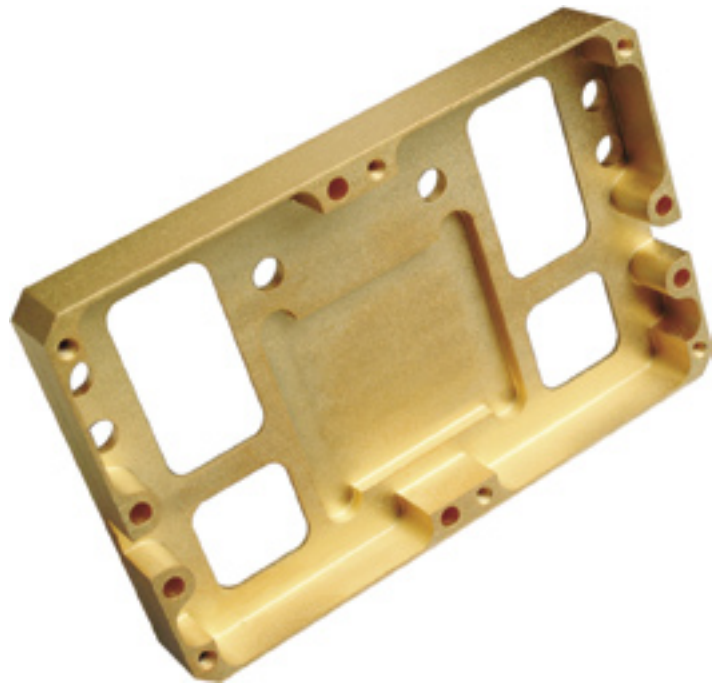




OSPREY **CE ALLOYS FOR THERMAL MANAGEMENT**



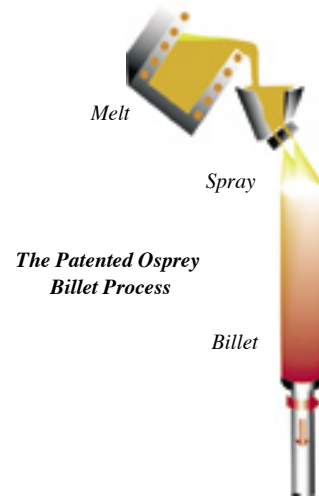
***Lightweight **Controlled Expansion**
Silicon Aluminium Alloys***

Osprey CE Alloys

Sandvik Osprey offers a family of lightweight, controlled expansion, Si/Al alloys in the form of blocks, plates, carriers and housings. Package manufacture, including feedthroughs, can be arranged via partner companies.

Typical uses include high performance device, circuit and system level packages for applications in defence, aerospace, space, communications, radar and other leading-edge industries.

The materials are produced using Sandvik Osprey's patented rapid solidification spray forming technology, which has been used for the manufacture of many advanced materials over the past 25 years.



PROPERTIES

LOW EXPANSION

CTE from 7ppm/°C to 17ppm/°C

LIGHTWEIGHT

Up to 10% lighter than pure aluminium

HIGH THERMAL CONDUCTIVITY

Up to 180W/mK

ELECTRICALLY CONDUCTIVE

Excellent EMI/RFI shielding characteristics

HIGH STIFFNESS VALUES

Specific stiffness up to 54GPa.cm³/g

EXCELLENT THERMO-MECHANICAL STABILITY

Up to 500°C

FULLY DENSE, HERMETIC

Leak rates of less than 1x10⁻⁹ atm-cm³/sec of He

MANUFACTURING

READILY MACHINABLE

Carbide or diamond tools

LOW COST, PROTOTYPE COMPONENTS

No dies required

SHORT LEAD TIMES

Typically 1-5 weeks depending on complexity

ENVIRONMENTALLY FRIENDLY

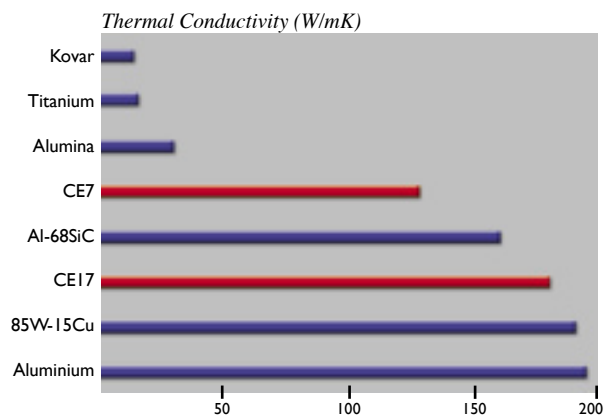
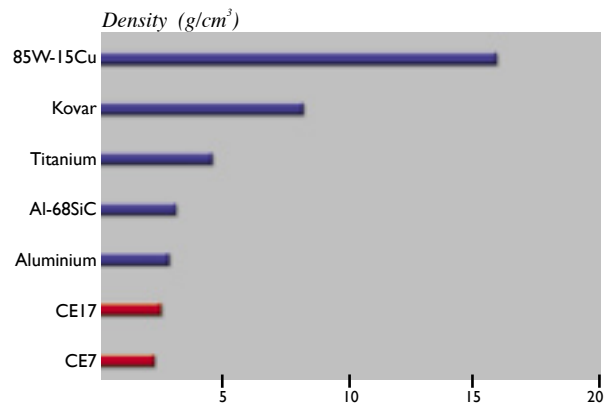
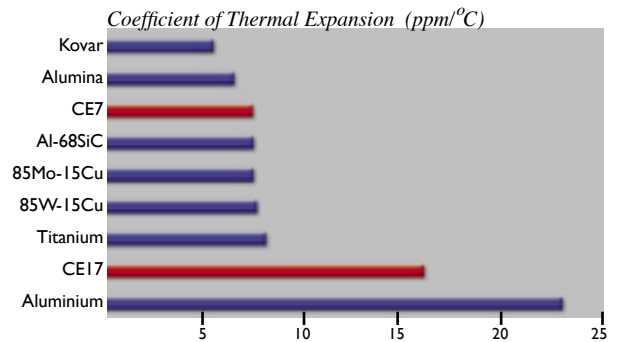
Non-toxic materials

READILY PLATEABLE

Nickel, gold, silver, tin, etc.

STANDARD MICROELECTRONIC ASSEMBLY

Adhesives, solders, wire and ribbon bonding, laser welding



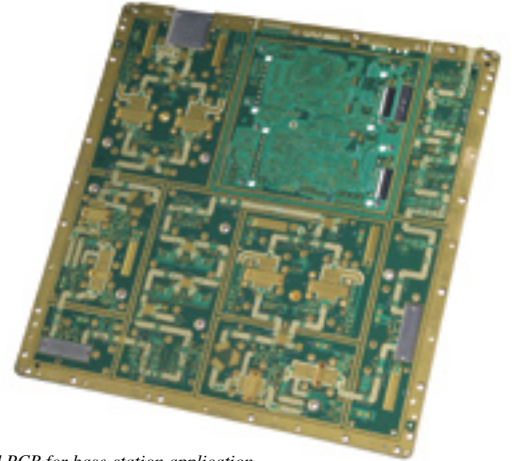
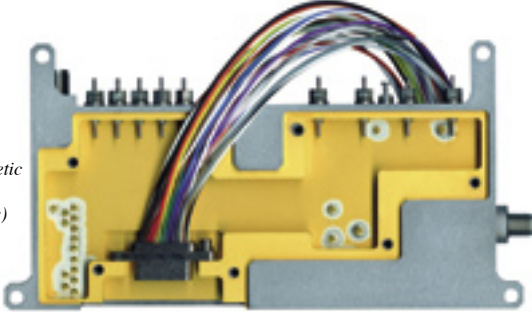
LOW COST, LIGHTWEIGHT ALTERNATIVES TO Cu/W, Cu/Mo, AlSiC, Ti or KOVAR

Typical Applications

MICROWAVE/RF HOUSINGS
HERMETIC PACKAGES
POWER BASEPLATES
CARRIERS

METAL-CLAD PCBs
PCB GUIDE BARS
ASSEMBLY FIXTURES FOR SOLDERING
STRUCTURAL COMPONENTS

CE11 Prototype Housing replacing Ti/Mo-Cu in hermetic aerospace product (Raytheon/Pacific Aerospace)

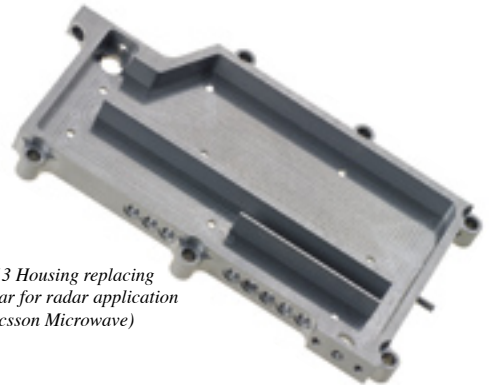


CE17-clad PCB for base-station application

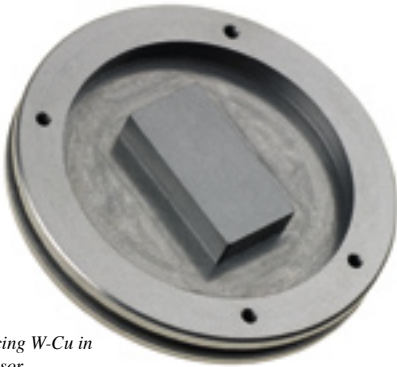
CE17M Guide Bars replacing W-Cu in PCBs (Radstone Technology)



CE13 Housing replacing Kovar for radar application (Ericsson Microwave)



CE7 Carrier replacing W-Cu in lightweight gas sensor (Proengin)



CE11 Hermetic Ka Band Amplifier for satellite application (Tyco M/A-COM)



CE7 Optical Housing for aerospace application



CE7 replacing W-Cu for low-cost 40Gbit/s transmit module (C-MAC)



Mechanical/Physical Properties

	CE7	CE9	CE11	CE13	CE17	CE17M
SI CONTENT %	70	60	50	42	27	27
DENSITY g/cm ³	2.40	2.45	2.50	2.55	2.60	2.60
TENSILE STRENGTH MPa	100	134	138	176	236	380
YIELD STRENGTH MPa	100	134	125	155	183	
BEND STRENGTH MPa	143	140	172	213	210	
ELASTIC MODULUS GPa	129	124	121	107	92	92
RIGIDITY MODULUS GPa	51	49	49	42	36	36
POISSON'S RATIO	0.26	0.25	0.25	0.27	0.28	0.28

Coefficient of Thermal Expansion ppm/°C

TEMPERATURE RANGE °C	CE7	CE9	CE11	CE13	CE17	CE17M
-60 to 200	7.6		11.6			
25 to 100	7.4	9.0	11.0	12.8	16.0	16.0
25 to 200	8.3	9.9	12.7	13.6	17.0	17.0
25 to 300	8.5	10.5	13.1	14.4	17.7	17.7
25 to 400	8.2	10.8	13.7	15.0	17.5	17.5
25 to 500	7.7	10.1	14.4	15.2	16.8	16.8

Thermal Conductivity W/mK

TEMPERATURE °C	CE7	CE9	CE11	CE13	CE17	CE17M
-100	180					
-50	140					
0	125					
25	120	129	149	160	177	147
100	110	125	132			
200	100	108	122		151	147

Values above are for guidance only and the suitability of a material for a specific application can be confirmed only when we know the actual service conditions. Continuous development may necessitate changes in technical data without notice.

Sandvik Osprey is a part of Sandvik Materials Technology, one of three business areas within the Sandvik Group - a high technology engineering organisation with 37,000 employees in 130 countries and annual sales of approximately \$6B.

Sandvik offers advanced products and world-leading positions in selected areas such as special alloys, tools for metalworking, and machinery and tools for rock excavation.

SMT has a global presence and is a leading multi-national high technology manufacturer, offering speciality stainless steels, medical alloys and other advanced alloys and products.

For more details about CE Alloys:

www.smt.sandvik.com/osprey

Sales & Enquiries: (Europe & Asia)

Dr. Andrew Ogilvy or Dr. Alan Leatham

Sandvik Osprey Ltd

Milland Road

Neath, SA11 1NJ

United Kingdom

Tel: +44(0) 1639 634121

Fax: +44(0) 1639 630100

e-mail: cealloys.osprey@sandvik.com

Sales & Enquiries: (North America)

Stu Weinshanker

Advanced Packaging Associates

5671 Beaumont Avenue

La Jolla

California 92037

Tel: 858 454 2149

Fax: 206 984 4482

e-mail: support@cealloys.com

For web sales of standard CE Alloy plates:

www.cealloys.com

www.cealloys.co.uk

