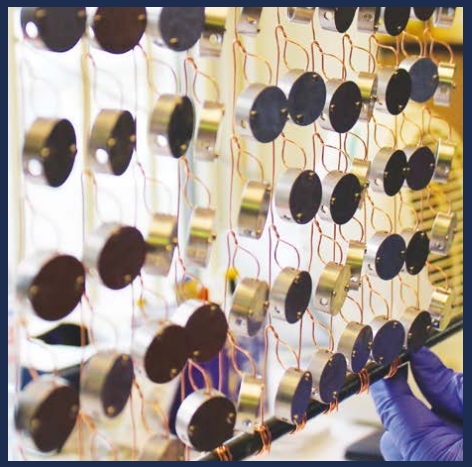
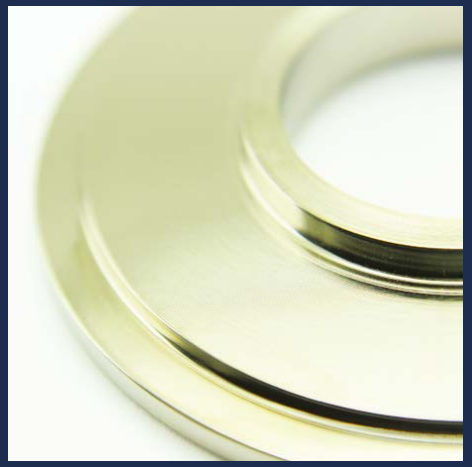

TWICKENHAM
PLATING GROUP
Technical
Plating Services





Technical plating

Twickenham Plating Group (TPG) offer a full range of technically advanced finishes using diverse methods of application.

Our greatest assets are our people, their experience and the ability to work in partnership with customers to develop their plated products at our specialist in-house facilities.

We have plated many billions of connectors which have been used in telecoms. In addition to use in everyday electronics, some components plated by TPG are buried in the ground, deployed under the sea, in the air, and even in space!

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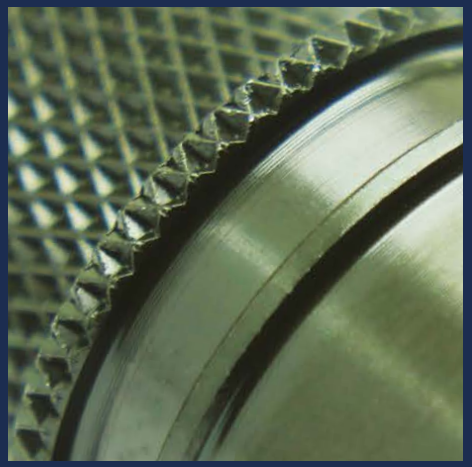


Specialist service

Quality control at every stage

All plating is carefully managed with TPG's quality management system certified to AS9100D and ISO 9001:2015.

Over 70 years of innovation

We are continually developing and researching new coatings for both superior functionality and environmental benefits, working alongside universities on many projects to enable our customers to be at the forefront of metal finishing technology.

Twickenham Plating Group deliver solutions quickly and effectively saving customers time and money

Technical plating services

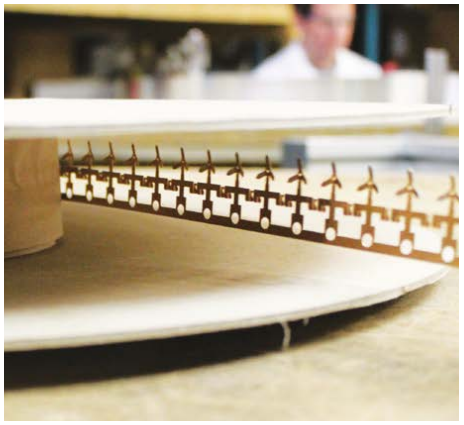
Twickenham Plating Group has in-house capability and expertise to provide one-stop plating solutions, unlike many other plating companies.

Plating to your specifications

Our technical specialists are available to assist – whether you already have a design specification or are in the process of development. We are highly experienced at plating to military, aerospace and other precise specifications.

Engineering and design

TPG has a highly responsive in-house design team. Our designers and engineers can develop process solutions using *Solidworks* CAD, that result in the most cost-effective way to deliver the desired finish.



Supply chain management

TPG can undertake responsibility for overall component supply, raw material inspection, plating and delivery. This enables shorter lead times and potential savings on delivered price.

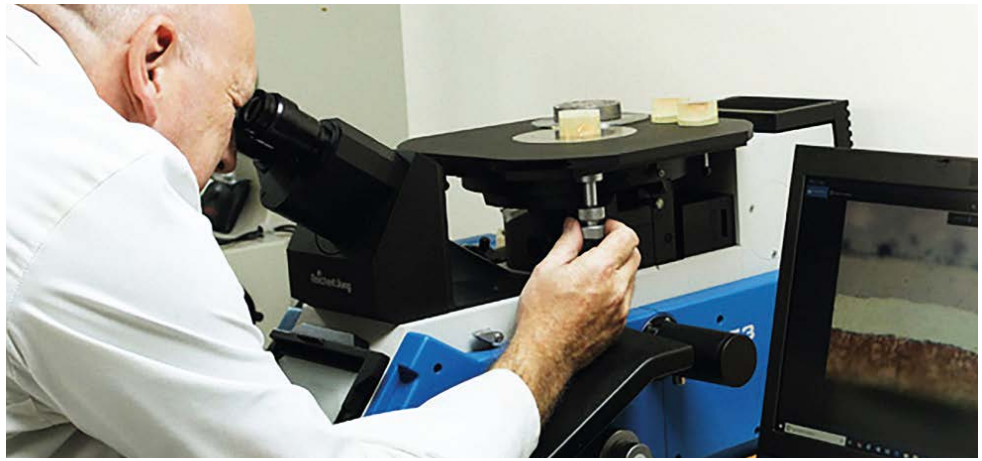
Special processes

We also offer many special processes in-house, including:

- poly surfing (mechanical polishing);
- deburring;
- heat treatment hardening;
- stress relieving.

Materials investigations

Our technical team are able to carry out an analysis of base materials and investigate composition of plated layers using X-ray fluorescence and micro section.



Materials advice

Our material specialists are on hand to offer advice and information on the different characteristics of finishes. We can advise as to the best materials for certain applications based on qualities such as contact resistance, solderability, corrosion resistance, whilst considering cost-effectiveness.

email a specialist at info@twickenham.co.uk

Our comprehensive application methods

Twickenham Plating Group will work with you to establish the most appropriate and cost-effective method of applying your specified finish.

Selective plating

With selective plating only a portion of a component is plated. This can offer functional benefits when using different coatings on the same component and with precious metals the advantage of reducing material consumption / cost whilst still maintaining functionality and performance.

Bespoke equipment

For many decades, we have designed and developed our own selective gold plating machines. Our Cyclon machine is the world's only fully automatic coax connector selective gold plating line – capable of plating selectively either externally or internally a large volume of loose parts.

Masking technology

Some applications have even been designed to graduate the internal thickness of plating in the bore so that there is a thicker deposit in the contact area further in the connector than at the opening.

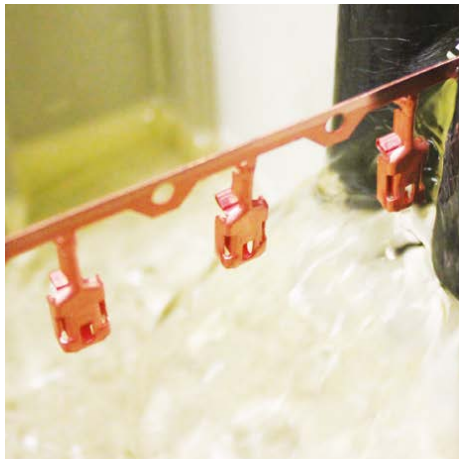
Reel-to-reel plating

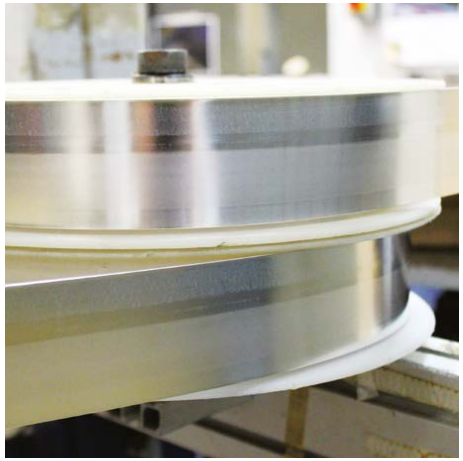
Automatic reelers and de-reelers control the transfer of the product through the reel-to-reel plants and together with computerised vision equipment so that even the most fragile of formed components can be plated.

TPG offers selective gold and silver stripe both on strip and formed components with a variety of solder finishes. Also, overall and selective plating of most metals on strip and formed components can be completed by full/partial immersion.

Material applications:

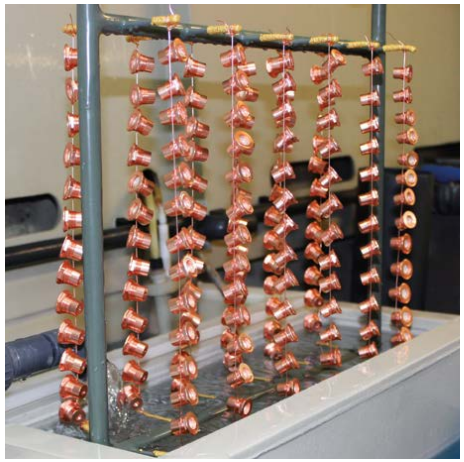
- high value stamped components;
- preformed strip;
- plain strip.

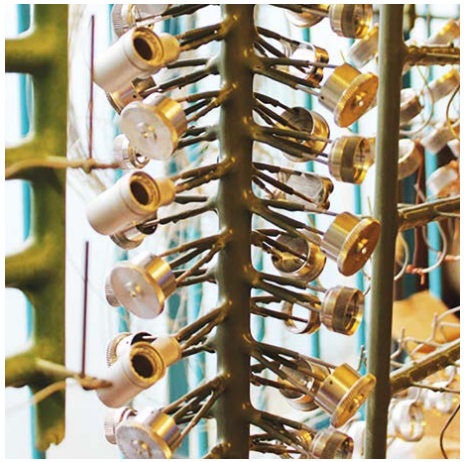




Jig/Vat/Rack plating

Twickenham Plating Group excel in the precious and base metal finishing of a variety of components using these traditional methods of plating. These involve wiring up components to jigs or racks which are then submerged in vats of plating solutions.





Specialist finishes:

- Internal anode technology and masking techniques to obtain the best possible coating distribution.

Barrel plating

The items to be plated are placed within a motorised barrel which is then rotated in one or more plating solutions to produce an even coating.

Suitable applications:

- High volume and low-cost option for loose parts;
- Vibrobarrel available for plating delicate parts.

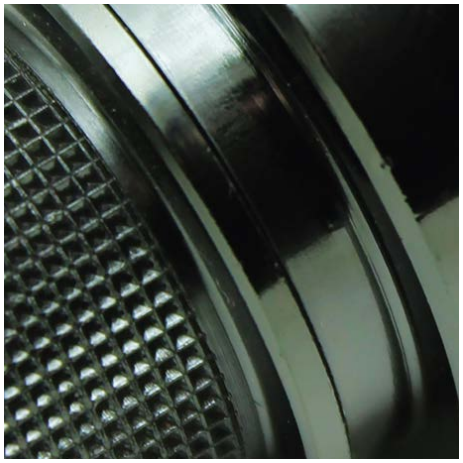
Call +44 (0)1202 692416 to speak to a specialist

High-performance coatings

We have developed a number of coatings specifically for optimum performance in harsh environments, for example: space exploration; aerospace; military; and broadcast applications.

Zinc Nickel

This alloy coating is a compatible alternative to cadmium. Ideally suited for protection of Aluminium connector shells and accessories, this black non reflective coating has exceptional corrosion resistance and conforms to plating standard ASTM B841.



High Phosphorous Electroless Nickel

This coating exhibits superior performance in many engineering and functional applications:

- superior corrosion performance in hostile environments;
- non-magnetic coating;
- good friction, wear and abrasion resistance;
- amorphous coating with inherent low porosity at thickness >10 microns;
- compressive stress resulting in minimal metal fatigue;
- MIL-C-26074 and AMS 2404 conformity.

Alternative cost-effective coatings

Palladium Nickel Gold (PNG)

With the price of Gold remaining high, this coating offers a highly cost-effective alternative to hard gold. The deposit is ductile, corrosion resistant and meets the same test criteria for contact/wear resistance as hard gold.

Exceeding standards

TPG prides itself on commitment to quality and ensuring that its customers' requirements are met or exceeded.

Quality control

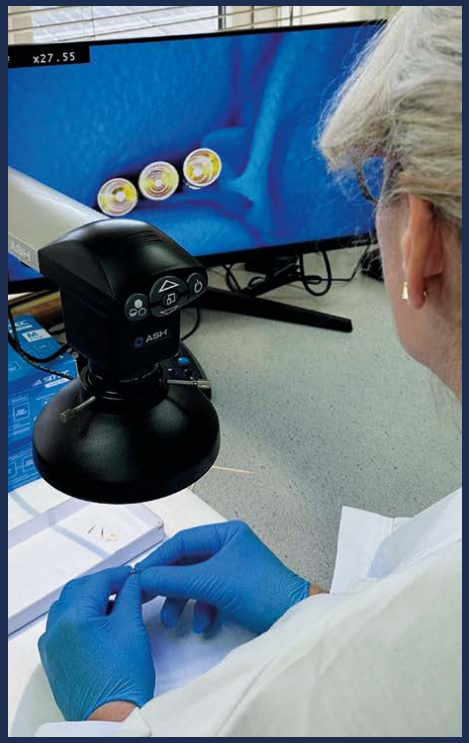
TPG prides itself on commitment to quality and ensuring that its customers' requirements are met or exceeded. The company's testing facilities, systems and dedication to training of personnel throughout the organisation ensure that all finishes meet with the required specification.

TPG's Quality Management system is certified to AS9100D and ISO 9001:20015.

Quality is an integral part of the plating process. Detailed processing instructions are controlled by the Quality Department and ensure consistent and proven finishes are plated to specification time and time again.

Customer quality documentation can be tailored for bespoke requirements from a certificate of conformity to full Production Part Approval Process (PPAP), including Failure Mode Effect Analysis (FMEA), Control Plans, Process Flows and Process Capability studies.

UKAS MANAGEMENT SYSTEMS 9963
auva AS 9100 CERTIFIED
CERTIFICATE NUMBER: 1842



Environmental control

TPG takes the environment very seriously and is continually striving to incorporate energy saving ideas to reduce the effects of climate change.

In a bid to reduce our organisation's carbon footprint we have recently helped reduce Dorset's carbon footprint by installing on-site solar generation of renewable power. Our project has been part funded by Low Carbon Dorset as part of the European Regional Development Fund and will save 70 tonnes of CO_2 each year.

TPG also operates an effluent control system and applies "Best Available Techniques" (BAT) to all plant installations to ensure that all waste is minimised.
We operate an Environmental Management System approved to ISO 14001:2015.

All packaging is recycled to further reduce the impact on the environment.

GCL® INTERNATIONAL
UKAS MANAGEMENT SYSTEMS
ISO 14001 5965
Registration No: 82E14061

Finishes and specifications

Process	Type	Method	Base Material	Specification
Palladium	Pure, Palladium/Nickel	Selective, Barrel and Rack	Copper Alloys, Steel, Aluminium, Die Castings	Customer specification
Rhodium	Pure	Selective, Barrel and Rack	Copper Alloys, Steel, Aluminium, Die Castings	DTD 931 (obsolete) ASTM B634
Gold	Hard, Pure	Reel-to-reel (all over, Selective plating and Spot plating), Barrel and Rack. Selective plating on loose parts.	Steel, Copper Alloys, Zinc Die Castings, Aluminium	DEF 03-17 superceded by SAE AMS 03-17, MIL-DTL-45204D, ASTM B488, SAE AMS 2422E, BS4292 part 1 & part 2 replaced by BS EN ISO 27874:2008
Silver	Semi-bright, Bright, Dull	Reel-to-reel (all over, Selective plating and Spot plating), Barrel and Rack	Steel, Copper Alloys, Zinc Die Castings, Aluminium	BS2816 replaced by BS EN ISO 4521:2008, DEF 03-9 superceded by SAE AMS 03-09 BS4290, QQ-S-365 replaced by ASTM B700
Copper	Cyanide, Acid, Pyrophosphate	Reel-to-reel (selective), Barrel and Rack	Steel, Aluminium, Zinc Die Castings, Copper Alloys	AMS-2418, ASTM B734, MIL-C-14550
Nickel	Dull, Bright, Semi-bright, Ductile	Reel-to-reel (all over, Selective plating and Spot) Barrel and Rack	Steel, Copper Alloys, Aluminium, Zinc Die Castings	QQ-N-290 superceded by SAE AMS QQ-N-290, DEF 03-27 superceded by SAE AMS 03-27, BS4758 replaced by ISO 4526:2004 BS EN ISO 12540:2000
Electroless Nickel	Medium, High Phosphorus Non-magnetic	Selective, Rack and Barrel	Steel, Copper Alloys, Aluminium, Die Castings	DEF 03-5 superceded by BS EN ISO 4527, AMS 2404 MIL-C-26074, ASTM B656, ASTM B733
Tin	Bright and Dull	Reel-to-reel (all over, Selective) Barrel and Rack	Steel, Copper Alloys, Aluminium	DEF 03-08, BS 1872, MIL-T-10727 replaced by ASTM B545
Zinc Cobalt	Passivated, Clear-Colour, Black and Olive Drab	Rack	Steel, Copper Alloys, Aluminium	Customer specification
Zinc Nickel	Passivated Black	Rack	Steel, Copper Alloys, Aluminium	Customer specification
Stainless Steel Passivation	–	Barrel and Rack	Stainless Steel	DEF 03-2, ASTM A967, ASTM A380, QQ-P-35, AMS 2700
Aluminium Conversion Coating	Alocrom 1200 Iridite NCP SurTec 650	Rack	Suitable Aluminium	DEF 03-18 superceded by SAE AMS 03-18, MIL-DTL-5541, MIL-DTL-81706

Other Processes: Heat treatment: Adhesion enhancement, hardening, stress relieving, de-embrittlement and heat treatment in Nitrogen

Properties of metals

Metal	Symbol	Atomic Weight	Density ρ(kg/m³) Water = 1000	°Cent. Melting Point	°Fahr. Melting Point	Specific Heat J/kg K	Electrical Resistivity (10⁻⁸ Ωm) at 0°C (273.2°K)	Heat Conductivity λ (W/m K) at 0°C (273.2°K)
Aluminium	Al	26.98	2698	660	1220	895.9	2.5	236
Antimony	Sb	121.75	6692	630	1166	209.3	39	25.5
Arsenic	As	74.92	5776	subl.613	subl.113	347.5	26	–
Barium	Ba	137.33	3594	710	1310	284.7	36	–
Beryllium	Be	9.012	1846	1285	2345	2051.5	2.8	218
Bismuth	Bi	208.98	9803	271	519	125.6	107	8.2
Cadmium	Cd	112.41	8647	321	609	234.5	6.8	97
Caesium	Cs	132.91	1900	29	84	217.7	18.8	36
Calcium	Ca	40.08	1530	840	1544	636.4	3.2	–
Cerium	Ce	140.12	6711	800	1472	188.4	7.3	11
Chromium	Cr	52	7194	1860	3380	406.5	12.7	96.5
Cobalt	Co	58.93	8800	1494	2721	431.2	5.6	105
Copper	Cu	63.54	8933	1084	1983	389.4	1.55	403
Gallium	Ga	69.72	5905	30	86	330.7	13.6	41
Gold	Au	196.97	19281	1064	1947	129.8	2.05	319
Indium	In	114.82	7290	156	312	238.6	8	84
Iridium	Ir	192.22	22550	2447	4436	138.2	4.7	147
Iron	Pb	55.85	7873	1540	2804	456.4	8.9	83.5
Lead	Fe	207.2	11343	327	620	129.8	19.2	36
Lithium	Li	6.94	533	180	356	4576.2	8.55	86
Magnesium	Mg	24.31	1738	650	1202	1046.7	3.94	157
Manganese	Mn	54.94	7473	1250	2282	502.4	138	8
Mercury	Hg	200.59	13547	-39	-38	142.3	94.1	7.8

Metal	Symbol	Atomic Weight	Density ρ(kg/m³) Water = 1000	°Cent. Melting Point	°Fahr. Melting Point	Specific Heat J/kg K	Electrical Resistivity (10⁻⁸ Ωm) at 0°C (273.2°K)	Heat Conductivity λ (W/m K) at 0°C (273.2°K)
Molybdenum	Mo	95.94	10222	2620	4748	272.1	5	139
Nickel	Ni	58.69	8907	1455	2651	439.6	6.2	94
Niobium	Nb	92.91	8578	2425	4397	267.9	15.2	53
Osmium	Os	190.2	22580	3030	5486	129.8	8.1	88
Palladium	Pd	106.4	11995	1554	2829	230.3	10	72
Platinum	Pt	195.08	21450	1772	3221	134	9.81	72
Potassium	K	39.09	862	63	145	753.6	6.1	104
Rhodium	Rh	102.91	12420	1963	3565	242.8	4.3	151
Rubidium	Rb	85.47	1533	38.8	102	330.7	11	58
Ruthenium	Ru	101.07	12360	2310	4190	255.4	7.1	117
Silver	Ag	107.87	10500	961	1760	234.5	1.47	428
Sodium	Na	22.989	966	97.8	208	1235.1	4.2	142
Strontium	Sr	87.62	2583	770	1418	–	20	–
Tantalum	Ta	180.95	16670	3000	5432	150.7	12.3	57
Thallium	Tl	204.38	11871	304	579	138.2	10	10
Thorium	Th	232.04	11725	1700	3092	117.2	14.7	54
Tin	Sn	118.69	7285	232	449	230.3	11.5	68
Titanium	Ti	47.88	4508	1670	3038	527.5	39	22
Tungsten	W	183.85	19254	3387	6128	142.8	4.9	177
Uranium	U	238.03	19050	1135	2075	117.2	28	27
Vanadium	V	50.94	6090	1920	3488	481.5	18.2	31
Zinc	Zn	65.38	7135	419	786	393.5	5.5	117
Zirconium	Zr	91.22	6507	1850	3362	284.7	40	23

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Whether you need advice on finishes, processes, specifications or wish to discuss a bespoke solution, we will be pleased to help.

email a specialist at info@twickenham.co.uk