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Program Document CPBOK

PD 6103

CPBoK-008/OP-1 REV. (N/A)

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BODY OF KNOWLEDGE:

ROLE DESCRIPTION: PAINT OPERATOR
SPECIAL PROCESS: CHEMICAL PROCESSING
SCOPE: PAINT
METHOD: PAINTING AND APPLICATION OF DRY FILM LUBRICANT
LEVEL: OPERATOR

All eQualified examinations are created using the applicable eQualified 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 eQualified BoKs are created by subject matter experts through an exhaustive job analysis process as detailed in the eQualified Program Document 6100: Industry Managed Special Process Bodies of Knowledge. All eQualified BoKs are updated periodically according to the requirements of the current eQualified PD6100 document to ensure they are consistent with current industry practice.

1. INTRODUCTION

This document has been created by the eQualified Chemical Processing Body of Knowledge Review Board (CPBoKRB) according to the requirements of eQualified Program Document PD6100 Industry Managed Special Process Bodies of Knowledge.

This document constitutes the eQualified BoK for Chemical Processing, Painting and Application of Dry Film Lubricants for the Operator 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 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 eQualified examination candidate preparation
- Chemical Processing Examination Review Board (CP-ERB) for the development of eQualified examinations
- Candidates taking eQualified examinations who wish to prepare in advance

2. REFERENCES

eQualified documents:

PD6000 Governance & Administration of eQualified Program

PD6100	Industry Managed Special Process Bodies of Knowledge
PD6200	Industry Managed Special Process Examinations System
IAQG	International Aerospace Quality Group

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 eQualified 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, 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 eQualified examination candidates are recommended to read all documents referenced in section 2 of this document.

As stated in eQualified PD6200, every eQualified 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 eQualified approved providers can be found at www.eQualified.com)

5. LEVELS

	Level		
Descriptors	Operator (OP) <i>Understand and perform the hands-on operations of the special process for which qualification is sought.</i>	Planner (PL) <i>Capable of selecting manufacturing processes and interpreting process procedures to conform to customer specification and requirements.</i> <i>Capable of problem solving and resolving day to day issues.</i>	Owner (OW) <i>Capable of writing, reviewing and approving processes, procedures and qualifications of Operators and Planners. Capable of designing new processes and resolving issues among other levels.</i>
Paint Process Specific Criteria	No additional criteria for the Painting process.	No additional criteria for the Painting process	No additional criteria for the Painting process
Technical Knowledge	Basic knowledge of the Painting process and application of Dry Film Lubricants, its main processes, methods and tools.	Good level of knowledge in all aspects of the Painting process and application of Dry Film Lubricants, 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 Painting process and application of Dry Film Lubricants, 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.
Experience	Sufficient experience to deal with recurrent activity.	Has enough experience to deal with unforeseen issues.	Wide proven experience of the subject. Is recognized as a specialist within the special process.
Personal Attributes	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.		
Skills	Describes the activities necessary to perform each level of job function to comply with the Body of Knowledge		
Non-Special Process Related Requirements	Health & Safety, Environmental, Quality System Requirements.		

Special Process Bodies of Knowledge Review Boards must complete Table 1 to form the BoK

TABLE 1

ROLE DESCRIPTION: Painting Operator

SPECIAL PROCESS: Chemical Processing

SCOPE / METHOD: Painting and Application of Dry Film Lubricant

REFERENCE GUIDELINES: Addendum 1 is a list of the International Standards applicable to Painting processes.

Row #	COMPETENCE	Level (e.g. OP, PL, OW, T1)	Weight (1,3,7,10)	Exam Type Gen/Specific /Practical	Reference Guidelines
	KNOWLEDGE: The basic knowledge of the special processes, methods and tools				
	GENERAL KNOWLEDGE:				
1.	Understand how to determine if there has been damage to the part surface.	OP	7	GEN	AC 7108: 4.4
2.	Full and complete understanding of Internal Work instructions	OP	7	GEN	AC 7108: 3.3.2
3.	Know how to access customer specifications and requirements (i.e. where to find them).	OP	1	GEN	AC 7108: 3.2
4.	Understand how to interpret customer specification and requirements in the context of performing the Paint process.	OP	1	GEN	General Industry
5.	Understand Industry Standards	OP	3	GEN	
6.	Knowledge and understanding of the accept/reject criteria for Paint / Dry Film, including thickness, adhesion and cure.	OP	3	GEN	AC 7108: 4.4
7.	Knowledge of the Surface Preparation procedures	OP	10	GEN	General Industry
8.	Have an awareness of the basic control and calibration requirements for equipment.	OP	7	GEN	General Industry
9.	Know how to perform any cleanliness requirements for paint booth.	OP	10	GEN	AC 7108/1: 3.2
10.	Knowledge and understanding of mathematics, including decimal and fractions	OP	3	GEN	General Industry
11.	Know how to use precision measuring instruments and equipment	OP	7	GEN	General Industry
12.	Know and understand job documentation including awareness of fixed and frozen process requirements.	OP	7	GEN	General Industry
13.	Know and understand the significance of delays between surface preparation and painting operations.	OP	10	GEN	AC 7108/1: 3.4
14.	Have an awareness of surface preparation prior to painting including general cleaning, mechanical cleaning and chemical cleaning prior to painting.	OP	3	GEN	AC 7108: 3.8, 5.6 – 5.8
15.	Know and understand the importance of cleanliness of the work area.	OP	10	GEN	General Industry
16.	Understand the importance of temperature control for paint storage and the need for the paint to be at the correct temperature before mixing or spraying.	OP	7	GEN	General Industry
17.	Know and understand how to mix, measure viscosity of paints and proper use of Zahn cup.	OP	10	GEN	AC 7108:3.8
18.	Know and understand how paint is cured and how to adjust the curing condition to match the paint.	OP	7	GEN	General Industry
19.	Know and understand key paint test procedures such as airline cleanliness, visual, thickness, adhesion & cure etc.	OP	7	GEN	General Industry
20.	Know and understand the importance of part set-up and masking. Especially matching masking materials to curing conditions and the need to remove inappropriate material and residues before curing.	OP	10	GEN	General Industry
21.	Knowledge and understand about the selection of appropriate equipment for use in the painting process.	OP	7	GEN	General Industry
22.	Understand the need for pre-process checks (such as calibration status and environmental conditions).	OP	10	GEN	AC 7108: 3.10
23.	Understand the mechanics and importance of allowing Carriers (Solvents/Water) to flash off between coats and before curing,	OP	10	GEN	General Industry
24.	Thoroughly understand the painting process and an awareness of the different types of paints.	OP	7	GEN	General Industry
25.	Have an awareness of the effects on painting of various pre-treatments such as blasting, chemical conversion coating anodizing, previous painting etc. on the paint application process.	OP	3	GEN	General Industry
26.	Have an awareness of the curing including infrared and thermal curing, and the potential impact of the curing cycle on temperature sensitive substrates such as	OP	3	GEN	General Industry

	composites and some aluminum alloys.				
27.	Have an awareness of the effect of temperature and humidity on painting and curing.	OP	7	GEN	AC7108/1: 3.20
28.	Understand the importance and the need for keeping paint records.	OP	10	GEN	AC7108/1: 3.11, 3-13, 3.14, 3.15
29.	Knowledge and ability to write and review internal procedures and practices.	N/A	1	GEN	General Industry
30.	Know how to recognize unsafe and/or inappropriate work practices.	OP	7	GEN	General Industry
31.	Understand how to deal with incorrect or inappropriate painting.	OP	3	GEN	General Industry
32.	Know and understand how to review and take action on paint test result data.	N/A	1	GEN	General Industry
33.	General knowledge and understanding of all the painting processes including the general concepts of color and gloss.	OP	3	GEN	General Industry
	ONE PACK/PART PAINTING (paints that can be used as supplied or with addition of a thinner only)				
34.	Know uses, features and applications for this type of paint.	OP	3	GEN	General Industry
35.	Understand the limitations for this type of paint.	OP	3	GEN	General Industry
36.	Understand the technical data sheets for this type of paint.	OP	7	GEN	General Industry
37.	Understand the mixing requirements for this type of paint.	OP	10	GEN	General Industry
38.	Understand the curing requirements for this type of paint.	OP	10	GEN	General Industry
39.	Understand the application requirements for this type of paint.	OP	10	GEN	General Industry
40.	Have an awareness of the potential impact of high curing cycles on temperature sensitive substrates.	OP	3	GEN	General Industry
41.	Have an awareness of the required PPE.	OP	7	GEN	General Industry
	MULTI-PACK/PART PAINTING (Paints made by mixing two or more constituents such as base & hardening or curing agents)				
42.	Know uses, features and applications for this type of paint.	OP	3	GEN	General Industry
43.	Have an awareness of the limitations for this type of paint.	OP	3	GEN	General Industry
44.	Understand the technical data sheets for this type of paint.	OP	7	GEN	General Industry
45.	Understand the mixing requirements for this type of paint including the pigmented constituent and using the correct catalysts and mixing ratios	OP	10	GEN	General Industry
46.	Understand the curing requirements for this type of paint	OP	10	GEN	General Industry
47.	Understand the application requirements for this type of paint	OP	10	GEN	General Industry
48.	Understand the significance of multipack paints including induction times, pot life and using the correct components.	OP	10	GEN	General Industry
49.	Knowledge of the difference between manufacture's shelf life and open tin shelf life.	OP	10	GEN	General Industry
50.	Have an awareness of the required PPE.	OP	7	GEN	General Industry
	PRIMER APPLICATION				
51.	Know the uses, features and applications for this type of paint.	OP	3	GEN	General Industry
52.	Know and understand the limitations for this type of paint.	OP	3	GEN	General Industry
53.	Know and understand the difference between primer types such as bond primers, wash primers and normal primers and the differences in their storage, mixing and application.	OP	3	GEN	General Industry
54.	Understand the need for and reactivation of old primed substrates	OP	10	GEN	General Industry
55.	Understand the mixing requirements for this type of Paint including the pigmented constituent and using the correct ratios	OP	10	GEN	General Industry
56.	Understand the curing requirements for this type of Paint	OP	10	GEN	General Industry
57.	Understand the application requirements for this type of Paint	OP	10	GEN	General Industry
58.	Have an awareness of the environmental, worker safety and health concerns associated with these types of Paint.	OP	7	GEN	General Industry

TOP COAT PAINT APPLICATION					
59.	Know the uses, features and applications for this type of paint.	OP	3	GEN	General Industry
60.	Know and understand the limitations for this type of Paint.	OP	3	GEN	General Industry
61.	Understand the need for and reactivation of old primed substrates	OP	7	GEN	General Industry
62.	Have an awareness of the need to know paint thickness of primer in order to measure that of the Topcoat.	OP	7	GEN	General Industry
63.	Know and understand the impact of spraying and curing conditions on the final appearance of Topcoat Paints.	OP	7	GEN	General Industry
64.	Have an awareness of the importance of color and gloss to topcoat painting.	OP	3	GEN	General Industry
65.	Understand the mixing requirements for this type of Paint including the pigmented constituent and using the correct catalysts and mixing ratios	OP	10	GEN	General Industry
66.	Understand the curing requirements for this type of Paint	OP	10	GEN	General Industry
67.	Understand the application requirements for this type of Paint	OP	10	GEN	General Industry
68.	Have an awareness of the environmental, worker safety and health concerns associated with these types of Paint.	OP	3	GEN	General Industry
DRY FILM LUBRICANT APPLICATION					
69.	Understand "Accept & Reject" Criteria.	OP	7	GEN	General Industry
70.	Know the uses, features and applications for this type of coating.	OP	3	GEN	General Industry
71.	Know and understand the limitations for this type of coating.	OP	3	GEN	General Industry
72.	Understand the build-up of thicker films.	OP	7	GEN	General Industry
73.	Understand the mixing requirements for this type of coating	OP	10	GEN	General Industry
74.	Understand the curing requirements for this type of coating	OP	10	GEN	General Industry
75.	Understand the application requirements for this type of coating	OP	10	GEN	General Industry
76.	Have an awareness of the local regulations environmental, worker safety and health concerns associated with these types of coating.	OP	3	GEN	General Industry
77.	Knowledge of proper cleaning of paint guns, hoses and other equipment	OP		GEN	General Industry
78.	Knowledge of proper painting techniques: Spray Application: Mixing of bases and curing solutions for primers and paints; Measuring of paint viscosity; Water-break free testing; Identification of improper and/or unacceptable finish application	OP		GEN	General Industry
79.	Knowledge and ability to perform thickness and dry/wet tape adhesion tests.	OP		GEN	General Industry
80.	Knowledge and ability to prepare composite surfaces for paint application.	OP		GEN	General Industry
81.	Knowledge of temperature limitations for accelerated cures.	OP		GEN	General Industry
82.	Knowledge of paint stripping and removal for rework purposes.	OP		GEN	General Industry
83.	Knowledge in monitoring pot life, storage life and work life of paints, primers and accelerators.	OP		GEN	General Industry
	SKILLS: Defined within these rolls describes the range of skills. The skills required to perform a particular special process task				
84.	READ AND UNDERSTAND WRITTEN INSTRUCTIONS:	OP	10	GEN	General Industry
85.	Apply Painting techniques appropriately	OP	10	GEN	General Industry
86.	Verify and validate the Painted results.	OP	3	GEN	General Industry
87.	Properly report non-conformance's	OP	10	GEN	General Industry
88.	Use of appropriate equipment for the Painting process.	OP	10	GEN	General Industry
89.	Ability to follow instructions	OP	10	GEN	General Industry
90.	Interpretation of an acceptable Painting process	OP	3	GEN	General Industry
91.	Must be able to set-up operations (equipment e.g. gravity test guns, viscosity,	OP	3	GEN	General

	timers & temperatures) including alternate procedures as appropriate				Industry
92.	Must be able to understand and interpret shop travelers	OP	7	GEN	General Industry
Sequencing					
93.	Has an appropriate understanding of where this process falls in the sequence of events.	OP	10	GEN	General Industry
PERSONAL ATTRIBUTES:					
Are statements that will enable judgment of the person's personal attributes					
94.	Be able to work independently with a minimum of supervision	OP	3	GEN	General Industry
95.	Must have a high degree of integrity	OP	10	GEN	General Industry
96.	Be attentive to details	OP	10	GEN	General Industry
97.	Be flexible	OP	3	GEN	General Industry
98.	Tolerate stress	OP	7	GEN	General Industry
99.	Exhibit conflict resolution	OP	3	GEN	General Industry
100.	Decision making ability	OP	3	GEN	General Industry
101.	Team Worker	OP	10	GEN	General Industry
102.	Ethical Behavior	OP	10	GEN	General Industry
EXPERIENCE:					
Are the minimum experience requirement expected to demonstrate their competence.					
EDUCATION:					
103.	High School Diploma or GED or Secondary Education	OP	7	GEN	General Industry
104.	Apprenticeship	OP	3	GEN	General Industry
105.	Industry Training or Courses	OP	3	GEN	General Industry
TRAINING / HANDS-ON-EXPERIENCE:					
Complete on the job training: Minimum number of hours-					
106.	OPERATOR – 160 Hours	OP	10	GEN	General Industry
NON-SPECIAL PROCESS RELATED REQUIREMENTS:					
Defined within these roles are other general or pre-requisite needed					
107.	Capability to lift up to 30 lbs. (e.g. up to 14 kg)	OP	7	GEN	General Industry
108.	Able to deal with repetitive bending and stooping	OP	10	GEN	General Industry
SAFETY & ENVIRONMENTAL REQUIREMENTS:					
109.	Knowledge and understanding of safety and handling and disposal of hazardous material, paints, etc. including safe storage, interpretation of Health & Safety Data Sheets and Regulatory Requirements	OP	10	GEN	General Industry
110.	Understand Safety Data Sheets (SDS) and Personal Protective Equipment Requirements: When and how to use appropriate personal protective equipment (masks, respirators, gloves, aprons, etc.)	OP	10	GEN	General Industry
111.	Understand which personal protective equipment to use, when and why	OP	10	GEN	General Industry
112.	Understand the safe storage, shelf life and mixing of paints, solvents and chemicals	OP	10	GEN	General Industry
113.	Ability to recognize symbols associated with paint related products and their usage	OP	10	GEN	General Industry
114.	General understanding of Quality System, AS/EN/JISQ 9100 or AC7004 or equivalent	OP			

ADDENDUM 1

LIST OF INTERNATIONAL STANDARDS FOR (SPECIAL PROCESS)

SPECIAL PROCESS	DOCUMENT TITLE	DOCUMENT NUMBER
Chemical Process	Standard Terminology for Paint, Related Coatings, Materials, and Applications	ASTM D16
Chemical Process	Standard Test Methods for Measuring Adhesion by Tape Test	ASTM D3359
Chemical Process	Standard Test Method for Measurement of Dry Film Thickness	ASTM-D-5796
Chemical Process/Paint	Standard Practice for Thickness of Paint	ASTM-D-8023
Chemical Process	Coating, Wash Primer (Pretreatment) for Metals, Application of (For Aeronautical Use)	MIL-C-8507
Chemical Process	Finishes, Organic, Weapons Systems, Application and Control of	MIL-DTL-18264
Chemical Process/Paint	PAINT, EPOXY-POLYAMIDE, GENERAL SPECIFICATION FOR	MIL-DTL-24441D
Chemical Process/Finishes	Organic Weapons Systems, Application and Control of	MIL-F-18264
Chemical Process/Primer	Primer Coating, Epoxy – Polyamide Chemical & Solvent Resistance	MIL-P-23377
Chemical Process/Primer	Primer Coating, Epoxy – Polyamide Chemical & Solvent Resistance	MIL-PRF-23377