Advanced Composite

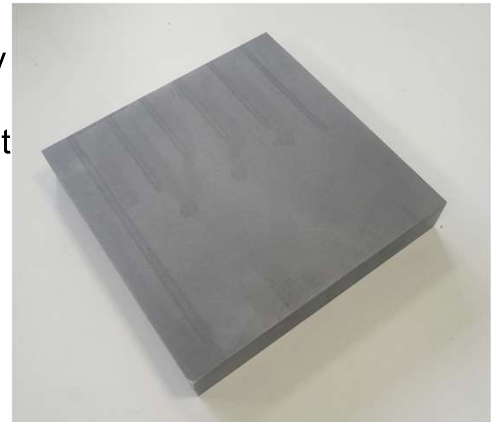
ACM-H1 / ACM-H2

■Overview

- Composite material of aluminum and graphite, an unprecedented new material
- A new material with a well-balanced characteristic value that has a thermal conductivity, which is second only to diamond, higher than silver and copper, and a small thermal expansion that is comparable to ceramics.
- It is also possible to arbitrarily design physical properties such as thermal conductivity, thermal expansion, strength, etc. according to the required needs.

■Feature

- Thermal conductivity: 1.2 times the thermal conductivity of copper
- Coefficient of thermal expansion: Approximately 1/5 that of copper, as small as ceramics
- Strength (Bending strength): 2.5 times that of graphite
- Lightweight: Density less than 1/4 that of copper, less than aluminum



■Application

- Alternative to aluminum and copper (heat spreaders)
- Thermal diffusion material for substrates: Ideal for heat spreaders for thermal diffusion as an alternative to Al-SiC, placed under ceramic substrates

■Data

	Our material w/ high thermal conductivity and low thermal expansion					General material			
Material	ACM								
Name	ACM-io	ACM-a	ACM-H1	ACM-H2	ACM-H3	Cu	Al	Graphite (CIP)	Alsic
Density (g/cm3)	2.10	2.10	2.34	2.56	2.77	8.90	2.70	1.80	2.95
Young's modulus (GPa) XY/Z	16.0	1.5 / 3.6	27.0 / 34.0	36.0 / 42.0	123.0/111.0	117	71	10.8	220
Specific stiffness (GPa-g/cm3)	8	1	13	15	42				
Coefficient of thermal expansion (ppm/K)	7.0~8.0	6.8 / 7.4	4.7 / 17.1	5.8 / 17.1	7.6 / 8.8	17.0	20.0	4.5	8.0
Thermal conductivity (W/m･K) XY/Z	164	188 / 361	470 / 106	466 / 159	256 / 217	390	220	128	175
Thermal diffusivity (㎟/S) XY/Z	–	127 / 244	203 / 45	189 / 64	93 / 80	112	90	–	–
	–	0.70	1.09	0.99	0.96	0.39	0.92	0.70	0.70
Standard size (mm)	150×200×250	150×200×250	400□×60	400□×60	400□×60	–	–	–	–

■ The above data are reference values and not guaranteed values.

Advanced Composite Co. Ltd.

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https://advance-composite.co.jp/

Advanced Composite

ACM-H3

■Overview

- Composite material of aluminum and graphite, an unprecedented new material
- Rigidity is 123 Gpa, higher than that of copper, and CTE (coefficient of thermal expansion) is about half that of copper.
- A new material that is superior to metal substrates made of aluminum and copper: Lighter than copper, stronger than aluminum, with a CTE comparable to that of titanium and a well-balanced thermal conductivity.
- Possible to design arbitrarily physical properties such as heat conduction, thermal expansion, strength, etc. according to the required needs.

■Feature

- Lightness is 1/3 of copper, equivalent to aluminum
- Young's modulus is 1.5 times that of aluminum
- Same thermal expansion as titanium: 8 ppm/K
- Thermal conductivity is better than pure aluminum: 256 W/m K
- Thermal conductivity, low thermal expansion, and small anisotropy

■Application

- Alternative to aluminum or copper (Heat spreaders)
- High-rigidity heat dissipation structural members (Sub heat spreaders, Heat spreaders, Heat sinks, etc.)
- Materials with high rigidity suitable for in-vehicle use

■Data

	Our material w/ high thermal conductivity and low thermal expansion					General material		
Material	ACM					Cu	Al	Graphite (CIP)
Name	ACM-io	ACM-a	ACM-H1	ACM-H2	ACM-H3			
Density (g/cm3)	2.10	2.10	2.34	2.56	2.77	8.90	2.70	1.80
Young's modulus (GPa) XY/Z	16.0	1.5 / 3.6	27.0 / 34.0	36.0 / 42.0	123.0/111.0	117	71	10.8
Specific stiffness (GPa-g/cm3)	8	1	13	15	42			
Coefficient of thermal expansion (ppm/K)	7.0~8.0	6.8 / 7.4	4.7 / 17.1	5.8 / 17.1	7.6 / 8.8	17.0	20.0	4.5
Thermal conductivity (W/m·K) XY/Z	164	188 / 361	470 / 106	466 / 159	256 / 217	390	220	128
Thermal diffusivity (㎟/S) XY/Z	–	127 / 244	203 / 45	189 / 64	93 / 80	112	90	–
	–	0.70	1.09	0.99	0.96	0.39	0.92	0.70
Standard size (mm)	150×200×250	150×200×250	400□×60	400□×60	400□×60	–	–	–

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