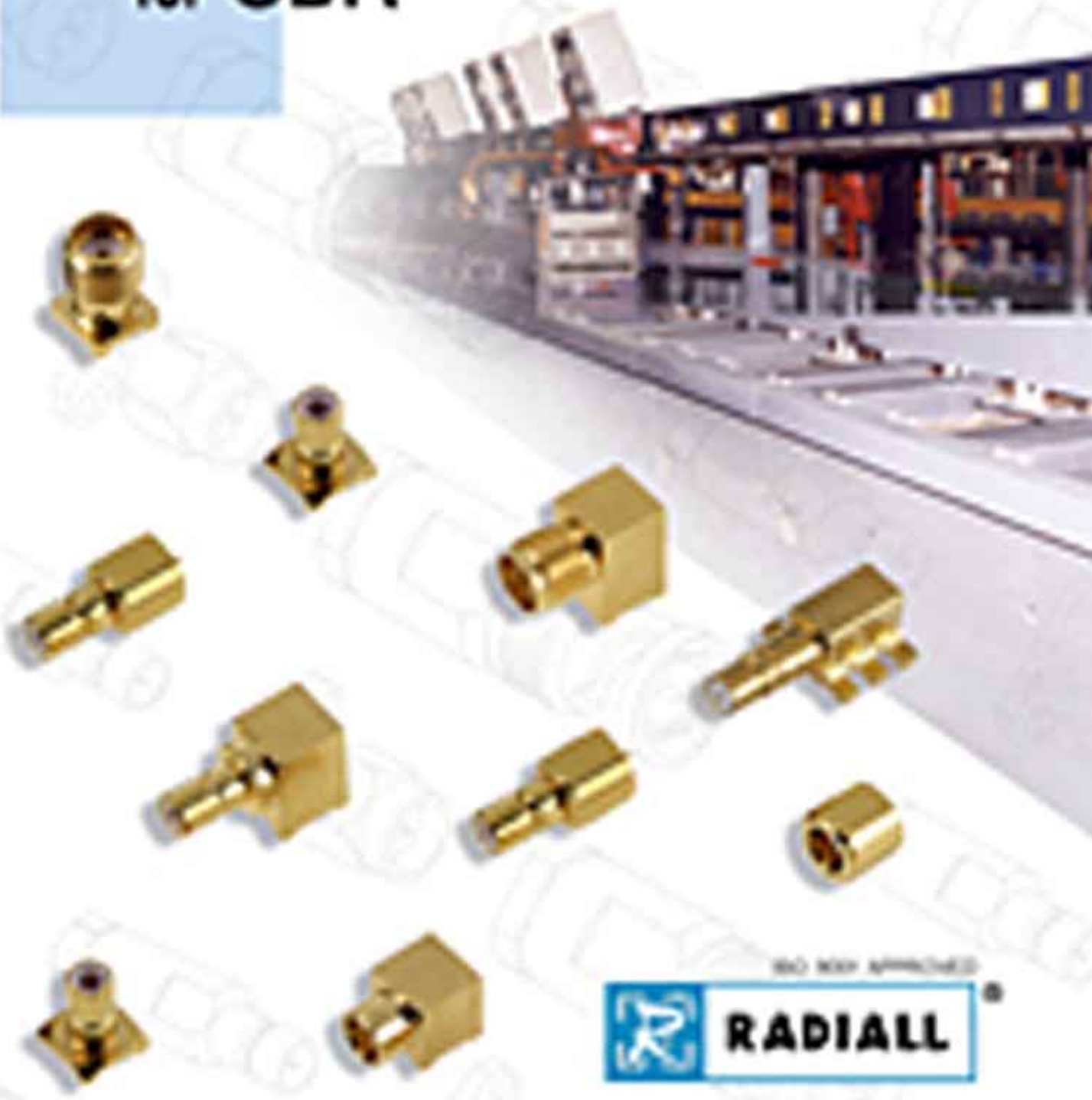
HIGH QUALITY SURFACE PLATING

Application guide for GBR



RADIALL

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MAIN ADVANTAGES OF GBR

- Low intermodulation level
- Non magnetic
- Excellent solderability
- Competitive price

GBR

CURRENT PLATING

Current popular platings have the following shortcomings:

Gold (0.2 µm) over Nickel (2 µm):

This can't be used when low intermodulation or low magnetism levels are required, because of the nickel underlayer.

Gold (1.3 µm) over Copper (2.5 µm):

This can't be used for SMT connectors: the required thickness of gold when using a copper underlayer causes the formation of intermetallic compounds (i.e. Gold-Tin compounds) during the soldering process. The resulting joints will be too fragile.

This can't be used for solder pins connectors: gold migrates into the tin/lead wave and causes a pollution of the tin/lead.

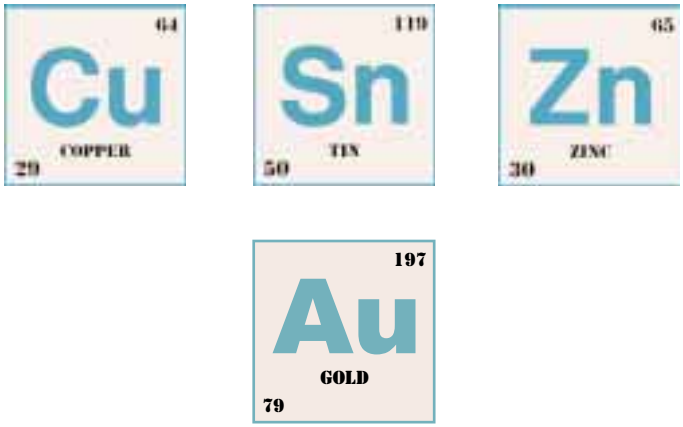
BBR *:

This requires the use of a mildly **activated** flux.

WHAT IS GBR?

GBR - Golden Bronze Radiall - is a new Radiall plating made of:

- BBR* plating (Cu 55% - Sn 30% - Zn 15%) - 1.8 µm min.
- a barrier preventing migration between gold and BBR
- a strike of Gold - 0.1 to 0.2 µm



Therefore the characteristics of the plating remain intact, without intermetallic diffusion.

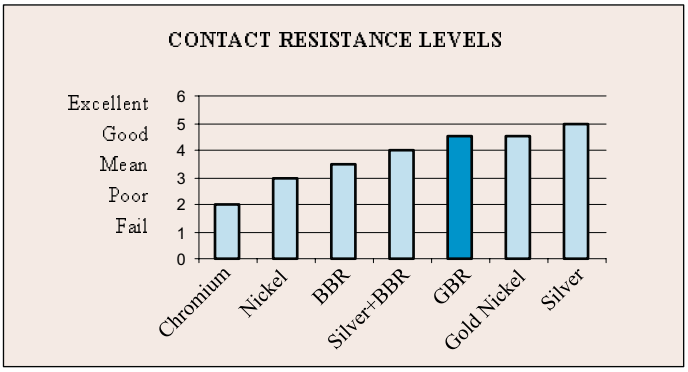
Radiall **GBR** demonstrates the best compromise between intermodulation and solderability characteristics.

** non magnetic plating, see application guide D1 030 DE*

GBR

CONTACT RESISTANCE

The level of contact resistance of **GBR** is similar to that of gold plating.



CONDUCTIVITY

In the frequency range of coaxial connectors, the skin effect takes place at about 0.5 µm. Therefore **GBR**'s conductivity is about the same as the conductivity of BBR* plating.

**see application guide for BBR : D1 030 DE*

INTERMODULATION (IMP)

RADIALL is an active member of the IEC committee in charge of the definition of an Intermodulation test procedure and of the establishment of a new IEC specification (Working group IEC TC46-WG6 / Passive Intermodulation Measurement).

In conjuction with this activity, RADIALL developed the **GBR** plating in order to meet the new requirements of applications such as base stations to achieve:

LOWER INTERMODULATION PRODUCTS

As **GBR** is non-magnetic (it is made of non ferrous materials) and corrosion resistant, the intermodulation products caused by dissimilar metals, corrosion or discontinuities are greatly reduced. Therefore, intermodulation products generated by **GBR** are **as low as those generated by a silver plating!**

GBR

MECHANICAL CHARACTERISTICS

The hardness of the **GBR** plating (**GBR** plating onto a brass connector) is about the same as that of a gold alloy.

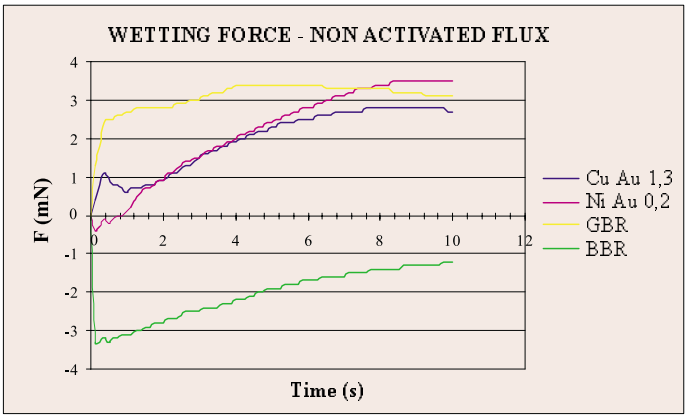
- External gold plating acts as a lubricant.
- Hard underlayer is wear resistant.

SOLDERABILITY

Environmental requirements restrict the use of activated fluxes. **GBR's** solderability has therefore been tested with a **non activated resin flux** and has proven to be **the most wettable plating.**

Test conditions:

Platings were checked with a wetting balance (solder material Sn Pb 60/40- 235°C - non activated flux - 10 seconds), according to Standard Reference IEC-68-2-20.



GBR

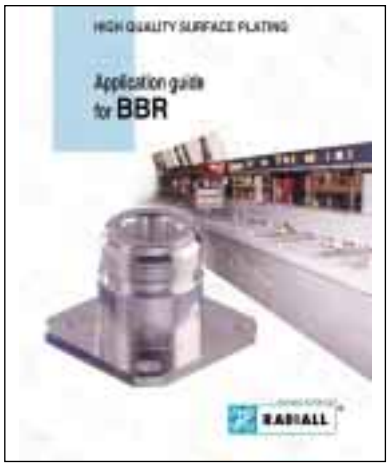
GBR plating offers the **best and most versatile solderability** compared to any other plating available on the market:

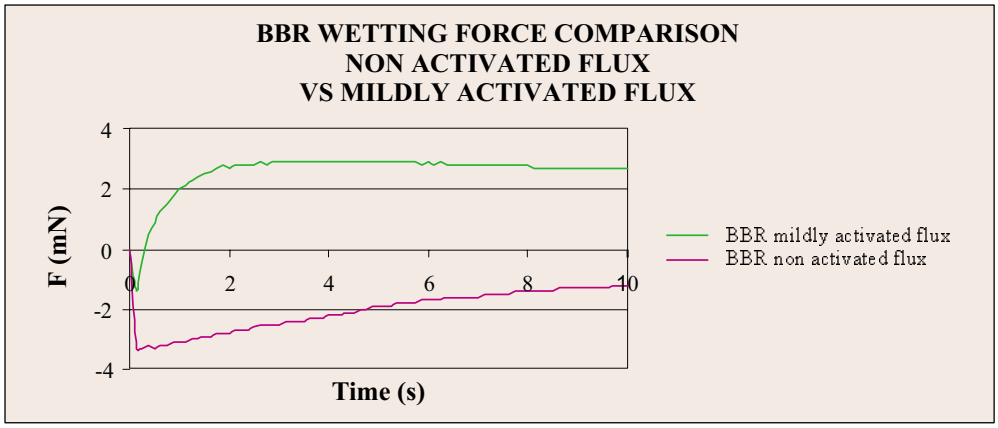
- It is wettable with **a non activated flux** even after a long time of storage. (Note: there is a trend to prohibit midly activated fluxes because they require the use of cleaning agents which are damaging for the environment)
- Its **very quick wetting** (less than 1s) makes it possible to use shorter cycle times during the soldering process:
  - ⇨ Money savings
  - ⇨ Temperature profile of the soldering process can be adapted to fragile electronic components.
- There is **no dewetting** during a period of up to 10 seconds, which also makes possible the use a *longer temperature profile if required (for example: when there is a larger component on the PCB).*

Remarks on BBR plating :

BBR's wettability is nevertheless very good when used with an appropriate flux (i.e. low activation flux = rosin with less than 0.5% chlorure).

For more information on BBR see application guide D1030DE.



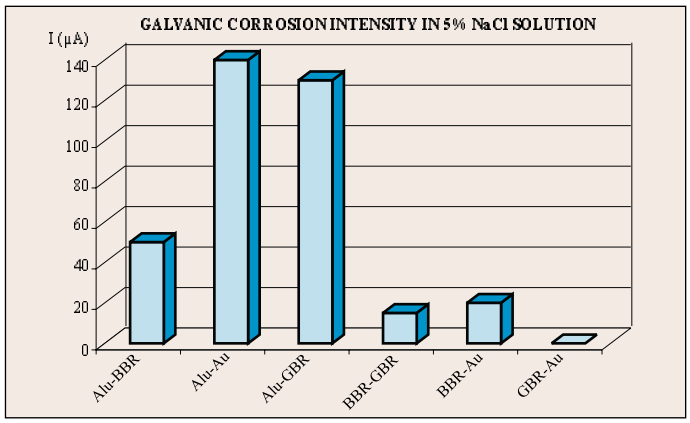


ENVIRONMENTAL CHARACTERISTICS

Corrosion and tarnishing resistance are among the most important environmental features of **GBR**.

GBR connectors can be mated to gold plated and to BBR plated connectors without being subject to galvanic corrosion.

Environmental tests (see hereafter) have proven that the behavior of **GBR** plated connectors is similar to that of Gold plated ones.



ENVIRONMENTAL TESTS

CORROSION RESISTANCE

Salt mist

(as per IEC standard 68-2-11)

GBR passes the test of exposure to salt mist (96 hours / 35°C / 5% NaCl). **GBR** plated connectors exhibit the same appearance as gold plated connectors. The contact resistance meets the standard requirements.

Industrial atmosphere gas test

(as per DIN 41640: SO2=10ppm; H2S=1ppm - 75% RH - t°: 25°C - 4 days)

The behavior of **GBR** plated receptacles is similar to the behavior of gold or BBR platings, whereas Nickel and silver don't pass these tests.

Electrical characteristics remain compliant with standard requirements.

MOISTURE TEST

Exposure of **GBR** plated parts to high humidity environment over a 10 day period (as per DIN MIL-STD 202 Method 106) doesn't cause any significant impact on appearance or on the connector outer contact resistance.

HEAT TEST

Appearance was not affected when exposed to an environmental condition of 145°C/100 hours. No problem of plating adhesion occurred.

THERMAL SHOCKS

This test (as per IEC 68.2.14) was performed to determine the resistance of the parts to exposures at high and low temperatures and to the thermal shock.

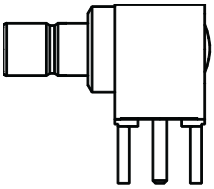
Exposure of **GBR** plated parts to 100 cycles at -65°C/+165°C, with a transfer time < 20s demonstrated fully satisfactory results.

Results showed no problem of adhesion or cracking of the plating.

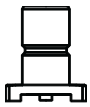
GBR

WHEN SHOULD A GBR PLATING BE CHOSEN?

GBR is particularly well suited for **PCB applications**:



PCB connectors with solder pins



SMT connectors

	Existing platings			
	Ni 2 Au 0.2	Cu 2.5 Au 1.3	BBR	GBR
Competitive price	+	-	++	+
Intermodulation / non magnetism	-	++	++	++
Solderability with mildly activated flux	++	++	++	+++
Solderability with non activated flux	++	++*	-	+++

* risk of pollution of the tin/lead wave by Gold

-	:	Bad	++	:	Very Good
+	:	Good	+++	:	Excellent

⇨ If low intermodulation features are required for a PCB connector, BBR or **GBR** may be selected. The choice will be dependant on a compromise between price and solderability.

⇨ If a non activated flux has to be used, then **GBR** provides the best cost/performance ratio.

GBR

WHICH PLATINGS ARE COMPATIBLE WITH GBR?

Any **Gold plated** or **BBR plated** connectors can be mated to a **GBR** plated connector.

MORE ADVANTAGES

APPEARANCE

Radiall's **GBR** looks like a gold plating and remains golden through aging,thanks to the barrier preventing migration between gold and BBR.

"GREEN" PLATING

- **GBR** does not contain any heavy metals such as Cadmium or Chromium.
- Activated fluxes use is restricted in many countries: **GBR**'s high wettability allows soldering with non activated fluxes.

CONNECTORS LIST

AVAILABILITY

Standard **GBR** plated connectors are listed hereafter. Do not hesitate to consult with us to develop any other **GBR** plated connector.

RADIALL ELECTROPLATING FACILITIES

RADIALL plating facilities stand as one of the most advanced in electronic industry.

Implementation of Statistical Process Control (SPC) in manufacturing processes and particularly of follows-up of thickness and deposit alloy composition, leads to a continuous high finish quality.

Moreover, RADIALL plating facilities stick to the legislation relative to waste treatment. The quality of the used water is checked through daily, weekly and quarterly samplings.

STANDARD GBR PLATED CONNECTORS

Series	Designation	Part number	Packaging
MCX	Edge card receptacle	**R113 423 847**	reel 500 pces
	Edge card receptacle	**R113 423 847W**	unit
	Straight SMT receptacle	**R113 424 027**	reel 500 pces
	Straight SMT receptacle	**R113 424 027W**	unit
	Straight pins receptacle	**R113 426 007**	reel 500 pces
	Straight pins receptacle	**R113 426 007W**	unit
	Right angle SMT receptacle	**R113 664 127**	reel 500 pces
	Right angle SMT receptacle	**R113 664 127W**	unit
	Right angle pins receptacle	**R113 665 807**	reel 350 pces
	Right angle pins receptacle	**R113 665 807W**	unit
SMB	Edge card receptacle	**R114 423 817**	reel 500 pces
	Edge card receptacle	**R114 423 817W**	unit
	Straight SMT receptacle	**R114 424 127**	reel 500 pces
	Straight SMT receptacle	**R114 424 127W**	unit
	Straight pins receptacle	**R114 426 007**	reel 100 pces
	Straight pins receptacle	**R114 426 007W**	unit
	Right angle SMT receptacle	**R114 664 127**	reel 500 pces
	Right angle SMT receptacle	**R114 664 127W**	unit
	Right angle pins receptacle	**R114 665 007**	reel 100 pces
	Right angle pins receptacle	**R114 665 007W**	unit
Commercial SMA	SMT Edge card receptacle	**R124 423 037**	bulk - unit
	Pin Edge card receptacle	**R124 423 227**	bulk -100 pces
	Straight pins receptacle	**R124 426 127**	100 pces
	Straight pins receptacle	**R124 426 127W**	unit
	Straight SMT receptacle	**R124 427 807**	reel 100 pces
	Straight SMT receptacle	**R124 427 807W**	unit
	Right angle pins receptacle	**R124 680 127**	100 pces
	Right angle pins receptacle	**R124 680 127W**	unit
	Right angle SMT receptacle	**R124 681 807**	reel 100 pces
	Right angle SMT receptacle	**R124 681 807W**	unit
	Right angle SMT (High retention)	**R124 683 857**	tube 25 pces
QMA	Straight pins receptacle	**R123 426 003**	bulk - 100 pces
	Straight pins receptacle	**R123 426 003W**	unit
	Straight SMT receptacle	**R123 427 803**	reel - 100 pces
	Straight SMT receptacle	**R123 427 803W**	unit
	Straight SMT receptacle	**R123 427 823**	reel - 300 pces
	Press mount receptacle	**R123 590 027**	bulk - 100 pces
	Right angle pins receptacle	**R123 680 003**	bulk - 100 pces
	Right angle pins receptacle	**R123 680 003W**	unit
	Right angle SMT receptacle	**R123 682 827**	reel - 100 pces
	Right angle SMT receptacle	**R123 682 827W**	unit

For more information, please ask for complete catalog: **D1 004 BE**.