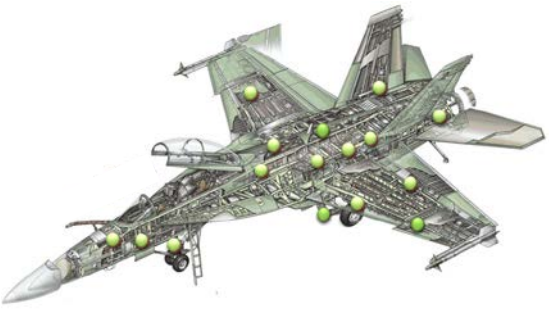
Corrosion Djinn™ Ver 3.1

Galvanic Corrosion Prediction and Assessment

Corrosion Djinn™ is Corrdesa's award-winning, easy-to-use engineering software tool enabling materials and design engineers to quickly assess galvanic corrosion risk according to MIL-STD-889C for dissimilar materials. Djinn™ is scientifically based on a qualified materials database, it instantly calculates the galvanic corrosion rate generated between the dissimilar material interfaces and also reports self-corrosion rates. If the corrosion rates are high the user can easily assess alternatives to see what would perform better.

Computational implementation of MIL-STD 889C

We are all familiar with the standard galvanic series tables we find in books and in military standards such as MIL-STD-889C. These tables and standards are always based on the galvanic potential difference, ΔE, between two materials. However, as recognized in the military standard, MIL-STD-889C, the galvanic potential difference is not really a true indicator of corrosion rate, since the potential difference does not account for the kinetics. Appendix B of MIL-STD-889C (2016) states that the maximum corrosion current is identified by the crossing point of the material polarization curves. However, the present form of MIL-STD-889C does not include polarization curves or even galvanic potential data on many modern materials.



Corrosion Djinn addresses these issues by providing an easy to use, computerized method for determining the crossing points, together with a consistent database of modern, accurate, polarization curves. All of this data has been acquired following a measurement protocol developed by NAVAIR. Consequently, the Djinn Platform provides a more accurate insight into the corrosion rate between a wide range of modern materials, coatings and treatments, the consequent risk of using them, and how that risk can best be alleviated by choosing the best materials and protective systems.

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Using Corrosion Djinn™

Corrosion Djinn™ is easy-to-use software designed for the M&P Engineer and anyone who needs a quick answer to questions such as "Which materials and coatings can I use together?" "How will trivalent chrome passivation compare with hexavalent?" "Will ZnNi be as good as Cd?" "How do these 12 options compare – which should I choose?"

Anyone can learn to use it in 5 minutes, and each calculation takes a few seconds.

The Science behind Corrosion Djinn™

Corrosion Djinn™ is based on the well-established principle that at equilibrium between a noble material (cathode) and a sacrificial material (anode) the corrosion current is determined by the crossing point of the their polarization curves. While this is idealized it works very well for most practical purposes, such as bushings, fasteners, butt and faying surfaces.

The Data behind Corrosion Djinn™

Good software is worthless if it is based on bad data. The old galvanic tables consist mostly of half century old measurements of galvanic potential from generic alloys. Corrosion Djinn™ depends for its accuracy on a new, curated database of electrochemical data, all taken in a consistent manner. These curves include many aerospace alloys and coatings, and new materials such as carbon fiber composites, new coatings such as ZnNi electroplate, and new treatments such as trivalent passivated aluminum. In response to user requests we are constantly adding new materials, coatings and treatments.

Planned additions

The current Version 3.1 embodies all the basic principles of correct current-based galvanic prediction. Over the coming year the following capabilities will be added:

- Effect of area ratios
- Impact of electrolyte thickness
- Graphics showing the severity and extent of corrosion for common geometries such as bushings, butt joints, faying surfaces and insulated Al/ composite interfaces.
- Extended information and help on Corrdesa's web site.

How to purchase Corrosion Djinn™

Corrosion Djinn™ is available as an on-line application at http://corrosiondjinn.com/.

A standalone version of Corrosion Djinn™ with customized electrochemical databases for military or proprietary use can also be purchased. For details see http://www.corrdesa.com/technology/corrosion-djinn/ Contact arose@corrdesa.com or klegg@corrdesa.com for sales and technical information.

Al Alloys[1]	2024-T3, 2219-T81, 6061-T6, 7050-T7451, 7075-T6
Carbon Fiber Composites[2]	BMS8-212, BMS8-276
Copper Alloys	Copper, Al-Bronze
High strength steels	4130, 4340
Stainless Steels	15-5 PH, 304, 316, 321, PH 13-8 Mo
Titanium Alloys	Ti6Al4V, Ti3Al2.5V
Coatings[3]	IVD Al, Cd, Cd LHE, nCo-P, ZnNi, ZnNi LHE, SAA, BSAA
Treatments	Seal Cr6, TEA etch, Alodine 600 & 1200, Chromate, TCP, Iridite 14-2, Cr3 passivate, annealed

Notes:
1 - Bare and anodized
2 - Surface, cross-section, sanded and unsanded
3 - Trademark coatings to be added, eg SIFCO, Coventya, Dalic,
Corrdesa can acquire materials and coating data if provided with samples