

# **GALVANIC COMPATIBILITY FOR BAL™ SEAL SPRING MATERIALS**

Technical Report  
TR-85 (Rev. Ø; 01-18-02)  
(100-78-1)



19650 Pauling  
Foothill Ranch, CA 92610-2610  
Tel (949) 460-2100  
Fax (949) 460-2300  
Email: [sales@balseal.com](mailto:sales@balseal.com)  
[www.balseal.com](http://www.balseal.com)

Spinozastraat 1  
1018 HD Amsterdam  
The Netherlands  
Tel +31 20 638 6523  
Fax +31 20 625 6018  
Email: [sales@balseal.nl](mailto:sales@balseal.nl)  
[www.balseal.nl](http://www.balseal.nl)

To reduce potential galvanic corrosion, corrosion between dissimilar metals, Bal Seal Engineering Company can plate spring gaskets with a galvanically compatible material. Typical plating materials include gold, silver, tin, nickel, and zinc. Other types of plating are available upon request. Silver plating is the most widely accepted plating because it is compatible with most materials. Tin is a low cost alternative for contact with aluminum, a common shielding material, and stainless steel parts. Table 1 groups galvanically compatible materials together for easy reference.

It is possible to use materials from adjacent groups in normal environments (temperature/humidity controlled environments, office environments, warehouses, and some non-temperature/humidity controlled environments). For harsh environments (in the presence of fair to good ionic conductors, high humidity, or salt air), dissimilar metals should belong to the same material grouping.

METALS COMPATIBILITY CHART					
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Gold	Rhodium	Titanium	Leaded Brass	Chromium Plate	Magnesium
Gold Alloys	Graphite	Nickel	Leaded Bronze	Tungsten	Tin
Platinum	Palladium	Nickel Alloys	Naval Brass	Molybdenum	
Platinum	Silver	Monel	*AISI 300	Steel AISI 410, 416,	
Alloys	Silver Alloys	Cobalt	Series Steels	420 Alloy	
Rhodium	Titanium	Cobalt Alloys	Steels AISI 451, 440, AM	and Carbon	
Graphite	Nickel	Copper	355 and PH Hardened	Tin	
Palladium	Nickel Alloys	Copper Alloys	Chromium Plate	Indium	
Silver	Nickel Copper	Bronze	Tungsten	Tin Lead Solder	
Silver	Alloys	Brass	Molybdenum	Lead	
Alloys	Monel	Silver Solder	Tin	Lead Tin Solder	
Titanium	Cobalt	Commercial Yellow Brass	Indium	Aluminum	
	Cobalt Alloys	Leaded Brass	Tin Lead Solder	All Aluminum Alloys	
	*AISI 300	Leaded Bronze	Lead	Cadmium	
	Series Steels	Naval Brass	Lead Tin Solder	Zinc	
	A286 Steel	AISI 300	Aluminum 2000	Galvanized Steel	
		Series Steels	And 7000 Series	Beryllium	
		*AISI Series 451, 440, AM	Alloy Steel	Zinc Base Casting	
		355 and PH Hardened	Carbon Steel		
		Chromium Plate			
		Tungsten			
		Molybdenum			

\*Standard spring materials

**Table 1**

To use this chart, locate the metals being considered for the housing and spring. Both materials should fall within the same group in harsh environments or adjacent groups in controlled environments. If the spring material is not compatible, select a plating material that is compatible with the housing. For example, with a 7000 series aluminum (Group 4), 300 series stainless steel spring material would be compatible in all environments. However, if the more conductive beryllium copper (Group 3) spring material is required in a harsh environment, the spring should be plated with a material in the same group as the aluminum, such as tin.

The information, descriptions, recommendations and opinions set forth herein are offered solely for your consideration, inquiry, and verification and are not, in part or in whole, to be construed as constituting a warranty, expressed or implied, nor shall they form or be a part of the basis of any bargain with Bal Seal Engineering. If any sample or model was shown to or provided by Buyer/User, such sample or model was used merely to illustrate the general description and type of goods. Such use is not to be construed as a warranty that the goods will conform to the sample or model. Furthermore, THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL OTHER WARRANTIES, IMPLIED OR EXPRESSED, ARE EXCLUDED AND SHALL NOT APPLY. This document provides product options for further investigation by Buyers/Users having technical expertise. The Buyer/User, through its own analysis and testing, is solely responsible for making the final selection of the products and for assuming that all performance, safety and warning requirements for the application are met. It is recommended that Buyers/Users run evaluation testing under actual service conditions to determine whether proposed BAL Seal products are suitable for the intended purpose. Nothing contained herein or in any of our literature shall be considered a license or recommendation for any use that may infringe patent rights. (LE-17)

PATENTS: The items described in this report include products that are the subject of the following issued United States patents: 5,979,904; 5,994,856; 6,050,572; 5,984,316; 6,161,838 and others, as well as foreign patents or products where patents are pending. (LE-88G) ©Copyright 2002, BAL Seal Engineering Co., Inc. U.S.A

Use or disclosure of data contained on this sheet is subject to the restrictions contained in the disclaimer located in this report.