

CSIR-CENTRAL GLASS & CERAMIC RESEARCH INSTITUTE

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Testing Schedule and Charges for utilization of Testing & Analysis Facility of CSIR-CGCRI, Kolkata

(With effect from 01.04.2025)

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TESTING OF ADVANCED CERAMICS & COMPOSITES

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
1)	Control atmosphere Sintering , Atmosphere: Argon/ Nitrogen/ Vacuum: 10- 3 torr Basic charge up to 1500°C for 1 hr.	Maximum Sample size: 50mm dia. x 100 mm height	21340.00
2)	Extra. Charge per hour for above mentioned Test in 'SL. No. 1'		1730.00
3)	Control atmosphere Sintering , Atmosphere: Argon/ Nitrogen/ Vacuum: 10- 3 torr Basic charge between 1500°C-1800°C for 1 hr.		26740.00
4)	Extra. Charge per hour for the test mentioned in 'SL. No. 2'		2300.00
5)	Control atmosphere sintering , Atmosphere: Argon/Nitrogen/ Vacuum: 10- 3 torr Basic charge between 1800°C-2000°C for 1 hr.		32030.00
6)	Extra. Charge per hour for the test mentioned in 'SL. No. 5'		2650.00
7)	Control atmosphere sintering , Atmosphere: Argon/Nitrogen/ Vacuum: 10- 3 torr Basic charge between 2000°C-2200°C , for Max. of 30 min holding		4140.00
8)	Hot Pressing at Temperature: 1700°C , Presser: 5 Mpa, Atmosphere: Argon/ Nitrogen/ Vacuum: (10-3 torr)	Maximum Sample size: 70mm dia. x 50mm height	34680.00
9)	Extra. Charge per hour for the Test, mentioned in 'SL. No. 8' and the Cost of Graphite die will be extra as per design		2820.00
10)	Hot Pressing at Presser of 35 MPa with Atmosphere: Argon/ Nitrogen Basic charge up to 1500°C for 1 hr.	Maximum Sample size: 170 mm dia. X 100 mm height	87860.00
11)	Extra. Charge per hour for the test. mentioned in 'SL. No. 10'		6790.00
12)	Hot pressing at Presser of 35 MPa with Atmosphere: Argon/ Nitrogen Basic charge between 1500°C-1800°C for 1 hr.		10470.00
13)	Extra. Charge per hour for the test mentioned in 'SL. No. 12'		8110.00
14)	Hot pressing at Presser of 35 MPa with Atmosphere: Argon/ Nitrogen Basic charge between 1800°C-2000°C for 1 hr.		146460.00
15)	Extra. Charge per hour for the test, mentioned in 'SL. No. 14'		13400.00
16)	Hot pressing at Presser of 35 MPa with Atmosphere: Argon/ Nitrogen Basic charge between 2000°C-2200°C , for 1 hr.		175670.00
17)	Extra. Charge per hour for the test, mentioned in 'SL. No. 16'		26740.00
18)	Spark Plasma Sintering Furnace with Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for Sample Dia. 20-30 mm Basic charge for up to 1500°C for 5 min.	Maximum Sample size: dia. 80 mm and height 10 mm	15670.00
19)	Spark Plasma Sintering Furnace with Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for Sample Dia. 20-30 mm		18290.00

	Basic charge for between 1500°C-2000°C for 5 min.		
20)	Spark Plasma Sintering Furnace with Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for Sample Dia. 20-30 mm Basic charge for >2000°C for 5 min.		19840.00
21)	Extra. Charge per 5 min for holding for the above-mentioned tests, as mentioned in 'Sl. Nos. 18-20'		1610.00
22)	Spark Plasma Sintering Furnace with Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for Sample Dia. 60-80 mm Basic charge up to 1500°C for 5 min.		15670.00
23)	Spark Plasma Sintering Furnace with Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for Sample Dia. 60-80 mm Basic charge between 1500°C-2000°C for 5 min.		18290.00
24)	Spark Plasma Sintering Furnace with Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for Sample Dia. 60-80 mm Basic charge between >2000°C for 5 min.		19840.00
25)	Spark Plasma Sintering Furnace with Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for Sample Dia. 60-80 mm Extra. Charge per 5 min of holding for the tests as mentioned in 'Sl. Nos. 22-24'		1610.00
26)	Thermal Conductivity (per run)	Dia 12.4-12.6 mm Thickness 2-2.5 mm	5750.00

TESTING OF MECHANICAL PROPERTIES

Sl. No.	Name of the Test(s)	Sample type/nature	Sample Specification	Rate(s) per Samples (Rs.)
27)	Determination of Glass to Resin Ratio (Glass/Ash content) as per IS:10182	FRP/Composite materials	○ Laminated Sheet of size 6"x 6" or ○ Corrugated Sheet of size 2" x 1.6" ○ No. of sample: 1 pc per set	1730.00
28)	Density/Specific Gravity for Composites (FRP/Plastics) as per ASTM:0792, IS: 10182, D4762-11a	FRP/Composite materials	For IS: Standards: ○ Laminated Sheet of size 1" x 15" or ○ Corrugated Sheet 4"x4" ○ No. of sample: 1 pc per set	1730.00
29)	Viscosity as per D2857-95(2007)	Liquid Resin/Finical	Minimum quantity of sample: 500 ml	2820.00
30)	Monomer Content/Solid Content as per D3749-08	Liquid Resin	Minimum quantity of sample: 100 ml.	1500.00
31)	Determination of Gel Time , as per ASTM:2471	Liquid Resin	Minimum quantity of sample: 500 ml.	1730.00
32)	Determination of Gel Time with Peak Exothermic Temperature as per ASTM: D2471	Liquid Resin	Minimum quantity of sample: 500 ml.	2820.00
33)	TEX MEASUREMENT ISO	Glass Roving	Quantity of sample require: 10 Meters	1210.00
34)	Barcol Hardness ASTM: D2583, IS:12866 & BS:4994	Plastic/FRP Composite material	○ Laminated Sheet of size 2" x2" or ○ Corrugated Sheet of size	1210.00

			2" x 1.6" ○ No. of sample: 1 pc per set	
35)	Water Absorption as per ASTM: D570, IS: 10182 & BS:2782	FRP Composite/ Plastics materials	○ Laminated Sheet of size 10" x 10 " or ○ Corrugated Sheet of size 2" x 1.6" ○ No. of sample: 1 pc per set	1730.00
36)	Tensile Test for metals as per ASTM: E8 with Crosshead (Loading) speed <0.5 mm/min (for 1 Pc. of sample)	Metal	Sample provided by the Party as per requirement Standards	1730.00
37)	Tensile Test for metals as per ASTM: E8 with Crosshead (Loading) speed <0.5 mm/min (for 5 Pcs. of sample)			7020.00
38)	Tensile Test for metals as per ASTM: E8 with Crosshead (Loading) speed >0.5 mm/min (for 1 Pc. of sample)			980.00
39)	Tensile Test for metals as per ASTM: E8 with Crosshead (Loading) speed >0.5 mm/min (for 5 Pcs. of sample)			4260.00
40)	Flexural strength (Cross- breaking)/ Bending Strength / Modulus of Rupture: For Advance Ceramics as per ASTM: C1341-06;	Ceramic & Advanced ceramics	Need ready-to-test samples for testing as per specifications for respective samples.	2820.00
41)	Flexural strength (Cross- breaking)/ Bending Strength / Modulus of Rupture: For Glass as per ASTM: C158	Glasses	For Bar type sample: ○ Gass: 250 mm (L) x 50 mm (W) x 10 mm (T) - 10 pcs per set;	2820.00
42)	Flexural strength (Cross- breaking)/ Bending Strength / Modulus of Rupture: For Ceramic as per ASTM: C674 & C689	Ceramic	○ Ceramic: 130-150 mm (L) x 25 mm (W) x 5-10 mm (T) – 10 Pcs samples per set;	2820.00
43)	Flexural strength (Cross- breaking)/ Bending Strength / Modulus of Rupture: For FRP/Plastics as per ASTM: D790 / BS: 2782 or IS: 10182	FRP / Plastics / Composite	○ Cement/Plaster: 250 mm (L) x 12.7 mm (W) x 25 mm (T) - 10 pcs. samples per set; For Rod type Sample: ○ Glass: 6- 8 mm (dia.) x 120mm(L) - 10 pcs sample per set; ○ Ceramics: 4mm (dia.) x 120mm(L) - 10 Pcs. samples per set; ○ Composites: dimensions to be confirmed from testing in-charge (as per type of material)	2820.00
44)	Measurement of Young's Modulus for Glasses as per ASTM: C158	Glass/ Ceramic/ FRP/ Composites/ Plastics	A) For Ceramic: ○ Size:60mm(L)x6mm(W) x 5mm(T) or	2820.00
45)	Measurement of Young's Modulus for Ceramic as per ASTM: C674 & ASTM: C689		○ Size: 50mm(L)x5mm (W) x 4mm(T)	2820.00
46)	Measurement of Young's Modulus for FRP/Plastics as per ASTM: D790, BS:2782 & IS: 10182		○ No. of sample: 5 Pcs/Set B) Composite: ○ sample dimensions to be confirmed by testing in-charge according for respective type of material	2820.00
47)	Tensile Strength/ Test for Composites, Rubbers & Polymers	Composites, Rubbers & Polymers	Finished sample with following dimensions must be provided by the Party	2820.00

48)	Young's modulus /E-modulus for Composites, Rubber & Plastics	Composites, Rubber & Plastics	a) Laminated Sheet of thickness range of >3mm to <10mm for as per IS & ASTM Standards b) No. of samples: 5 Pcs. sample per Set	2820.00
49)	Percent Elongation for FRP/Plastic samples as per standards: for Polymer-Composites : ASTM: D638- 10	Composites, Plastics etc.	Finished sample with following dimensions must be provided by the Party	2820.00
50)	Percent Elongation for FRP/Plastic samples as per standards: for FRP/Plastics: ASTM: D638, BS: 2782 & IS: 10182.		a) Laminated Sheet: thickness of >3mm to <10mm for as per IS and b) b) No. of samples: 5 Pcs. sample per Set	2820.00
51)	Tensile Strength of Single Fiber as per ASTM: D3379	Single Fiber (Glass/Carbon/ Jute/ Coir)	a) Specimen must be provided by the Party as per requirement of Standards b) No. of sample: 10 pcs. samples per set	4260.00
52)	Impact Test (Charpy & Izod) as per ASTM: D256, BS: 2782 & IS: 10182	Glass, Ceramic, Composites & Plastics / FRP/ Plastics	o Specimen must be provided by the Party as per requirement of respective Standards c) No. of sample: 10 pcs sample per set	2820.00
53)	Load Deflection Test for FRP Corrugated Sheets as per IS:12866, BS: 4154	FRP Corrugated Sheet	o Sample dimensions: min. of 5" (L)x3.6" (W) or 5'6" (L) x 4' (W) o No. of sample: 3 pcs /set	2820.00
54)	Bolt-Shear Test for FRP Corrugated Sheet as per IS:12866, BS: 4154	FRP Corrugated Sheet	o Specimen must be provided by the Party as per Standards requirement o No. of sample: 6 pcs. per set	2820.00
55)	Shear Bond Strength for Resin-Zirconia/ Dental Cement base sample	Resin-Zirconia/ Dental Cement base sample	o A batch of five nos. test samples must be provided by the Party	2820.00
56)	Young's Modulus by Resonance/ Elastosonic method as per ASTM: C1259-21	Ceramic and Metal	o Finished sample must be provided by the Party as per requirement Standard o No. of sample: 5 Nos./set (Parallel Surface)	4660.00
57)	Compressive Strength/ Crushing Load as per ASTM:C1424-10	Ceramic/ Composite/ Refractory	o Finished sample should be provided by party as per requirement of Standard o No. of sample: 5 Nos. (Parallel Surface)	2820.00
58)	Vicker's Micro Hardness as per ASTM:C1327- 08 / Knoop Hardness	Ceramic/ Glass/ Metal Ceramic/ Glass/ Metal	o For Cubic sample: 5 mm x 5mm x 5mm o For Disc sample: 5~10mm (dia.) x 4 mm (Thick) o No. of sample: 6 pcs/set o Surface finish: Flat- Parallel surface and One surface must be polished	3630.00
59)	Vicker's Macro hardness by using Macro indenter (100-300 N load) (data only)		o Sample size : 20mm x 20mm x 5mm parallelo-piped samples or 25mm(dia.) x 8-12 mm (Thickness)	5870.00
60)	Vicker's Macro hardness by using Macro indenter (100-300 N load) with data and indent's optical picture with scale bar,			7020.00
61)	Vicker's Micro hardness Data using Micro indenter (10-30 N load) (data only)			4660.00

62)	Vicker's Micro hardness Data using Macro indenter (10-30 N load) with data and indent's optical picture with scale bar,			5870.00
63)	Fracture Toughness for Glass and Ceramics by the Single Edge Notched Beam (SENB) Technique (data only)	Glass and Ceramics	- Sample size: 50mm(L)x5mm(W)x4 mm(T) parallelepiped samples - No. of sample: 5 Nos.	9320.00
64)	Fracture Toughness for Glass and Ceramics by the Single Edge Notched Beam (SENB) Technique (data only) along with load displacement plots			11680.00
65)	Fracture Toughness for bulk glass and Ceramics by Indentation Method using Macro-indenter (load: 100-300N) (data only)	Bulk Glass and Ceramics	- Sample size (mm): 25x25x10 parallelepiped samples or Discs of 25 mm (dia.) x 10 mm (thickness) - No. of sample: 5 Nos.	7020.00
66)	Fracture Toughness for bulk glass and Ceramics by the Indentation Method using Macro indenter (100-300 N load) with indent's optical pictures with scale bar			9260.00
67)	Fracture Toughness for Glass and Ceramics by the Indentation Method using Macro indenter (100-300 N load) with optical pictures with scale bar and crack length & hardness data	Glass and Ceramics	- Sample size (mm): 25x25x10 parallelepiped samples or Discs of 25 mm (dia.) x 10 mm (thickness) - No. of sample: 5 Nos. per set	11680.00
68)	Fracture Toughness for Glass and Ceramics by the Indentation Method using Micro indenter (10-30 N load) (data only)			5870.00
69)	Fracture Toughness for Glass and Ceramics by the Indentation Method using Micro indenter (10-30N load) with optical image with scale bar,			7020.00
70)	Fracture Toughness for Glass and Ceramics by the Indentation Method using Micro indenter (10-30 N load) with optical pictures with scale bar and crack length and hardness data			9260.00
71)	Nano-hardness of Glass by Nano-indentation method (0.01 μ N- 12,000 μ N) (data only)	Glasses	Sample size: 25x25x10 mm	17480.00
72)	Nano-hardness of Glass by Nanoindentation method at load range of (0.01 μ N- 12,000 μ N) with indent's Scanning Probe image ,			20930.00
73)	Nano-hardness of Glass by Nanoindentation method at load range of (0.01 μ N- 12,000 μ N) with indent's Scanning Probe image and load vs. depth plots			23180.00
74)	Nano-hardness of Bulk ceramics by Nanoindentation method at load range (0.01 μN-12,000 μN) (data only),	Bulk ceramics	Sample size: 25x25x10 mm	17480.00
75)	Nano-hardness of Bulk ceramics by Nanoindentation method at load range (0.01 μ N- 12,000 μ N) with indent's Scanning Probe image			20930.00
76)	Nano-hardness of Bulk ceramics by Nanoindentation method at load range (0.01 μ N- 12,000 μ N) with indent's Scanning Probe image and load vs. depth plots			23180.00
77)	Nano-hardness of thin films by Nanoindentation method at load range (0.01 μ N- 12,000 μ N) (data only),	Thin films / coatings	Sample size: 25x25x10 mm	17480.00
78)	Nano-hardness of thin films by Nanoindentation method at load range (0.01 μ N- 12,000 μ N) with indent's Scanning Probe image			20930.00
79)	Nano-hardness of thin films by Nanoindentation method at load range (0.01 μ N- 12,000 μ N) with indent's Scanning Probe image and load vs. depth plots			23180.00

CHEMICAL ANALYSIS / CHARACTERISATION			
Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
80)	Quantitative chemical analysis of ceramic raw materials , finished products and industrial waste for determination of 09 constituents : SiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , TiO ₂ , CaO, MgO, Na ₂ O, K ₂ O and loss on ignition	Minimum 100g powdered sample	16050.00
81)	Quantitative chemical analysis by wet-chemical method for determination of each of the following constituents SiO ₂ , Fe ₂ O ₃ , TiO ₂ , CaO, MgO, PbO, BaO, SrO, ZnO, CdO, CuO, MnO ₂ , Li ₂ O, CoO, NiO, B ₂ O ₃ , SO ₃ , Na ₂ O & K ₂ O)	Minimum 50g powdered sample	3340.00
82)	Quantitative chemical analysis by Wet-chemical method for determination of each of the following constituents (Al ₂ O ₃ , ZrO ₂ , Cr ₂ O ₃ , P ₂ O ₅)	Minimum 50g powdered sample	5700.00
83)	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, Ag)	Minimum 50g powdered sample	4660.00
84)	Quantitative chemical analysis by AAS (Atomic Absorption Spectroscopy) for determination of each element (Pb, Cd, As)	Minimum 50g powdered sample	3340.00
85)	Quantitative chemical analysis by UV-VIS Spectrophotometer for determination of each element (Fe, Ti)	Minimum 50g powdered sample	3340.00
86)	Quantitative chemical analysis by Flame photometer for determination of each element (Na₂O, K₂O, Li₂O)	Minimum 50g powdered sample	3340.00
87)	Quantitative chemical analysis of Fluoride / Chloride by Ion selective electrode	Minimum 50g powdered sample	3340.00
88)	Determination of loss on ignition / ash content of carbonaceous material / graphite	Minimum 50g powdered sample	3340.00
89)	Grading of glass for Alkalinity as per IS : 2303-1994	Minimum 500g solid sample (not powdered)	4660.00
90)	Determination of Lead and Cadmium extracted from Glazed Ceramic surfaces as per ASTM C 738-94 (Each element)	Minimum 6 pieces of sample	4660.00
91)	Acid Resistance of bricks as per IS:4860-1968	Minimum 500g solid sample (not powdered)	4660.00
92)	Chemical Analysis of Water: pH measurement	Minimum quantity of sample require: 1 liter	1730.00
93)	Chemical Analysis of Water: Hardness test		7420.00
94)	Chemical Analysis of Water: TDS test		3740.00
95)	Chemical Analysis of Water: Arsenic by FI-HG-AAS		4660.00
96)	Chemical Analysis of Water: Fluoride / Chloride		1730.00
97)	Chemical Analysis of Water: 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)		2300.00
98)	Chemical analysis of castable (Al ₂ O ₃ , Fe ₂ O ₃ , TiO ₂ , CaO)	Minimum 100g powdered sample	9430.00
99)	Quantitative chemical analysis of Glass & Frit for following constituents: For SiO ₂ (wet chemical method) :	Minimum 100g	3340.00
100)	Quantitative chemical analysis of Glass & Frit for following constituents: For B ₂ O ₃ (wet chemical method)		3340.00

101)	Quantitative chemical analysis of Glass & Frit for following constituents: Al ₂ O ₃ , Fe ₂ O ₃ , TiO ₂ , CaO, MgO, Na ₂ O, K ₂ O (ICP-AES Method, 7 x Rs. 2300.00)		16100.00
102)	Quantitative chemical analysis of Glass & Frit for the constituents mentioned in Sl. Nos. 99-101: Total cost of tests, mentioned in Sl. Nos. 99-101)		22780.00
103)	Quantitative chemical analysis of Silica Ramming mass and Rice Husk Ash for following constituents: SiO₂ (by wet chemical method) :	Minimum quantity of sample require: 100g	3340.00
104)	Quantitative chemical analysis of Silica Ramming mass and Rice Husk Ash for following constituents: Loss of Ignition, LOI (by wet chemical method) :		3340.00
105)	Quantitative chemical analysis of Silica Ramming mass and Rice Husk Ash for following constituents: Al ₂ O ₃ , Fe ₂ O ₃ , TiO ₂ , CaO, MgO, Na ₂ O, K ₂ O (by ICP-AES Method, 7 x Rs. 2300.00)		16100.00
106)	Quantitative chemical analysis of Silica Ramming mass and Rice Husk Ash for the constituents, mentioned in Sl. Nos. 103-105: Total cost (for testes mentioned in Sl. Nos. 103-105)		22780.00
107)	Quantitative chemical analysis of Fly Ash for following constituents/components: For SiO ₂ (wet chemical method) :	Minimum quantity of sample require: 100g	3340.00
108)	Quantitative chemical analysis of Fly Ash for following constituents/components: For Loss of Ignition, LOI (by wet chemical method) :		3340.00
109)	Quantitative chemical analysis of Fly Ash for following constituents/components: For Al ₂ O ₃ (wet chemical method) :		5700.00
110)	Quantitative chemical analysis of Fly Ash for following constituents/components: For Fe ₂ O ₃ , TiO ₂ , CaO, MgO, Na ₂ O, K ₂ O (by ICP AES Method, 6 x Rs.2300.00)		13800.00
111)	Quantitative chemical analysis of Fly Ash for following /components, mentioned in Sl. Nos. 107-110: For Total cost of tests, mentioned in Sl. Nos. 107-110		26180.00
112)	Quantitative chemical analysis of Magnesite for following constituents: For SiO ₂ (wet chemical method) :	Minimum 100g	3340.00
113)	Quantitative chemical analysis of Magnesite for following constituents: For Loss of Ignition, LOI (by wet chemical method) :		3340.00
114)	Quantitative chemical analysis of Magnesite for following constituents: For MgO (wet chemical method) :		3340.00
115)	Quantitative chemical analysis of Magnesite for following constituents: For Al ₂ O ₃ , Fe ₂ O ₃ , TiO ₂ , CaO, Na ₂ O, K ₂ O		13800.00
116)	Quantitative chemical analysis of Magnesite for following constituents: By ICP AES Method, 6 x Rs. 2300.00)		13800.00
117)	Quantitative chemical analysis of Magnesite For Total cost of tests, as mentioned in Sl. Nos. 112-1116		23820.00
118)	Determination of % Sodium dichromate (Na ₂ Cr ₂ O ₇) as per IS:249- 1979	Minimum 50g powdered sample	7310.00
119)	Sample preparation charges for chemical analysis		1500.00

TESTING & ANALYSIS OF ENERGY MATERIALS & DEVICES

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
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120)	Li-ion coin cell fabrication (2032 type) without powder processing or casting		2130.00
121)	Li-ion coin cell fabrication (2032 type) including powder processing and casting	o Minimum quantity of sample require: 1 gm	4140.00
122)	Galvanostatic charge-discharge cycling (Range: 6 V, 500 mA): Up to 3 cycles	Ready-to-test sample	2130.00
123)	Galvanostatic charge-discharge cycling (Range: 6 V, 500 mA): up to 10 cycles		6100.00
124)	Galvanostatic charge-discharge cycling (Range: 6 V, 500 mA): up to 50 cycles		10070.00
125)	Galvanostatic charge-discharge cycling (Range: 6 V, 500 mA): up to 300 cycles		20240.00
126)	Cyclic voltammetry (Limit: 6 V & 1 A) At Normal Scan (scan rate: ≥ 1 m V/s)		4140.00
127)	Cyclic voltammetry (Limit: 6 V & 1 A) At slow Scan (scan rate: < 1 m V/s)		6100.00
128)	Electrochemical impedance spectroscopy (Range: 1 mHz to 100 kHz)		2130.00
129)	Other electrochemical tests		Rate as per request

CHARACTERIZATION OF THERMAL & OTHER PHYSICAL PROPERTIES

Sl. No.	Name of the Test(s)	Sample type/nature	Sample Specification	Rate(s) per Samples (Rs.)
130)	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 For Test Temperature Up to 1200°C (with only heating curve)	Solid cylindrical	o Sample size: 25 mm (L) x 6-8 mm (dia) o No. of sample: 3 identical specimens for each set	3970.00
131)	Co-efficient of linear Thermal Expansion and supply of data with Curve, Glass transition, Softening point, etc. For Test Temperature Up to 1500°C (with only heating curve)			5870.00
132)	Extra charge for cooling curve for above mentioned Tests in Sl. Nos. 130-131, if required			1500.00
133)	Co-efficient of linear Thermal Expansion and supply of data with Curve, Glass transition, Softening point, etc. For Test Temperature - 40°C to 400°C		o	5500.00
134)	Differential thermal analysis (DTA): [DIN: 51007, ASTM E 473-85] for Temperature up to 1200°C (only heating curve)	Powder	o 200 mg /10 micron (approxly)	5470.00
135)	Differential thermal analysis (DTA): [DIN: 51007, ASTM E 473-85] For Temperature up to 1500°C (only heating curve)			6790.00
136)	Extra charge for cooling curve for the Tests as mentioned in 'Sl. No. 134-135', if required			1500.00
137)	Thermo-gravimetric analysis (TGA): [DIN: 51006, ASTM E 914-83] For Temperature upto 1200°C (only heating curve)	Powder	o 200 mg /10 micron (approxly)	5470.00

138)	Thermo-gravimetric analysis (TGA): [DIN: 51006, ASTM E 914-83] For Temperature Up to 1500°C (only heating curve)			6790.00
139)	Extra charge for cooling curve for the tests as mentioned in Sl. Nos. 137-138 , if required			1500.00
140)	Determination of Specific heat: [ASTM E 1269]; DSC-Differential Scanning Calorimetry For Temperature Up to 1000°C (only heating curve)	Powder/ Bulk	Powder: 200 mg o /Bulk: 5.2 mm dia/0.25 - 0.5mm thick	6790.00
141)	Determination of Specific heat: [ASTM E 1269]; DSC-Differential Scanning Calorimetry For Temperature Up to 1400°C (only heating curve)			8110.00
142)	Extra charge for cooling curves the tests as mentioned in Sl. Nos. 140-141 , if required			1500.00
143)	Determination of Thermal Conductivity (within 80°C) at single temperature point; (a) Solid Sample only RT; (b) Liquid/Paste sample at any temperature within 80°C	Solid/ Liquid/ Paste	o For Bulk sample (Dia: 50mm. x 20.5 mm (H)) o No. of sample: 2 nos. of identical samples) o For Liquid/paste sample: 80 cc/ o for Powder samples: 25cc	10990.00
144)	Determination of Thermal Conductivity up to 400°C			14550.00
145)	Determination of Thermal Conductivity up to 1000°C			31740.0
146)	Particle Size Analysis (micron range) using LASER Diffraction System [ISO:13320-1]	Powder	o Sample quantity: 1 gm	6100.00
147)	Nano particle size analysis by DLS (Dynamic Light scattering) method	Dispersion	o Sample: 20 ml dispersed sol.	5290.00
148)	Zeta potential Measurement			5290.00
149)	Isoelectric point determination			7020.00
150)	Surface area measurement by BET method [ASTM B 922-10]	Powder	o Power sample of ~30 cc	5470.00
151)	Measurement of Pore volume and Pore size by N ₂ gas adsorption (if surface area >20 m ² /gm)			8110.00
152)	Measurement of Density of sample (any shape) by Gas Pycnometry`	Solid / powder	o 100 cm ³ volume / 3-5 mm	1730.00
153)	Pore size distribution by Mercury Porosimeter: [ASTM D 4284-07]	Solid	o Powder sample: 15 cc or o Solid sample: 6mm x 3mm x 4 mm o Quantity: 10 -15 pieces.	5075.00
154)	Porosity measurement (Bulk Density to be provided by user)			5075.00
155)	Determination of carbon content in sample (Carbon Analyser C 600 LECO, USA)		o For liquid sample: 4 ml o For Powder sample: 5-10 cc	2420.00
156)	Determination of Nitrogen content in sample by LECO TC 600 O ₂ /N ₂ determinator		o 4 ml for liquid sample/ 4mm x 4 mm x 10 mm for solid sample	2420.00
157)	Determination of Oxygen content in sample		o 4 ml for liquid sample/ 4mm x 4 mm x 10 mm for solid sample	2420.00
158)	Evaluation of Rheological Properties of gels, pastes and other viscous substances. For Flow characterization	Slurry	Sample require: 50 ml	3630.00
159)	Evaluation of Rheological Properties of gels, pastes and other viscous substances. For Creep and relaxation analysis		Sample require: 50 ml	3630.00
160)	Evaluation of Rheological Properties of gels, pastes and other viscous substances. For Thixotropic analysis		Sample require: 50 ml	3630.00

161)	Evaluation of Rheological Properties of gels, pastes and other viscous substances. For Oscillation		Sample require: 50 ml	3630.00
162)	Magneto-Rheology (at 3 magnetic field values)	Slurry	50 ml	4950.00
163)	Fourier-Transform Infrared (FTIR) Spectroscopy, absorption/emission spectra	Powder/Film	500 mg	1000.00
164)	Sample preparation charge as applicable			1210.00

XRD/ XRF / XPS			
Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
165)	XRD Diffractogram without any analysis Basic charge	Sample type: Powder or Solid; Sample Qty. require: 5 g. per sample Sample type: Thin Film Sample size: 2.5cm (L) x1.5cm (W) x 0.5cm (T min.) or 6 cm (L) x 3cm (W) 1cm(T-Max.)	2130.00
166)	Extra charges for results in Soft Copy for the test mentioned in Sl. No. 165		180.00
167)	XRD Diffractogram with qualitative phase analysis	-do-	3630.00
168)	XRD Diffractogram with quantitative phase analysis with sample containing less or equal to three phases (multiphase)	-do-	7020.00
169)	XRD Diffractogram with quantitative phase analysis with sample containing more than three phases (multi- phase)	-do-	11680.00
170)	XRD Diffractogram with only amorphous phase quantification	Minimum 10 gms powder	7020.00
171)	Semi-Quantitative elemental analysis by X-Ray Florescence (XRF)	Minimum 8 gms powder	8580.00
172)	To Study the materials interaction at atomic level by using XPS (X-ray photo-electron spectroscopy)	50 mg powder of Pellet of 5mm diameter sample	10570.00

Scanning Electron Microscopy (FESEM) and EDAX analysis			
Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
173)	High Resolution Micro-structural analysis by FESEM (Field Emission Scanning Electron Microscopy) including conducting coating and 6 micrographs . (FS)	Sample size for Bulk: 2 mm x 2mm x 0.5 mm (min), or 10mm x10mm x 5 mm (max) For powder sample: 100 mg (min) ~ 1 g (max)	7080.00
174)	Extra for FESEM Micrograph in SOFT COPY (as mentioned in Sl. No. 173)		180.00
175)	Additional charges for FESEM Micrographs (a package of 4) (FS-A) (as mentioned in Sl. No. 173)		980.00
176)	Elemental Analysis by Energy Dispersive X-Ray Analysis (EDX) in FESEM (including conductive coating).	For Bulk: 2 x 2 x 0.5mm(min); 10 x 10 x 5mm (max); For Powder: 100 mg.(min) 1gm.(max)	8230.00
177)	Extra Charge for Soft copy for the test, as mentioned in Sl. No. 176		180
178)	Elemental Distribution Analysis EDX Line Scanning/ Dot Mapping in FESEM (including conductive coating) (EDX- LS)	For Bulk: 2 x 2 x 0.5mm (min); 10 x 10 x 5 mm (max); For Powder: 100 mg.(min) 1gm.(max)	10760.00

Transmission Electron Microscopy (TEM) and EDAX Analysis

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
179)	Transmission Electron Microscope (TEM) studies (Includes powder sample preparation only and 6 micrographs)	Powder:100mg(min) 1gm(max)	9040.00
180)	Charges for additional Micrographs (a package of 4)	-----	1500.00
181)	Sample Preparation charges for TEM Study: For bulk sample	Sample size: min. 3mm (dia.) x 10mm (L) or Max. 10mm (L) x 10mm(W) x 20mm(H)	5470.00
182)	Sample Preparation charges for TEM Study: For Cross-sectional view of thin films/layers on substrates	Sample size: min. 2.5mm(W) x 10mm(L) x 0.2mm(T) or max. 2.5mm(W)x x 10mm(L) x 1mm(T)	8230.00
EDAX analysis			
183)	Elemental Analysis by Energy Dispersive X-Ray Analysis (EDX) in SEM/FESEM/TEM (Including conductive coating).	Same as TEM sample	8230.00
184)	Elemental Distribution Analysis EDX Line Scanning in SEM / FESEM/TEM (Including conductive coating) (EDX-LS)	Same as TEM sample	10760.00
185)	Elemental Distribution Analysis EDX Dot Mapping in SEM / FESEM/TEM (Including conductive coating) (EDX-DM)	Same as TEM sample	10760.00

ELECTRICAL & SURFACE PROFILE OF THIN FILMS & COATINGS

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
186)	Current- Voltage property of some films using I-V Source measuring unit	Films	1210.00
187)	Determine the surface profile of coating & Thin films by Profilometer	Thin Films	390.00

TESTING OF GLASSES & RELATED MATERIALS

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
188)	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	80040.00
189)	Co-efficient of linear thermal expansion of Glass and supply of data with Curve including Dilatometric Softening Point.	6-8 mm (dia) x 25 mm length	6270.00
190)	Spectroscopic measurement of overall transmission in UV/Visible/NIR	25mm x 25mm x at actual thickness	1570.00
191)	Determination of Glass Type: Whether Sheet Glass or Float Glass	100mm x 100mm x at actual thickness	7190.00
192)	Determination of Glass Thickness	At actual size and thickness. Sample should be flat	1900.00

193)	Determination of Density of Glass	10mm cube – 20mm cube /rectangular block	2650.00
194)	Measurement of Refractive index (n) at one wavelength of light	20mm x 20mm x 2mm	3630.00
195)	Extra for measurement of Refractive index (n) at each additional Wavelength	20mm x 20mm x 2mm	1500.00
196)	Measurement of Refractive index (n_d) and Abbe number (V_d) at standard wavelength	20mm x 20mm x 2mm	3090.00
197)	Determination of Abbe number (V_d) only at standard wavelength	20mm x 20mm x 2mm	3090.00
198)	Polarization test for toughened window glasses	100mm-200mm x 100mm- 200 mm x at actual thickness	6270.00
199)	Softening Point Test	5mm x 5mm x 3mm	7710.00
200)	Optical microscopic observation of Glass	20 -25mm x 20 -25mm x 2-5mm thick parallel optical polished surfaces	9260.00
201)	Residual Stress test (for Glasses)	50 – 150 mm x 50 – 150 mm x 50 – 150 mm	9660.00
202)	Expert opinion on the overall result on Glass (for 5 samples Max.)		13400.00
203)	Samples for Tempered or Toughening of opal glass articles/transparent glass articles	As such product	25820.00
204)	Fabrication/ Sample preparation charge wherever applicable		2000.00
205)	Thermal Shock Resistance/ Thermal durability	As such product (1 ft x 1 ft)	25820.00
206)	Young's modulus, Poisson's Ratio and Bulk Density		5470.00
207)	Viscosity Measurement using FRS 1800 High temperature Viscometer (Anton Paar, Austria)	100g powder sample	29510.00
208)	Glass Melting in Platinum crucible		19225.00
209)	Glass Melting in Refractory crucible		11730.00
210)	Raman Spectroscopy	Powder, bulk samples, thin films Range: 50 – 3000 cm ⁻¹ : Laser Sources: (i) 488nm Argon ion laser (20mW) 785nm diode laser (100mW). Detector: TE cooled CCD detector; Additional: Equipped with LINKAM temperature controller (- 150°C to 600°C)	1620.00
211)	Vicker's/Knoop Micro Hardness only data	10mm x 10mm x actual thickness	4660.00
212)	Vicker's/Knoop Micro Hardness data with optical picture	1" x 1" X actual thickness	5870.00
213)	Detection of defects like cracks, bubbles, scratches, un- melted particles in Glass lenses of glass blocks samples by shadow technique		25300.00
214)	Expert Opinion on above -mentioned Test (Sl No. 204)		5470.00
215)	Measurement of Contact Angle (at SGD)	Coated or uniform shaped flat sample dimension (Sample size Minimum 1" x1" to Maximum 4 " x 4")	1380.00
216)	Fragmentation Test	Min 600mm x 600mm	31000.00

REFRACTORY & TRADITIONAL CERAMICS

Sl. No.	Name of the Test(s)	Sample Type	Sample Specification	Rate(s) per Sample (Rs)
217)	Sieve Analysis as per IS: 1528 (Part – XIV): Dry	Refractory Sample	1 kg material (minimum)	2300.00

218)	Sieve Analysis as per IS: 1528 (Part – XIV): Wet (single sieve)			3220.00
219)	Size tolerance as per IS: 1528 (Part – X)	Brick	Minimum 30 nos. of sample or as desired by the party	810.00
220)	PCE/Refractoriness (Pyrometric Cone Equivalent) as per IS:1528 (Part-I)		1 kg material (-72 BS)	6250.00
221)	RUL (Refractoriness Under Load) as per IS:1528 (Part-II)		50mm dia x 50mm height (2 nos.)	6250.00
222)	PLCR (Permanent Linear Change after Reheating) as per IS:1528 (Part-VI: Up to 1400°C for 5 hours		50 x 50 x 60 mm / 50 mm dia 60 mm height (5 nos. of samples)	10760.00
223)	PLCR (Permanent Linear Change after Reheating) as per IS:1528 (Part-VI: Above 1400°C and up to 1600°C for 5 hrs			13920.00
224)	Spalling resistance test as per IS:1528 (Part-III) Prism method by air quenching up to 1000°C (Thermal Shock Resistance)		3" x 2" x 2" or 50 mm (dia) x 50mm (H) (3 nos. of samples)	15360.00
225)	CCS (cold Crushing Strength) as per IS:1528(Part- IV) (Sample preparation charge extra)		3" cube or std. size bricks (5nos. of samples)	2300.00
226)	Hot MOR (upto 1400°C) IS : 1528 (Part XX)	Brick/Preferred Castable	150mm x 25mm x 25" (5 nos. of samples)	10320.00
227)	CMOR (Cold Modulus of rupture) as per IS: 1528 (Part-V) (Sample preparation charge extra)	Standard Brick/ Castable	160 x 40 x 40 mm or std. size bricks (5 nos. of samples)	2300.00
228)	Water Absorption/Apparent Porosity/ Bulk density/ Apparent Specific gravity as per IS : 1528 (Part- VIII) (Sample preparation charge extra)	Brick	65 x 65 x 40mm or std. size bricks (5nos. of samples)	2300.00
229)	True density/Specific gravity as per IS:1528 (Part- IX) (Sample preparation charge extra)	Brick/Castable	500 gm powder (150 micron)	2650.00
230)	True porosity / Closed Porosity as per IS:1528 (Part XV) (Sample preparation charge extra)		Standard Bricks (5 nos. of samples)	4370.00
231)	Compressive strength/ modulus of rupture as per IS:10570: after 24 hrs. curing	Monolithic /Castable	6 kg sample for a particular temperature	3220.00
232)	Compressive strength/ modulus of rupture as per IS:10570: after 72 hrs. curing			3740.00
233)	Compressive strength/ modulus of rupture as per IS:10570: after firing at temp upto 1000°C (3 hrs.)			8630.00
234)	Compressive strength/ modulus of rupture as per IS:10570: after firing at temp upto 1400°C (3 hrs)			12310.00
235)	Compressive strength/ modulus of rupture as per IS:10570: after firing at temp upto 1550°C (3 hrs)			13920.00
236)	Firing in electric furnace: upto 1000°C (5 hrs.)		As desired by the party	7190.00
237)	Firing in electric furnace: upto 1500°C (5 hrs.)			10760.00
238)	Firing in electric furnace: upto 1700°C (5 hrs.)			15000.00
239)	Abrasion Resistance/Abradability index as per B.S. 1902 Part-1A By Morgan Marshal Index Method	Refractory sample	3" x 2" x 1" ; 4nos. of samples	4370.00
240)	Static Cup Slag Resistance		Sample details	15360.00
241)	MOHS' Scale Hardness		Regular shape sample with smooth surface (Defect Free)	1730.00
242)	Dry & Fired Shrinkage (each) (firing Charge extra)			2300.00

243)	Creep Test upto 1500°C: for 5 to 25 h	Pre fired Refractory Sample	50 mm dia x 50 mm height; 10-12 mm dia (two identical sample)	17410 .00
244)	Creep Test upto 1500°C: for 5 to 50 h			34500.00
245)	Thermal Diffusivity up to 1000°C for Ceramic Sample			4220.00
246)	Sample preparation charge as applicable			1610.00
247)	Sample preparation charge for Fabrication of Castable Samples (per sample)			2650.00
248)	Expert Opinion			5470.00

TESTING OF TRADITIONAL CERAMICS

Sl. No.	Name of the Test(s)	Sample Type	Sample Specification	Rate(s) per Sample (Rs)
249)	Water Absorption as per IS 13630 (Pt 2) /Apparent Porosity/ Bulk density	Fired samples	Minimum. 5 nos	2300.00
250)	Firing Between 1000°C to 1350°C 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	13920.00
251)	Determination of Moisture Expansion using boiling water- unglazed tiles as per IS:13630 (Pt 3) - 1992	Unglazed tiles	Minimum. 5 nos	2820.00
252)	Determination of Thermal shock resistance of tiles as per IS: 3630 (pt %)- 1992 +	Tiles	Minimum. 5 nos	2420.00
253)	Determination of Water Absorption is must for the tests, mentioned in SL. Nos. 250-251)			2300.00
254)	Determination of modulus of rupture as per IS:13630 (part 6)-2006	Tiles	Minimum. 7 nos./ As per IS 13630 (part 6): 2006	800.00
255)	Burnt Clay Building Bricks as per IS-3495:1992 for Water Absorption (Pt - 2)		Minimum. 5 nos. /As per IS 5454 (1978)	2420.00
256)	Burnt Clay Building Bricks as per IS-3495:1992 for Efflorescence (Pt - 3)		Minimum. 5 nos.	4140.00
257)	Burnt Clay Building Bricks as per IS-3495:1992 for Warpage (Pt - 4)			4140.00

TESTING OF VARIOUS TYPES OF CERAMIC BODIES

Sl. No.	Name of the Test(s)	Sample Type	Sample Specification	Rate(s) per Sample (Rs)
258)	Grit Content	Clay sample		980.00
259)	Water of Plasticity	Clay sample		1610.00
260)	Plasticity By Hand Feel	Clay sample		340.00
261)	Atterbeg Number	Clay sample		1100.00
262)	Slaking test	Clay sample		340.00
263)	Dry Liner Shrinkage			530.00
264)	Dry/Green/Fired MOR (without firing)	Clay sample		800.00
265)	FIRED Color	Clay sample		340.00
266)	Water Absorption, Apparent Volume Porosity, bulk density	Clay sample		2300.00
267)	Total Linear Shrinkage	Clay sample		530.00
268)	Water Absorption, Apparent Porosity, Bulk density with fabrication of bar and one firing upto 1300°C (Max) (Single mix up to 24 hrs. grinding/ max. ten samples or 1 kg. batch)	Clay sample	Single mix upto 24 hrs. grinding/ max. ten samples or 1 kg. batch	11390.00
269)	Dry & Firing Shrinkage with fabrication of bar and one firing upto 1300°C (Max)		Single mix upto 24 hrs. grinding/ max. ten samples or 1 kg. batch	10870.00
270)	Sample preparation Charges	Clay sample		1060.00
271)	Expert Opinion on types of Tiles/Bricks			5470.00

MEMBRANE AND SEPARATION TECHNOLOGY RELATED

Sl. No.	Name of the Test(s)	Sample Type	Sample Specification	Rate(s) per Sample (Rs)
272)	Liquid permeability of water through porous samples	Sintered porous ceramic / metallic material	i. Sample shape & size: (a) Flat sample: ϕ 5 mm – 50 mm, sample thickness: 2 mm-10 mm (max) (b) Hollow tube of single channel / multichannel configuration: Outer dia.- 6mm, 10mm, 25mm & 34mm; Sample length- 200 mm to 1000 mm ii. Operating water pressure: up to 10 bar. Sample information needed: material of composition, sintering temperature, total porosity (approx.), toxicity (if any), any special instruction.	2000.00

SAMPLING & ANALYSIS FOR WATER AND WASTEWATER			
Sl. No.	Name of the Test(s)	Sample volume /Quantity	Rate(s) per Sample (Rs)
273)	Sample Processing / Pre-treatment Charge		1150.00
274)	pH	500 ml	190.00
275)	Temperature	500 ml	120.00
276)	Conductivity	500 ml	190.00
277)	DO (Dissolved Oxygen)	500 ml	460.00
278)	BOD	1 ltr	1840.00
279)	Oil & Grease	500 ml	690.00
280)	Turbidity	500 ml	190.00
281)	COD (Chemical Oxygen Demand)	1 ltr	920.00
282)	Total Kjeldal Nitrogen	500 ml	1150.00
283)	Total Dissolved Solid	500 ml	350.00
284)	Determination of Fluoride, Chloride, Bromide, Nitrate, Sulphate, Phosphate: Ion Chromatography analysis	500 ml	4030.00
285)	Determination of Lithium, Sodium, Potassium, Calcium, Magnesium, Copper, Nickel, Zinc, Cobalt, Cadmium, Iron: Ion Chromatography analysis	500 ml	4030.00
286)	Total Suspended Solids	500 ml	690.00
287)	Total Organic Carbon	500 ml	1150.00

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