chukoh

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URL: http://www.chukoh.co.jp

⚠Warnings

- Do not use where the laminate comes in contact with the human body such as medical care, etc.
- Treat the laminate in compliance with the related laws and regulations for disposal and do not attempt to dispose of by incineration.
- Do not use the laminate where temperature exceeds 260℃ except for soldering treatment.
- Carefully read the catalog, product safety data sheet (MSDS), and fluoroplastic instruction manual in order to maintain functions essential to products and to safely use products.

November 1.2001-doc(1)

CHUKOH FLO®
COPPER-CLAD LAMINATES

Advanced fluoroplastic laminates that supports the IT age.

CHUKOH FLO® COPPER-CLAD LAMINATES

CHUKOH FLO® COPPER-CLAD LAMINATES are our originally developed fluoroplastic circuit board particularly used for the microwave band.
With the advance of various electronic and communication apparatus in the IT-related field, reduced size, higher reliability (stability), high-frequency characteristics, etc. are required for substrates used.
CHUKOH FLO® COPPER-CLAD LAMINATES enjoy high reputation as circuit board that satisfy these requirements.

ISO 9001 and 14001 certification

We have been registered / certified to ISO 9001 and ISO 14001 with respect to the following the scope of registration.

The Scope of the Registration
Design & Development, Production for all products, such as, the Products contained fluorocarbon plastics, the Fabrics coated with fluorocarbon resin, the Products coated with Silicone and the Products contained Biodegradable resin.

MS JAB CM035

ASR REGISTERED FIRM ISO9001, ISO14001 Q1570,E0498

UL approval condition

CHUKOH FLO® COPPER-CLAD LAMINATES CGP-500 and CGS-500 are UL-approved products (UL File No. E78936).

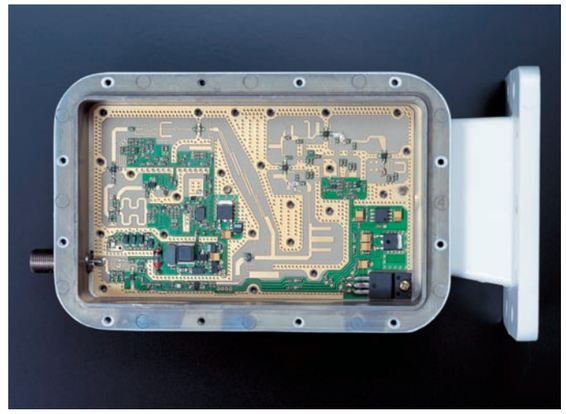
Primary Features

- Stable dielectric constant in the wide frequency band.
- Remarkably low dissipation factor in the high frequency band.
- Outstanding tracking resistance.
- Unrivaled low water absorption in all the substrate materials.
- Stable characteristics over a wide temperature range (continuous application results: 220℃)

Essential Applications

●Satellite communications ●Aatellite broadcasting ●Various mobile telecom capabilities such as advanced mobile phones, etc. ●Non-stop automatic electronic toll collection (ETC) system or automatic cruise-assist highway system (AHS) ●Regional wireless local loop (WLL) networks ●CPU ●Measuring instruments ●Artificial satellite mounted apparatus, etc.

Application example

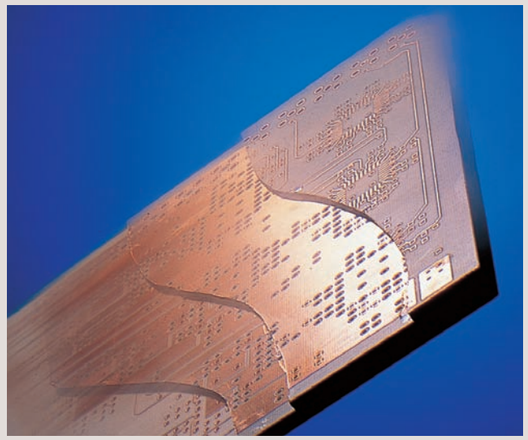


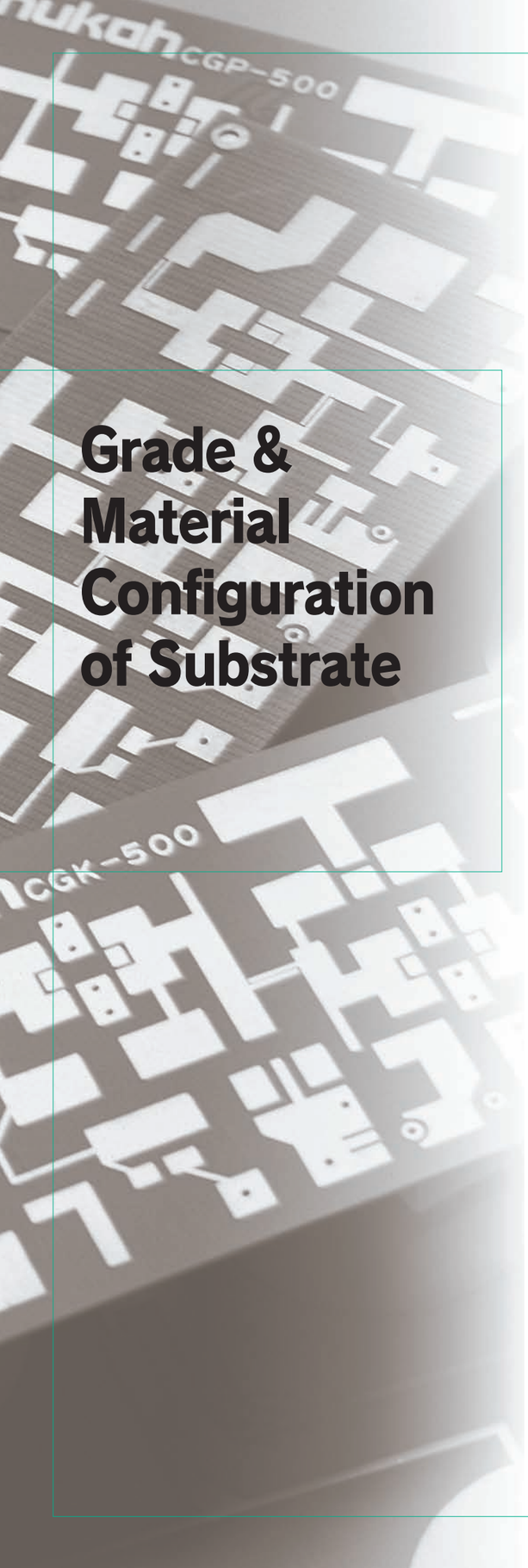
●Receiver for satellite communications

Multilayer Substrate

It is possible to form multilayered substrates in order to meet requirements for advanced features and increased densification.

Features of fluoroplastic multilayer board
Higher speed signal processing, small dielectric loss, stable operation, lowering of cross talks, and excellent heat resistance.





Grade & Material Configuration of Substrate

Grade

CGP-500
This is standard substrate with superb peel strength, water absorption, through-hole workability, etc. It possesses high dimensional stability and mechanical strength.

CGS-500
This is substrate with still improved dielectric constant and dissipation factor as compared to CGP.

CQF-500
This is substrate with extremely small dielectric loss in the microwave band.

CGN-500
This is substrate with dielectric loss reduced to less than one half and with excellent performance at 20 GHz or higher.

CGA-500
This is substrate intended for mass-production with high-frequency characteristics of fluoroplastic substrate maintained.

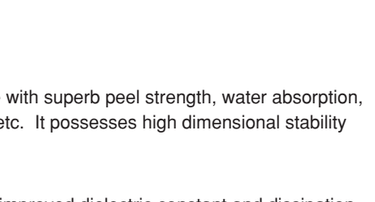
CGH-500
Because of dielectric constant equal to general substrates but lower dissipation factor, substrates with lower loss can be obtained by the same design.

CGK-500
The high dielectric constant achieves compact, lightweight, and low-loss high-performance substrates.

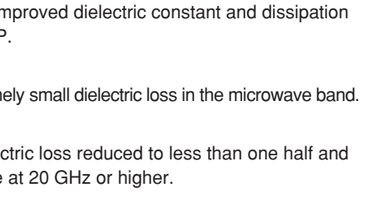
CGC-500
This is substrate that combines strength, dimensional stability, workability, etc., advantages of both conventional ceramics substrate and other high dielectric constant fluoroplastic substrate.

Material Configuration of Substrate

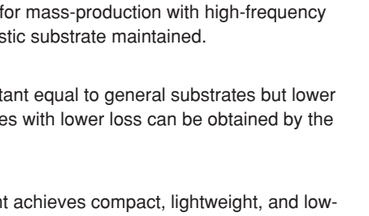
CGP and CGN
Base material: laminate of moven glass impregnated with fluoroplastic.



CGS
Base material: laminate of moven glass impregnated with fluoroplastic and fluoroplastic sheet.



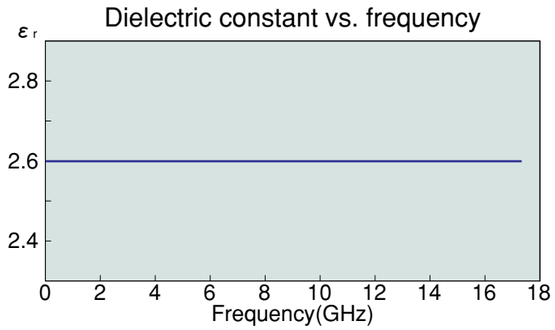
CQF
Base material: laminate of moven quartz glass impregnated with fluoroplastic.

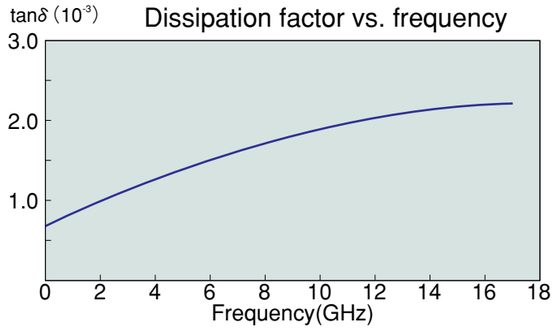


CGA, CGH, CGK and CGC
Base material: laminate of moven glass impregnated with fluoroplastic and special inorganic material.

Influence of Frequency on Dielectric Property

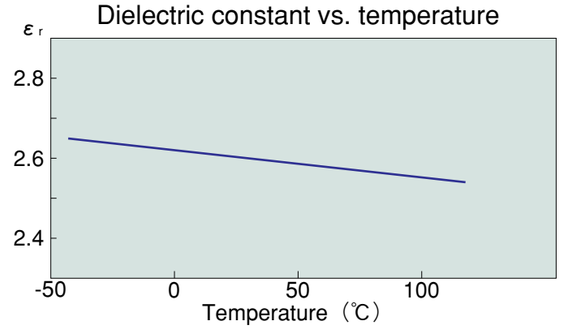
Specimens: CGP-500 (1.6 mm thick with 1/2 oz copper foil on both surfaces)
Measurement method: Balanced type disk resonator method
Measuring temperature: room temperature (25℃)

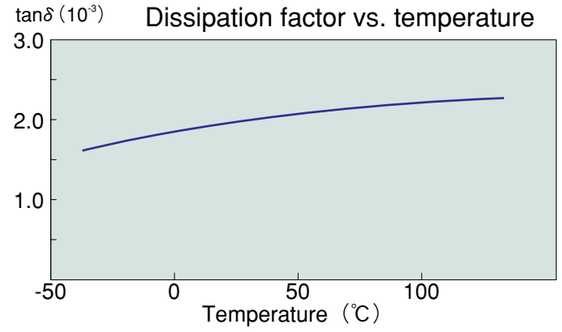




Influence of Temperature on Dielectric Property

Specimens: CGP-500 (0.8 mm thick with 1/2 oz copper foil on both surfaces)
Measurement method: Balanced type disk resonator method
Measuring frequency: 12 GHz

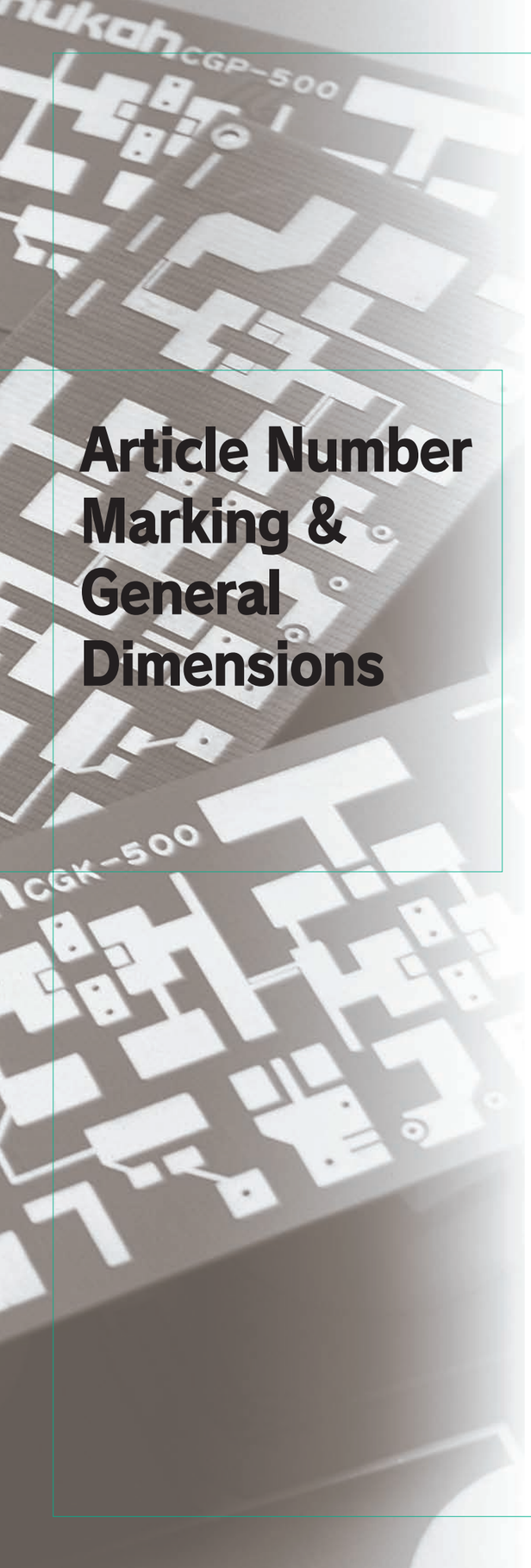




Typical Property table

Property	Unit	Conditions	CGP	CGS	CQF	CGN	CGA	CGH	CGK	CGC	Remarks
Density	—	A	2.2	2.2	2.2	2.2	2.3	2.3	2.4	3.2	—
Thermal expansion	ppm／°K	−60～150℃	21	40	13	25	20	15	13	30	—
Peel strength	kN／m	A	3.0	1.0	2.0	1.0	1.5	1.5	1.5	1.0	JIS-C6481
		Environment of 200℃	1.5	0.5	1.0	0.5	1.0	1.0	1.2	0.5	—
Flexural strength	N／mm^2	A	120	50	60	100	60	120	240	130	JIS-C6481
Volume resistivity	Ω・cm	A	10^{15}	10^{15}	10^{15}	10^{15}	10^{15}	10^{15}	10^{13}	10^{13}	
		C-96／40／90	10^{14}	10^{14}	10^{14}	10^{14}	10^{14}	10^{14}	10^{13}	10^{13}	
Surface resistivity	Ω	A	10^{14}	10^{14}	10^{14}	10^{14}	10^{14}	10^{14}	10^{12}	10^{13}	
		C-96／40／90	10^{14}	10^{13}	10^{13}	10^{13}	10^{14}	10^{14}	10^{12}	10^{12}	
Insulation resistance	Ω	A	10^{13}	10^{13}	10^{13}	10^{14}	10^{13}	10^{13}	10^{11}	10^{12}	
		D-2／100	10^{13}	10^{13}	10^{7}	10^{12}	10^{10}	10^{12}	10^{10}	10^{10}	
Dielectric constant	—	※	2.6	2.15	2.3	2.3	3.0	3.45	5.0	10.0	Disk Resonator method
Dissipation factor	—	※	0.0018	0.0010	0.0005	0.0008	0.003	0.0027	0.004	0.0035	
Water absorption	%	—	0.01	0.01	0.04	0.01	0.02	0.02	0.04	0.03	JIS-C6481
Chemical resistance	—	—	excellent	excellent	excellent	excellent	excellent	excellent	excellent	excellent	
Flammability	—	—	incombustible	incombustible	incombustible	incombustible	incombustible	incombustible	incombustible	incombustible	

※CGP, CGS, CQF, CGN, CGA:12GHz, CGH:9GHz,CGK:8GHz, CGC:6GHz
The above values are the measured values in 1.6mm thickness (CGS:0.8mm, CGN:0.6mm, CGA:0.54mm, CGC:4.0mm) and not the specification.
The peel strength is a measured value of 1oz copper foil (35μm).



Article Number Marking & General Dimensions

Standard Marking System Chart

(Ex.)

CGP-500 BF-6012

(1)Symbol indicating dielectric substance
(2)Symbol indicating dielectric constant
(3)Symbol indicating copper foil thickness
(4)Symbol indicating the number of copper foil layers

(1)Symbols indicating dielectric substance

Symbol	Dielectric constant band
CGS-500 BP-	2.10～2.25
CGP-500 BF-	2.30～2.85
CQF-500-QP-	2.3
CGN-500 NF-	2.3
CGA-500 HF-	2.9～3.2
CGH-500 XF-	3.25～3.55
CGK-500 XP-	4.5～5.5
CGC-500 JP-	8.5～11.0

(2)Symbol indicating dielectric constant

●Indicates two decimal places of dielectric constant except CGC.
●Indicates the first two digits of dielectric constant for CGC only.

(3)Symbol indicating copper foil thickness

Symbol	Kind
0	1/2 oz (18 μm)
1	1 oz (35 μm)
2	2 oz (70 μm)
6	1/3 oz (12 μm)

(4)Symbol indicating the number of copper foil layers

Symbol	Kind
1	One surface clad with electrodeposited copper foil
2	Both surfaces clad with electrodeposited copper foil

Substrate Workability

CHUKOH FLO® COPPER-CLAD LAMINATES can be machined in the same manner as general substrates. The hole wall must have the surface preparation (metallic sodium treatment, etc.) in advance when through-hole machining is carried out.

Typical Dimensions

※unit: mm ※Thickness indicates the total thickness of copper-clad laminates

●CGP-500

Nominal thickness	Tolerance of thickness	
	1020×1220・510×1220	300×300
0.2	±0.02	±0.02
0.3	±0.03	±0.03
0.4	±0.04	±0.03
0.5	±0.04	±0.03
0.6	±0.04	±0.03
0.8	±0.05	±0.04
1.0	±0.06	±0.04
1.2	±0.06	±0.04
1.6	±0.08	±0.04
2.0	±0.10	±0.05
2.4	±0.10	±0.05
3.2	±0.12	±0.06
4.0	±0.12	±0.06

※Tolerance:+5、0

●CGS-500

Nominal thickness	Tolerance of thickness	
	1020×1220・510×1220	300×300
0.4	±0.05	±0.04
0.5	±0.05	±0.04
0.6	±0.06	±0.05
0.8	±0.08	±0.05
1.0	±0.10	±0.08
1.2	±0.12	±0.10
1.6	±0.20	±0.16

※Tolerance:+5、0

●CQF-500

Nominal thickness	Tolerance of thickness
	300×300
0.4	±0.04
0.5	±0.04
0.6	±0.05
0.8	±0.06
1.0	±0.08
1.2	±0.10
1.6	±0.20

※Tolerance:+5、0

●CGN-500

Nominal thickness	Tolerance of thickness
	900×900・450×900
0.2	±0.02
0.3	±0.03
0.4	±0.04
0.5	±0.04
0.6	±0.04
0.8	±0.06
1.0	±0.08
1.2	±0.08
1.6	±0.10

※Tolerance:+5、0

●CGA-500

Nominal thickness	Tolerance of thickness
	1020×1220・510×1220
0.4	±0.05
0.5	±0.05
0.6	±0.06
0.8	±0.08
1.0	±0.10
1.2	±0.12
1.6	±0.20

※Tolerance:+5、0

●CGH-500

Nominal thickness	Tolerance of thickness
	1020×1220・510×1220
0.8	±0.05
1.0	±0.06
1.2	±0.06
1.6	±0.08
2.0	±0.10
2.4	±0.10
3.2	±0.12
4.0	±0.12

※Tolerance:+5、0

●CGK-500

Nominal thickness	Tolerance of thicknes
	300×300
0.3	±0.03
0.4	±0.03
0.5	±0.03
0.6	±0.03
0.8	±0.04
1.0	±0.06
1.2	±0.06
1.6	±0.08
2.0	±0.10
2.4	±0.10

※Tolerance:+5、0

●CGC-500

Nominal thickness	Tolerance of thicknes
	900×900・450×900
0.8	±0.08
1.0	±0.10
1.2	±0.10
1.6	±0.12

※Tolerance:+5、0

Copper foil is standardly clad on both side with 1/2-oz electrodeposited copper foil.
If electrodeposited copper foil of other thickness, one side copper foil, rolled copper foil, and special sizes are required, consult us separately.

Nominal Thickness	1/3oz	0.012mm ±0.003
	1/2oz	0.018mm ±0.005
	1oz	0.035mm +0.010、−0.005
	2oz	0.070mm +0.018、−0.008
Purity	99.8% or more	

Dielectric constant substrates and metal base substrates (with aluminum sheets) other than specified are available on request.