BODY OF KNOWLEDGE:

ROLE DESCRIPTION: ETCH & ETCH INSPECTOR PLANNER
SPECIAL PROCESS: Chemical Processing
METHOD: Nital, Temper, Blue Etch Anodize, Electrolytic (Anodic), Macrostructure, Pre-Penetrant

All PRI Qualification℠ program examinations are created using the applicable PRI Qualification℠ 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℠ Body of Knowledge Review Boards. All BoKs are updated periodically according to the latest revision of PRI Qualification℠ 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℠ program Chemical Processing Body of Knowledge Review Board (CP BoKRB) according to the requirements of PD6100.

This document constitutes the PRI Qualification℠ program BoK for Chemical Processing Etch / Nital, Temper, Blue Etch Anodize, Electrolytic (Anodic), Macrostructure and Pre-Penetrant, Planner 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 revision of International Aerospace Quality Group (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℠ program examination candidate preparation
- Chemical Processing Examination Review Board (CP-ERB) for the development of PRI Qualification℠ program examinations
- Candidates taking PRI Qualification℠ program examinations who wish to prepare in advance
2. REFERENCES

PRI Qualification\textsuperscript{SM} program documents:

\begin{itemize}
  \item PD6000 Governance & Administration of PRI Qualification\textsuperscript{SM} Program
  \item PD6100 Industry Managed Special Process Bodies of Knowledge
  \item PD6200 Industry Managed Special Process Examinations System
  \item IAQG International Aerospace Quality Group
\end{itemize}

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\textsuperscript{SM} program 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 revision of PD 6000 for definitions of these levels.

METHOD: A well-defined division of a SPECIAL PROCESS widely recognized 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. 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 QualificationSM program examination candidates are recommended to read all documents referenced in Section 2 of this document.

As stated in PRI QualificationSM program document PD6200, every exam question shall relate directly to and be derived from the information as detailed in the current revision of the BoK.

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

NOTE: Industry Standards require various intervals of reassessment (3-5 years)

- Physical tests (eye exam) are required annually
- ARP1923 states at qualification and each year thereafter, inspection personnel shall pass physical, written and practical examinations.

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 (per MIL-STD-867C) shall be maintained and include:

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

<table>
<thead>
<tr>
<th>Descriptors</th>
<th>Operator (OP) / Technician (T)</th>
<th>Planner (PL)</th>
<th>Owner (OW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Etch Planner</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Specific Criteria</td>
<td>For descriptions, please refer to current version of PD6000</td>
<td>For descriptions, please refer to current version of PD6000</td>
<td>For descriptions, please refer to current version of PD6000</td>
</tr>
<tr>
<td>Technical Knowledge</td>
<td>Basic knowledge of the special process, its main processes, methods and tools.</td>
<td>Good level of knowledge in all aspects of the special process, all its processes, methods and tools. Ability to coach others on contents and methods in the context of their workplace.</td>
<td>High or extensive knowledge in all aspects of the special 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.</td>
</tr>
<tr>
<td>Experience</td>
<td>Sufficient experience to deal with recurrent activity.</td>
<td>Has enough experience to deal with unforeseen issues.</td>
<td>Wide proven experience of the subject. Is recognized specialist within the special process.</td>
</tr>
<tr>
<td>Personal Attributes</td>
<td>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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skills</td>
<td>Describes the activities necessary to perform each level of job function to comply with the Body of Knowledge.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Special Process</td>
<td>Health &amp; Safety, Environmental, Quality System Requirements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Related Requirements</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 1

**ROLE DESCRIPTION: ETCH & ETCH INSPECTOR PLANNER**

**SPECIAL PROCESS: CHEMICAL PROCESSING**

**METHOD: ETCH / Nital, Temper, Blue Etch Anodize, Electrolytic (Anodic), Macrostructure, Pre-Penetrant**

**REFERENCE GUIDELINES:** *Addendum 1 is a list of the International Standards and Reference Documents applicable to Etch and Etch Inspection*

<table>
<thead>
<tr>
<th>Row #</th>
<th>COMPETENCE</th>
<th>Weight (1,3,7,10)</th>
<th>Exam Type Written / Practical</th>
<th>Reference Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GENERAL KNOWLEDGE:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>Understand how to perform the inspection necessary to detect any damage that may have been caused</td>
<td>10</td>
<td>W</td>
<td>General Industry; AC7108/2</td>
</tr>
<tr>
<td>3</td>
<td>Full and complete understanding of Internal Work Instructions</td>
<td>7</td>
<td>W</td>
<td>General Industry; AC7108/2</td>
</tr>
<tr>
<td>4</td>
<td>Knowledge how to access customer specifications and requirements (i.e. where to find them)</td>
<td>10</td>
<td>W</td>
<td>General Industry; AC7108/2</td>
</tr>
<tr>
<td>5</td>
<td>Understand how to interpret customer specifications and requirements in the context of the etching carried out</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC7108/2</td>
</tr>
<tr>
<td>6</td>
<td>Understanding of Industry Standards</td>
<td>10</td>
<td>W</td>
<td>Addendum 1 – all documents; AC7108/2</td>
</tr>
<tr>
<td>7</td>
<td>Knowledge and understanding of the Accept/Reject Criteria</td>
<td>7</td>
<td>W</td>
<td>General Industry; AC7108/2</td>
</tr>
<tr>
<td>8</td>
<td>Knowledge of Surface Preparation procedures</td>
<td>10</td>
<td>W</td>
<td>AC7108/2</td>
</tr>
<tr>
<td>9</td>
<td>Knowledge and Understanding of the Post Bake Requirements and other Post Inspection operation/procedures</td>
<td>10</td>
<td>W</td>
<td>MIL-STD-867; AC7108/2</td>
</tr>
<tr>
<td>10</td>
<td>Basic understanding of control and calibration requirements of Post Bake Ovens</td>
<td>7</td>
<td>W</td>
<td>AC7108/2</td>
</tr>
<tr>
<td>11</td>
<td>Water Break Free Cleanliness Verification</td>
<td>10</td>
<td>W</td>
<td>Addendum 1 List of Standards; AC7108/2</td>
</tr>
<tr>
<td>12</td>
<td>Knowledge and understanding in mathematics, including decimals and fractions</td>
<td>10</td>
<td>W</td>
<td>General Industry; AC7108/2</td>
</tr>
<tr>
<td>13</td>
<td>Use of precision measuring instruments and equipment.</td>
<td>10</td>
<td>W</td>
<td>General Industry; AC7108/2</td>
</tr>
<tr>
<td>14</td>
<td>Knowledge and Understanding of Job Documentation including Fixed / Frozen Process</td>
<td>10</td>
<td>W</td>
<td>AS9100, AC7108/2, General Industry</td>
</tr>
<tr>
<td>15</td>
<td>Knowledge and Understanding of proper chemistry usage and application</td>
<td>10</td>
<td>W</td>
<td>AC7108/2</td>
</tr>
<tr>
<td>16</td>
<td>Knowledge and Understanding of the General Cleaning, Mechanical Cleaning and Chemical Cleaning prior to Etching</td>
<td>10</td>
<td>W</td>
<td>AC 7108/2</td>
</tr>
<tr>
<td>17</td>
<td>Knowledge and Understanding of Etch Rate and Stock Removals</td>
<td>10</td>
<td>W</td>
<td>AC7108/2</td>
</tr>
<tr>
<td>18</td>
<td>Knowledge and Understanding of how to correct or adjust Etch Rate and Stock Removals</td>
<td>7</td>
<td>W</td>
<td>AC7108/2</td>
</tr>
<tr>
<td>19</td>
<td>Knowledge and Understanding of Local Etch Stock Solutions and correct chemistry application and removal</td>
<td>10</td>
<td>W</td>
<td>AC7108/2</td>
</tr>
<tr>
<td>20</td>
<td>Knowledge and Understanding of Laboratory Procedures</td>
<td>7</td>
<td>W</td>
<td>AC7108/2, AC7108/2</td>
</tr>
<tr>
<td>21</td>
<td>Knowledge and Understanding of Analytical requirements &amp; limits</td>
<td>7</td>
<td>W</td>
<td>AC 7108/2</td>
</tr>
<tr>
<td>22</td>
<td>Knowledge and Understanding to review and act on Analytical data &amp; limits</td>
<td>7</td>
<td>W</td>
<td>AC 7108/2</td>
</tr>
<tr>
<td>23</td>
<td>Understand the need for pre-process checks (such as calibration status, temperatures &amp; light levels)</td>
<td>10</td>
<td>W</td>
<td>AC7108, AC7108/2</td>
</tr>
<tr>
<td>24</td>
<td>Understanding of Racking and part set-up</td>
<td>10</td>
<td>W</td>
<td>AC 7108/2</td>
</tr>
<tr>
<td>25</td>
<td>Thorough understanding of the appropriate etch process</td>
<td>10</td>
<td>W</td>
<td>AC 7108/2</td>
</tr>
<tr>
<td>26</td>
<td>Knowledge and Ability to write and review internal procedures and practices</td>
<td>10</td>
<td>W</td>
<td>AC 7108/2</td>
</tr>
<tr>
<td>27</td>
<td>Knowledge to recognize unsafe and/or inappropriate work practices</td>
<td>10</td>
<td>W</td>
<td>Occupational Safety and Health Administration (OSHA)</td>
</tr>
<tr>
<td>28</td>
<td>Knowledge and Understanding of the effect all aspects of the etching process on different alloys and materials (including masking materials, tanks, work environment etc.).</td>
<td>7</td>
<td>W</td>
<td>AC7108, AC7108/2</td>
</tr>
<tr>
<td>29</td>
<td>Understand how to deal with incorrect or in appropriate etch processing</td>
<td>10</td>
<td>W</td>
<td>AC 7108/2, AC7108</td>
</tr>
<tr>
<td>30</td>
<td>Knowledge and Understanding of the selection of appropriate plant and equipment for use in etch inspection processing</td>
<td>3</td>
<td>W</td>
<td>AC 7108/2</td>
</tr>
<tr>
<td>31</td>
<td>Understanding of the significance pH and grades of water purity and their measurement</td>
<td>3</td>
<td>W</td>
<td>AC 7108/2</td>
</tr>
<tr>
<td>32</td>
<td>Knowledge and Understanding of appropriate lighting levels and their measurement</td>
<td>7</td>
<td>W</td>
<td>AC 7108</td>
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<tr>
<td>33</td>
<td>General Knowledge and Understanding of all the etch inspection processes (including their strengths and weaknesses)</td>
<td>3</td>
<td>W</td>
<td>AC 7108/2, AC 7108/15</td>
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<tr>
<td>34</td>
<td>Knowledge and Understanding to select appropriate inspection methods</td>
<td>7</td>
<td>W</td>
<td>AC 7108/2, AC 7108/15</td>
</tr>
<tr>
<td></td>
<td>NITAL AND TEMPER ETCH:</td>
<td></td>
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<tr>
<td>35</td>
<td><strong>ACCEP/T REJECT CRITERIA</strong></td>
<td>10</td>
<td>W</td>
<td>AC 7108/2</td>
</tr>
<tr>
<td>36</td>
<td>Understanding the effects of heat being applied to metal during the cutting, grinding and forming</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2</td>
</tr>
<tr>
<td>37</td>
<td>A conforming etched surface will exhibit a matte gray etched surface</td>
<td>10</td>
<td>W</td>
<td>Addendum 1; AC7108/2</td>
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<tr>
<td>38</td>
<td>Tempered Etch Inspection is used for inspection of Low Alloy Steels (Group A), Tool Steels (Group B), Limited Access or Swab Etch, Ammonium Persulfate Swat Etch</td>
<td>10</td>
<td>W</td>
<td>MIL-STD-867; AC 7108/2</td>
</tr>
<tr>
<td>39</td>
<td>Understand the importance of proper equipment set-up and use</td>
<td>10</td>
<td>W</td>
<td>MIL-STD-867 / AMS 2649; AC 7108</td>
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<tr>
<td>40</td>
<td>Understand the use and control of known defect samples</td>
<td>10</td>
<td>W</td>
<td>MIL-STD-867 / AMS 2649</td>
</tr>
<tr>
<td>41</td>
<td>Knowledge and Understanding to review known defect data</td>
<td>10</td>
<td>W/P</td>
<td>MIL-STD-867; AC 7108/2</td>
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<tr>
<td>42</td>
<td>Understand surface preparation techniques and requirements</td>
<td>10</td>
<td>W</td>
<td>General Industry; AC 7108/2; AC 7108/2</td>
</tr>
<tr>
<td>43</td>
<td>Understand process requirements</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2</td>
</tr>
<tr>
<td>44</td>
<td>Understand post process requirements</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2</td>
</tr>
<tr>
<td>45</td>
<td>Understand Local Swab Etch Process</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2</td>
</tr>
<tr>
<td>46</td>
<td>Knowledge and Understanding to identify susceptibility of parts to corrosion and/or embrittlement</td>
<td>10</td>
<td>W</td>
<td>AC 7108/2; MIL-STD-867</td>
</tr>
<tr>
<td>47</td>
<td>Knowledge and Understanding of sampling plans</td>
<td>10</td>
<td>W</td>
<td>AC 7108/2; MIL-STD-867</td>
</tr>
<tr>
<td>48</td>
<td>Understanding of defects, their causes and their appearance after etching</td>
<td>7</td>
<td>W/P</td>
<td>AC 7108/2; MIL-STD-867</td>
</tr>
<tr>
<td>49</td>
<td>Knowledge and Understanding to create and sign off Process Technique Sheets and Data Cards</td>
<td>7</td>
<td>W</td>
<td>AC 7108/2</td>
</tr>
<tr>
<td>50</td>
<td>Knowledge and Understanding of the significance of indications and etched appearance</td>
<td>7</td>
<td>W</td>
<td>AC 7108/2; MIL-STD-867</td>
</tr>
<tr>
<td>51</td>
<td><strong>BLUE ETCH ANODIZE AND ELECTROLYTIC (ANODIC) ETCHING:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>Accept / Reject Criteria – Uniform color and appearance, segregation, laps, folds, cracks, inclusions, arc outs, pitted areas, inconclusive macrostructure, microstructure evaluation</td>
<td>10</td>
<td>W</td>
<td>SAE AMS 2642</td>
</tr>
<tr>
<td>53</td>
<td>Thorough understanding of the Blue Etch Anodize or Anodic Etch processes used</td>
<td>10</td>
<td>W</td>
<td>SAE AMS 2642; AC 7108/2</td>
</tr>
<tr>
<td>54</td>
<td>Acid salt immersion time and required stock removal</td>
<td>10</td>
<td>W</td>
<td>SAE AMS 2642</td>
</tr>
<tr>
<td>55</td>
<td>Anodize rectifier parameters: voltage, amperage, time, ramp rate</td>
<td>10</td>
<td>W</td>
<td>SAE AMS 2642; AC 7108/2</td>
</tr>
<tr>
<td>56</td>
<td>Thorough understanding of the significance of rack construction and size, location and cleanliness of contact points</td>
<td>10</td>
<td>W</td>
<td>SAE AMS 2642; AC 7108/2</td>
</tr>
<tr>
<td>57</td>
<td>Back strip immersion time and acceptable color range</td>
<td>10</td>
<td>W</td>
<td>SAE AMS 2642</td>
</tr>
<tr>
<td>58</td>
<td>Thorough understanding of handling and processing Titanium</td>
<td>10</td>
<td>W</td>
<td>AC 7108</td>
</tr>
<tr>
<td>59</td>
<td>Understanding of defects, their causes and their appearance after BEA or anodic etching</td>
<td>7</td>
<td>W/P</td>
<td>SAE AMS 2642; AC7108/2</td>
</tr>
<tr>
<td>60</td>
<td>Knowledge and Understanding to create and sign off Process Technique Sheets and Data Cards</td>
<td>7</td>
<td>W</td>
<td>AC 7108/2</td>
</tr>
<tr>
<td>61</td>
<td>Knowledge and Understanding of the significance of indications and etched appearance</td>
<td>7</td>
<td>W</td>
<td>SAE AMS 2642; AC7108/2</td>
</tr>
<tr>
<td>62</td>
<td><strong>MACROSTRUCTURE ETCH:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>Accept / Reject Criteria</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2, ASTM 340; ASTM A 646</td>
</tr>
<tr>
<td>64</td>
<td>Thorough understanding of the Macrostructure Etch process</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2, ASTM A 646; ASTM E 340</td>
</tr>
<tr>
<td>65</td>
<td>Wet inspection and temporary marking</td>
<td>10</td>
<td>W</td>
<td>General Industry</td>
</tr>
<tr>
<td>66</td>
<td>Rinsing restrictions after etching and before de-smutting</td>
<td>10</td>
<td>W</td>
<td>General Industry</td>
</tr>
<tr>
<td>67</td>
<td>Definition of a detectable and rejectable indications</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2, ASTM 340; ASTM A 646</td>
</tr>
<tr>
<td>68</td>
<td>Understand Local Swab Etch Process</td>
<td>10</td>
<td>W</td>
<td>General Industry; AC 7108/2</td>
</tr>
<tr>
<td>69</td>
<td>Understanding of Metallographic structure (grains, boundaries, phases etc.)</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2, ASTM 340</td>
</tr>
<tr>
<td>70</td>
<td>Understanding of defects, their causes and their appearance after etching</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2; ASTM A 646; ASTM E 340</td>
</tr>
<tr>
<td>71</td>
<td>Understanding of defects, their causes and their appearance after etching</td>
<td>10</td>
<td>W</td>
<td>General Industry; AC 7108/2; ASTM A 646; ASTM E 340</td>
</tr>
<tr>
<td>72</td>
<td>Understand the use of classification charts</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2; ASTM A 646; ASTM E 340</td>
</tr>
<tr>
<td>73</td>
<td>Knowledge and Understanding of etch solutions and processes and the appropriate selection of etch processes</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2; ASTM A 646; ASTM E 340</td>
</tr>
<tr>
<td>74</td>
<td>Knowledge and Understanding to create and sign off Process Technique Sheets and Data Cards</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2; ASTM A 646; ASTM E 340</td>
</tr>
<tr>
<td>75</td>
<td>Knowledge and Understanding of the significance of etched appearance</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/2; ASTM A 646; ASTM E 340</td>
</tr>
<tr>
<td>76</td>
<td><strong>PRE-PENETRANT ETCH:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>Determine an acceptable etch is presented to NDT</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/15</td>
</tr>
<tr>
<td>78</td>
<td>Understand Qualified Materials for etch process</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/15</td>
</tr>
<tr>
<td>79</td>
<td>Thorough understanding of the Pre-Penetrant Etch process</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/15</td>
</tr>
<tr>
<td>80</td>
<td>Understands the effects of the etch processes</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/15</td>
</tr>
<tr>
<td>81</td>
<td>Understands visual appearance results of the etch process</td>
<td>10</td>
<td>W/P</td>
<td>General Industry: AC 7108/15</td>
</tr>
<tr>
<td>82</td>
<td>Understands proper handling of solutions and parts</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/15</td>
</tr>
<tr>
<td>83</td>
<td>Understand Local Swab Etch Process</td>
<td>10</td>
<td>W</td>
<td>General Industry: AC 7108/15</td>
</tr>
<tr>
<td>84</td>
<td>Understands the effects of etch rate on different alloys</td>
<td>10</td>
<td>W</td>
<td>General Industry; ASTM E 1417</td>
</tr>
<tr>
<td>SKILLS:</td>
<td>Defined within these rolls describes the range of skills. The skills required to perform a particular special process task</td>
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<tr>
<td>85</td>
<td>READ AND UNDERSTAND WRITTEN INSTRUCTIONS:</td>
<td></td>
<td></td>
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<tr>
<td>86</td>
<td>Ability to understand specification requirements and customer flow-down requirements</td>
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<tr>
<td>87</td>
<td>Apply Inspection Techniques appropriately</td>
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<tr>
<td>88</td>
<td>Verify and validate the accuracy of the results</td>
<td></td>
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<tr>
<td>89</td>
<td>Property document nonconformance’s</td>
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<tr>
<td>90</td>
<td>Apply technical knowledge in a skillful way in solving problems</td>
<td></td>
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<tr>
<td>91</td>
<td>Familiar with the scope and limitations of the method.</td>
<td></td>
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<tr>
<td>92</td>
<td>Use appropriate equipment for inspection of process</td>
<td></td>
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<tr>
<td>93</td>
<td>Ability to follow instructions</td>
<td></td>
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<tr>
<td>94</td>
<td>Ability to write Work Instructions and procedures</td>
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<tr>
<td>95</td>
<td>Interpretation of an acceptable etch process</td>
<td></td>
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<tr>
<td>96</td>
<td>Must be able to read drawings and specification</td>
<td></td>
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<tr>
<td>97</td>
<td>Must be able to interpret specification requirements</td>
<td></td>
<td></td>
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<tr>
<td>98</td>
<td>Must be able to set up operations (equipment, levels, timer and temperature)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>including alternate procedures as appropriate</td>
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<tr>
<td>99</td>
<td>Must be able to understand and interpret shop traveler</td>
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<tr>
<td>100</td>
<td>Understand Mass Loss</td>
<td></td>
<td></td>
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<tr>
<td>101</td>
<td>Ability to identify training needs and plan their correction</td>
<td></td>
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<tr>
<td>102</td>
<td>Ability to identify strengths and weaknesses in the personnel that report to them</td>
<td></td>
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<tr>
<td>103</td>
<td>Has an appropriate understanding of where this process falls in the sequence of events.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PERSONAL ATTRIBUTES:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are statements that will enable judgment of the person's personal attributes</td>
</tr>
<tr>
<td>104</td>
</tr>
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<td>105</td>
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<td>106</td>
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<td>107</td>
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<td>111</td>
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<td>112</td>
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<td>113</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>EXPERIENCE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are the minimum experience requirements expected to demonstrate their competence.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EDUCATION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>115</td>
</tr>
<tr>
<td>116</td>
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<tr>
<td>117</td>
</tr>
<tr>
<td>118</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRAINING / HANDS-ON EXPERIENCE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete on the job training (Minimum # of hours required)</td>
</tr>
<tr>
<td>Level 2</td>
</tr>
<tr>
<td>PT - Level 1 + 270 hours = 400 hours, total</td>
</tr>
<tr>
<td>MT - Level 1 + 400 hours = 530 hours, total</td>
</tr>
<tr>
<td>RT/UT/ET - Level 1 + 1200 hours = 1600 hours, total</td>
</tr>
<tr>
<td>Experience and understanding of the potential hazards / damage that the process can cause to parts</td>
</tr>
<tr>
<td>Training must include Practical Examination according to Industry requirements</td>
</tr>
<tr>
<td>Tempr Etch Inspection shall pass a physical, written and practical test.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NON-SPECIAL PROCESS RELATED REQUIREMENTS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defined within these rolls are other general or pre-requisite needed</td>
</tr>
<tr>
<td>Capability to lift up to 30 lbs. (e.g. up to 14 kg)</td>
</tr>
<tr>
<td>Capability to deal with repetitive bending and stooping</td>
</tr>
<tr>
<td>General understanding of Quality Systems AS/EN/JISQ 9100 or equivalent</td>
</tr>
</tbody>
</table>
130 Vision Examination Pre-requisite:
Jaeger No. 2 or equivalent, not less than 30 cm/12 inches in at least one eye, natural or corrected 10 P NAS410

131 Color Perception:
Must be able to adequately distinguish and differentiate between the colors used in the method process involved. 10 P NAS410

132 SAFETY & ENVIRONMENTAL REQUIREMENTS:

133 Knowledge and understanding of safety and handling of hazardous materials, chemicals, etc. including safe storage, interpretation of Health & Safety Data Sheets and Regulatory Requirements 7 W Environmental laws and regulations

134 Understand Safety Data Sheets (SDS) and Personal Protective Equipment (PPE) Requirements: When and How to use appropriate personal protective equipment (PPE) (goggles, gloves, rubber boots, aprons, etc.) 10 W Occupational Safety and Health Administration (OSHA)

135 Ability to prepare and administer appropriate safety and environmental procedures and controls 7 W Occupational Safety and Health Administration (OSHA)

7. DOCUMENT REVISION HISTORY

<table>
<thead>
<tr>
<th>REVISION DATE</th>
<th>SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 November 14</td>
<td>Editorial change made to formatting and to add sequencing</td>
</tr>
<tr>
<td>3 June 16</td>
<td>Editorial change made to update BoK with new template revisions</td>
</tr>
<tr>
<td>6 March 17</td>
<td>Updated reference paragraphs for AC7108 and AC7108/2 in reference columns – all line items Added document NAS410 to Addendum 1 Added document AS9100 to Addendum 1 Change Anodic Etch to Electrolytic Etch – all line items</td>
</tr>
<tr>
<td>31 October 2018</td>
<td>Editorial change made to formatting and to update eQualified logo</td>
</tr>
<tr>
<td>3 December 2019</td>
<td>Editorial revision to update program name from eQualified to PRI QualificationSM.</td>
</tr>
</tbody>
</table>
ADDENDUM 1

LIST OF INTERNATIONAL STANDARDS & REFERENCE DOCUMENTS FOR CHEMICAL PROCESSING / ETCH

<table>
<thead>
<tr>
<th>SPECIAL PROCESS</th>
<th>DOCUMENT TITLE</th>
<th>DOCUMENT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Process</td>
<td>Audit Criteria for Chemical Processes</td>
<td>AC 7108</td>
</tr>
<tr>
<td>Chemical Process/Etch</td>
<td>Audit Criteria for Pre-Penetrant Etch</td>
<td>AC 7108/15</td>
</tr>
<tr>
<td>Chemical Process/Etch</td>
<td>Audit Criteria for Etch Inspection Processes (Anodic, Blue Etch Anodize, Macrostructure, Nital/Temper) Appendix A, B, C, D</td>
<td>AC7108/2</td>
</tr>
<tr>
<td>NDT</td>
<td>Etch Inspection of High Strength Steel Parts</td>
<td>AMS 2649C</td>
</tr>
<tr>
<td>NDT</td>
<td>Pyrometry</td>
<td>AMS 2750</td>
</tr>
<tr>
<td>Quality</td>
<td>Quality Management Systems – Requirements for Aviation, Space and Defense Organizations</td>
<td>AS9100</td>
</tr>
<tr>
<td>Macrostructure Etch</td>
<td>Standard Specification for Premium Quality Alloy Steel Blooms and Billets for Aircraft and Aerospace Forgings</td>
<td>ASTM A 646</td>
</tr>
<tr>
<td>Chemical Process</td>
<td>Standard Methods of Analysis of Sulfochromate Etch Solution Used in Surface Preparation of Aluminum</td>
<td>ASTM D2674</td>
</tr>
<tr>
<td>Chemical Process</td>
<td>Liquid Penetrant Testing</td>
<td>ASTM E 1417</td>
</tr>
<tr>
<td>Macroetch</td>
<td>Standard Practice for Macroetching Metals and Alloys</td>
<td>ASTM E 340</td>
</tr>
<tr>
<td>Etch Inspection</td>
<td>Method for the Etch Inspection of Metallic Material and Components</td>
<td>BSI SS M 37</td>
</tr>
<tr>
<td>Etch Inspection</td>
<td>Acid Etch Inspection for Steel Parts</td>
<td>HB7717</td>
</tr>
<tr>
<td>NDT</td>
<td>Nital Etch</td>
<td>MIL-STD-867</td>
</tr>
<tr>
<td>Chemical Process</td>
<td>Temper Etch Inspection</td>
<td>MIL-STD-867 C</td>
</tr>
<tr>
<td>NDT</td>
<td>NAS CERTIFICATION &amp; QUALIFICATION OF NONDESTRUCTIVE TEST PERSONNEL</td>
<td>NAS410</td>
</tr>
<tr>
<td>Etch Inspection</td>
<td>Structural Examination of Titanium Alloys Etch-Anodize Inspection Procedure</td>
<td>SAE AMS2642D</td>
</tr>
<tr>
<td>Etch Inspection</td>
<td>Structural Examinations of Titanium Alloys Chemical Etch Inspection Procedure</td>
<td>SAE AMS2643E</td>
</tr>
<tr>
<td>Etch Inspection</td>
<td>Qualification &amp; Certification of Etch Inspector</td>
<td>SAE ARP 1923 A</td>
</tr>
</tbody>
</table>
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](http://www.echa.europa.eu/web/guest/candidate-list-table)