

CERTIFICATE OF ANALYSIS



ALFRED H KNIGHT

EVE COLLINS
 IRISH CEMENT LIMITED
 LIMERICK WORKS
 CASTLEMUNGRET
 COUNTY LIMERICK
 IRELAND

Sampling Date: 20-Feb-2023
 Date Received: 24-Mar-2023

Test Date(s): 24-Mar-2023 to 02-Apr-2023
Date of Report: 02-Apr-2023

AHK Ref: DW/397174

Material Described As: SRF

Client Ref: SRF 20/2023 SAMPLE REC 24/03/2023

Samples were received by Alfred H Knight Energy Services Ltd and analysis results relate only to the items tested.

Client Ref.	Test	Unit	As Received	Dry Basis	Dry Ash-Free
<u>SRF 20/02/2023</u>					
	Removed Ash Contributors	%	0.00		
	Total Moisture	%	17.1		
	Total Ash Content	%	11.9	14.4	
	Volatile Matter	%	63.3	76.4	89.3
	Fixed Carbon	%	7.6	9.2	10.7
	Total Sulphur	%	0.34	0.41	0.48
	Chlorine	%	0.51	0.62	0.72
	Carbon	%	42.6	51.4	60.0
	Carbon from Fossil	%	22.5	27.1	31.7
	Carbon from Non-Fossil	%	20.1	24.2	28.3
	Hydrogen	%	5.72	6.90	8.06
	Nitrogen	%	0.70	0.85	0.99
	Oxygen By Difference	%	21.1	25.4	29.7
	Gross Calorific Value	KCal/Kg	4413	5323	6218
	Gross Calorific Value	MJ/Kg	18.477	22.288	26.037
	Net Calorific Value	KCal/Kg	4020		
	Net Calorific Value	MJ/Kg	16.829		
	Fluorine	mg/Kg	32	38	44
	Bromine	mg/Kg	22	27	32
	Iodine	mg/Kg	< 5	< 5	< 5
	Biomass Content	%		45.9	

Gibson Kabaso
 Technical Manager

For and on behalf of Alfred H Knight Energy Services Ltd



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<u>SRF 20/02/2023</u>					
	Mercury	mg/MJ	0.00394		
TRACE METAL ANALYSIS					
	Cadmium	mg/Kg		0.22	
	Beryllium	mg/Kg		< 0.10	
	Zinc	mg/Kg		79.84	
	Vanadium	mg/Kg		6.81	
	Lead	mg/Kg		4.31	
	Copper	mg/Kg		10.63	
	Chromium	mg/Kg		25.72	
	Nickel	mg/Kg		7.69	
	Antimony	mg/Kg		12.03	
	Cobalt	mg/Kg		5.25	
	Manganese	mg/Kg		22.07	
	Thallium	mg/Kg		< 0.10	
	Arsenic	mg/Kg		0.79	
	Mercury	mg/Kg		0.08	
	Tin	mg/Kg		3.74	
	Tellurium	mg/Kg		< 0.10	
	Selenium	mg/Kg		< 0.10	
	Titanium	mg/Kg		177.55	

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Client Ref.	Test	Unit	Result
<u>SRF 20/02/2023</u>			
SIZE ANALYSIS (mm) - Air Dried Basis			
	>31.5	%	1.1
	<31.5	%	98.9
ELEMENTAL ASH ANALYSIS			
	SiO ₂	%	25.70
	Al ₂ O ₃	%	15.08
	Fe ₂ O ₃	%	3.54
	TiO ₂	%	3.42
	Mn ₃ O ₄	%	0.16
	CaO	%	37.50
	MgO	%	2.38
	Na ₂ O	%	1.75
	K ₂ O	%	2.12
	P ₂ O ₅	%	0.96
	SO ₃	%	7.39

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