROM BANK COAL FOR  
GAS PRODUCER

CO-WORKERS : E F E MÜLLER, A H KUHN

ENQUIRIES TO : DR T C ERASMUS

INVESTIGATION REQUESTED  
BY : COMBUSTION SECTION

SECTION : ENGINEERING/PILGT PLANTS

CHAR PRODUCTION FROM BANK COAL FOR GAS PRODUCER

1. INTRODUCTION

In August, 1974, it was requested by the Combustion Department to produce a suitable char for use in their gas producer. It was decided to use Bank coal. The coal was washed at the Coal Preparation Pilot Plant on 19th July, 1974 at a relative density of 1,475 to reduce the ash content in the final product to 11%. The coal was charred in the Institute's Rotary Carbonizer, i.e. Pancake oven, at the Pilot Plant.

2. TEST PROGRAMME

Tests started on 5th August, 1974 and were completed on 8th August, 1974. Eight batches of char were made and numbered K1 to K8.

3. ANALYSIS REQUIRED

Input coal	i)	Proximate analysis
	ii)	Swelling index
Char	i)	Proximate analysis
	ii)	Sieve analysis
	iii)	Micum drum test.

4. TEST RUN

Judged from volatile matter determination of spot samples, the test runs of 7th August, 1974 (K5 and K6) were deemed to meet the requirements and it was decided to do a Micum test on this batch only. All eight batches were dried on concrete slabs and sampled for analysis.

5. TABLES

- i) Details of the test runs are listed in table 1. No information to primary and secondary air flow can be given.
- ii) Details of the char analysis are listed in table 2.
- iii) Details of the Micum test are listed in table 3.
- iv) Details of the coal analysis are listed in table 4..

6. CONCLUSION

Batches K7 and K8 gave the best results when tested in the gas producer, and more of this type of char is required. It will be produced as soon as possible.

It will be of interest to observe the effect of oxidation of coal that has been stored for 10 months in the open atmosphere, as will be shown in the next test series.

J J MYBURGH  
TECHNICIAN

PRETORIA  
1975 JULY 7TH

JJM/adp



TABLE 2

CHAR ANALYSIS

DATE	DESCRIPTION	CODE			PROXIMATE	ANALYSIS	
		NO	% H <sub>2</sub> O	% Ash	% Vol.Mat.	% Fixed Carbon	Cal.Vol. MJ/kg
5.8.74	First Char	K1	1,3	-	4,6	-	-
5.8.74	First Char	K2	1,2	-	3,9	-	-
6.8.74	Second day	K3	0,6	10,6	3,4	85,4	-
6.8.74	Second day	K4	0,6	10,7	3,3	85,4	-
7.8.74	Third day	K5	1,3	-	2,3	-	-
7.8.74	Third day	K6	1,1	-	4,3	-	-
8.8.74	Fourth day	K7	2,4	10,0	7,9	79,7	29,8
8.8.74	Fourth day	K8	2,3	9,7	9,7	78,3	29,8

TABLE 3

SIEVE ANALYSIS AND  $\frac{1}{5}$  MICUM TEST ON 10 X 25 mm CHAR

SAMPLE NO DESCRIPTION	K 5 + K6 (COMBINED) 10 X 25 mm FRACTION + SIEVE ANALYSIS ON WHOLE SAMPLE			
	Frac. 0X40 mm	10X25 mm USED FOR MICUM TEST	QJM 0x40 mm	10X25mm USED FOR MICUM TEST
<u>SIEVE ANALYSIS, %</u>				
(mm ROUND HOLES)				
40 X 25	3,6		3,6	
25 X 20	22,2	2,6	25,8	2,6
20 X 10	64,7	7,4	90,5	10,0
10 X 5	5,4		95,9	
5 X 0	4,1		100,0	
MEAN SIZE, mm	16,4	17,0		
<u>MICUM TEST</u>				
<u>50 REVS. SIEVE ANALYSIS, %</u>				
25 X 20	8,20		8,2	
20 X 10	78,1		86,3	
10 X 5	6,9		93,2	
5 X 0	6,8		100,0	
MEAN SIZE, mm		14,3		
MEAN SIZE STABILITY %		84,6		
- 5 mm %		6,8		
<u>100 REVS. SIEVE ANALYSIS, %</u>				
25 X 20	4,6		4,6	
20 X 10	75,0		79,6	
10 X 5	9,9		89,5	
5 X 0	10,5		100,0	
MEAN SIZE, mm		13,3		
MEAN SIZE STABILITY, %		78,7		
- 5 mm %		10,5		

TABLE 4

PROXIMATE ANALYSIS OF BANK COAL

SAMPLE NO.	CAL. VAL. MJ/kg	% H <sub>2</sub> O	% ASH	% VOL. MAT.	% FIXED CARBON	SW. NO.
74/680 B1	30,2	2,9	8,0	26,7	62,4	1