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## Program Document CPBOK

PD 6103

CPBoK-006/PL-1- REV. A

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### BODY OF KNOWLEDGE:

**ROLE DESCRIPTION:** PLANNER

**SPECIAL PROCESS:** CHEMICAL PROCESSING

**METHOD:** CHROMIC ACID ANODIZING, SULPHURIC ACID ANODIZING, HARDCOAT/HARD ANODIZING, ANODIZING FOR BONDING, ANODIZING FOR TITANIUM, MAGNESIUM, BORIC ACID ANODIZING, TARTARIC SULPHURIC ANODIZING

All PRI Qualification<sup>SM</sup> program examinations are created using the applicable PRI Qualification<sup>SM</sup> program Body of Knowledge (BoK), which defines the baseline knowledge and experience required to be considered competent to perform the specified job role in aerospace special process manufacturing.

All BoKs are created by subject matter experts who participate in the PRI Qualification<sup>SM</sup> Body of Knowledge Review Boards. All BoKs are updated periodically according to the latest revision of PRI Qualification<sup>SM</sup> program documentation (PD6100: Industry Managed Special Process Bodies of Knowledge) to ensure consistency with current industry practice

## 1. INTRODUCTION

This document has been created by the PRI Qualification<sup>SM</sup> program Chemical Processing Body of Knowledge Review Board (CP-BoKRB) according to the requirements of PD6100.

This document constitutes the PRI Qualification<sup>SM</sup> program BoK for Chemical Processing, Anodize including Chromic Acid Anodizing, Sulphuric Acid Anodizing, Hardcoat/Hard Anodizing, Anodizing for Bonding, Anodizing for Titanium, Magnesium, Boric Acid Anodizing, Tartaric Sulphuric Anodizing for the Planer Level. It defines the baseline knowledge and experience required to be considered competent to perform this role.

Unless otherwise stated, the CP-BoKRB has followed guidelines as detailed in the current version of IAQG Guidance PCAP 001 (Competence Management Guideline) to develop this BoK.

The information in this BoK will provide guidance for the following:

- Training providers who wish to develop training courses intended to support PRI Qualification<sup>SM</sup> program examination candidate preparation
- Chemical Processing Examination Review Board (CP-ERB) for the development of PRI Qualification<sup>SM</sup> program examinations
- Candidates taking PRI Qualification<sup>SM</sup> program examinations who wish to prepare in advance

**PRI Qualification<sup>SM</sup> Body of Knowledge:** Chemical Processing, Chromic Acid Anodizing, Sulphuric Acid Anodize, Hardcoat/Hard Anodizing, Anodizing for Bonding, Titanium Anodize, Magnesium Anodize, Boric Acid Anodizing, Tartaric Sulphuric Anodizing; Planner

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## 2. REFERENCES

PRI Qualification<sup>SM</sup> program documents:

PD6000	Governance & Administration of PRI Qualification <sup>SM</sup> Program
PD6100	Industry Managed Special Process Bodies of Knowledge
PD6200	Industry Managed Special Process Examinations System

IAQG documents:

IAQG Guidance PCAP 001 Competence Management Guideline

## 3. DEFINITIONS

**Definitions described within are specific to the Special Process BoK. For program-specific definitions, please refer to either the PD 6000 or the PRI Qualification<sup>SM</sup> Dictionary.**

**BODY OF KNOWLEDGE (BoK):** Baseline knowledge and experience required to be considered competent for a target position.

**GENERAL EXAMINATION:** The General Examination is designed to ascertain the candidate's general knowledge required for a particular job, role or activity. All of the questions will be derived from the corresponding BoK.

**EXPERIENCE:** The accumulation of knowledge or skill that results from direct participation in events or activities over a period of time.

**KNOWLEDGE:** Information / understanding acquired over a period of time. Information acquired through study and retained over that period of time (education, training, experience etc.) The combination of data and information, to which is added expert opinion, skills and experience, to result in a valuable asset which can be used to aid decision making and problem solving.

**LEVEL:** A class or division of a group based on education, training and experience. There are 3 levels: Operator/Technician, Planner and Owner. Please refer to the current version of PD 6000 for definitions.

**METHOD:** A well-defined division of a SPECIAL PROCESS widely recognised by industry. A specific area of a special process for example anodizing within Chemical Processing

**NON-SPECIAL PROCESS RELATED REQUIREMENTS:** Miscellaneous requirements such as Health and Safety, Environmental, etc.

**PERSONAL ATTRIBUTES:** A quality or characteristic expected and required for a particular job, role or activity.

**PRACTICAL EXAMINATION:** The Practical Examination shall consist of a demonstration of proficiency in performing tasks that are typical of those to be accomplished in the performance of the candidate's duties. The examination content is derived from the corresponding BoK.

**SKILL:** Ability to perform a particular task. Skill is the quality of being able to do something that is acquired or developed through training or experience.

**SPECIFIC EXAMINATION:** The Specific Examination shall cover requirements and use of the specifications, codes, equipment, operating procedures and test techniques the candidate may use in the performance of his/her duties with the employer. Examination content will be derived from the corresponding BoK where applicable.

**WEIGHTING:** The "weighting" of each line item, using a scale of 1, 3, 7, 10, (1 being least important; 10 being most important) indicates the relative importance of that aspect of the BoK and will determine the likelihood and frequency of a question on that topic appearing in the examination

#### 4. GUIDANCE TO EXAMINATION CANDIDATES

All PRI Qualification<sup>SM</sup> program examination candidates are recommended to read all documents referenced in section 2 of this document.

As stated in PRI Qualification<sup>SM</sup> program document PD6200, every exam question shall relate directly to and be derived from the information as detailed in the current version of the BoK.

Re-assessment to this BoK is required every 5 years, unless otherwise specified.

Candidates are therefore advised to ensure familiarity with all aspects of the BoK as detailed in Table 1. This can be done through:

- Self-study
- Completion of internal training
- Completion of external training (a list of Approved Training Providers can be found at <https://p-r-i.org/> )

Records of all qualified personnel shall be maintained and include:

- Date of Qualification
- Results of Written Exam
- Results of Practical Exam (if applicable)
- Summary of Experience (Owner level only)

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**5. LEVELS**

Descriptors	Level		
	Operator (OP) / Technician (T)	Planner (PL)	Owner (OW)
	<i>For descriptions, please refer to current version of PD6000</i>	<i>For descriptions, please refer to current version of PD6000</i>	<i>For descriptions, please refer to current version of PD6000</i>
<b>Anodize Process Specific Criteria</b>	No additional criteria for the Anodize process.	No additional criteria for the Anodize process	No additional criteria for the Anodize process
<b>Technical Knowledge</b>	Basic knowledge of the Anodizing process, its main processes, methods and tools.	Good level of knowledge in all aspects of the Anodizing process, all its processes, methods and tools.  Ability to coach others on contents and methods in the context of their workplace.	High or extensive knowledge in all aspects of the Anodizing process, all its processes, methods and tools to assess and validate improvements.  Able to contribute to set externally recognized standards.  Ability to define contents and methods for using knowledge effectively in influencing and developing international processes. Ability to influence the process with one's knowledge.
<b>Experience</b>	Sufficient experience to deal with recurrent activity.	Has enough experience to deal with unforeseen issues.	Wide proven experience of the subject. Is recognized specialist within the special process.
<b>Personal Attributes</b>	Takes into consideration behavioral characteristics such as but not limited to: team working, communication, direction and purpose, innovation and problem solving, mutual trust and respect, confidentiality and trustworthiness.		
<b>Skills</b>	Describes the activities necessary to perform each level of job function to comply with the Anodize Body of Knowledge		
<b>Non-Special Process Related Requirements</b>	Health & Safety, Environmental, Quality System Requirements.		

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**6. TABLE 1**

**ROLE DESCRIPTION:** Planner

**SPECIAL PROCESS:** Chemical Processing

**METHOD:** Chromic Acid Anodizing, Sulphuric Acid Anodizing, Hardcoat/Hard Anodizing, Anodizing for Bonding, Titanium Anodizing, Magnesium, Boric Acid Anodizing, Tartaric Sulphuric Anodizing

**REFERENCE GUIDELINES:** *Addendum 1 is a list of the International Standards and Reference Documents applicable to Anodizing processes.*

Row #	COMPETENCE	Weight (1,3,7,10)	Exam Type Written / Practical	Reference Guidelines
	<b>KNOWLEDGE:</b> The basic knowledge of the special processes, methods and tools			
	<b>GENERAL KNOWLEDGE:</b>			
1	Understand how to determine if there has been damage to the part surface.	10	Written	AC 7108
2	Full and complete understanding of Internal Work instructions	10	Written	AC 7108
3	Know how to access customer specifications and requirements (i.e. where to find them).	10	Written	AC 7108
4	Understand how to interpret customer specification and requirements in the context of performing the Anodize process.	3	Written	AC 7004; AS 9100
5	Understand Industry Standards (see Addendum 1 of this document)	7	Written	Addendum 1
6	Knowledge and understanding of the Accept/Reject Criteria	7	Written	AC 7108
7	Knowledge of the Surface Preparation procedures	10	Written	AC 7108/3; ASTM D2651
8	Basic understanding of the control and calibration requirements for equipment.	7	Written	AC 7004; AS 9100
9	Know how to perform the Water Break Free Cleanliness Verification	7	Written	AC 7108
10	Knowledge and understanding of mathematics, including decimal and fractions	10	Written	General Industry
11	Know how to use precision measuring instruments and equipment	7	Written	General Industry
12	Know and understand Job Documentation including Fixed and Frozen Process requirements.	10	Written	AC 7004; AS 9100; AC 7108
13	Know and understand proper chemistry, both usage and application.	10	Written	MIL-A-8625; AC 7108
14	Know and understand General Cleaning, Mechanical Cleaning and Chemical Cleaning prior to Anodize.	10	Written	MIL-A-8625; AC 7108
15	Know and understand Sealing performance and process requirements.	10	Written	AC 7108
16	Know and understand how to properly calculate the Ramp Rate Voltage and ASF for the Anodize process.	7	Written	AC 7108/8
17	Know and understand Laboratory Procedures.	7	Written	AC 7108
18	Know and understand Analytical requirements and limits.	7	Written	AC 7108
19	Know and understand how to review and take action on Analytical data & limits.	7	Written	AC 7108
20	Understand the need for pre-process checks (such as calibration status and solution temperatures.	7	Written	AC 7108
21	Understand the mechanics and importance of Racking, Part Set-Up and Masking.	7	Written	AC 7108
22	Knowledge and ability to write and review internal procedures and practices.	10	Written	AS 9100; AC 7004; AC 7108
23	Know how to recognize unsafe and/or inappropriate work practices.	7	Written	AC 7108
24	Know and understand the effects and aspects of the Anodize process on different alloys and materials (including chemicals, masking materials, tanks, work environment, etc.)	10	Written	AC 7108/8
25	Understand how to deal with incorrect or inappropriate Anodizing.	10	Written	AC 7108/8
26	Knowledge and understand about the selection of appropriate equipment for use in the Anodize process.	7	Written	AC 7108/8
27	Understanding of the significance of pH and grades of water purity and their measurement.	7	Written	AC 7108
28	General knowledge and understand of all the Anodize processes.	10	Written	AC 7108/8
	<b>CHROMIC ACID ANODIZING</b>			
29	Understand "Accept & Reject" Criteria including thickness and color range.	7	Written	MIL-A-8625; AMS 2470; AC 7108/8
30	Know uses, features and applications for this type of Anodize.	10	Written	MIL-A-8625; AMS 2470; AC 7108/8
31	Understand the limitations for this type of Anodize.	10	Written	MIL-A-8625; AMS 2470; AC 7108/8

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32	Understand the dyeing and sealing options and requirements.	7	Written	MIL-A-8625; AMS 2470; AC 7108/8
33	Understand the environmental, worker safety and health concerns associated with this type of Anodize.	7	Written	MIL-A-8625; AMS 2470; AC 7108/8
<b>SULFURIC ACID ANODIZE</b>				
34	Understand "Accept & Reject" Criteria including thickness and color range.	7	Written	MIL-A-8625; AMS 2471; AMS 2472; AC 7108/8
35	Know uses, features and applications for this type of Anodize.	10	Written	MIL-A-8625; AMS 2471; AMS 2472; AC 7108/8
36	Understand the limitations for this type of Anodize.	10	Written	MIL-A-8625; AMS 2471; AMS 2472; AC 7108/8
37	Understand the dyeing and sealing options and requirements.	7	Written	MIL-A-8625; AMS 2471; AMS 2472; AC 7108/8
38	Understand the environmental, worker safety and health concerns associated with this type of Anodize.	7	Written	MIL-A-8625; AMS 2471; AMS 2472; AC 7108/8
39	Understand the comparison of Sulfuric Acid Anodize related to other types of Anodize in regards to cost of chemicals used, heating, power consumption and length of time to obtain required thickness.	7	Written	MIL-A-8625; AMS 2471; AMS 2472; AC 7108/8
40	Knowledge of "Thin-film Sulfuric Acid Anodize" and similar options.	7	Written	MIL-A-8625; AMS 2471; AMS 2472; AC 7108/8
<b>HARDCOAT OR HARD ANODIZING</b>				
41	Understand "Accept & Reject" Criteria including thickness.	7	Written	MIL-A-8625; AMS 2469; AC 7108/8; BS ISO 10074; BS EN 2536
42	Know uses, features and applications for this type of Anodize.	10	Written	MIL-A-8625; AMS 2469; AC 7108/8; BS ISO 10074; BS EN 2536
43	Understand the limitations for this type of Anodize.	10	Written	MIL-A-8625; AMS 2469; AC 7108/8; BS ISO 10074; BS EN 2536
44	Understand the dyeing and sealing options and requirements.	7	Written	MIL-A-8625; AMS 2469; AC 7108/8; BS ISO 10074; BS EN 2536
45	Understand the environmental, worker safety and health concerns associated with this type of Anodize.	7	Written	MIL-A-8625; AMS 2469; AC 7108/8; BS ISO 10074; BS EN 2536
<b>PHOSPHORIC ACID ANODIZE</b>				
46	Understand "Accept & Reject" Criteria.	7	Written	MIL-A-8625; ASTM D3933; AC 7108/8
47	Know uses, features and applications for this type of Anodize.	10	Written	MIL-A-8625; ASTM D3933; AC 7108/8
48	Understand the limitations for this type of Anodize.	10	Written	MIL-A-8625; ASTM D3933; AC 7108/8
49	Understand the dyeing and sealing options and requirements.	7	Written	MIL-A-8625; ASTM D3933; AC 7108/8
50	Understand the environmental, worker safety and health concerns associated with this type of Anodize.	7	Written	MIL-A-8625; ASTM D3933; AC 7108/8
<b>ANODIZING FOR BONDING</b>				
51	Understand "Accept & Reject" Criteria.	7	Written	MIL-A-8625; ASTM D2651; AC 7108/3
52	Know uses, features and applications for this type of Anodize.	10	Written	MIL-A-8625; ASTM D2651; AC 7108/3
53	Understand the limitations for this type of Anodize.	10	Written	MIL-A-8625; ASTM D2651; AC 7108/3
54	Understand the environmental, worker safety and health concerns associated with this type of Anodize.	7	Written	MIL-A-8625; ASTM D2651; AC 7108/3
55	What type of base materials are used for this type of Anodizing?	7	Written	MIL-A-8625; ASTM D2651; AC 7108/3
56	Type of surface preparations used for Anodize bonding.	7	Written	MIL-A-8625; ASTM D2651; AC 7108/3
57	Knowledge and understanding of post anodize – pre-bond handling and storage requirements.	7	Written	MIL-A-8625; ASTM D2651; AC 7108/3
<b>TITANIUM ANODIZING</b>				
58	Understand "Accept & Reject" Criteria.	7	Written	AMS 2487; AMS 2488; AC 7108/8
59	Know uses, features and applications for this type of Anodize.	10	Written	AMS 2487; AMS 2488; AC 7108/8
60	Understand the limitations for this type of Anodize.	10	Written	AMS 2487; AMS 2488; AC 7108/8

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61	Understand the differences between achieving color on Titanium and other metals, such as aluminum.	7	Written	AMS 2487; AMS 2488; AC 7108/8
62	Know cleaning restrictions when using Titanium.	7	Written	AMS 2487; AMS 2488; AC 7108/8
63	Understand the environmental, worker safety and health concerns associated with this type of Anodize.	7	Written	AMS 2487; AMS 2488; AC 7108/8
<b>MAGNESIUM ANODIZING</b>				
64	Understand "Accept & Reject" Criteria.	7	Written	AMS 2466; AMS 2478; AMS 2479; AC 7108/8
65	Know uses, features and applications for this type of Anodize.	10	Written	AMS 2466; AMS 2478; AMS 2479; AC 7108/8
66	Understand the limitations for this type of Anodize.	10	Written	AMS 2466; AMS 2478; AMS 2479; AC 7108/8
67	Understand the dyeing and sealing options and requirements.	7	Written	AMS 2466; AMS 2478; AMS 2479; AC 7108/8
68	Understand the environmental, worker safety and health concerns associated with this type of Anodize.	7	Written	AMS 2466; AMS 2478; AMS 2479; AC 7108/8
<b>BORIC SULFURIC ACID ANODIZING (BSAA)</b>				
69	Understand "Accept & Reject" Criteria.	7	Written	MIL-A-8625
70	Know uses, features and applications for this type of Anodize.	10	Written	MIL-A-8625
71	Understand the limitations for this type of Anodize.	10	Written	MIL-A-8625
72	Understand the dyeing and sealing options and requirements.	7	Written	MIL-A-8625
73	Understand the environmental, worker safety and health concerns associated with this type of Anodize.	7	Written	MIL-A-8625
<b>TARTARIC ACID SULPHURIC ANODIZING</b>				
74	Understand "Accept & Reject" Criteria.	7	Written	MIL-A-8625
75	Know uses, features and applications for this type of Anodize.	10	Written	MIL-A-8625
76	Understand the limitations for this type of Anodize.	10	Written	MIL-A-8625
77	Understand the environmental, worker safety and health concerns associated with this type of Anodize.	7	Written	MIL-A-8625
<b>SKILLS:</b>				
Defined within these rolls describes the range of skills. The skills required to perform a particular special process task				
<b>READ AND UNDERSTAND WRITTEN INSTRUCTIONS:</b>				
78	Ability to understand specification requirements and customer flow-down requirements	10	Written	AC 7108; AS 9100; AC 7004
79	Apply Anodizing techniques appropriately	3	Written	MIL-A-8625; AC 7108/8
80	Verify and validate the Anodize results.	3	Written	MIL-A-8625; AC 7108/8
81	Properly report non-conformances	10	Written	AC 7108; AS 9100; AC 7004
82	Apply technical knowledge in a skillful way when solving problems	10	Written	AC 7108; AS 9100; AC 7004
83	Be familiar with the scope and limitations of Anodizing.	10	Written	MIL-A-8625; AC 7108/8
84	Use of appropriate equipment for the Anodize process.	7	Written	MIL-A-8625; AC 7108/8
85	Ability to follow instructions	10	Written	AC 7108; AS 9100; AC 7004
86	Ability to write Work Instructions and Procedures	10	Written	MIL-A-8625; AC 7108/8
87	Interpretation of an acceptable Anodize process	10	Written	MIL-A-8625; AC 7108/8
88	Must be able to read drawings and specifications	10	Written	AC 7108; AS 9100; AC 7004
89	Must be able to interpret specification requirements	10	Written	AC 7108; AS 9100; AC 7004General Industry
90	Must be able to set-up operations (equipment, rates, timers & temperatures) including alternate procedures as appropriate	3	Written	AC 7108; AS 9100; AC 7004
91	Must be able to understand and interpret shop travelers	7	Written	AC 7108; AS 9100; AC 7004
92	Ability to identify training needs and coordinate the training		Written	AC 7108; AS 9100; AC 7004
93	Be able to identify strengths and weaknesses in the personnel involved in the anodizing activity		Written	MIL-A-8625; AC 7108/8
<b>Sequencing</b>				
94	Has an appropriate understanding of where this process falls in the sequence of events		Written	AC 7108; AS 9100; AC 7004
<b>PERSONAL ATTRIBUTES:</b>				
Are statements that will enable judgment of the person's personal attributes				
95	Be able to work independently with a minimum of supervision	10	N/A	General Industry
96	Must have a high degree of integrity	10	N/A	General Industry

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97	Be attentive to details	10	N/A	General Industry
98	Be flexible	7	N/A	General Industry
99	Tolerate stress	7	N/A	General Industry
100	Exhibit conflict resolution	7	N/A	General Industry
101	Decision making ability	10	N/A	General Industry
102	Team Worker	10	N/A	General Industry
103	Ethical Behavior	10	N/A	General Industry
104	Exhibit Leadership	7	N/A	General Industry
<b>EXPERIENCE:</b>				
Are the minimum experience requirement expected to demonstrate their competence.				
<b>EDUCATION:</b>				
105	High School Diploma or GED or Secondary Education	10	N/A	General Industry
106	Apprenticeship	3	N/A	General Industry
107	Industry Training or Courses	3	N/A	General Industry
108	<b>TRAINING / HANDS-ON-EXPERIENCE:</b>	10	N/A	General Industry
109	Complete on the job training: Minimum number of hours-		N/A	
110	PLANNER – 160 Hours	10	N/A	General Industry
<b>NON-SPECIAL PROCESS RELATED REQUIREMENTS:</b>				
Defined within these rolls are other general or pre-requisite needed				
111	Capability to lift up to 30 lbs. (13 kg)		N/A	General Industry
112	Able to deal with repetitive bending and stooping		N/A	General Industry
113	General understand of Quality Systems AS/EN/JISQ 9100, or AC 7400, or equivalent	3 7 10	N/A	AS 9100; AC 7004
114	<b>SAFETY &amp; ENVIRONMENTAL REQUIREMENTS:</b>		N/A	
115	Knowledge and understanding of safety and handling of hazardous material, chemicals, etc. including safe storage, interpretation of Health & Safety Data Sheets and Regulatory Requirements	10	N/A	AC 7108; ISO 14001; OHSAS 18001
116	Understand Safety Data Sheets (SDS) and Personal Protective Equipment (PPE) Requirements: When and how to use appropriate personal protective equipment (goggles, gloves, rubber boots, aprons, etc.)	10	N/A	AC 7108; ISO 14001; OHSAS 18001
117	Ability to prepare and administer appropriate safety and environmental procedures and controls.		N/A	AC 7108; ISO 14001; OHSAS 18001
118	Understand which personal protective equipment to use, when and why	10	N/A	AC 7108; OHSAS 18001
119	Understand the safe storage, shelf life and mixing of chemicals	10	N/A	AC 7108; ISO 14001; OHSAS 18001
120	Ability to recognize symbols associated with chemicals and their usage	10	N/A	AC 7108; ISO 14001; OHSAS 18001

## 7. DOCUMENT REVISION HISTORY

REVISION DATE	SUMMARY
27D December 2017	Updated to new BoK Template
11 May 2018	Updated color scheme, new web address
2019 November 2019	Reviewed by eQualified Content Developer to ensure content is up to date.
3 December 2019	Editorial revision to update program name from eQualified to PRI Qualification <sup>SM</sup> .

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**ADDENDUM 1**

**LIST OF INTERNATIONAL STANDARDS & REFERENCE DOCUMENTS CHEMICAL PROCESSING ANODIZING**

<b>SPECIAL PROCESS</b>	<b>DOCUMENT TITLE</b>	<b>DOCUMENT NUMBER</b>
Chemical Process	Audit Criteria for Quality Management System	AC7004
Chemical Process	Audit Criteria for Chemical Processing	AC7108
Chemical Process	Audit Criteria for Surface Preparation Prior to Metal Bond	AC7108/3
Chemical Process	Audit Criteria for Anodizing	AC7108/8
Chemical Process	Tartaric Sulphuric Anodizing of Aluminum Alloys for Corrosion Protection and Paint Pre-treatment.	AIP 02-01-003
Chemical Process	Hard Anodic Coating Treatment of Magnesium Alloys	AMS 2466
Chemical Process	Hard Anodic Coating Treatment of Aluminum Alloys	AMS 2468
Chemical Process	Hard Anodic Coating on Aluminum and Aluminum Alloys	AMS 2469
Chemical Process	Anodic Treatment of Aluminum Alloys, Chromic Acid Process	AMS 2470
Chemical Process	Anodic Treatment of Aluminum Alloys Sulfuric Acid Process, Undyed Coating	AMS 2471
Chemical Process	Anodic Treatment of Aluminum Alloys, Sulfuric Acid Process, Dyed	AMS 2472
Chemical Process	Anodic Treatment of Magnesium Alloys, Acid Type, Full Coat	AMS 2478
Chemical Process	Anodic Treatment of Magnesium Alloys, Acid Type Thin Coat	AMS 2479
Chemical Process	Anodic Treatment of Titanium and Titanium Alloys Solution pH 12.4 Maximum	AMS 2487
Chemical Process	Anodic Treatment-Titanium and Titanium Alloys Solutions pH 13 or Higher	AMS 2488
Quality	Quality Management System-Requirements for Aviation, Space and Defense Organization	AS 9100
Chemical Process	Standard Specification for Anodic Oxide Coatings for Aluminium	ASTM B580
Chemical Process	Standard Specification for Hard-Coat Anodizing of Magnesium for Engineering Application	ASTM B893
Chemical Process	Standard Guide for Preparation of Metal Surfaces for Adhesive Bonding	ASTM D2651
Chemical Process	Standard Guide for Preparation of Aluminum Surfaces for Structural Adhesives Bonding (Phosphoric Acid Anodizing)	ASTM D3933
Chemical Process	Boric Sulfuric Anodizing	BAC 5632
Chemical Process	Hard Anodizing of Aluminum Alloys	BS EN 2536
Chemical Process	Anodizing of Aluminum and its Alloys. Specification for Hard Anodic Oxidation Coatings on Aluminum and its Alloys	BS ISO 10074
Safety	Occupational Health and Safety Management	BS OHSAS 18001
Chemical Process	Anodizing of Aluminum and its Alloys. Method for Specifying Decorative and Protective Anodic Oxidation Coatings on Aluminum	BS ISO 7599
Environment	Environmental Management System	ISO 14001
Chemical Process	Anodic Coatings for Aluminum and Aluminum Alloys	MIL-A-8625

## ADDENDUM 2

### ADDITIONAL SAFETY & ENVIRONMENTAL REQUIREMENTS

#### REACH REGULATION INFORMATION

Several metal finishing processes (painting, anodize, chromate conversion, passivate, electroplating) may have REACH regulated substances that are either used as process chemicals or are contained within the finished product after a process is completed. Chemical suppliers are obliged to provide a legislatively compliant safety data sheet. Below are topics of concern that a chemical processing owner should be aware of and have adequate understanding if products are produced within or shipped to the European Union.

- REACH (Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals)
- Affects raw materials/substances that go into products either produced within or shipped to the European Union.
- Under EU REACH regulation, substances that are one of the following can be regarded as substance of very high concern (SVHC):
  - carcinogenic, mutagenic or toxic to reproduction (CMRs);
  - persistent, bio-accumulative and toxic (PBTs);
  - very persistent and bio-accumulative (vPvBs);
  - seriously and / or irreversibly damaging the environment or human health, as substances damaging the hormone system;
- The SVHC candidate list is a moving target that will continue to grow with 168 substances as of January 2016. This list is reviewed nominally twice a year by ECHA.
- Some typically used SVHC's contained in or used but not limited to during chemical processing are:
  - Cadmium
  - Strontium Chromate
  - Chromium trioxide
  - Sodium dichromate
- SVHC content is allowable up to 0.1% of an article produced within or shipped to the EU.
- Additionally, SVHC's may at some time be added to the Authorization List known as Annex 14 or XIV which contains a sunset date for each SVHC in this list.
- Owner needs to be aware of sunset dates for SVHC's contained in the Authorization list. Once an SVHC from the Authorization List reaches the sunset date, it can no longer be used in the EU without specific authorization from ECHA (European Chemicals Agency).
- Manufacturing sites either located within or if shipping product to the EU must comply with all aspects of REACH. Chemical suppliers in the EU must provide safety data sheets that reflect any conditions of an authorization.
- Further information/current SVHC and Authorization list with sunset dates can be obtained by accessing (<http://www.echa.europa.eu/web/guest/candidate-list-table>)