Galvanic Series Chart & Bimetallic Potential Reference (26 Metals)

Open-circuit electrochemical potential (mV vs Saturated Calomel Electrode, SCE) measured in 2% NaCl aqueous solution at ~20°C. Metals are ranked from most noble (cathodic, protected) at the top to most active (anodic, sacrificial) at the bottom.

#	Metal / Alloy	Standard (EN / DIN / ASTM)	AFNOR	Potential (mV vs SCE)	Polarity
1	Platinum	Pt 99.9	—	+350 mV	Noble (Cathodic)
2	Gold	Au 99.9	—	+220 mV	Noble (Cathodic)
3	Passivated 18-10 Stainless	1.4301 / 304 (Passivé)	Z6CN18-09	+100 mV	Noble (Cathodic)
4	Silver	Ag 99.9	—	0 mV	Noble (Cathodic)
5	Mercury	Hg	—	0 mV	Noble (Cathodic)
6	Nickel	Ni 99.2	N	-80 mV	Intermediate
7	Arcap (CuNiZn)	CuNi25Zn15 (Arcap)	UZ23N22	-100 mV	Intermediate
8	Pure Copper	Cu-ETP (CW004A)	U	-220 mV	Intermediate
9	Aluminum Bronze	CuAl10Fe3 (CW305G)	UA10	-250 mV	Intermediate
10	Free-cutting Brass	CuZn39Pb3 (CW614N)	UZ39Pb	-300 mV	Active
11	Tin Bronze	CuSn12 (CC483K)	UE12	-420 mV	Active
12	Pure Tin	Sn 99.5	E	-450 mV	Active
13	Lead	Pb 99.9	Pb	-490 mV	Active
14	Duralumin (2017A)	EN AW-2017A	AU4G	-590 mV	Active
15	Mild Structural Steel	1.0301 (C10)	XC8 à 10	-650 mV	Very Active (Anodic)
16	Cast Aluminum (AS10G)	EN AC-43000	AS10G	-715 mV	Very Active (Anodic)
17	Pure Aluminum 99.5%	EN AW-1050A	A5	-740 mV	Very Active (Anodic)
18	High-Carbon Spring Steel	1.1269 (C85S / XC80)	XC80 à 120	-745 mV	Very Active (Anodic)
19	Duralinox (AlMg 5083)	EN AW-5083 / 5754	AG4.5MC	-750 mV	Very Active (Anodic)
20	Cadmium Plating	Cadmium (REACH Annexe XVII)	Cd	-750 mV	Very Active (Anodic)
21	Pure ARMCO Iron	Fer ARMCO	Fe	-755 mV	Very Active (Anodic)
22	Almasilium (6060 Al)	EN AW-6060	ASG	-755 mV	Very Active (Anodic)
23	Hard Chromium (active)	Chrome électrolytique	C	-850 mV	Very Active (Anodic)
24	Tin-Zinc Solder (75/25)	Alliage 75Sn-25Zn	EZ25	-1010 mV	Very Active (Anodic)
25	Zinc & Galvanized Steel	Zn 99.9 (ISO 2081)	Z	-1050 mV	Very Active (Anodic)
26	Magnesium (AZ31)	Mg-AZ31	G	-1600 mV	Very Active (Anodic)

Engineering Screening Guidelines (Filame Group)

• **Potential Differential (|ΔV|)**: Keep |ΔV| ≤ 150 mV for marine/saline exposure, ≤ 250 mV for industrial/humid environments, and ≤ 500 mV for controlled dry indoor assemblies.
• **Area Ratio Rule (Ac / Aa)**: Avoid coupling a small anode (e.g. carbon steel screw, aluminum clip) to a large cathode (stainless steel or copper housing), which accelerates localized perforation.
• **Mitigation**: Specify barrier platings (Zinc-Nickel 12–15% Ni, Geomet zinc flake per ISO 10683), chemical passivation (EN 2516), dielectric isolation, or noble superalloys (Inconel 718 / X-750, Hastelloy, Elgiloy).
• **Disclaimer**: Reference values for preliminary screening only; validate critical assemblies via ISO 9227 neutral salt spray testing. Need custom springs, clips, or stamped parts? Contact engineering@filame.com | https://filame.com/en/materials-treatments/coupling-of-metals-and-galvanic-corrosion/