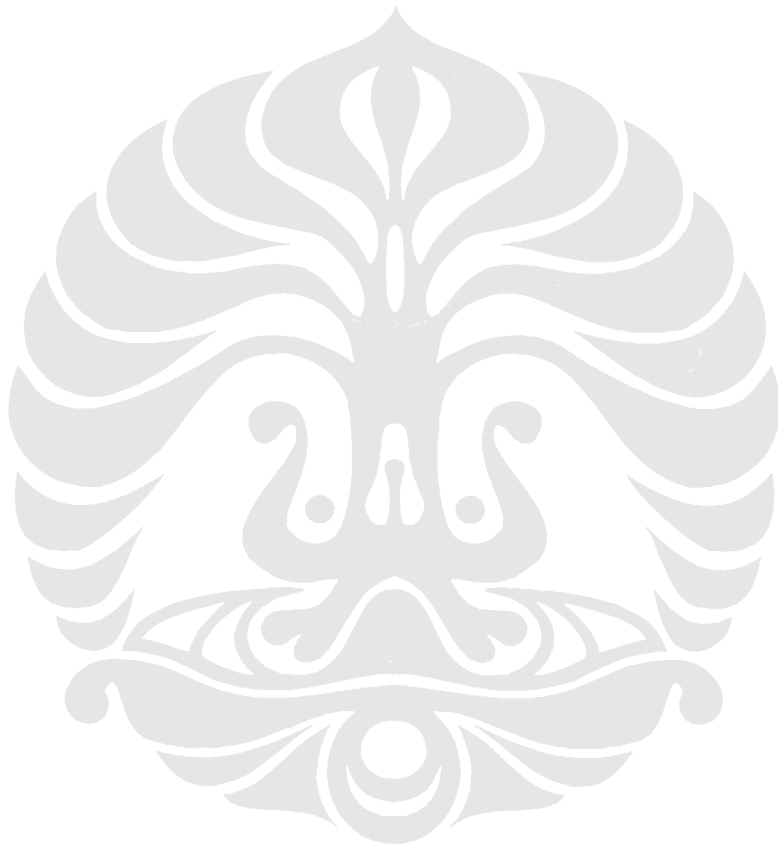


LAMPIRAN



LAMPIRAN 1

Nilai Luas Permukaan yang didapatkan dari data uji laju adsorpsi										
No.	Karbon aktif	Tekanan adsorpsi	Loading		Berat Molekul CO ₂	Jari molekul CO ₂	Avogrado	Luas Molekul	mol	Luas Permukaan
		bar	mg/g	g/g	g/mol	m	mol-1	m ²	mol	m ² /g
1	RU3	1	43.8	0.044	44	1.65E-10	6.02E+23	3.42E-19	0.00100	204.9
		1.5	44.1	0.044	44	1.65E-10	6.02E+23	3.42E-19	0.00100	206.3
		2	90.2	0.090	44	1.65E-10	6.02E+23	3.42E-19	0.00205	422.0
2	RU4	1	39.9	0.040	44	1.65E-10	6.02E+23	3.42E-19	0.00091	186.7
		1.5	63.2	0.063	44	1.65E-10	6.02E+23	3.42E-19	0.00144	295.7
		2	68.2	0.068	44	1.65E-10	6.02E+23	3.42E-19	0.00155	319.1
3	RU5	1	87	0.087	44	1.65E-10	6.02E+23	3.42E-19	0.00198	407.0
		1.5	238	0.238	44	1.65E-10	6.02E+23	3.42E-19	0.00541	1113.5
		2	275	0.275	44	1.65E-10	6.02E+23	3.42E-19	0.00625	1286.6
4	Carbotech	1		0.000	44	1.65E-10	6.02E+23	3.42E-19	0.00000	0.0
		1.5	68.9	0.069	44	1.65E-10	6.02E+23	3.42E-19	0.00157	322.3
		2		0.000	44	1.65E-10	6.02E+23	3.42E-19	0.00000	0.0

Diameter CO₂ = 0.33 nm (Marsh, et al., 2006)

LAMPIRAN 2



PERTAMINA
DIREKTORAT PENGOLAHAN
PENELITIAN & LABORATORIUM
 Jl. Raya Bekasi km. 20 Pulogadung, Jakarta
 Telp. (021) 4609311 - 4609312 - 4609313 / Facs (021) 4609314

SERTIFIKAT PENGUJIAN
CERTIFICATE OF ANALYSIS

No. 012/CSV/P&L/2008

Diterima dari : Mahasiswa UI Tanggal terima contoh : 28 Mei 2008
Principal up. Sehat Abdi ember 2007
Date of Received

Alamat : Jakarta Tanggal Selesai : 19 Juni 2008
Date of complete

Nomor Registrasi : 012/JL/CSV/2008 Halaman / Page : 1 (satu)
Registration Number

HASIL PENGUJIAN

Sampel : Carbon Aktif

Jenis Analisa	Metoda	Satuan	Hasil Uji						
			KA 1	KT 3	KT 4	KT 5	RU 2	RU 4	
BET Area	Surface	Gemini	M ² /g	896	164	189	190	30	27
				855	159	182	201	22	29

Jenis Analisa	Metoda	Satuan	Hasil Uji					
			RU 5	RU 6	SS 3	SS 4	SS 5	
BET Area	Surface	Gemini	M ² /g	46	80	30	55	110
				48	72	32	47	88

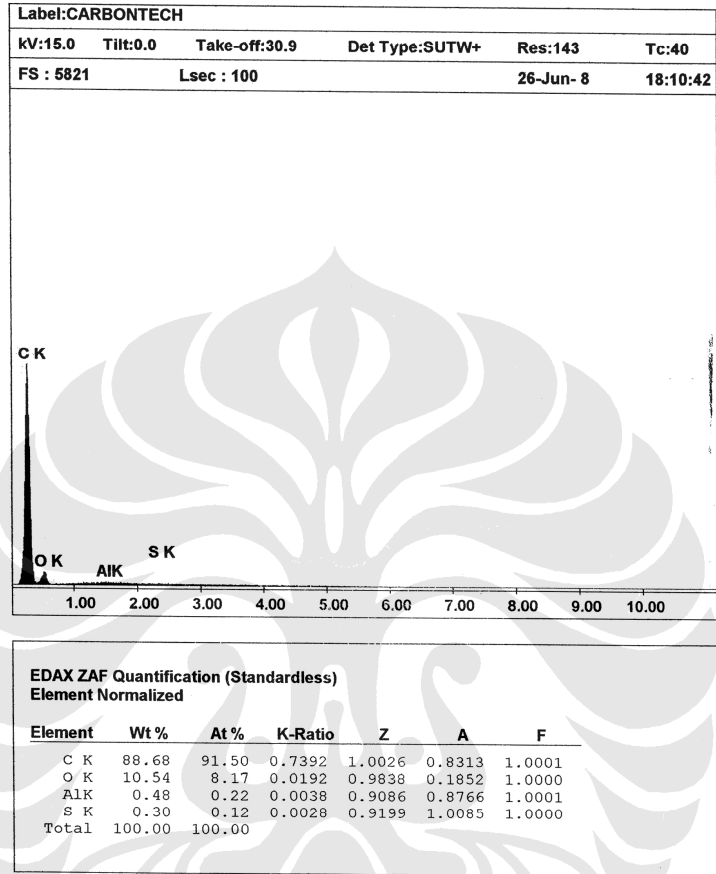
Jakarta, 19 Juni 2008
 Manajer Teknis

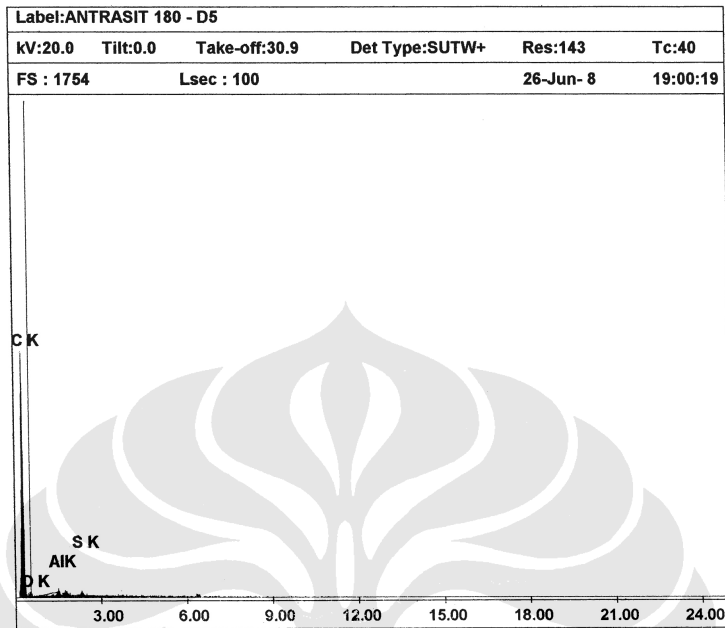
Agustina Eliyanti

Hasil pengujian ini hanya berlaku untuk contoh uji yang diujikan. Dilarang memperbanyak/copy secara terpisah tanpa izin dari PERTAMINA.
 This report is valid for tested sample only. This report may not be reproduced or copied separately without prior permission from PERTAMINA.

FR/02/MP - SUM1
 No. Revisi : 01

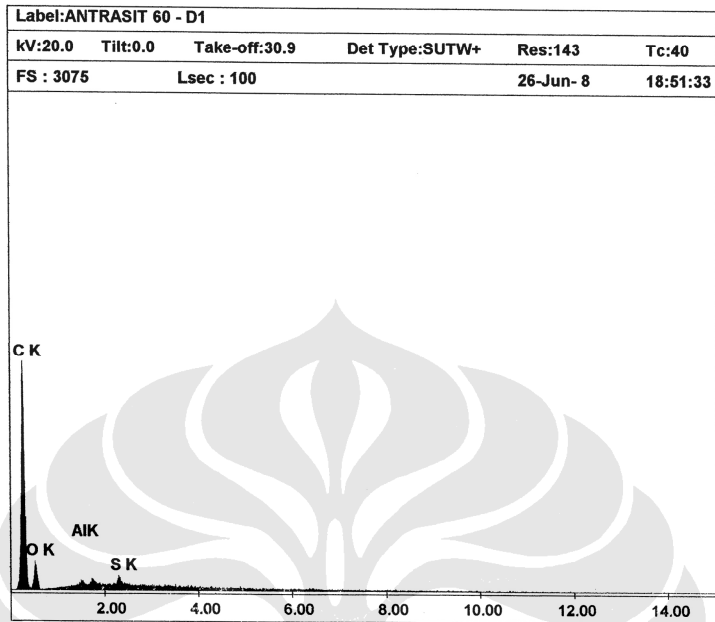
LAMPIRAN 3





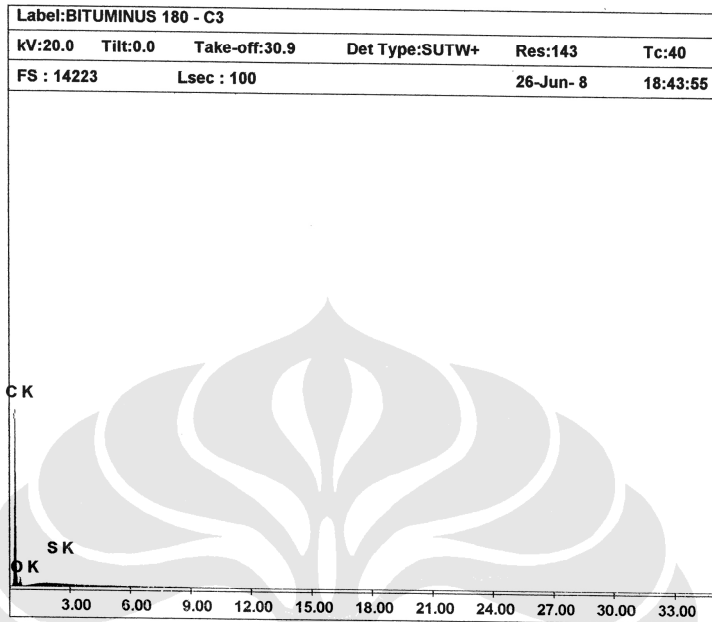
EDAX ZAF Quantification (Standardless)
Element Normalized

Element	Wt %	At %	K-Ratio	Z	A	F
C K	95.58	96.94	0.8036	1.0012	0.8398	1.0000
O K	3.56	2.71	0.0046	0.9846	0.1323	1.0000
Al K	0.30	0.14	0.0023	0.9176	0.8322	1.0002
S K	0.55	0.21	0.0052	0.9220	1.0248	1.0000
Total	100.00	100.00				



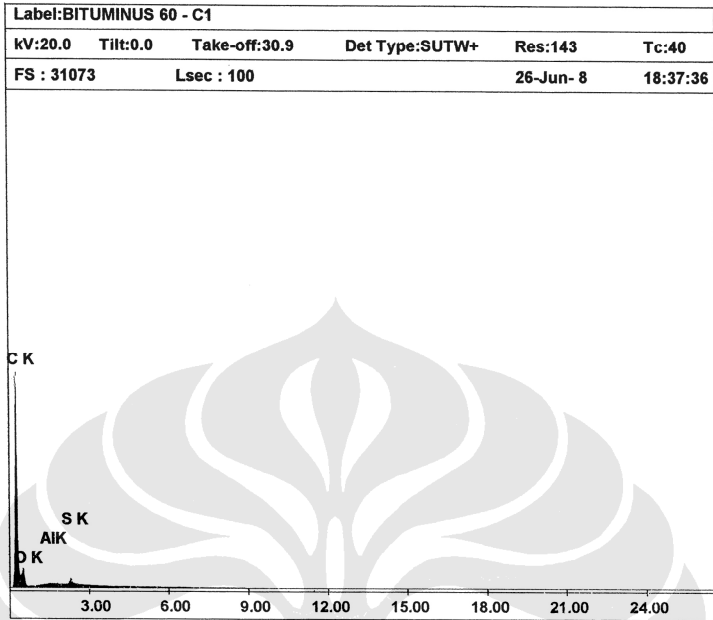
EDAX ZAF Quantification (Standardless)
Element Normalized

Element	Wt %	At %	K-Ratio	Z	A	F
C K	81.91	86.20	0.5549	1.0037	0.6748	1.0001
O K	16.74	13.23	0.0249	0.9870	0.1509	1.0000
Al K	0.50	0.23	0.0036	0.9199	0.7819	1.0003
S K	0.85	0.34	0.0079	0.9248	1.0018	1.0000
Total	100.00	100.00				



EDAX ZAF Quantification (Standardless)
Element Normalized

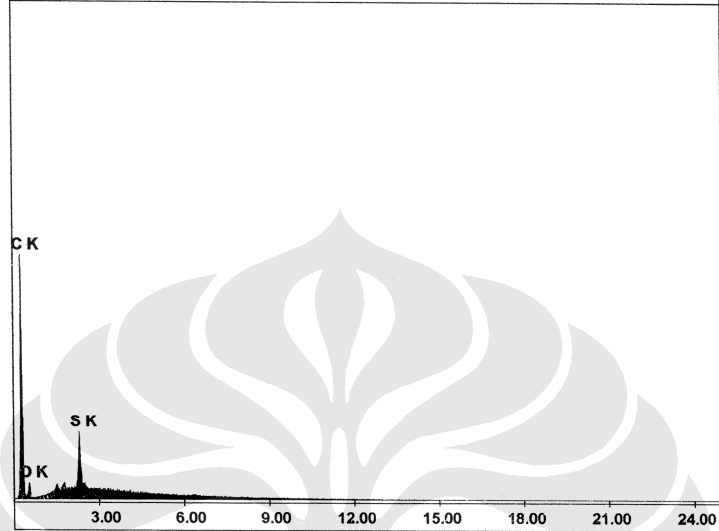
Element	Wt %	At %	K-Ratio	Z	A	F
C K	89.73	92.12	0.7668	1.0017	0.8530	1.0001
O K	10.18	7.85	0.0141	0.9851	0.1407	1.0000
S K	0.09	0.03	0.0008	0.9226	1.0168	1.0000
Total	100.00	100.00				



EDAX ZAF Quantification (Standardless)
Element Normalized

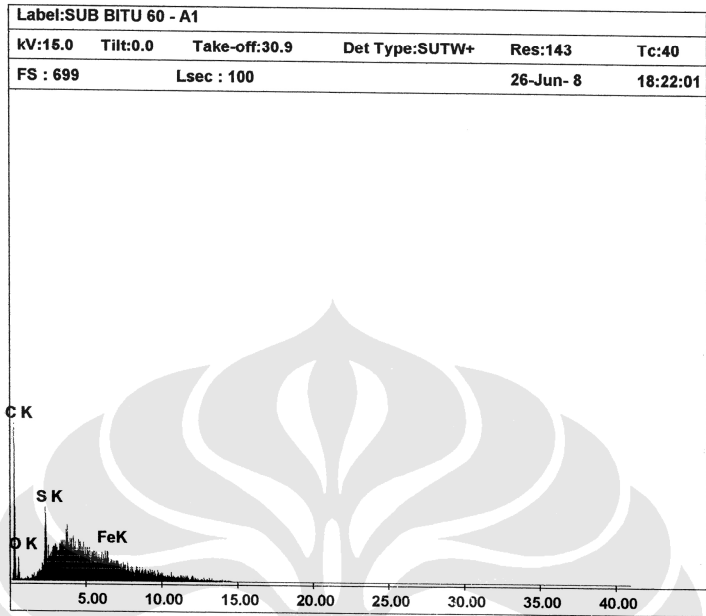
Element	Wt %	At %	K-Ratio	Z	A	F
C K	84.75	88.42	0.6083	1.0030	0.7155	1.0001
O K	14.30	11.20	0.0207	0.9863	0.1468	1.0000
AlK	0.10	0.05	0.0007	0.9192	0.7904	1.0003
S K	0.84	0.33	0.0078	0.9240	1.0091	1.0000
Total	100.00	100.00				

Label: SUB BITU 180 - A7
 KV:20.0 Tilt:0.0 Take-off:30.9 Det Type:SUTW+ Res:143 Tc:40
 FS : 6474 Lsec : 100 26-Jun-8 18:30:47



EDAX ZAF Quantification (Standardless)
Element Normalized

Element	Wt %	At %	K-Ratio	Z	A	F
C K	88.19	92.42	0.4435	1.0039	0.5009	1.0001
O K	7.47	5.88	0.0101	0.9873	0.1371	1.0000
S K	4.34	1.70	0.0409	0.9251	1.0198	1.0000
Total	100.00	100.00				



EDAX ZAF Quantification (Standardless)
Element Normalized

Element	Wt%	At%	K-Ratio	Z	A	F
C K	75.22	86.70	0.2841	1.0195	0.3704	1.0001
O K	9.33	8.08	0.0181	1.0004	0.1943	1.0002
S K	7.57	3.27	0.0699	0.9369	0.9849	1.0007
FeK	7.88	1.95	0.0658	0.8259	1.0120	1.0000
Total	100.00	100.00				

LAMPIRAN 4



SUCOFINDO
WORLDWIDE SERVICES
CORRESPONDENTS OF:
SGS Société Générale de Surveillance S.A., GENEVA.

Issuing Office : **Sucofindo Pekanbaru Branch**
JL.A Yani No.79 - Pekanbaru
Phone/Fax No. 62-761-839949

PT. SUPERINTENDING COMPANY OF INDONESIA

HEAD OFFICE : GRAHA SUCOFINDO JL. RAYA PASAR MINGGU KAV. 34
JAKARTA 12780 PO BOX 2377 JKT 10001 PHONE : (021) 7983666
FAX : (021) 7983888 TELEX : 860956, 860957, 860958 SUCOF IA CABLE SUCOFINDO
No. : **3712169**

CERTIFICATE OF SAMPLING AND ANALYSIS

CONSIGNMENT : **5,398.893 M/T INDONESIA STEAM COAL**
SHIPPER : **PT. NUSARIAU KENCANA COAL**
GRAHA TNT 3rd FLOOR
JL. DR. SAHARDJO NO.107
JAKARTA 12810
INDONESIA

NOTIFY PARTY : **PT. HARAPAN BARANUSA SUKSES**
JL. SOEKARNO - HATTA NO. 10
PEKANBARU - INDONESIA

TUG BOAT/BARGE : **TB. MARCOPOLO.25 / BG. MARCOPOLO 40**
PORT OF LOADING : **MAREDAN, PEKANBARU, RIAU, INDONESIA**
DATE OF LOADING : **April 14 up to 20, 2007**
PORT OF DESTINATION : **LUMUT, PERAK, MALAYSIA**

THIS IS TO CERTIFY, that upon request of the above Principal, we have carried out Sampling and Analysis of the above consignment.

TIME AND PLACE OF SAMPLING : **April 14 up to 20, 2007 at time of loading at Maredan, Pekanbaru, Riuan, Indonesia**

STANDARD OF SAMPLING : **ASTM Standard**

DISTRIBUTION OF SAMPLES : ♦ **3 (three) bags to Principal.**
♦ **3 (three) bags to Notify Party.**
♦ **3 (three) bags to Our Laboratory.**
♦ **3 (three) bags to retained as our reference for a period of 3 (three) months.**

NOTE : ♦ **The samples above duly sealed with zinc seal SCI**

RESULT OF ANALYSIS : **ASTM Standard**

PARAMETERS	UNITS	RESULTS
- Total Moisture,	% AR	12.92
- Inherent Moisture,	% ADB	5.59
- Ash Content,	% ADB	17.96
- Volatile Matter,	% ADB	34.51
- Fixed Carbon,	% ADB	41.94
- Total Sulphur	% ADB	1.74
- Gross Calorific Value	Kcal/Kg ADB	5909
- Hardgrove Grindability Index	Index Points	50
- Size : 0 - 50 mm	%	100

This Certificate reflects our finding of the above intervention only and is issued without prejudice.
Pekanbaru, April 25, 2007
Ref. PKU.MIN.001592007

IW/KP



PT. SUPERINTENDING COMPANY OF INDONESIA
PEKANBARU
SUCOFINDO
Hendra
92.67.03400

This inspection order has been accepted and this certificate/report is issued subject to the Standard General Conditions of the INTERNATIONAL FEDERATION OF INSPECTION AGENCIES (IFIA). The company's liability is limited under the terms of Article 10 thereof. Issuance of this certificate/report does not exonerate the buyers and sellers from exercising all their rights and discharging their liabilities under the Contract of Sale.

SCI - 1

LAMPIRAN 5



Energy Technology Center
(Balai Besar Teknologi Energi)

LAPORAN ANALISA REPORT OF ANALYSIS

SAMPLE : COAL

PROXIMATE ANALYSIS	As Received	Std. Method
% MOISTURE	6.97	ASTM D-3173
% ASH	0.52	ASTM D-3174
% VOLATILE	39.70	ASTM D-3175
% FIXED CARBON	52.81	By Difference

ULTIMATE ANALYSIS	As Received	Std. Method
% MOISTURE	6.97	ASTM D-3173
% ASH	0.52	ASTM D-3174
% CARBON	70.87	ASTM D-5373
% HYDROGEN	4.98	ASTM D-5373
% NITROGEN	1.31	ASTM D-5373
% TOTAL SULFUR	0.20	ASTM D-4239
% OXYGEN (by diff.)	15.16	By Difference

ENERGY TECHNOLOGY CENTER
Technical Manager,



Dt. Adjarso
NIP. 680002316

AN.0074-KA

LAMPIRAN 6



Energy Technology Center
(Balai Besar Teknologi Energi)

SAMPLE CODE :

PROXIMATE ANALYSIS	As Received	ADB	Dry	DAF	Std. Method
% MOISTURE	3.13	3.10	--	--	ASTM D-3173
% ASH	6.39	6.39	6.59	--	ASTM D-3174
% VOLATILE MATTER	29.21	29.22	30.15	32.28	ASTM D-3175
% FIXED CARBON	61.27	61.29	63.25	67.72	By Difference

ULTIMATE ANALYSIS	As Received	ADB	Dry	DAF	Std. Method
% MOISTURE	3.13	3.10	--	--	ASTM D-3173
% ASH	6.39	6.39	6.59	--	ASTM D-3174
% CARBON	73.46	73.48	75.83	81.18	ASTM D-5373
% HYDROGEN	4.47	4.47	4.61	4.94	ASTM D-5373
% NITROGEN	0.62	0.62	0.64	0.69	ASTM D-5373
% TOTAL SULFUR	0.83	0.83	0.83	0.92	ASTM D-4239
% OXYGEN (by diff.)	11.11	11.11	11.11	12.27	By Difference

ENERGY TECHNOLOGY CENTER
Technical Manager,



Dr. Adiatso
NIP. 680002316

LAMPIRAN 7



Activated Carbon DGF 8 x 30 AW

Granulated activated Carbon with a main grain diameter of 1 to 2 mm

Product-Description

G A C from Type DGF are produced by steam activation from de-ashed hard coal. The raw material hard-coal and a special manufacturing process will allow a thermal reactivation of the spent activated carbon with minor mass losses. The reactivated carbon will obtain the full adsorption capacity of the original activated carbon.

Typical Properties

Bulk density	[kg/m ³]	450 ± 30
Moisture (as packed)	[wt-%]	< 2,0
Surface area (BET)	[m ² /g]	1050 ± 50
Ash content	[wt-%]	< 8,0
Iodine No.	[mg I ₂ /g]	>1000
Hardness/ abrasion no.	[ASTM]	>95
Pore volume	[ml/g]	0.8
M.B. value	[mg/g]	>240
Mesh size	[US]	8 x 30
CTC	[wt-%]	63 ± 3
Benzene capacity at 20°C	[wt-%]	
p/p _s =0,9*		39 ± 2
p/p _s =0,1		34 ± 2
p/p _s =0,01		24 ± 2
p/p _s =0,001		16 ± 2

(*p/p_s = relative saturation/at 20°C = 324 g/m³)

The typical properties are the average of analysis !