

### FORM OF SHORT QUOTATION NOTICE

No D2/5523/17/GECTCR

Government Engineering College Thrissur

Sealed quotations are invited for the supply of the following stores for Electronics & Communication engg. department of this institution:

Sl No	Item Description	Specification	Quantity( Numbers)
1	High Frequency Low Loss Microwave Laminate Dielectric Constant (Design) — 2.33 (Thickness - 0.020" (0.508mm)) (Standard Copper Cladding - (35µm) electrodeposited copper on both sides) Panel Size - 18" X 12" (457mm X 305mm)	Detailed Specifications Attached	1
2	High Frequency Low Loss Microwave Laminate Dielectric Constant (Design) — 2.33 (Thickness - 0.031" (0.787mm) ) (Standard Copper Cladding - (35µm) electrodeposited copper on both sides) Panel Size 18" X 12" (457mm X 305mm)	Detailed Specifications Attached	1
3	High Frequency Low Loss Microwave Laminate Dielectric Constant (Design) — 2.2 (Thickness - 0.020" (0.508mm)) (Standard Copper Cladding - (35µm) electrodeposited copper on both sides) Panel Size - 18" X 12" (457mm X 305mm)	Detailed Specifications Attached	1

Approximate cost Rs. 99,900/- (Rupees Ninety Nine Thousand Nine Hundred Only)

The envelopes containing the quotation should bear the superscription "Qtn. No.D2/133/17-18 due on 21/11/17" and should be addressed to the Principal, Govt. Engg. College, Thrissur, Kerala. Intending tenderers may submit the quotations on their own papers.

Last date for receipt of quotations is 21/11/2017 2.00pm Late quotations will not be accepted. The quotations will be opened at 11.00am on 22/11/2017 in the presence of such of the tenderers or their authorized representatives who may be present at that time. The maximum period required for delivery of the articles should also be mentioned.

Details of the requirements and the conditions governing their supply can be obtained free on request from Principal, Govt. Engg. College, Thrissur, Kerala. till 21/11/2017 2.00pm

Place:Thrissur

Date: 7-11-2017

copy to

1. NOTICE BOARD

2. HOD ECE

3. OC

  
Dr. Jayanand. B

Principal



PROPERTY	TYPICAL VALUES				DIRECTION	UNITS <sup>[3]</sup>	CONDITION	TEST METHOD
	ITEM NO. 1 & 2		ITEM NO. 3					
<sup>[4]</sup> Dielectric Constant, $\epsilon_r$ Process	2.33 2.33 $\pm$ 0.02 spec.		2.20 2.20 $\pm$ 0.02 spec.		Z Z	N/A	C24/23/50 C24/23/50	1 MHz IPC-TM-650 2.5.5.3 10 GHz IPC-TM 2.5.5.5
<sup>[4]</sup> Dielectric Constant, $\epsilon_r$ Design	2.33		2.20		Z	N/A	8 GHz - 40 GHz	Differential Phase Length Method
Dissipation Factor, $\tan \delta$	0.0005 0.0012		0.0004 0.0009		Z Z	N/A	C24/23/50 C24/23/50	1 MHz IPC-TM-650, 2.5.5.3 10 GHz IPC-TM-2.5.5.5
Thermal Coefficient of $\epsilon_r$	-115		-125		Z	ppm/°C	-50 - 150°C	IPC-TM-650, 2.5.5.5
Volume Resistivity	2 X 10 <sup>7</sup>		2 X 10 <sup>7</sup>		Z	Mohm cm	C96/35/90	ASTM D257
Surface Resistivity	2 X 10 <sup>7</sup>		3 X 10 <sup>7</sup>		Z	Mohm	C/96/35/90	ASTM D257
Specific Heat	0.96 (0.23)		0.96 (0.23)		N/A	J/g/K (cal/g/C)	N/A	Calculated
Tensile Modulus	Test at 23 °C	Test at 100 °C	Test at 23 °C	Test at 100 °C	N/A	MPa (kpsi)	A	ASTM D638
	1300 (189)	490 (71)	1070 (156)	450 (65)	X			
	1280 (185)	430 (63)	860 (125)	380 (55)	Y			
ultimate stress	50 (7.3)	34 (4.8)	29 (4.2)	20 (2.9)	X	MPa (kpsi)	A	ASTM D638
	42 (6.1)	34 (4.8)	27 (3.9)	18 (2.6)	Y			
ultimate strain	9.8	8.7	6.0	7.2	X	%	A	ASTM D638
	9.8	8.6	4.9	5.8	Y			
Compressive Modulus	1210 (176)	680 (99)	710 (103)	500 (73)	X	MPa (kpsi)	A	ASTM D695
	1360 (198)	860 (125)	710 (103)	500 (73)	Y			
	803 (120)	520 (76)	940 (136)	670 (97)	Z			
ultimate stress	30 (4.4)	23 (3.4)	27 (3.9)	22 (3.2)	X	MPa (kpsi)	A	ASTM D695
	37 (5.3)	25 (3.7)	29 (5.3)	21 (3.1)	Y			
	54 (7.8)	37 (5.3)	52 (7.5)	43 (6.3)	Z			
ultimate strain	4.0	4.3	8.5	8.4	X	%	A	ASTM D695
	3.3	3.3	7.7	7.8	Y			
	8.7	8.5	12.5	17.6	Z			
Moisture Absorption	0.02		0.02		N/A	%	.062" (1.6mm) D48/50	ASTM D570
Thermal Conductivity	0.22		0.20		Z	W/m/K	80°C	ASTM C518
Coefficient of Thermal Expansion	22 28 173		31 48 237		X Y Z	ppm/°C	0-100°C	IPC-TM-650, 2.4.41
Td	500		500		N/A	°C TGA	N/A	ASTM D3850
Density	2.2		2.2		N/A	gm/cm <sup>3</sup>	N/A	ASTM D792
Copper Peel	27.2 (4.8)		31.2 (5.5)		N/A	pli (N/ mm)	1 oz (35mm) EDC foil after solder float	IPC-TM-650 2.4.8
Flammability	V-0		V-0		N/A	N/A	N/A	UL94
Lead-Free Process Compatible	Yes		Yes		N/A	N/A	N/A	N/A