

COAL BANK SAMPLE

COAL:HAMBACH (RHEINISH LIGNITE)

SEAM:FRIMMERSDORF - b

BCC COAL RANK CODE:N/A

ECE / ISO CLASSIFICATION:N/A

GRADE:SPECIAL

PROXIMATE ANALYSIS

(% a.d.)	
Moisture	18.0
Ash	3.5
Volatile matter	41.0
Fixed carbon	37.5
Volatile matter (dmmf)	53.0

ULTIMATE ANALYSIS (%)

Carbon (dmmf)	67.5
Hydrogen (dmmf)	4.4
Oxygen (dmmf)	27.2
Nitrogen (dmmf)	0.03

ASH ANALYSIS

(% on ash)	
Na ₂ O	0.7
K ₂ O	<0.5
CaO	35.8
MgO	16.3
Fe ₂ O ₃	18.6
Al ₂ O ₃	1.5
SiO ₂	1.3
SO ₃	20.0
TiO ₂	<0.1
Mn ₃ O ₄	0.3
P ₂ O ₅	<0.5

CAKING PROPERTIES

Swelling Index	0
Gray-King Coke Type	A

Organic sulphur (db)	0.73
Sulphate as S (db)	<0.1
Pyritic sulphur as S (db)	<0.1

Chlorine (db)	0.02
Carbon dioxide (db)	0.26
Mineral matter (db)	4.58

CALORIFIC VALUE

kJ / kg (daf)	26060
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MACERAL ANALYSIS

(% by volume , mmf)	
Huminite	82
Exinite	17
Inertinite	1

ASH FUSION RANGE (°C) *

Deformation temp.	1310
Hemisphere temp.	1350
Flow temp.	1350

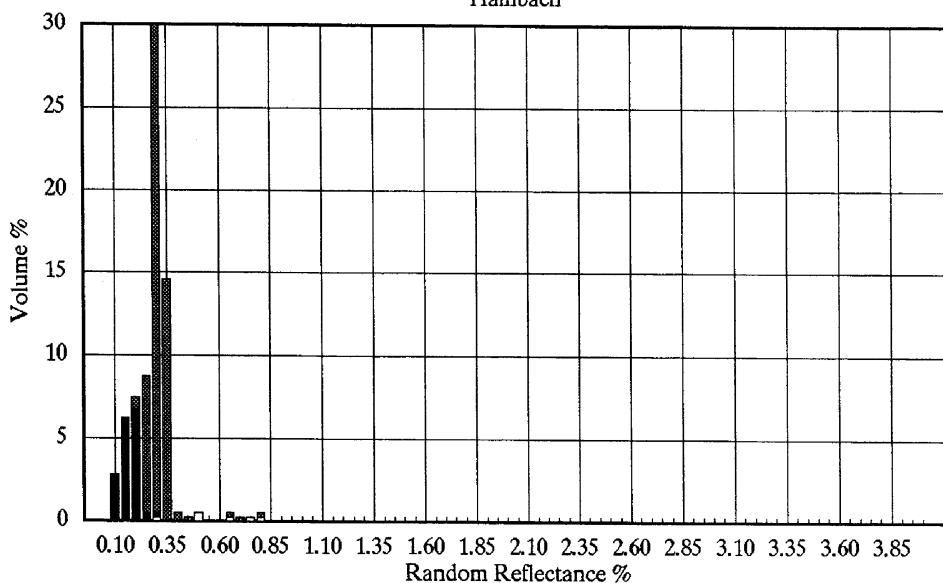
*Test atmosphere: reducing (50% CO₂ / 50% H₂)

ad: as analysed
 db: dry basis
 daf: dry, ash free
 dmmf: dry, mineral matter free
 mmf: mineral matter free

This analysis is typical of this specially selected sample, but there may be slight variations between the data given above and that of the actual sample supplied.

INTERACTIVE REFLECTANCE HISTOGRAM

Hambach



□ Inertinite ■ Liptinite ▨ Vitrinite

Mean random vitrinite reflectance 0.28
 Vitrinite Standard Deviation 0.05

International classification of hard coals by type
(Coals with gross calorific value over 5,700 kcal/kg on moist, ash-free basis)

GROUPS — GROUPEs (determined by caking properties) — (déterminés d'après le pouvoir agglutinant)			CODE NUMBERS — NOMBRES CONVENTIONNELS										SUB-GROUPS — SOUS-GROUPES (determined by coking properties) — (déterminés d'après le pouvoir cokéifiant)					
Group number N° du groupe	Alternative group parameters Paramètres de détermination du groupe (au choix)		The first figure of the code number indicates the class of the coal, determined by volatile matter content up to 33% V.M. and by calorific parameter above 33% V.M. Le premier chiffre du nombre conventionnel indique la classe, déterminée d'après l'indice M.V. (Charbons contenant jusqu'à 33% de M.V.) ou par paramètre du pouvoir calorifique (charbons contenant plus de 33% M.V.) The second figure indicates the group of coal, determined by caking properties. Le deuxième chiffre indique le groupe, déterminé d'après le pouvoir agglutinant. The third figure indicates the sub-group, determined by coking properties. Le troisième chiffre indique le sous-groupe, déterminé d'après le pouvoir cokéifiant.										Sub-group number N° du sous-groupe	Alternative sub-group parameters Paramètres de détermination du sous-groupe (au choix)				
	Crucible-swelling number Indice du gonflement au creuset	Roga index Indice Roga	Dilatometer Essai dilatométrique		Gray-King Essai Gray-King													
3	>4	>45			435	535	635					5	>140	>G8				
					334	434	534	634			4	>50 - 140	G5 - G8					
					333	433	533	633	733			3	>0 - 50	G1 - G4				
					332 a	332 b	432	532	632	732	832			2	≤0	E - G		
2	2½ - 4	>20 - 45			323	423	523	623	723	823			3	>0 - 50	G1 - G4			
					322	422	522	622	722	822			2	≤0	E - G			
					321	421	521	621	721	821			1	Contraction only Contraction seulement	B - D			
1	1 - 2	>5 - 20			212	312	412	512	612	712	812			2	≤0	E - G		
					211	311	411	511	611	711	811			1	Contraction only Contraction seulement	B - D		
0	0 - ½	0 - 5			100 A	200	300	400	500	600	700	800	900			0	Non-softening Ne se ramollissant pas	A
Class number — N° de la classe →			0	1	2	3	4	5	6	7	8	9	As an indication, the following classes have an approximate volatile matter content of: A titre d'indication, les classes ci-après ont environ l'indice volatile matter content of: M.V. (matières volatiles) suivant:					
Class parameters Paramètres de détermination de la classe	Volatile matter (d.a.f.) Matières volatiles (produit sec exempt de cendres) →		0 - 3	>3 - 10 >3 - 6.5 - 6.5 - 10	>10 - 14	>14 - 20	>20 - 28	>28 - 33	>33	>33	>33	>33	Class 6 33 - 41% Classe 6 7 33 - 44% 7 8 35 - 50% 8 9 42 - 50% 9					
	Calorific parameter ^a Paramètre du pouvoir calorifique ^a →		-	-	-	-	-	-	-	>7 750	>7 200 - 7 750	>6 100 - 7 200	>5 700 - 6 100					
CLASSES																		
(determined by volatile matter up to 33% V.M. and by calorific parameter above 33% V.M.) — (déterminés d'après l'indice de matières volatiles (charbons contenant jusqu'à 33% de M.V.) ou par paramètre de pouvoir calorifique (charbons contenant plus de 33% de M.V.))																		

NOTE. — (i) Where the ash content of coal is too high to allow classification according to the present systems, it must be reduced by laboratory float-and-sink method (or any other appropriate means). The specific gravity selected for flotation should allow a maximum yield of coal with 5 to 10% of ash.

(ii) 332a ... > 14-16% V.M.
332b ... > 16-20% V.M.

^a Gross calorific value on moist, ash-free basis (30° C, 96% humidity) kcal/kg.

THE COAL CLASSIFICATION SYSTEM USED BY THE NATIONAL COAL BOARD

(Revision of 1964)

Coals with ash of over 10 per cent. must be cleaned before analysis for classification to give a maximum yield of coal with ash of 10 per cent. or less.

Coal Rank Code			Volatile Matter (d.m.m.f.) (per cent.)	Gray-King Coke Type*	General Description
Main Class(es)	Class	Sub-class			
100	101† 102†		Under 9.1 Under 6.1 6.1 - 9.0	A } A	Anthracites
200	201 202 203 204	201a 201b	9.1-19.5 9.1-13.5 9.1-11.5 11.6-13.5 13.6-15.0 15.1-17.0 17.1-19.5	A-G8 A-C A-B B-C B-G E-G4 G1-G8	
300	301 302 303	301a 301b	19.6-32.0 19.6-32.0 19.6-27.5 27.6-32.0 19.6-32.0 19.6-32.0	A-G9 and over G4 and over } G4 and } over G-G3 A-F	Medium-volatile coals } Prime coking coals } Medium-volatile, } medium-caking or } weakly caking coals } Medium-volatile, } weakly caking to } non-caking coals
400 to 900:-			Over 32.0	A-G9 and over	High-volatile coals
400	401 402		Over 32.0 32.1-36.0 Over 36.0	G9 and over } G9 and over	High-volatile, very strongly caking coals
500	501 502		Over 32.0 32.1-36.0 Over 36.0	G5- G8 } G5-G8	
600	601 602		Over 32.0 32.1-36.0 Over 36.0	G1- G4 } G1-G4	High-volatile, medium- caking coals
700	701 702		Over 32.0 32.1-36.0 Over 36.0	E-G } E-G	
800	801 802		Over 32.0 32.1-36.0 Over 36.0	C-D } C-D	High-volatile, very weakly caking coals
900	901 902		Over 32.0 32.1-36.0 Over 36.0	A-B } A-B	

*Coals with volatile matter of under 19.6 per cent. are classified by using the parameter of volatile matter alone; the Gray-King coke types quoted for these coals indicate the general ranges found in practice, and are not criteria for classification.

†In order to divide anthracites into two classes, it is sometimes convenient to use a hydrogen content of 3.35 per cent. (d.m.m.f.) instead of a volatile matter of 6.0 per cent. as the limiting criterion. In the original Coal Survey rank coding system the anthracites were divided into four classes then designated 101, 102, 103 and 104. Although the present division into two classes satisfies most requirements it may sometimes be necessary to recognize more than two classes.

NOTES

1. Coals that have been affected by igneous intrusions ('heat-altered' coals) occur mainly in classes 100, 200 and 300, and when recognized should be distinguished by adding the suffix H to the coal rank code, e.g. 102H, 201bH.
2. Coals that have been oxidized by weathering may occur in any class, and when recognized should be distinguished by adding the suffix W to the coal rank code, e.g. 801W.