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	Specific Test Performed	Test Method Specification against which tests are	Range of Testing / Limits of Detection

CHEMICAL	TEGTINIC

I.	ORES & MINERALS			
1.	Bentonite	Chemical analysis by XRF		
		SiO ₂	IKC/ACC/INS01/XRF/16-17	47 % to 77 %
		Al_2O_3	Issue No: 01, Revision No:	8 % to 22 %
		Fe ₂ O ₃	00, Issue Date: 01/01/2017	1 % to 18 %
		TiO ₂		0.1 % to 4 %
		CaO		1 % to 4 %
		MgO		1 % to 4 %
		Na ₂ O		0.5 % to 4 %
		K ₂ O		0.1 % to 2 %
		SO3	 	0.01 % to 1 %
		Loss on Ignition	IS:12107 (Part-1): 1987 (RA 2017)	4 % to 12 %
		Trace element analysis by ICP		
		Pb	IKC/ACC/INS08/ICP/16-17	1 mg/L to 20 mg/L
		As	Issue No: 01, Revision No:	0.1 mg/L to 5 mg/L
		Cd	00, Issue Date: 01/01/2017	0.1 μg/L to 5 μg/L
		Hg		0.1 μg/L to 5 μg/L
		Mineralogy by XRD	!	:
		Montmorillonite	IKC/ACC/INS02/XRD/16-17	65 % to 90 %
		Quartz	Issue No: 01, Revision No:	1 % to 5 %
		Calcite	00, Issue Date: 01/01/2017	1 % to 10 %
	1 1 1	Cristoballite		15 % to 25 %

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SI.	Product / Material	Specific Test	Test Method Specification	Range of Testing /
	of Test	Performed	against which tests are	Limits of Detection
	+	Kaolin		1 % to 15 %
		Hematite		1 % to 10 %
		Maghemite		1 % to 10 %
		Anatase		1 % to 4 %
		Particle size by Malvern		
	1	d10	IKC/ACC/INS03/PSD/16-17	0.5 µm to 3 µm
		d50	Issue No: 01, Revision No:	3 μm to 15 μm
	1	d90	00, Issue Date: 01/01/2017	10 μm to 50 μm
		Microstructure by SEM		· · · · · · · · · · · · · · · · · · ·
		Surface Morphology,	IKC/ACC/INS04/SEM/16-17	Qualitative
	1	Grain Size	Issue No: 01, Revision No:	
			00, Issue Date: 01/01/2017	
	1	Thermal Analysis by		
		TG-DTA	 	, , ,
		Wt. Loss w.r.t. Temp. &	IKC/ACC/INS07/DTA/16-17	Qualitative
		Type of reaction	Issue No: 01, Revision No:	
		Endo/Exo-Thermic	00, Issue Date: 01/01/2017	! !
		Surface Area by BET	 	
		Surface Area		1 m²/g to 100 m²/g
			Issue No: 01, Revision No:	1 1 1
	, , +		00, Issue Date: 01/01/2017	1
2.	Attapulgite	Chemical analysis by		
		XRF		
	1	SiO ₂	IKC/ACC/INS01/XRF/16-17	40 % to 70 %
		Al ₂ O ₃	Issue No: 01, Revision No:	5 % to 15 %
		Fe ₂ O ₃	00, Issue Date: 01/01/2017	2 % to 12 %
		TiO ₂		0.1 % to 4 %
		СаО		1 % to 15 %
		MgO		5 % to 15 %
	, , 	Na₂O	 	0.1 % to 1 %

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SI.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are	Range of Testing / Limits of Detection
	* ! !	K ₂ O		0.1 % to 3 %
		SO ₃		0.01 % to 1 %
	1 1 1 1	Loss on Ignition	IS:12107 (Part-1): 1987 (RA 2017)	10 % to 25 %
		Trace element analysis by ICP		
		Pb	IKC/ACC/INS08/ICP/16-17	1 mg/L to 20 mg/L
		As	Issue No: 01, Revision No:	0.1 mg/L to 5 mg/L
	, , ,	Cd	00, Issue Date: 01/01/2017	0.1 µg/L to 5 µg/L
	1 1 1	Hg		0.2 µg/L to 5 µg/L
	1 1 1	Mineralogy by XRD		1
	1 1 1	Palygorskite	IKC/ACC/INS02/XRD/16-17	40 % to 80 %
		Montmorillonite	Issue No: 01, Revision No:	1 % to 10 %
	1	Calcite	00, Issue Date: 01/01/2017	5 % to 25 %
		Dolomite		2 % to 30 %
		Quartz		5 % to 30 %
	1 1 1	Hematite		1 % to 5 %
	1 1 1	Anatase		1 % to 4 %
	1	Particle size by Malvern		1 1
	1	d10 (µm)	IKC/ACC/INS03/PSD/16-17	0.5 µm to 3 µm
		d50 (µm)	Issue No: 01, Revision No:	3 µm to 15 µm
		d90 (µm)	00, Issue Date: 01/01/2017	10 µm to 50 µm
		Microstructure by SEM	, , ,	1 1 4
		Surface Morphology,	IKC/ACC/INS04/SEM/16-17	Qualitative
	1 1 1	Grain Size	Issue No: 01, Revision No:	
			00, Issue Date: 01/01/2017	! ! *
		Thermal Stability by TG-DTA		1 1

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SI.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are	Range of Testing / Limits of Detection
		Wt. Loss w.r.t. Temp. & Type of reaction Endo/Exo-Thermic	IKC/ACC/INS07/DTA/16-17 Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	Qualitative
		Surface Area by BET Surface Area	IKC/ACC/INS09/BET/16-17 Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	1 m²/g to 230 m²/g
3.	Kaolin	Chemical analysis by XRF		
		SiO ₂ Al ₂ O ₃ Fe ₂ O ₃	IKC/ACC/INS01/XRF/16-17 Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	30 % to 60 % 20 % to 55 % 0.1 % to 3 %
		TiO₂ CaO MgO		0.1 % to 3 % 0.1 % to 3 % 0.01 % to 1 %
		Na ₂ O K ₂ O SO ₃		0.01 % to 1 % 0.01 % to 2 % 0.01 % to 1 %
		Loss on Ignition	IS:12107 (Part-1): 1987 (RA 2017)	0.1 % to 20 %
		Trace element analysis by ICP		
		As Pb Cr	IKC/ACC/INS08/ICP/16-17 Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	0.01 mg/L to 25 mg/L 1 mg/L to 150 mg/L 0.01 mg/L to 10 mg/L
		Mineralogy by XRD Kaolin	IKC/ACC/INS02/XRD/16-17	40 % to 100 %
		Quartz Anatase	Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	1 % to 80 % 1 % to 5 %
	<u>.</u>	Mica	i	1 % to 2 %

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SI.	Product / Material	Specific Test	Test Method Specification	Range of Testing /
	of Test	Performed	against which tests are	Limits of Detection
• :	+ ! !	Cristobalite	. nortormen	1 % to 20 %
1 1 1	1 1 1	Mullite		55 % to 70 %
1 1 1	1	Amorphous		20 % to 100 %
	1	Corundum		1 % to 5 %
		Particle size by Malvern		
		d10	IKC/ACC/INS03/PSD/16-17	0.4 μm to 2 μm
		d50	Issue No: 01, Revision No:	1 μm to 35 μm
1 1 1	1 1 1	d90	00, Issue Date: 01/01/2017	5 µm to 230 µm
1 1 1	1 1 1	Particle size by		,
	1	Sedigraph		, , ,
		10 µm	IKC/ACC/INS05/SDG/16-17	80 % to 100 %
		5 μm	Issue No: 01, Revision No:	60 % to 100 %
		2 μm	00, Issue Date: 01/01/2017	40 % to 100 %
1 1 1	1 1 1	Microstructure by SEM		/ / /
1 1 1	1	Surface Morphology,	IKC/ACC/INS04/SEM/16-17	Qualitative
	1	Grain Size	Issue No: 01, Revision No:	
			00, Issue Date: 01/01/2017	
		Thermal Stability by TG-DTA		
		Wt. Loss w.r.t. Temp. &	IKC/ACC/INS07/DTA/16-17	Qualitative
		Type of reaction	Issue No: 01, Revision No:]
	1 1 1	Endo/Exo-Thermic	00, Issue Date: 01/01/2017	· · · · · · · · · · · · · · · · · · ·
1 1 1	1 1 1	Surface Area by BET		
1 1 1	1	Surface Area	IKC/ACC/INS09/BET/16-17	1 m²/g to 30 m²/g
			Issue No: 01, Revision No:	
!- <u>-</u>	· •		00, Issue Date: 01/01/2017	; •
4.	Feldspar	Chemical analysis by XRF		
1 1 1		SiO ₂	IKC/ACC/INS01/XRF/16-17	55 % to 85 %
	 	Al ₂ O ₃		15 % to 25 %

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SI.	Product / Material	Specific Test	Test Method Specification	Paper of Testing /
J I.	of Test	Performed	against which tests are	Limits of Detection
	UT TESL	Feriornied	against which tests are	Limits of Detection
	*	Fe ₂ O ₃	Issue No: 01, Revision No:	0.01 % to 1 %
	1	TiO ₂	00, Issue Date: 01/01/2017	0.01 % to 1 %
		CaO		0.01 % to 1 %
		MgO		0.01 % to 1 %
		Na ₂ O		1 % to 15 %
		K₂0		1 % to 15 %
	1 1 1	SO3		0.01 % to 1 %
	1 1 1	Loss on Ignition	IS:9749: 2007	0.1 % to 2 %
		Ũ	(RA 2017)	
		Microstructure by SEM		
		Surface Morphology,	IKC/ACC/INS04/SEM/16-17	Qualitative
		Grain Size	Issue No: 01, Revision No:	
	1 1 1		00, Issue Date: 01/01/2017	
	1	Thermal Stability by		
		TG-DTA		
		Wt. Loss w.r.t. Temp. &	IKC/ACC/INS07/DTA/16-17	Qualitative
		Type of reaction	Issue No: 01, Revision No:	
	' ' 	Endo/Exo-Thermic	00, Issue Date: 01/01/2017	
5.	Aluminum Ores			
а.	Bauxite	Chemical analysis by XRF		
		SiO ₂	IKC/ACC/INS01/XRF/16-17	1 % to 16 %
		Al_2O_3	Issue No: 01, Revision No:	45 % to 90 %
		Fe ₂ O ₃	00, Issue Date: 01/01/2017	1 % to 15 %
	1	TiO ₂		1 % to 10 %
		CaO		0.1 % to 2 %
	1	MgO		0.1 % to 2 %
		Na ₂ O		0.01 % to 1 %
		K₂O		0.01 % to 1 %
	1 1 1	SO3		0.1 % to 5 %
	! ! 	Loss on Ignition	IS:2000 (Part-1): 1985	0.1 % to 35 %

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			(RA 2017)	
		Mineralogy by XRD		
		Gibbsite	IKC/ACC/INS02/XRD/16-17	65 % to 85 %
	1 1 1	Goethite	Issue No: 01, Revision No:	1 % to 5 %
	1 1 1	Kaolin	00, Issue Date: 01/01/2017	1 % to 20 %
	1 1 1	Quartz		1 % to 10 %
	1 1 1	Anatase		1 % to 10 %
		Hematite		1 % to 10 %
	1	Maghemite		1 % to 10 %
		Corundum		75 % to 90 %
		Mullite		1 % to 10 %
		Amorphous		1 % to 20 %
	1 1 1	FAT		1 % to 10 %
	1 1 1	Particle size by Malvern	l l l	
	1 1 1	d10	IKC/ACC/INS03/PSD/16-17	0.5 µm to 2 µm
	1 1 1	d50	Issue No: 01, Revision No:	3 µm to 15 µm
	1	d90	00, Issue Date: 01/01/2017	15 μm to 75 μm
		Microstructure by SEM		
		Surface Morphology,	IKC/ACC/INS04/SEM/16-17	Qualitative
		Grain Size	Issue No: 01, Revision No:	
			00, Issue Date: 01/01/2017	
	1 1 1	Thermal Stability by		
	1 1 1	TG-DTA	; •	
	1	Wt. Loss w.r.t. Temp. &	IKC/ACC/INS07/DTA/16-17	Qualitative
		Type of reaction	Issue No: 01, Revision No:	
		Endo/Exo-Thermic	00, Issue Date: 01/01/2017	
	I I	Surface Area by BET		1 m ² /a to 000 m ² /a
		Surface Area	IKC/ACC/INS09/BET/16-17 Issue No: 01, Revision No:	1 m²/g to 200 m²/g
			00, Issue Date: 01/01/2017	

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SI.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are	Range of Testing / Limits of Detection		
6.	Silica Sand					
a.	Quartz & Silica Sand	Trace element analysis by ICP Al ₂ O ₃ Fe ₂ O ₃ TiO ₂ CaO MgO Na ₂ O K ₂ O SO ₃ Loss on Ignition Microstructure by SEM Surface Morphology, Grain Size	IKC/ACC/INS08/ICP/16-17 Issue No: 01, Revision No: 00, Issue Date: 01/01/2017 IS:1917 (Part-1): 1992 (RA 2017) IKC/ACC/INS04/SEM/16-17 Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	0.01 % to 10 % 0.01 % to 2 % 0.01 % to 5 % 0.01 % to 4 % 0.01 % to 2 % 0.01 % to 2 % 0.01 % to 2 % 0.01 % to 2 % 0.1 % to 2 % 0.1 % to 2 %		
7.	Limestone and Dolo	omite		·		
a.	Calcite, Limestone	Chemical analysis by XRI CaO SiO ₂ Al ₂ O ₃ Fe ₂ O ₃ MgO Loss on Ignition	 IKC/ACC/INS01/XRF/16-17 Issue No: 01, Revision No: 00, Issue Date: 01/01/2017 IS:1760 (Part-1): 1992 (RA 2017) 	45 % to 56 % 0.1 % to 5 % 0.1 % to 2 % 0.01 % to 1 % 0.1 % to 5 % 35 % to 45 %		

IKC/ACC/INS02/XRD/16-17

Issue No: 01, Revision No: 00, Issue Date: 01/01/2017

(RA 2017)

Mineralogy by XRD Calcite Dolomite

70 % to 100 % 1 % to 30 %

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SI.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are	Range of Testing / Limits of Detection
		Particle size by Malvern d10 d50 d90 Microstructure by SEM Surface Morphology, Grain Size Thermal Stability by TG-DTA Wt. Loss w.r.t. Temp. &	IKC/ACC/INS03/PSD/16-17 Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	0.5 μm to 1.5 μm 2.5 μm to 20 μm 6.0 μm to 50 μm Qualitative Qualitative
b.	Dolomite	Type of reaction Endo/Exo-Thermic Chemical analysis by	Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	
		XRF SiO ₂ Al ₂ O ₃ Fe ₂ O ₃ CaO MgO	IKC/ACC/INS01/XRF/16-17 Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	0.1 % to 2 % 0.1 % to 5 % 0.01 % to 1 % 20 % to 40 % 15 % to 30 %
		Los on Ignition Mineralogy by XRD Calcite	IS:1760 (Part-1): 1992 (RA 2017) IKC/ACC/INS02/XRD/16-17	40 % to 47 % 1 % to 30 %
		Dolomite Particle size by Malvern d10	Issue No: 01, Revision No: 00, Issue Date: 01/01/2017 IKC/ACC/INS03/PSD/16-17	70 % to 100 %
	· · ·	d10 d50	IKC/ACC/INS03/PSD/16-17	0.5 μm to 1.5 μm 2.5 μm to 20 μm

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		d90	Issue No: 01, Revision No 00, Issue Date: 01/01/20		

IKC/ACC/INS04/SEM/16-17 Qualitative

Qualitative

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Issue No: 01, Revision No: 00, Issue Date: 01/01/2017

IKC/ACC/INS07/DTA/16-17

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Microstructure by SEM Surface Morphology,

Thermal Stability by

Type of reaction

Endo/Exo-Thermic

Wt. Loss w.r.t. Temp. &

Grain Size

TG-DTA