

Coal of Africa Limited																
Coal quality data sheet																
Physical Locality	Limpopo Province, South Africa															
Coal Mine	Makhado Project															
Rank	Coking Coal															
Mine Location	Northern Limpopo Province, Makhado															
Mining Method	opencast															
Seams	all seams															
% washed	100															
Laboratory undertaking Test	Advanced Coal Technologies, Pretoria															
Other notes	Preliminary Results Bulk Sample Drilling															
Seams	Middle Upper Coal Seam				Middle Lower Coal Seam(219)				Bottom Upper Coal Seam(218)				Bottom Lower Coal Seam			
Proximate Analysis	Unit	Air Dried	As Received Basis	Dry Basis	Unit	Air Dried	As Received Basis	Dry Basis	Unit	Air Dried	As Received Basis	Dry Basis	Unit	Air Dried	As Received Basis	Dry Basis
Total Moisture	%		2.50%		%		2.50%		%		2.50%		%		2.50%	
Inherent Moisture	%	1.20%			%	0.9%			%	1.50%			%	0.80%		
Ash	%	12.10%		12.2	%	12.1%		12.2	%	11.90%		12.1	%	12.30%		12.3
Volatile Matter	%	28.40%		28.7	%	30.3%		30.6	%	29.20%		29.6	%	30.30%		30.6
Fixed Carbon	%	58.30%			%	56.7%			%	57.40%			%	56.60%		
Total Sulphur	%	1.56%			%	1.2%			%	0.83%			%	0.92%		
Gross Calorific value	MJ/kg	30.55			MJ/kg	31.09			MJ/kg	30.81			MJ/kg	31.06		
Ultimate Analysis	Unit	Air Dried	As Received Basis	Dry Basis	Unit	Air Dried	As Received Basis	Dry Basis	Unit	Air Dried	As Received Basis	Dry Basis	Unit	Air Dried	As Received Basis	Dry Basis
Carbon	%			77.56	%			74.72	%			75.27	%			75.59
Hydrogen	%			4.05	%			4.2	%			4.13	%			4.12
Nitrogen	%			1.76	%			1.76	%			2.03	%			1.53
Sulphur	%			1.62	%			1.29	%			0.84	%			0.98
Ash	%			12.68	%			12.26	%			12.26	%			12.76
Oxygen	%			2.33	%			5.77	%			5.47	%			5.02
Phosphorus	%				%				%				%			
Chlorine	%				%				%				%			
Caking Properties	Unit				Unit				Unit				Unit			
Free Swelling Index		9				9.0				9				9		
Light Transmittance	%				%				%				%			
Gray - King Index																
Roga Index		86				91				89				90		
Gieseler Plasticity	Unit				Unit				Unit				Unit			
Max Fluidity	ddpm	150			ddpm	14277			ddpm	5493			ddpm	10109		
Max Fluidity Temp	°C	452			°C	450			°C	450			°C	454		
Initial Softening Temp	°C	418			°C	398			°C	396			°C	391		
Final Fluid Temp	°C				°C				°C				°C			
Solidification Temp	°C	483			°C	488			°C	485			°C	493		
Plastic Range (T ₃ - T ₁)	°C				°C				°C				°C			
Annul Dilatation	Unit				Unit				Unit				Unit			
Max Contraction	%	38			%	34			%	37			%	32		
Max Dilatation	%	66			%	268			%	237			%	281		
T ₁ - Initial softening	°C	387			°C	368			°C	362			°C	365		
Max Contraction	°C	432			°C	408			°C	411			°C	406		
Max Dilatation	°C	476			°C	502			°C	490			°C	490		
Petrography Analysis																
V Types																
5																
6																
7																
8						4				2				20		
9		36				31				49				36		
10		48				63				40				37		
11		16				2				9				7		
12																
13																
14																
15																
16																
17																
18																
19																
20																
Reactivities %																
Vitrinite		88.1				82.6				77.9				79.3		
Liptinite (Exinite)		0				1.9				1.9				0.7		
Resinite																
Semi Fusinite		0.8				1.9				3				2.7		
Total Reactives		88.9				86.4				82.8				82.7		
Inert %																
½ semi Fusinite		3.4				5.6				6.7				6.3		
Micrinite		0				0				0				0		
Fusinite		0.7				1.1				3.7				4.1		
Mineral Matter		7				6.9				6.8				6.9		
Total Inerts		11.1				13.6				17.2				17.3		
Petrographic Indices																
Mean Max Reflectance %RoVmax		1.03				1.01				1.01				0.98		
Mean Max Reflectance of Reactives %RoRmax		1.03				1.02				1.02				0.99		
Composition Balance Index		0.47				0.6				0.81				0.84		