CSIR-CENTRAL GLASS AND CERAMIC RESEARCH INSTITUTE

196 RAJA S. C. MULLICK ROAD
KOLKATA-700032
INDIA

SCHEDULE OF TESTING CHARGES

WITH EFFECT FROM 15TH MAY 2017

Contact Phone No. 033 2483 7339 (Tele Fax)

033 2322 3288

e-mail: testing_cell@cgcri.res.in

ADVANCED MATERIALS CHARACTERIZATION UNIT (AMCU)

TRANSMISSION ELECTRON MICROSCOPY (TEM)

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) per Sample(Rs.)
1.	Transmission Electron Microscope (TEM) studies (Includes powder sample preparation only and 6 micrographs)	Powder:100mg(min) 1gm (max)	10100.00
2.	Additional Micrographs (a package of 4)	------	1100.00

Sample Preparation for TEM Study

1.	For bulk sample	3 D x 10 L (mm, min) 10 x 10 x 20(mm,max)	4100.00
2.	For Cross-sectional view of thin films/layers on substrates	2.5W x 10L x 0.2T(min) 2.5W x 10L x 1T(min)	6200.00

EDAX Analysis

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) per Sample(Rs.)
1.	Elemental Analysis by Energy Dispersive X-Ray Analysis (EDX) in SEM/FESEM/TEM (Including conductive coating).	Same as TEM sample	6200.00
2.	Elemental Distribution Analysis EDX Line Scanning in SEM / FESEM/TEM (Including conductive coating) (EDX-LS)	- Do -	8100.00
3.	Elemental Distribution Analysis EDX Dot Mapping in SEM / FESEM/TEM (Including conductive coating) (EDX-DM)	- Do -	8100.00

ATOMIC FORCE MICROSCOPY (AFM)

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) per Sample(Rs.)
1.	Normal AFM tapping mode(AF-T)/Contact mode scan (AF-C)	5 x 5 x 0.5mm (min) 20 x 20 x 3mm (max)	7000.00
2.	Nano-Indentation (AF-N)	- Do -	12300.00
3.	Special Scans (Under liquid, Thermal Conductivity, Electrical resistivity) (AF-S)	20 x 20 x 3mm	12300.00
4.	Any extra analysis (like roughness, grain size etc.) will involve extra cost per sample. (AF-R/GS)	15 x 15 x 10mm(max)	1100.00
5.	Sample preparation charge – per sample (AF-SP)	-----	900.00

Special Note: Imaging of each sample enables scanning at 3 (three) different locations, image post processing, 2D/3D morphology & sectional analysis

ADVANCED MECHANICAL & MATERIALS CHARACTERIZATION DIVISION (AMMCD)

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) per Sample(Rs.)
1.	Glass to Resin Ratio (Glass/Ash content) as per IS:10182	6" x 6" – 1No. (Laminated Sheet) 2' x 1'6"- 1No.(Corrugated Sheet)	1300.00
2.	Density/Specific Gravity (Composites) FRP/Plastics-ASTM:0792, IS: 10182, D4762-11a	IS: Standard – 1" x 15" – 1 No 4" x 4" – 1No. (Laminated Sheet) 2' x 1'6"- 1No.(Corrugated Sheet)	1300.00
3.	Viscosity (Liquid) Resin/ Favicall as per D2857-95(2007)	Minimum: 500 ml.	2100.00
4.	Monomer Content (Resin)/Solid Content as per D3749-08	Minimum: 100 ml.	1100.00
5.	Gel Time of Resin, as per ASTM:2471	Minimum: 500 ml.	1300.00
6.	Gel Time with Peak Exothermic Temperature (Resin) as per ASTM:D2471	Minimum: 500 ml.	2100.00
7.	Fibre Diameter Measure as per D619-99(2004) TEX MEASUREMENT	1 Meter	900.00
8.	Barcol / Shore Hardness (for Barcol Hardness ASTM:D2583, IS:12866 & BS:4994)	2" x2" - 1 NO.(Laminated Sheet) 2' x 1'6"- 1No.(Corrugated Sheet)	900.00
9.	Water Absorption as per C1585-11, FRP/Plastics-ASTM:D570, IS: 10182 & BS:2782	10"x 10"- 1No.(Laminated Sheet) 2' x 1'6"- 1No.(Corrugated Sheet)	1300.00
10.	Tensile Test of Metals: as per E8M-11 & ASTM:E8 a) Crosshead speed<0.5 mm/min (1Pc.) b) -do- (5Pcs.) c) Crosshead speed>0.5 mm/min (1Pc.) d) -do- (5Pcs.)	Sample prepared by party as per our requirement.	 1300.00 5300.00 700.00 3200.00
11.	a) Flexural Test (Cross-breaking) of Glass, Ceramic & Composites (5Pcs. set) as per C1341-06 (advanced ceramics) Glass-ASTM: C158 Ceramic- ASTM: C674 & C689 FRP/Plastics- ASTM: D790, BS: 2782 & IS: 10182.	Sample prepared by party as per our requirement. Bar Sample: Glass: T 10x L 250x W 50mm Ceramic: T 5-10 mm x L 130-150mm x W 25mm Cement/plaster: T 25x L 250x W 12.7mm. Porous: T 8 x L 120 x W 10mm Rod Sample: Glass: D 6-8mm x L 120mm Ceramic: D 4mm x L 120mm	2100.00
	b) Young's Modulus of Glass, Ceramic Glass-ASTM: C158 Ceramic- ASTM: C674 & C689 FRP/Plastics- ASTM: D790, BS:2782 & IS: 10182.	For Ceramic (5Pcs. set): sample size : 60x6x5 or50x5x4 mm	2100.00

12.	a) Tensile Test of Composites, Rubber & Polymers (5pcs.) b) Young's/E-modulus of Composites, Rubber & Plastics (5pcs. set), c) Percent Elongation of Composites, Plastics etc. (5Pcs. set) as per D638-10, FRP/Plastics- ASTM: D638, BS: 2782 & IS: 10182.	Laminated Sheet (>3mm-<10mm) for IS: Stander 15"x15"- 2 nos. ASTM: Standard 12"x12"- 2 nos.	2100.00 2100.00 2100.00
13.	Tensile Test of Single Fibre (10pcs.) as per ASTM: D3379	Specimen prepare by party otherwise extra charge will be include	3200.00
14.	Impact Test of Glass, Ceramic, Composites & Plastics (Charpy & Izod – 10pcs. set) as per E 1876-09, FRP/Plastics- ASTM: D256, BS: 2782 & IS: 10182.	Single laminate sheet- 12" x 12" (Thickness > 4mm)	2100.00
15.	Load Deflection Test (FRP Corrugated Sheet) as per D 5944-96, ASTM:D3379, IS:12866, BS: 4154	5' x 3'6" Min. or 5'6" x 4' - 3pcs.	2100.00
16.	Bolt-Shear Test (FRP Corrugated Sheet), as per D 4435-08	2' x 1'6"- 1No.(Corrugated Sheet)	2100.00
17.	Particle Size Distribution using Image Analyser (Set per Sample)	SEM Photocopy	5300.00
18.	Heat Distortion Temperature (H.D.T.) (Composite or Cast Resin) as per D 4435-08	110mm x 10mm x 10mm – 4 Nos.	2700.00
19.	Flammability/Fire Retardance	1' x1' – 1 No (Laminated Sheet)	2700.00
20.	Young's Modulus by Resonance as per D 4435-08 (Elastosonic) (As per ASTM Standard)	100mm x 10mm x 6mm – 5 Nos. (Parallel Surface)	3500.00
21.	Compressive Strength/ Crushing Load as per C1424-10	6" x 6"–1no.(Laminated Sheet) Cement/ Plaster Sample: 25mm. Cube – 6No Ceramic Sample: 10mm. Cube – 6No Porous Sample: 15mm. Cube – 6No	2100.00
22.	Vicker's Hardness/ Micro Hardness (Ceramic/Glass/Mattel) as per C1327-08	Ceramic Sample: 8" x 8" x 8" Cube – 6No 10 mm dia x 4 mm T	2700.00
	Special Mechanical Testing Facilities**		
23.	Vicker's Macro hardness Data using Macro indenter (100-300 N load) (data only) Sample size : 20x20x5 mm parallelopiped samples or 25 mm dia disks		4400.00
24.	Vicker's Macro hardness Data of Bulk Glass and Ceramics using Macro indenter (100-300 N load) with data and indent's optical picture with scale bar, Sample size : 20x20x5 mm parallelepiped samples or 25 mm dia disks		5300.00
25.	Vicker's Micro hardness Data of Bulk Glass and Ceramics using Micro indenter (10-30 N load)(data only) Sample size : 20x20x5 mm parallelopiped samples or 25 mm dia disks, thickness – 10 mm		3500.00
26.	Vicker's Micro hardness Data of Data Bulk Glass and Ceramics using Macro indenter (10-30 N load) with data and indent's optical picture with scale bar, Sample size : 20x20x5 mm parallelepiped samples or 25 mm dia disks, thickness – 10 mm		4400.00
27.	Fracture Toughness of Bulk Glass and Ceramics by the Single Edge Notched Beam (SENB) Technique (data only), Sample size : 50x5x4 mm parallelopiped samples		7000.00
28.	Fracture Toughness of Bulk Glass and Ceramics by the Single Edge Notched Beam (SENB) Technique (data only) along with load displacement plots,		8800.00

	Sample size : 50x5x4 mm parallelepiped samples	
29.	Fracture Toughness of Bulk Glass and Ceramics by the Indentation Method using Macro indenter (100-300 N load) (data only), Sample size : 25x25x10 mm parallelepiped samples or 25 mm dia disks, thickness – 10 mm	5300.00
30.	Fracture Toughness by the Indentation Method using Macro indenter (100-300 N load) with indent's optical pictures with scale bar, Sample size : 25x25x10 mm parallelepiped samples or 25 mm dia disks, thickness – 10 mm	7000.00
31.	Fracture Toughness by the Indentation Method using Macro indenter (100-300 N load) with optical pictures with scale bar and crack length and hardness data, Sample size : 25x25x10 mm parallelepiped samples or 25 mm dia disks, thickness – 10 mm	8800.00
32.	Fracture Toughness by the Indentation Method using Micro indenter (10-30 N load) (data only), Sample size : 25x25x10 mm parallelepiped samples or 25 mm dia disks, thickness – 10 mm	4400.00
33.	Fracture Toughness by the Indentation Method using Micro indenter (10-30 N load) with optical pictures with scale bar, Sample size : 25x25x10 mm parallelepiped samples or 25 mm dia disks, thickness – 10 mm	5300.00
34.	Fracture Toughness by the Indentation Method using Micro indenter (10-30 N load) with optical pictures with scale bar and crack length and hardness data, Sample size : 25x25x10 mm parallelepiped samples or 25 mm dia disks, thickness – 10 mm	7000.00
35.	Fracture Toughness of thin films using Nano-Indenter at load range (0.4 – 1000 mN) (data only), Sample size : 25x25 mm by t (micron) [t-film thickness]	7000.00
36.	Fracture Toughness of thin films using Nano-Indenter at load range (0.4 mN – 1000 mN) along with load depth plots, Sample size : 25x25 mm by t (micron) [t-film thickness]	8800.00
37.	Fracture Toughness of ceramic coatings using Nano-Indenter at load range (0.4 mN – 1000 mN) (data only), Sample size : 25x25 mm by t (micron) [t-film thickness]	7000.00
38.	Fracture Toughness of ceramic coatings using Nano-Indenter at load range (0.4 mN – 1000 mN) along with load depth plots, Sample size : 25x25 mm by t (micron) [t-film thickness]	8800.00
39.	Nanohardness of Glass using Nano-Indenter (0.4 mN-1000 mN), Sample size : 25x25x10 mm	5300.00
40.	Nanohardness of Glass using Nano-Indenter at load range of 0.4 mN-1000 mN with indent's optical pictures with scale bar, Sample size : 25x25x10 mm	7000.00
41.	Nanohardness of Glass using Nano-Indenter (0.4 mN-1000 mN) along with indent's optical pictures with scale bar and load depth plots, Sample size : 25x25x10 mm	8800.00
42.	Nanohardness of Bulk ceramics using Nano-Indenter at load range 0.4 mN– 1000 mN (data only), Sample size : 25x25x10 mm	5300.00
43.	Nanohardness of Bulk Ceramics using Nano-Indenter at load range of 0.4 mN - 1000 mN with indent's optical pictures with scale bar, Sample size : 25x25x10 mm	7000.00
44.	Nanohardness of Bulk Ceramics using Nano-Indenter at load range of 0.4 mN-1000 mN along with indent's optical pictures with scale bar and load depth plots, Sample size : 25x25x10 mm	8800.00
45.	Nanohardness of ceramic thin films using Nano-Indenter at load range (0.4 mN – 1000 mN) (data only),	7000.00

	Sample size : 25x25 mm by t (micron) [t-film thickness]	
46.	Nanohardness of thin films using Nano-Indenter at load range (0.4 –1000 mN) along with load depth plots, Sample size : 25x25 mm by t (micron) [t-film thickness]	8800.00
47.	Nanohardness of ceramic coatings using Nano-Indenter at load range (0.4 mN – 1000 mN) (data only), Sample size : 25x25 mm by t (micron) [t-film thickness]	7000.00
48.	Nanohardness of ceramic coatings using Nano-Indenter at load range (0.4 mN – 1000 mN) along with load depth plots, Sample size: 25x25 mm by t (micron) [t-film thickness]	8800.00
49.	Nanohardness of Glass using Hysitron triboindenter (0.01 μN- 12,000 μN) (data only), Sample size : 25x25x10 mm	13200.00
50.	Nanohardness of Glass using Hysitron triboindenter at load range of (0.01 μN-12,000 μN) with indent's Scanning Probe Microscope (AFM) pictures, Sample size : 25x25x10 mm	15800.00
51.	Nanohardness of Glass using Hysitron triboindenter at loads in the range of (0.01 μN-12,000 μN) along with indent's Scanning Probe Microscope (AFM) pictures and load depth plots, Sample size : 25x25x10 mm	17500.00
52.	Nanohardness of Bulk ceramics using Hysitron triboindenter at load range (0.01 μN-12,000 μN) (data only), Sample size : 25x25x10 mm	13200.00
53.	Nanohardness of Bulk Ceramics using Hysitron triboindenter at load range of (0.01 μN-12,000 μN) with indent's Scanning Probe Microscope (AFM) pictures, Sample size : 25x25x10 mm	15800.00
54.	Nanohardness of Bulk Ceramics using Hysitron triboindenter at load range of (0.01 μN-12,000 μN) along with indent's Scanning Probe Microscope (AFM) pictures and load depth plots, Sample size : 25x25x10 mm	17500.00
55.	Nanohardness of thin films using Hysitron triboindenter at load range (0.01 μN-12,000 μN) (data only), Sample size : 25x25 mm by t (micron) [t-film thickness]	13200.00
56.	Nanohardness of thin films using Hysitron triboindenter at load range of (0.01 μN-12,000 μN) with indent's Scanning Probe Microscope (AFM) pictures, Sample size : 25x25 mm by t (micron) [t-film thickness]	15800.00
57.	Nanohardness of thin films using Hysitron triboindenter at load range of (0.01 μN-12,000 μN) along with indent's Scanning Probe Microscope (AFM) pictures and load depth plots, Sample size : 25x25 mm by t (micron) [t-film thickness]	17500.00
58.	Micro-Scratch Testing at 2-20 N load of Bulk Glass and Ceramics with only friction data at constant peak load, Sample size : 25x25x10 mm	7000.00
59.	Micro-Scratch Testing at 2-20 N load of Bulk Glass and Ceramics with only friction data at ramping load up to the peak load, Sample size : 25x25x10 mm	7600.00
60.	Micro-Scratch Testing at 2-20 N load of Bulk Glass and Ceramics with friction data and graphical data plots, Sample size : 25x25x10 mm	7900.00
61.	Micro-Scratch Testing at 2-20 N load of Bulk Glass and Ceramics with friction data and graphical data plots and optical pictures with scale bar, Sample size : 25x25x10 mm	8800.00
62.	Macro-Scratch Testing at 20-200 N load of Bulk Glass and Ceramics with only friction data at constant peak load, Sample size : 25x25x10 mm	8800.00
63.	Macro-Scratch Testing at 20-200 N load of Bulk Glass and Ceramics with only friction data at ramping load up to the peak load, Sample size : 25x25x10 mm	9300.00
64.	Macro-Scratch Testing at 20-200 N load of Bulk Glass and Ceramics with friction data and graphical data plots, Sample size : 25x25x10 mm	9700.00

65.	Macro-Scratch Testing at 20-200 N load of Bulk Glass and Ceramics with friction data and graphical data plots and optical pictures with scale bar, Sample size : 25x25x10 mm	10500.00

**** Sample to be supplied in r/o Sl.23-65 above as flat, parallel, ground and polished on the surface to be notched / indented and / or scratched.**

FIELD EMISSION SCANNING ELECTRON MICROSCOPY (FESEM) (AMMCD)

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) per Sample(Rs.)
1.	High Resolution Micro structural analysis by Field Emission Scanning Electron Microscopy (FESEM SUPRA 35VP) (Including conducting coating & 6 nos. of micrographs). (FS) SOFT COPY	Bulk: 2 x 2 x 0.5mm(min) 10 x 10 x 5mm (max) Powder: 100 mg.(min) 1 gm.(max)	7700.00 100.00
2.	Additional Micrographs (a package of 4) (FS-A)	-----	700.00

EDAX Analysis (AMMCD)

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) per Sample(Rs.)
1.	**Elemental Analysis** by **Energy Dispersive X-Ray** Analysis (**EDX**) in SEM/FESEM/TEM (Including conductive coating).	Same as SEM sample	6200.00
2.	Elemental Distribution Analysis EDX Line Scanning/ Dot Mapping in SEM / FESEM/TEM (Including conductive coating) (EDX-LS)	- Do -	8100.00

XRD/ XRF (AMMCD)

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) per Sample(Rs.)
1.	XRD Diffractogram **without** any analysis Soft Copy	Min. 5gms. **Powder** or **Solid** sample/ **Thin Film** Length x Breadth x Width(cm) 2.5cm x1.5cm x 0.5cm(Min.) 6 cm x 3 cm x 1cm(Max.)	1600.00 100.00
2.	XRD Diffractogram with **qualitative** phase analysis	- Do -	2700.00
3.	XRD Diffractogram with **quantitative** phase analysis	- Do -	
	(a) Sample containing less or equal to three phases (multi phase)		5300.00
	(b) Sample containing more than three phases (multi phase)		8800.00
4.	XRD Diffractogram with only amorphous phase quantification	Minimum 10 gms powder	5300.00
5.	Semi-Quantitative elemental analysis by X-Ray Florescence (XRF)	Minimum 8 gms powder	9700.00

FUEL CELL & BATTERY DIVISION (FCBD)

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) per Sample(Rs.)
1.	Li-ion coin cell fabrication (2032 type) without powder processing or casting		1600.00
2.	Li-ion coin cell fabrication (2032 type) including powder processing and casting	Minimum 1 gm sample	3100.00
3.	Galvanostatic charge discharge (Range 6 V, 500 mA) Up to 3 cycles Up to 10 cycles Up to 50 cycles Up to 300 cycles		 1600.00 4600.00 7600.00 15300.00
4.	Cyclic voltammetry (Limit 6 V, 1 A) Normal Scan (≥ 1 m V/s) Slow Scan (< 1 m V/s)		 3100.00 4600.00
5.	Electrochemical impedance spectroscopy (Range 1 mHz to 100 kHz)		1600.00
6.	Other electrochemical tests		Rate on request

GLASS DIVISION

GLASS SCIENCE & TECHNOLOGY SECTION

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) per Sample(Rs.)
1.	Generation of **Glass Annealing Curve** including **Co-efficient of linear thermal expansion**, **Dilatometric Softening Point**, **Strain Point** and **Annealing Point**.	6-8 mm (dia) x 25 mm length	60500.00
2.	**Co-efficient of linear thermal expansion** of Glass and supply of data with Curve including Dilatometric Softening Point.	6 mm ϕ, 25 mm length	4700.00
3	**Spectroscopic measurement** of overall transmission in **UV/Visible/NIR**.	25mm x 25mm x at actual thickness	4700.00
4			
	(a) Whether Sheet Glass or Float Glass	100mm x 100mm x at actual thickness	5400.00
	(b) **Thickness** of the Glass	At actual size and thickness. Sample should be flat	1400.00
5	Determination of **Density** of Glass	10mm cube - 20mm cube /rectangular block	2000.00
6			
	(a) at one **wavelength of light**	20mm x 20mm x 2mm	2700.00
	(b) at each additional Wavelength	20mm x 20mm x 2mm	1100.00
	(c) **Refractive index** (n_d) and **Abbe number** (V_d)	20mm x 20mm x 2mm	5000.00
	(d) **Abbe number** (V_d) only	20mm x 20mm x 2mm	4700.00
7.	**Polarization** test for toughened window glasses	100mm-200mm x 100mm-200 mm x at actual thickness	4700.00
8	**Softening Point** Test	5mm x 5mm x 3mm	5800.00
9	**Optical microscope** observation	20 -25mm x 20 -25mm x 2-5mm thick parallel optical polished surfaces	7000.00
10	**Residual Stress** test **Expert opinion** on the overall result**(**for 5 samples **Max.)**	50 - 150 mm x 50 – 150 mm x 50 -150 mm	7300.00 10100.00
11.	Samples for **Tempered or Toughening of opal glass** articles/transparent glass articles	As such product	19500.00
12	**Fabrication/ Sample preparation** charge wherever applicable	----------	1200.00
13.	**Thermal Shock Resistance**	As such product	19500.00
13.	**Expert Opinion**		4100.00

MATERIAL CHARACTERIZATION AND INSTRUMENTATION DIVISION (MCID)

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) per Sample(Rs.)
1.	**Co-efficient of linear thermal expansion** and supply of data with Curve, **Glass transition**, **Softening point**, etc. [DIN:51045, ASTM E 831-86] **RTE, TDA**-Thermal Dilatometer Analysis, **INST.**: NETZSCH make Dilatometer 402C. (i) Up to 1200^{0}C (ii) Up to 1500^{0}C (iii) Extra charge for cooling curve, if required	25 mm x 6-8 mm (dia)	 3000.00 4400.00 1100.00
2.	**Differential thermal** analysis **(DTA):** [DIN: 51007, ASTM E 473-85] (i) Up to 1200^{0}C (ii) Up to 1500^{0}C (iii) Extra charge for cooling curve, if required	200 mg 10 micron (approxly)	 4100.00 5100.00 1100.00
3.	**Thermo-gravimetric** analysis **(TGA):** [DIN: 51006, ASTM E 914-83] (i) Up to 1200^{0}C (ii) Up to 1500^{0}C (iii) Extra charge for cooling curve, if required	200 mg	 4100.00 5100.00 1100.00
4.	Determination of **Specific heat: [**ASTM E 1269] **DSC**-Differential Scanning Calorimetry (i) Up to 1000^{0}C (ii) Up to 1400^{0}C (iii) Extra charge for cooling curve, if required	Powder**:** 200 mg Solid**:** 5.2 mm dia 0.25 - 0.5mm thick	 5100.00 6100.00 1100.00
5.	**Particle Size** Analysis (**micron range**) using LASER Diffraction System [ISO:13320-1]	20 mg	4600.00
6.	(i) **Nano particle size** analysis by **DLS** (Dynamic Light scattering) (ii) **Zeta potential** and (iii) **Isoelectric point** determination	20 ml dispersed sol.	4000.00 4000.00 5300.00
7.	Determination of **Thermal Conductivity** (within 80°C) at single temperature point For Solid Sample only RT Powder/Paste sample any temperature within 80^{o}C	Bulk sample(two nos of identical samples): Dia: 100mm., Height:20.5mm Liquid/paste sample: 80c.c. Powder samples: 25 c.c.	8300.00
8.	Determination of **carbon content** in sample (Carbon Analyser C 600 LECO, USA)	4 ml for solid sample	1800.00
9.	(i) **Surface area** measurement by **BET** method : [ASTM B 922-10] (ii) **Pore volume** and **Pore size** by **N2** gas adsorption	30 cc powder sample	4100.00 6100.00
10.	Measurement of **Density** of sample (any shape) by Gas Pycnometry	100 cm^3 volume	1300.00

11.	Analysis of gas/liquid by Gas Chromatography Mass Spectrometer **(GCMS)**	2ml for liquid sample	3200.00
12.	Analysis of gas/liquid by Gas Chromatography (GC)	2 ml for liquid sample	2500.00
13.	**Pore size** distribution by mercury **Porosimeter:** [ASTM D 4284-07]	15 cc powder sample/ 6 mm x 3 mm x 4 mm of solid sample 20 to 25 pieces.	2500.00
14.	Determination of **Nitrogen** content in sample LECO TC 600 O_2/N_2 determinator.	4 ml for liquid sample/ 4mm x 4 mm x 10 mm for solid sample	1800.00
15.	Determination of **Oxygen** content in sample	4 ml for liquid sample/ 4mm x 4 mm x 10 mm for solid sample	1800.00
16.	Evaluation of **Rheological Properties** of gels, pastes and other viscous substances. (i) Flow characterization (ii) Creep and relaxation analysis (iii) Thixotropic analysis (iv) Oscillation	 50 ml 50 ml 50 ml 50 ml	 2700.00 2700.00 2700.00 2700.00
17.	**Magneto-Rheology** (at 3 magnetic field values)	50 ml	3700.00
18.	Sample preparation charge as applicable against Sl. No.1, 6 & 10 above		900.00

ANALYTICAL CHEMISTRY (MCID)

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) per Sample(Rs.)
1.	Quantitative chemical analysis of ceramic raw materials, finished products and industrial waste for determination of **09 constituents** : SiO_2, Al_2O_3, Fe_2O_3, TiO_2, CaO, MgO, Na_2O,K_2O and loss on ignition	Minimum 100g powdered sample	12100.00
2.	Quantitative chemical analysis by wet chemical method for determination of **each** of the following constituents (SiO2, Fe2O3, TiO2, CaO, MgO, PbO, BaO, SrO, ZnO, CdO, CuO, MnO2, Li2O, CoO, NiO, B_2O_3, SO_3)	Minimum 50g powdered sample	2500.00
3.	Quantitative chemical analysis by wet chemical method for determination of **each** of the following constituents **(Al2O3, ZrO2,Cr2O3, P2O5)**	Minimum 50g powdered sample	4300.00
4.	Quantitative chemical analysis by **ICP AES** for determination of each element (Si, Al, Fe, Ti, Ca, Mg,Na, K, Li, Sr, Ba, Mn, Zn, Zr, Cu, Cr, Ni, Co, Mo, Pb, Cd, Pt, Pd, As, Sb, S, P)	Minimum 50g powdered sample	3500.00
5.	Quantitative chemical analysis by **AAS (Atomic Absorption Spectrocopy)** for determination of each element **(Pb, Cd, As)**	Minimum 50g powdered sample	2500.00
6.	Quantitative chemical analysis by **UV-VIS Spectrophotometer** for determination of each element **(Fe, Ti)**	Minimum 50g powdered sample	2500.00
7.	Quantitative chemical analysis by **Flame photometer** for determination of each element **(Na, K, Li)**	Minimum 50g powdered sample	2500.00

8.	Quantitative chemical analysis of **Fluoride / Chloride** by **Ion selective electrode**	Minimum 50g powdered sample	2500.00
9.	Determination of **loss on ignition / ash content** of carbonaceous material / graphite	Minimum 50g powdered sample	2500.00
10	Grading of glass for **Alkalinity** as per IS : 2303-1994	Minimum 500g solid sample (not powdered)	3500.00
11	Determination of **Lead and Cadmium** extracted from Glazed Ceramic surfaces as per ASTM C 738-94 **(Each element)**	Minimum 6 pieces of sample	3500.00
12.	Test for **Acid Resistance of bricks** as per IS:4860-1968	Minimum 500g solid sample (not powdered)	3500.00
13.	Chemical Analysis of Water		
	i. pH measurement		1300.00
	ii. Hardness test	Minimum 1 litre	5600.00
	iii. TDS test		2800.00
	iv. Arsenic by FI-HG-AAS		3500.00
	v. Fluoride / Chloride		1300.00
	vi. ICP AES analysis of each element (Si, Al, Fe, Ca, Mg, Na, K, Sr, Ba, Mn, Zn, Cu, Cr, Ni, Co, Mo, Pb, Cd, S, P)		1700.00
14.	Chemical analysis of castable (Al_2O_3, Fe_2O_3, TiO_2,CaO)	Minimum 100g powdered sample	7100.00
15.	Quantitative chemical analysis of glass and Frit :	Minimum 100g	
	SiO_2 (wet chemical method) :		2500.00
	B_2O_3 (wet chemical method) :		2500.00
	Al_2O_3, Fe_2O_3, TiO_2, CaO, MgO, Na_2O,K_2O		11900.00
	(ICP AES Method, 7 x Rs. 1700.00)	Total:	16900.00
16.	Quantitative chemical analysis of Silica Ramming mass and Rice Husk Ash :	Minimum 100g	
	SiO_2 (wet chemical method) :		2500.00
	LOI (wet chemical method) :		2500.00
	Al_2O_3, Fe_2O_3, TiO_2, CaO, MgO, Na_2O,K_2O		11900.00
	(ICP AES Method, 7 x Rs. 1700.00)	Total:	16900.00
17.	Quantitative chemical analysis of Fly Ash :	Minimum 100g	
	SiO_2 (wet chemical method) :		2500.00
	LOI (wet chemical method) :		2500.00
	Al_2O_3 (wet chemical method) :		4300.00
	Fe_2O_3, TiO_2, CaO, MgO, Na_2O,K_2O		10200.00
	(ICP AES Method, 6 x Rs. 1700.00)	Total:	19500.00
18.	Quantitative chemical analysis of Magnesite :	Minimum 100g	
	SiO_2 (wet chemical method) :		2500.00
	LOI (wet chemical method) :		2500.00
	MgO (wet chemical method) :		2500.00
	Al_2O_3,Fe_2O_3, TiO_2, CaO, Na_2O, K_2O		10200.00
	(ICP AES Method, 6 x Rs. 1700.00)	Total:	17700.00
19.	Sample preparation for chemical analysis		1100.00

NON-OXIDE CERAMICS & COMPOSITES DIVISION (NOCCD)

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) per Sample(Rs.)
1.	**Control atmosphere sintering** **i)** Basic charge up to 1500^{o}C, 1 hr. (Extra. Charge per hour) **ii)** Basic charge between 1500^{o}C-1800^{o}C, 1 hr. (Extra. Charge per hour) **iii)** Basic charge between 1800^{o}C-2000^{o}C, 1 hr. (Extra. Charge per hour) **iv)** Basic charge between 2000^{o}C-2200^{o}C, (Max. 30 min hold) **Atmosphere:** Argon/Nitrogen/**Vacuum**:(10^{-3} torr)	**Maximum Sample size**: 50mm dia. x 100 mm height	16100.00 1300.00 20200.00 1700.00 24200.00 2000.00 3100.00
2.	**Hot pressing** Temperature: 1700^{o}C, **Presser**: 5 MPa (Extra. Charge per hour) **Atmosphere:** Argon/Nitrogen/ **Vacuum**: (10^{-3} torr) Cost of Graphite die extra as per design	**Maximum Sample size**: 70mm dia. x 50mm height	26200.00 2100.00
3.	**Hot pressing** **Presser:** 35MPa **Atmosphere:** Argon/Nitrogen **i)** Basic charge up to 1500^{o}C, 1 hr. (Extra. Charge per hour) **ii)** Basic charge between 1500^{o}C-1800^{o}C, 1 hr. (Extra. Charge per hour) **iii)** Basic charge between 1800^{o}C-2000^{o}C, 1 hr. (Extra. Charge per hour) **iv)** Basic charge between 2000^{o}C-2200^{o}C, 1 hr. (Extra. Charge per hour)	**Maximum Sample size**: 170 mm dia. X 100 mm height	66400.00 5100.00 7900.00 6100.00 110700.00 10100.00 132800.00 20200.00
4.	**Spark Plasma Sintering Furnace** Pressure : 35MPa **Atmosphere:** Argon/Nitrogen/Vacuum **Sample Dia.** 20-30 mm **i)** Basic charge up to 1500^{o}C, 5 min. **ii)** Basic charge between 1500^{o}C-2000^{o}C, 5 min. **iii)** Basic charge between >2000^{o}C, 5 min. (Extra. Charge per 5 min holding) **Sample Dia.** 60-80 mm **i)** Basic charge up to 1500^{o}C, 5 min. **ii)** Basic charge between 1500^{o}C-2000^{o}C, 5 min. **iii)** Basic charge between >2000^{o}C, 5 min. (Extra. Charge per 5 min holding)	**Maximum Sample size**: dia. 80 mm and height 10 mm	11500.00 13800.00 15000.00 1200.00

REFRACTORY & TRADITIONAL CERAMICS DIVISION (RTCD)

REFRACTORY

Sl. No.	Name of the Test(s)	Sample Size & Volume/Quantity	Rate(s) Per Sample(Rs.)
1.	**Sieve Analysis** as per IS : 1528 (Part – XIV) (a) Dry (b) Wet	1 kg material	1700.00 2400.00
2.	**Size tolerance** as per IS : 1528 (Part – X)	Minimum 30nos. or as desired by the party	600.00
3.	**PCE** (Pyrometric Cone Equivalent) as per IS:1528 (Part-I)	1 kg material	5400.00
4.	**RUL** (Refractoriness Under Load) as per IS:1528 (Part-II) (Sample preparation charge extra)	(2nos.) 50mm dia x 50mm height	5400.00
5.	**PLCR** (Permanent Linear Change after Reheating) as per IS:1528 (Part-VI): (a) Up to 1400oC for 5 hours (b) Above 1400oC and up to 1600oC for 5 hrs (Sample preparation charge extra)	(5 nos. of samples) 5" x 2" x 2"	 8100.00 10500.00
6.	**Spalling resistance** test as per IS:1528 (Part-III) Prism method by air quenching up to 1000^{o}C	(3 nos. of samples) 3" x 2" x 2" 50mm (dia) x 50mm (H)	11600.00
7.	**CCS** (cold Crushing Strength) as per IS:1528(Part-IV) (Sample preparation charge extra)	3" cube 5nos. of samples **or** std. size bricks	1700.00
8.	**MOR** (Modulus of rupture) as per IS: 1528 (Part-V) (Sample preparation charge extra)	160 x 40 x 40mm 5nos. of samples **or** std. size bricks	1700.00
9.	**Water Absorption /Apparent Porosity/ Bulk density/ Apparent Specific gravity** as per IS : 1528 (Part-VIII) (Sample preparation charge extra)	65 x 65 x 40mm 5nos. of samples **or** std. size bricks	1700.00
10.	**True density/Specific gravity** as per IS:1528 (Part-IX) (Sample preparation charge extra)	3nos. of samples **or** 100gm powder (150 micron)	2000.00
11.	**True porosity / Closed Porosity** as per IS:1528 (Part XV) (Sample preparation charge extra)	5nos. of samples 65 x 65 x 40mm	3300.00
12.	**Compressive strength / modulus of rupture** of monolithics and castables as per IS:10570: a. after 24 hrs. curing … … … … b. after 72 hrs. curing … … … … c. after firing at temp up to 1000oC (3 hrs) … … d. after firing at temp up to 1400oC (3 hrs) … … e. after firing at temp up to 1550oC (3 hrs) … …	3 kg sample for a particular temperature	 2400.00 2800.00 6500.00 9300.00 10500.00
13.	**Firing** in electric furnace : a. up to 1000oC (5 hrs) … b. up to 1400oC (5 hrs) … c. up to 1500oC (5 hrs) …	As desired by the party	5400.00 8100.00 8100.00
14.	**Abrasion Resistance/Abradability index** as per B.S. 1902 Part-1A	4nos. of samples (3" x 2" x 1")	3300.00
15.	**Hot MOR** (up to 1400^{o}C) IS : 1528 (Part XX)		11600.00

16.	Static Cup Slag Resistance	-----	11600.00
17.	Testing in **Moh's Scale hardness**	Regular shape sample with good surface (Defect Free)	1300.00
18.	**Dry & Fired Shrinkage** (each) **(firing Charge extra)**		1700.00
19.	**Sample preparation** charge (Sl. 4-12 & 21 as applicable)	------	1200.00
20.	Fabrication of **Castable Samples** (per sample)	-----	2000.00
21	**Expert Opinion**		4100.00

TRADITIONAL CERAMICS

Sl. No.	Name of the Test(s)	Sample Size & Volume/ Quantity	Rate(s) per Sample(Rs.)
1.	**Deviation** in the dimension of tiles as per IS 13630 (Pt 1)- 1993 reaffirmed 2003	Minimum. 10 nos	1000.00
2.	**Straightness** of sides of tiles as per IS 13630 (Pt 1)- 1993 reaffirmed 2003	Minimum. 10 nos	11700.00
3.	**Rectangularity of tiles** as per IS 13630 (Pt 1)- 1993 reaffirmed 2003	Minimum. 10 nos	1700.00
4.	**Surface Flatness** of glazed tiles as per IS 13630 (Pt 1)- 1993 reaffirmed 2003	Minimum. 10 nos	3100.00
5.	**Water Absorption** as per IS 13630 (Pt 2) **/Apparent Porosity/ Bulk density** (for fired samples)	Minimum. 5 nos	1700.00
6.	Firing Between 1000^0C to 1350^0C in electric furnace (one firing) and examination of fired characteristics like: Colour, Shrinkage, Water Absorption, Apparent Porosity and Bulk density	Size of the tiles: 6' x 6' and 8' x 8' (No of tiles max. four) on each cycle	10500.00
7(a)	Determination of **Moisture Expansion** using boiling water-unglazed tiles as per IS:13630 (Pt 3) - 1992	Minimum. 5 nos	2100.00
7(b)	Determination of Thermal shock resistance of tiles as per IS:13630 (Pt 5) – 1992 + water Absorption (must)	Minimum. 5 nos	1800.00 +1700.00
8.	**Crazing Resistance**		
	i) Tiles as per IS 13630 (Pt.9) 2006	Minimum. 5 nos	3000.00
	ii) Sanitary ware as per IS 2556 – 1994/2004	Minimum. 5 nos	3700.00
	iii) Fine Bone China 5kgf/cm^2 for 2 hrs(5 cycles)	Minimum. 5 nos	3700.00
9.	**Burnt Clay Building Bricks as per IS - 3495:1992**		
	i) Water Absorption (Pt - 2)	Minimum. 5 nos	1800.00
	ii) Efflorescence (Pt - 3)	Minimum. 5 nos	3100.00
	iii) Warpage (Pt - 4)	Minimum. 5 nos	3100.00
	Test detail of various types of ceramic bodies		
10.	**Grit Content**		700.00
11.	**Water of Plastisity**		1200.00
12.	**Water Absorption, Apparent Porosity, Bulk density** with fabrication of bar and one firing upto 1300^0C (Max) (Single mix up to 24 hrs. grinding/ max. ten samples or 1 kg. batch)	Single mix upto 24 hrs. grinding/ max. ten samples or 1 kg. batch	8600.00
13.	**Atterbeg Number**		800.00
14.	**Dry & Firing Shrinkage** with fabrication of bar and one firing upto 1300^0C (Max)	Single mix upto 24 hrs. grinding/ max. ten samples or 1 kg. batch	8200.00
15.	**Expert Opinion on types of Tiles/Bricks**		4100.00