

APPENDIX E

Properties of Selected Coals

Table E.1 Analyses of Selected U.S. Coals, as mined

Table E.2 Typical analyses of Coals of the World

TABLE E.1 Analyses of Typical U.S. Coals, as Mined

State	Rank†	% Proximate Analyses				% Ultimate Analyses						HHV, Btu/lb	A at Zero Excess Air, lb/10 ⁶ Btu ⁴
		H ₂ O	VM	FC	Ash	H ₂ O	C	H ₂	S	O ₂	N ₂		
RI	A	13.3	2.5	65.3	18.9	13.3	64.2	0.4	0.3	2.7	0.2	9,313	808
CO	B	2.5	5.7	83.8	8.0	2.5	83.9	2.9	0.7	0.7	1.3	13,720	787
NM	B	2.9	5.5	82.7	8.9	2.9	82.3	2.6	0.8	1.3	1.2	13,340	786
PA													
Orchard bed	B	5.4	3.8	77.1	13.7	5.4	76.1	1.8	0.6	1.8	0.6	11,950	791
Mammoth bed	B	2.3	3.1	87.7	6.9	2.3	86.7	1.9	0.5	0.9	0.8	13,540	794
Holmes bed	B	4.9	3.7	82.2	9.2	4.9	81.6	1.8	0.5	1.3	0.7	12,820	788
AR	C	2.1	9.8	78.8	9.3	2.1	80.3	3.4	1.7	1.7	1.5	13,700	770
PA	C	3.0	8.4	78.9	9.7	3.0	80.2	3.3	0.7	2.0	1.1	13,450	777
VA	C	3.1	10.6	66.7	19.6	3.1	70.5	3.2	0.6	2.2	0.8	11,850	782
AR	D	3.4	16.2	71.8	8.6	3.4	79.6	3.9	1.0	1.8	1.7	13,700	774
MD	D	3.2	18.2	70.4	8.2	3.2	79.0	4.1	1.0	2.9	1.6	13,870	761
OK	D	2.6	16.5	72.2	8.7	2.6	80.1	4.0	1.0	1.9	1.7	13,800	775
WV	D	2.7	17.2	76.1	4.0	2.7	84.7	4.3	0.6	2.2	1.5	14,730	767
PA	E	3.3	20.5	70.0	6.2	3.3	80.7	4.5	1.8	2.4	1.1	14,310	765
VA	E	3.1	21.8	67.9	7.2	3.1	80.1	4.7	1.0	2.4	1.5	14,030	778
AL	F	5.5	30.8	60.9	2.8	5.5	80.3	4.9	0.6	4.2	1.7	14,210	768
CO	F	1.4	32.6	54.3	11.7	1.4	73.4	5.1	0.6	6.5	1.3	13,210	763
KS	F	7.4	31.8	52.4	8.4	7.4	70.7	4.6	2.6	5.0	1.3	12,670	769
KY	F	3.1	35.0	58.9	3.0	3.1	79.2	5.4	0.6	7.2	1.5	14,290	758
MO	F	5.4	32.1	53.5	9.0	5.4	71.6	4.8	3.6	4.2	1.4	12,990	769
NM	F	2.0	33.5	50.6	13.9	2.0	70.6	4.8	1.3	6.2	1.2	12,650	766
OH	F	4.9	36.6	51.2	7.3	4.9	71.9	4.9	2.6	7.0	1.4	12,990	762
OK	F	2.1	35.0	57.0	5.9	2.1	76.7	4.9	0.5	7.9	2.0	13,630	757
PA	F	2.6	30.0	58.3	9.1	2.6	76.6	4.9	1.3	3.9	1.6	13,610	773
TN	F	1.8	35.9	56.1	6.2	1.8	77.7	5.2	1.2	6.0	1.9	13,890	767
TX	F	4.0	48.9	34.9	12.2	4.0	65.5	5.9	2.0	9.1	1.3	12,230	767
UT	F	4.3	37.2	51.8	6.7	4.3	72.2	5.1	1.1	9.0	1.6	12,990	758
VA	F	2.2	36.0	58.0	3.8	2.2	80.6	5.5	0.7	5.9	1.3	14,510	764
WA	F	4.3	37.7	47.1	10.9	4.3	68.9	5.4	0.5	8.5	1.5	12,610	758
WV	F	2.4	33.0	60.0	4.6	2.4	80.8	5.1	0.7	4.8	1.6	14,350	768
IL	G	8.0	33.0	50.6	8.4	8.0	68.7	4.5	1.2	7.6	1.6	12,130	766
KY	G	7.5	37.7	45.3	9.5	7.5	66.9	4.8	3.5	6.4	1.4	12,080	774

TABLE E.1 (continued)

State	Rank [†]	% Proximate Analyses				% Ultimate Analyses						HHV, Btu/lb	A at Zero Excess Air, lb/10 ⁶ Btu [*]
		H ₂ O	VM	FC	Ash	H ₂ O	C	H ₂	S	O ₂	N ₂		
MO	G	10.5	32.0	44.6	12.9	10.5	63.4	4.2	2.5	5.2	1.3	11,300	773
OH	G	8.2	36.1	48.7	7.0	8.2	68.4	4.7	1.2	9.1	1.4	12,160	762
WY	G	5.1	40.5	49.8	4.6	5.1	73.0	5.0	0.5	10.6	1.2	12,960	757
IL	H	12.1	40.2	39.1	8.6	12.1	62.8	4.6	4.3	6.6	1.0	11,480	769
IN	H	12.4	36.6	42.3	8.7	12.4	63.4	4.3	2.3	7.6	1.3	11,420	758
IA	H	14.1	35.6	39.3	11.0	14.1	58.5	4.0	4.3	7.2	0.9	10,720	754
MI	H	12.4	35.0	47.0	5.6	12.4	65.8	4.5	2.9	7.4	1.4	11,860	762
CO	I	19.6	30.5	45.9	4.0	19.6	58.8	3.8	0.3	12.2	1.3	10,130	756
WY	I	23.2	33.3	39.7	3.8	23.2	54.6	3.8	0.4	13.2	1.0	9,420	757
ND	J	34.8	28.2	30.8	6.2	34.8	42.4	2.8	0.7	12.4	0.7	7,210	750
TX	J	33.7	29.3	29.7	7.3	33.7	42.5	3.1	0.5	12.1	0.8	7,350	752

* A is the theoretical air required for combustion under stoichiometric conditions (no excess air).

† Rank Key: A—Meta-anthracite, B—Anthracite, C—Semianthracite, D—Low-vol. bituminous, E—Med.-vol. bituminous, F—High-vol. bituminous A, G—High-vol. bituminous B, H—High-vol. bituminous C, I—Subbituminous, J—Lignite
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TABLE E.2 Typical Analyses of Coals of the World

Country	District or Mine	Typical Analysis—As Received					Cal/kg	HHV, Btu/lb
		H ₂ O	Vol.	FC	Ash	Sul.		
Argentina	Turbio River	8.6	34.8	40.9	15.7	0.9	5755	10,360
Australia	New South Wales							
	Western Field	2.6	30.0	52.8	14.6	0.7	6455	11,620
	Southern Field	0.6	23.29	65.08	11.0	3.7	7275	13,090
	Queensland	1.5	37.0	49.9	11.6	...	6835	12,300
	Victoria(Brown Coal)	66.3	17.7	15.3	0.7	0.1	2055	3,700
Belgium	Batterie and Vidette	1.0	8.5	63.5	27.0	...	595	10,710
Brazil	Sao Jeronimo	13.8	24.7	27.1	34.4	3.0	3665	6,600
	Sao Jeronimo-Washed	16.0	23.1	32.9	28.0	0.9	4205	7,570
	Butia	11.5	32.0	42.9	13.6	1.3
Canada	Alberta-Drumheller	20.0	28.0	41.0	11.0	...	5010	9,020
	Saskatchewan-Souris	35.0	23.4	34.6	8.0	...	4050	7,290
	British Col. Crows Nest	1.4	24.5	61.8	12.3	0.5	7420	13,360
	Nova Scotia-Emery	4.0	33.7	51.6	10.7	2.5	7000	12,600
Chile	Schwager	2.9	41.3	52.2	3.6	0.9	7950	14,310
	Lota	3.4	39.6	55.4	1.6	0.7	7900	14,220
	Mafil	12.6	35.6	40.0	11.8	0.6	5620	10,120
China	Kailin	2.5	29.9	44.4	25.7	0.66	5720	10,300
	Kew Loong Kieng	5.4	29.7	45.0	19.9	...	6040	10,870
	Kiaping	3.5	24.4	41.1	31.0	...	5160	9,290
Colombia	Bogota	5.3	23.4	63.7	7.6	0.8	7900	14,220
France	Bethune	8.0	18.0	39.0	35.0	...	4670	8,410
	Anzin	1.6	9.2	44.3	44.9	...	4275	7,690
Germany	Frimmersdorf-Westfield	60.7	20.0	16.7	2.6	0.2	2355	4,240
	Saar	9.7	31.8	48.7	9.8	...	6130	11,040
	Saxony	53.1	25.3	18.1	3.5	0.9	2500	4,500
	Westphalia	1.7	23.7	69.2	5.4	...	7760	13,970
	Lower Silesia	4.5	25.6	56.1	13.8	...	6540	11,770
United Kingdom								
Wales	Cardiff	1.5	11.0	85.5	2.0	0.8	8000	14,400
	Arley	1.1	36.3	59.0	3.6	2.3	8155	14,680
England	Durham	1.5	34.7	60.0	3.8	0.87	7410	13,340
Scotland	Lanark	7.5	31.8	56.7	4.0	0.2	7600	13,680

TABLE E.2 (continued)

Country	District or Mine	Typical Analysis—As Received					Cal/kg	HHV, Btu/lb
		H ₂ O	Vol.	FC	Ash	Sul.		
Greece	Aliveri	31.0	30.0	21.0	18.0	...	3130	5,640
India	Bermo Seam	1.9	21.1	50.4	26.6	0.9	6010	10,820
	Damodar Valley	4.0	12.8	41.1	42.1	0.3	4365	7,850
	Trombay	7.2	20.8	44.7	27.3	1.0	5315	9,560
	Umaria Field	5.3	27.1	47.8	19.8	...	6100	10,980
	Palana	41.4	29.2	23.8	5.6	...	3730	6,710
Italy	Sardinia	3.6	39.8	33.0	23.6	6.5	5670	10,210
Japan	Hiyoshi-Anthracite	2.7	5.8	75.0	16.5	...	6960	12,540
	Hukuho	8.6	33.8	44.5	13.1	...	6830	12,300
	Niiura	19.0	24.8	31.2	25.0	...	4730	8,520
Mexico	Palu	1.3	21.0	59.0	18.7	0.7	6780	12,200
Peru	Chimbote	4.4	4.4	77.5	13.7	...	4150	7,470
	Goyllarisquisga	4.0	35.3	29.5	31.2	...	4950	8,910
Poland	Katowice	17.0	21.0	40.0	22.0	...	4500	8,100
	Upper Silesia	4.0	31.6	58.4	6.0	...	7500	13,500
Russia	Donetz Anthracite	2.0	3.5	83.0	11.5	0.8	7170	12,910
	Donetz Med. Vol.	3.5	21.0	71.0	4.5	3.6	8070	14,530
	Donetz Long Flame	7.0	40.0	31.5	21.5	5.7	6280	11,300
Spain	Asturias	10.2	11.9	47.6	30.3	0.8	4960	8,930
	Asturias	5.9	20.0	60.5	14.0	...	6120	11,020
	Zaragoza	19.5	34.6	25.4	20.5	...	4000	7,200
Turkey	Raihenburg	17.1	34.9	24.8	23.2	0.5	3700	6,660
South Africa	Natal	4.2	16.6	70.5	8.7	4.18
Africa	Orange Free State	5.6	28.4	50.4	15.6	1.5	5910	10,640
	Transvaal	2.2	27.0	57.5	13.3	0.7	6730	12,120
Venezuela	Barcelona	3.0	36.1	57.5	3.4	1.4	7600	13,680
Yugoslavia	Anatolia	1.4	29.4	51.3	17.9	1.0	6510	11,720

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