Knowledge Centre, Ashapura Minechem Ltd., Plot No. 206, Madhapar,

Bhuj-Kutch, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

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ſ	SI.	Product / Material	Specific Test	Test Method Specification	Range of Testing /
		of Test	Performed	against which tests are	Limits of Detection
				performed	

## **CHEMICAL TESTING**

I.	ORES & MINERALS				
1.	Bentonite	Chemical analysis by XRF			
		SiO <sub>2</sub>	IKC/ACC/INS01/XRF/16-17	47 % to 77 %	
		Al <sub>2</sub> O <sub>3</sub>	Issue No: 01, Revision No:	8 % to 22 %	
		Fe <sub>2</sub> O <sub>3</sub>	00, Issue Date: 01/01/2017	1 % to 18 %	
		TiO <sub>2</sub>		0.1 % to 4 %	
		CaO		1 % to 4 %	
		MgO		1 % to 4 %	
		Na <sub>2</sub> O		0.5 % to 4 %	
		K <sub>2</sub> O		0.1 % to 2 %	
		SO <sub>3</sub>		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 %	
		Cristoballite		15 % to 25 %	
		Kaolin		1 % to 15 %	
		Hematite	-	1 % to 10 %	
		Maghemite		1 % to 10 %	
<u> </u>		Anatase		1 % to 4 %	

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	   	Particle size by Malvern	 	
		d10	IKC/ACC/INS03/PSD/16-17	0.5 μm to 3 μm
		d50	Issue No: 01, Revision No:	3 μm to 15 μm
		d90	00, Issue Date: 01/01/2017	10 μm to 50 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	
		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	IKC/ACC/INS09/BET/16-17	1 m <sup>2</sup> /g to 100 m <sup>2</sup> /g
			Issue No: 01, Revision No:	
			00, Issue Date: 01/01/2017	
2.	Attapulgite	Chemical analysis by XRF		
		SiO <sub>2</sub>	IKC/ACC/INS01/XRF/16-17	40 % to 70 %
! !		$Al_2O_3$	Issue No: 01, Revision No:	5 % to 15 %
		Fe <sub>2</sub> O <sub>3</sub>	00, Issue Date: 01/01/2017	2 % to 12 %
		TiO <sub>2</sub>		0.1 % to 4 %
! !		CaO		1 % to 15 %
! !		MgO		5 % to 15 %
! !		Na₂O		0.1 % to 1 %
! !		K₂O		0.1 % to 3 %
<u>.</u>		SO <sub>3</sub>	<u> </u>	0.01 % to 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

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[	   	As	Issue No: 01, Revision No:	0.1 mg/L to 5 mg/L
İ		Cd	00, Issue Date: 01/01/2017	0.1 μg/L to 5 μg/L
İ		Hg		0.2 μg/L to 5 μg/L
		Mineralogy by XRD	 	
		Palygorskite	IKC/ACC/INS02/XRD/16-17	40 % to 80 %
ļ		Montmorillonite	Issue No: 01, Revision No:	1 % to 10 %
		Calcite	00, Issue Date: 01/01/2017	5 % to 25 %
		Dolomite		2 % to 30 %
		Quartz		5 % to 30 %
		Hematite		1 % to 5 %
		Anatase		1 % to 4 %
		Particle size by Malvern		
		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		
		Surface Morphology,	IKC/ACC/INS04/SEM/16-17	Qualitative
		Grain Size	Issue No: 01, Revision No:	
į			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:	
į		Endo/Exo-Thermic	00, Issue Date: 01/01/2017	 
		Surface Area by BET		
		Surface Area	IKC/ACC/INS09/BET/16-17	1 m <sup>2</sup> /g to 230 m <sup>2</sup> /g
			Issue No: 01, Revision No:	
		<u> </u>	00, Issue Date: 01/01/2017	
3.	Kaolin	Chemical analysis by XRF		
İ		SiO <sub>2</sub>	IKC/ACC/INS01/XRF/16-17	30 % to 60 %
İ		Al <sub>2</sub> O <sub>3</sub>	Issue No: 01, Revision No:	20 % to 55 %
		Fe <sub>2</sub> O <sub>3</sub>	00, Issue Date: 01/01/2017	0.1 % to 3 %

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SI.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	 	TiO <sub>2</sub>		0.1 % to 3 %
		CaO		0.1 % to 3 %
		MgO		0.01 % to 1 %
		Na <sub>2</sub> O		0.01 % to 1 %
		K <sub>2</sub> O		0.01 % to 2 %
		SO₃		0.01 % to 1 %
		Loss on Ignition	IS:12107 (Part-1): 1987 (RA 2017)	0.1 % to 20 %
		Trace element analysis by ICP		
		As	IKC/ACC/INS08/ICP/16-17	0.01 mg/L to 25 mg/L
	Ì	Pb	Issue No: 01, Revision No:	1 mg/L to 150 mg/L
		Cr	00, Issue Date: 01/01/2017	0.01 mg/L to 10 mg/L
		Mineralogy by XRD	<u> </u>	j
		Kaolin	IKC/ACC/INS02/XRD/16-17	40 % to 100 %
		Quartz	Issue No: 01, Revision No:	1 % to 80 %
		Anatase	00, Issue Date: 01/01/2017	1 % to 5 %
		Mica	7	1 % to 2 %
		Cristobalite	7	1 % to 20 %
		Mullite	7	55 % to 70 %
		Amorphous	7	20 % to 100 %
		Corundum	7	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
		d90	00, Issue Date: 01/01/2017	5 μm to 230 μm
		Particle size by 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 %
		Microstructure by SEM		
		Surface Morphology,	IKC/ACC/INS04/SEM/16-17	Qualitative

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SI.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Grain Size	Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	
		Thermal Stability by TG-DTA		
		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 m <sup>2</sup> /g to 30 m <sup>2</sup> /g
4.	Feldspar	Chemical analysis by XRF		
		SiO <sub>2</sub>	IKC/ACC/INS01/XRF/16-17	55 % to 85 %
		Al <sub>2</sub> O <sub>3</sub>	Issue No: 01, Revision No:	15 % to 25 %
		Fe <sub>2</sub> O <sub>3</sub>	00, Issue Date: 01/01/2017	0.01 % to 1 %
		TiO <sub>2</sub>		0.01 % to 1 %
		CaO		0.01 % to 1 %
		MgO		0.01 % to 1 %
		Na₂O		1 % to 15 %
		K₂O		1 % to 15 %
		SO₃		0.01 % to 1 %
		Loss on Ignition	IS:9749: 2007 (RA 2017)	0.1 % to 2 %
		Microstructure by SEM		
		Surface Morphology, Grain Size	IKC/ACC/INS04/SEM/16-17 Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	Qualitative
		Thermal Stability by TG-DTA		
		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

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SI.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
5.	Aluminum Ores			
a.	Bauxite	Chemical analysis by XRF		
		SiO <sub>2</sub>	IKC/ACC/INS01/XRF/16-17	1 % to 16 %
		Al <sub>2</sub> O <sub>3</sub>	Issue No: 01, Revision No:	45 % to 90 %
		Fe <sub>2</sub> O <sub>3</sub>	00, Issue Date: 01/01/2017	1 % to 15 %
		TiO <sub>2</sub>		1 % to 10 %
		CaO		0.1 % to 2 %
		MgO		0.1 % to 2 %
		Na₂O		0.01 % to 1 %
		K₂O		0.01 % to 1 %
		SO₃		0.1 % to 5 %
		Loss on Ignition	IS:2000 (Part-1): 1985 (RA 2017)	0.1 % to 35 %
		Mineralogy by XRD		
		Gibbsite	IKC/ACC/INS02/XRD/16-17	65 % to 85 %
		Goethite	Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	1 % to 5 %
		Kaolin		1 % to 20 %
		Quartz		1 % to 10 %
		Anatase		1 % to 10 %
		Hematite		1 % to 10 %
		Maghemite		1 % to 10 %
		Corundum		75 % to 90 %
		Mullite		1 % to 10 %
		Amorphous		1 % to 20 %
		FAT		1 % to 10 %
		Particle size by Malvern		
		d10	IKC/ACC/INS03/PSD/16-17	0.5 μm to 2 μm
		d50	Issue No: 01, Revision No:	3 μm to 15 μm
		d90	00, Issue Date: 01/01/2017	15 μm to 75 μm
		Microstructure by SEM		
		Surface Morphology, Grain Size	IKC/ACC/INS04/SEM/16-17 Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	Qualitative

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		Thermal Stability by TG-DTA		
		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 m <sup>2</sup> /g to 200 m <sup>2</sup> /g
6.	Silica Sand			
a.	Quartz & Silica Sand	Trace element analysis by ICP		
		Al <sub>2</sub> O <sub>3</sub>	IKC/ACC/INS08/ICP/16-17	0.01 % to 10 %
		Fe <sub>2</sub> O <sub>3</sub>	Issue No: 01, Revision No:	0.01 % to 2 %
		TiO <sub>2</sub>	00, Issue Date: 01/01/2017	0.01 % to 5 %
		CaO		0.01 % to 4 %
		MgO		0.01 % to 2 %
		Na₂O		0.01 % to 2 %
		K <sub>2</sub> O		0.01 % to 2 %
		SO₃		0.01 % to 2 %
		Loss on Ignition	IS:1917 (Part-1): 1992 (RA 2017)	0.1 % to 2 %
		Microstructure by SEM		
		Surface Morphology, Grain Size	IKC/ACC/INS04/SEM/16-17 Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	Qualitative
7.	Limestone and Dolo	omite		
a.	Calcite, Limestone	Chemical analysis by XRF		
		CaO	IKC/ACC/INS01/XRF/16-17	45 % to 56 %
		SiO <sub>2</sub>	Issue No: 01, Revision No:	0.1 % to 5 %
		Al <sub>2</sub> O <sub>3</sub>	00, Issue Date: 01/01/2017	0.1 % to 2 %
		Fe <sub>2</sub> O <sub>3</sub>		0.01 % to 1 %
		MgO		0.1 % to 5 %

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		Loss on Ignition	IS:1760 (Part-1): 1992 (RA 2017)	35 % to 45 %
		Mineralogy by XRD		
		Calcite	IKC/ACC/INS02/XRD/16-17	70 % to 100 %
		Dolomite	Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	1 % to 30 %
		Particle size by Malvern		
		d10	IKC/ACC/INS03/PSD/16-17	0.5 μm to 1.5 μm
		d50	Issue No: 01, Revision No:	2.5 µm to 20 µm
		d90	00, Issue Date: 01/01/2017	6.0 µm to 50 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	
		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	
b.	Dolomite	Chemical analysis by XRF		
		SiO <sub>2</sub>	IKC/ACC/INS01/XRF/16-17	0.1 % to 2 %
		$Al_2O_3$	Issue No: 01, Revision No:	0.1 % to 5 %
		Fe <sub>2</sub> O <sub>3</sub>	00, Issue Date: 01/01/2017	0.01 % to 1 %
		CaO		20 % to 40 %
		MgO		15 % to 30 %
		Los on Ignition	IS:1760 (Part-1): 1992 (RA 2017)	40 % to 47 %
		Mineralogy by XRD		
		Calcite	IKC/ACC/INS02/XRD/16-17	1 % to 30 %
		Dolomite	Issue No: 01, Revision No: 00, Issue Date: 01/01/2017	70 % to 100 %
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		Particle size by Malvern		
		d10	IKC/ACC/INS03/PSD/16-17	0.5 μm to 1.5 μm
		d50		2.5 µm to 20 µm
		d90	00, Issue Date: 01/01/2017	6.0 µm to 50 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	
		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	