Galvanic corrosion and *dissimilar metals*

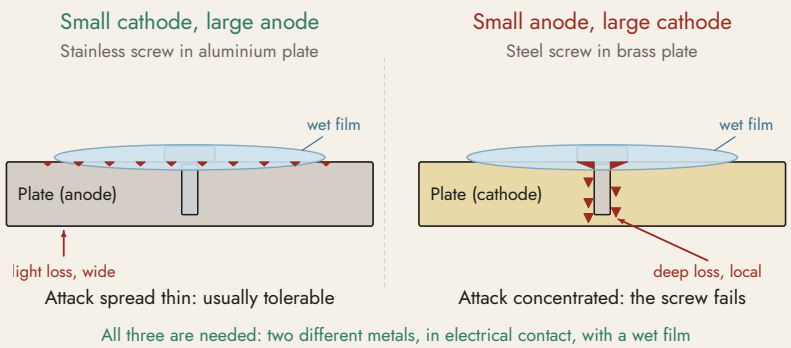
Which metals can touch or fix to each other, by environment, from published tables, with two published galvanic series, isolation details and wording. General guidance: check with an engineer for structural fixings.

Compliance guidance. This is general guidance on corrosion where metals touch. The ratings summarise published tables for set conditions and are not a guarantee: the right choice depends on the metals, the environment, the relative areas and the detail. For load-bearing, safety-critical, coastal or pool-hall fixings, take advice from a corrosion or structural engineer. PD 6484, the British Standard commentary on this subject, was not read: check the ratings against its current edition.

AT A GLANCE

Couple	Dry interior	Humid or outdoor air	Coastal, wet or pool hall	What to do
Stainless fixing in aluminium, galvanised or mild steel	OK	OK; protect the steel	Check	Stainless on the large, less noble part is the safe way round. Keep crevices drained.
Brass or bronze inlay or part in mild steel	OK	Check	Isolate	Brass unharmed; the steel is the anode. Seal the joint. Coating only the steel is not enough.
Mild steel or zinc-plated screw in brass or copper	OK	Avoid	Avoid	Small anode on large cathode: the worst way round. Use brass or stainless.
Galvanised or zinc part with copper or brass	OK	Isolate	Avoid	Ideally not together. Isolate even in air; keep copper run-off off the zinc.
Aluminium with brass, bronze or copper	OK	Avoid	Avoid	Reported as incompatible. If unavoidable, isolate and keep dry.
Aluminium part or fixing on large stainless steel	OK	Check	Isolate	Small aluminium on large stainless is the wrong way round.
Copper inlay or part in zinc or galvanised steel	OK	Check	Avoid	Rating uncertain in air; large potential difference. Isolate.
Brass or copper with stainless steel	OK	OK	Check	Rated good both ways in air. Keep crevices open.
Stainless of different grades	OK	OK	OK	Same free potential: no galvanic effect. Each grade has its own limits.
Run-off over a different metal	OK	Check	Check	Water from copper, brass or steel can corrode zinc or aluminium below. Drain it away.

OK: low risk in that condition. Check: acceptable if the detail is dry, open and drained. Isolate: keep the metals apart. Avoid: change the metal or the way round. These are the studio's readings of the sources on this page, not table values; the last column is our reading throughout. A dry interior means heated, aerated and free of condensation.



The same screw in two plates: small cathode (left), small anode (right). Original drawing; not to scale.

SPECIFICATION WORDING

FIXINGS AND CONTACT BETWEEN METALS

Fixings to be [stainless steel, grade A4 / 316] unless stated, and of the same or a more noble metal than the part they fix. No galvanised, zinc-plated or mild steel fixings in [brass, bronze or copper] parts. Dissimilar metals to be isolated by [polyamide sleeves and washers and a gasket] wherever moisture or condensation can reach the joint, at the locations marked [ ]. Fixings and isolation to be shown on the shop drawing.

INLAYS AND DISSIMILAR METALS IN ONE PIECE

Inlay of [brass] in [mild steel]: joint to be [sealed against moisture] and the steel finished with [system] on every face including the rebate. The fabricator is to state in writing how the joint is sealed and how damage to the finish is repaired.

ENVIRONMENT, RUN-OFF AND CONFIRMATION

Environment for [element]: [dry heated interior / damp interior / external inland / coastal / pool hall]. Run-off from [copper, brass, steel] not to fall on [aluminium, zinc or galvanised steel, stainless steel]. Every contact between different metals to be confirmed by the fabricator in writing, for the environment stated, against [PD 6484, edition [ ], or the fixing maker's guidance], before shop drawings are approved.

TERMS USED

Galvanic corrosion

Accelerated corrosion of one metal where it touches a different metal in the presence of moisture. A small part of the more reactive metal against a large area of the nobler metal is the worst case.

Anode and cathode

In a corrosion couple, the anode is the less noble metal, which is attacked, and the cathode the more noble metal, which is protected. A wet film (the electrolyte) joins them.

STANDARDS AND SOURCES

- PD 6484:1979, Commentary on corrosion at bimetallic contacts and its alleviation (BSI): the UK reference; paywalled, not read. Check the ratings against it.
- BS EN ISO 9223:2012, Corrosivity of atmospheres: environment classes; text not read.
- Euro Inox, Stainless Steel in Contact with Other Metallic Materials (Materials and Applications Series, Vol. 10, 2009)
- Galvanizers Association, HDG Datasheet 10: Bimetallic Corrosion (October 2024)
- BRANZ Facts, Metal corrosion in New Zealand buildings #2 (April 2020): a New Zealand source.
- Qualicoat TIS No. 4 (May 2023) and Qualicoat UK & Ireland Guidance Note 7 (April 2025)

Full guide: https://makebespoke.com/trade/technical/galvanic-corrosion-and-dissimilar-metals. Make Bespoke Studio coordinates manufacture through its partner workshops. Figures are guidance only and your specification governs; some may be superseded, so contact the studio to verify.