

Position Paper on Preparing a Standard Specification for Non-Chromates on Aluminum (Discussion on the Appropriateness of ASTM B449 for this Application)

Introduction

Many people have become accustomed to using the ASTM B449-93 (R2004) *Standard Specification for Chromates on Aluminum* to specify coating weights for prepainted aluminum; however, new treatments that do not use chromates are becoming more widespread. The B449 standard is not applicable to these new coatings. Specifying coating weights for these new non-chromate coatings requires a different approach.

Review of the ASTM B449 Standard for Chromate Coatings

The ASTM B449 standard has served the industry well, incorporating a wide variety of various treatments, which are divided into 4 classes based on appearance, coating weight range and performance characteristics. Performance characteristics include electrical resistance, corrosion resistance, and adhesion performance. The class of coating used depends on the combination of performance characteristics required in the finished product (e.g., low electrical resistance in an application where corrosion resistance does not need to be robust will be a class 3 chromate coating).

Review of the Difficulties of Preparing a Standard for Non-Chromate Coatings

The National Coil Coating Association (NCCA) became aware of inappropriate use of the B449 standard to specify coating weights for non-chromate coatings. NCCA formed a special committee to investigate possible modification of the B449 standard to address non-chromate coatings, or possible development of a new standard for non-chromate coatings that would be similar to the ASTM B449 standard for chrome. The committee came to the conclusion this would not be feasible for non-chromate coatings, as there is too much variation in chemistry among the many different alternatives. The committee reports the following:

1. The history of non-chromate coatings is relatively short. In contrast, chromate coatings have been widely used since the mid 40's. By the time the ASTM B449 standard was written, chromate technology was a well-established process used freely in the public domain. A given combination of performance requirements determined the specific type of chromate required. These were well defined, making preparation of a standard possible. In contrast, non-chromate coatings are nearly all proprietary. Practice of the various non-chromate coatings is in the early phases of becoming established.
2. The term 'chromate coatings' immediately narrows the field to those coatings which contain chromium. The term 'non-chromate coatings' opens the field to everything else. This is a very large group of coatings.

3. A standard nonchromate coating simply doesn't exist at this point. Not long ago, a non-chromate coating likely contained hydrofluoric acid or a salt of fluoride. It was also very likely to contain titanium or zirconium along with a 'classic' additive such as acrylic acid, a vinyl, or tannin. The technology is still developing rapidly. Non-chromate coatings now might have cobalt, nickel, hafnium, etc. The organics have broadened further, and a non-chromate coating may now be formulated with more exotic polymers or polymer mixes, with or without a metal.
4. Non-chromate coatings do not have performance/coating weight relationships that line up with each other. A required coating weight range for one proprietary formulation will probably not match up with the required coating weight range of another proprietary product.
5. Again, the technology is developing so rapidly that even if the preparation and adoption of a new standard for non-chromate coatings were possible, the standard will possibly preclude or arrest the development of a more advantageous non-chromate coating in the immediate future.

Recommendation:

NCCA does not believe that a standard similar to ASTM B 449 can be prepared for non-chromate coatings at this time. Specification of non-chromate coatings should be prepared on a case by case basis and requires agreement between the non-chromate coating supplier and the coater. Such specification should also include a supplier-prepared 'Standard Operating Procedure' for applying the non-chromate coating under optimal conditions.