


APPLICATION		REVISIONS				
NEXT ASSY	USED ON	SYM	DESCRIPTION	CN	DATE	APVD
		--	RELEASED PER CN201464.	----	03/09/18	J. GRUNENBERG

WRITER	J. GRUNENBERG	03/09/18	
CHK	S. MYERS	03/09/18	
ENGR	M. MIKA	11/27/17	
APPROVED			RELEASES AND RESTRAINTS MANUFACTURING QUALITY STANDARD FOR
CONTRACT NO.			
APPROVAL			

THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO CARLETON LIFE SUPPORT SYSTEMS INC. ANY REPRODUCTION, DISCLOSURE, OR USE OF THIS DOCUMENT IS EXPRESSLY PROHIBITED EXCEPT AS CARLETON LIFE SUPPORT SYSTEMS INC. MAY OTHERWISE AGREE IN WRITING.

SIZE	CAGE CODE	
A	99251	ST1637827
REVISION LEVEL	-	SHEET 1 OF 9

1 PURPOSE AND SCOPE

The purpose of this Manufacturing Quality Standard is to define the minimum requirements and acceptable quality for parts and assemblies manufactured by or for Carleton Life Support Systems Inc. (CLSS) when the engineering drawing or applicable documents do not otherwise indicate specific requirements. In case of uncertain or conflicting requirements, the Engineering Department of CLSS shall be consulted for interpretation or drawing revision before proceeding with any manufacture. In cases where this standard is more restrictive than the applicable government or military specifications, the requirements of this document shall prevail. CLSS, as used herein, refers to Carleton Life Support Systems Inc. doing business as Cobham Mission Systems.

2 APPLICABLE DOCUMENTS

The following documents form a part of this standard to the extent specified herein. Unless otherwise indicated, the issue in effect on the date of invitation for bid or request for proposals shall apply. When a specific document issue is indicated below, references to the document in subsequent sections of this standard shall consist of the basic document number without repetition of the pertinent issue designations.

2.1 Government documents.

SPECIFICATIONS

Military

FED-STD-H28 Screw-Thread Standards for Federal Services

MIL-A-8625 Anodic Coatings for Aluminum and Aluminum Alloys

2.2 Non-Government documents.

STANDARDS

American Society of Mechanical Engineers (ASME)

ASME B46.1 Surface Texture

ASME Y14.5 Dimensions and Tolerancing for Engineering Drawings

IPC

IPC J-STD-001 Requirements for Soldered Electrical and Electronic Assemblies

THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO CARLETON LIFE SUPPORT SYSTEMS INC. ANY REPRODUCTION, DISCLOSURE, OR USE OF THIS DOCUMENT IS EXPRESSLY PROHIBITED EXCEPT AS CARLETON LIFE SUPPORT SYSTEMS INC. MAY OTHERWISE AGREE IN WRITING.

SIZE A	CAGE CODE 99251	ST1637827
REVISION LEVEL -		SHEET 2

OTHER PUBLICATIONS

CLSS

PD1634800	Sewing Quality Guide for Restraints, Procedure for
QSP-7.4.2.2.1	Supplemental Purchase Order Conditions Manual
QSP-830	Control of Non-Conforming Material
SCSP-741.02.01	Supplier Deviation Request Form
ST1637815	Engineering Change Notice, Configuration Control Standard
ST1637819	Electrostatic Discharge Sensitivity, Standard For
ST1637822	Printed Circuit Boards, Manufacturing and Storage Standard For

SAE, International

AS 8879	Screw Threads, Controlled Radius Root with Increased Minor Diameter, General Specification for
---------	--

(Copies of specifications, standards, drawings, and publications required by suppliers should be obtained by the supplier, except CLSS-controlled documents, which will be furnished by CLSS. If a supplier is unable to obtain any document listed herein, he should immediately contact CLSS for assistance.)

3 DEFINITIONS

3.1 Finished surfaces. A finished surface is a surface produced by bringing a tool in contact with a workpiece and then moving or removing material on the workpiece by motion either of the workpiece or the tool or both. All surfaces shown on drawings will be considered as finished surfaces unless evidence to the contrary is contained on the drawing; e.g., by specification or reference to a process or by symbols which differentiate finished and unfinished surfaces.

When the drawing does not require a specific process, any method of manufacture may be used that will produce a product that meets the requirements of the drawing and this document.

3.2 Arithmetic average (Ra). The definition of arithmetic average (Ra) in paragraph 1.4.1.1 of ASME B46.1M, or paragraph 3.8.1 of ASME B46.1 shall apply, as applicable.

3.3 Drawing format tolerance standards. These are the tolerance standards, which are listed on drawings as a part of the preprinted format.

3.4 General dimensioning. All definitions listed in ASME Y14.5M issue noted on the face of the drawing, apply to this document.

4 GENERAL REQUIREMENTS

4.1 Temperature. All dimensions and tolerance stated herein apply at 68 ± 8 °F. Measurements can be made at other temperatures if proper compensation is made for differences in temperature of the part and measuring tools.

THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO CARLETON LIFE SUPPORT SYSTEMS INC. ANY REPRODUCTION, DISCLOSURE, OR USE OF THIS DOCUMENT IS EXPRESSLY PROHIBITED EXCEPT AS CARLETON LIFE SUPPORT SYSTEMS INC. MAY OTHERWISE AGREE IN WRITING.

SIZE A	CAGE CODE 99251	ST1637827
REVISION LEVEL -		SHEET 3

4.2 Reference dimensions. Drawing dimensions and notes identified as "reference" (REF) are intended as information for processing and manufacturing and do not require verification for acceptance of the part or assembly.

4.3 Sewing quality. Sewn harnesses and parachute releases shall comply with PD1634800.

5 DETAILED REQUIREMENTS

5.1 Surface roughness quality. Unless otherwise specified on the engineering drawing, surface roughness is related to size tolerances according to the following table:

<u>Size Tolerance</u>	<u>Maximum Surface Roughness in Microinches Ra</u>
To and including 0.001 in.	32
Greater than 0.001 in., but not greater than 0.002 in.	63
Greater than 0.002 in. on any machined surface	125

For size tolerances over 0.002 in. on surfaces not produced by machining, the roughness produced by the process is satisfactory.

5.1.1 Surface roughness of transitions. The surface roughness of areas of transition such as fillets, chamfers, etc., shall conform to the roughest adjacent area.

5.1.2 Roughness word descriptions.

5.1.2.1 Burnish. Where the note "burnish" is shown, the surface must be produced by a burnishing process and have a surface roughness of 8 Ra (microinches) maximum.

5.1.2.2 Smooth finish. This requires a maximum surface roughness of 16 Ra (microinches). The manufacturing process is optional.

5.1.2.3 Polish. Where the word "polish" is specified, the operation or process is optional, but the surface produced must have a surface roughness of 6 Ra (microinches) or better and must be reflective when viewed with the unaided eye.

5.1.2.4 Tumble to polish. This note requires the roughness to be produced by the tumbling process. A surface roughness of 4 Ra (microinches) or better is required.

5.2 Surface coating.

5.2.1 Effect on dimensions and finish. Unless otherwise specified on the engineering drawing, dimensions apply after the application of metallic plating, organic finishes, anodic coatings, or conversion coating except in the following cases:

- A. Drawing dimensions apply prior to the application of solid film lubricants
- B. When paint and/or primer are used and the drawing specifies "dimensions apply before application of the coatings", comply with drawing.

SIZE A	CAGE CODE 99251	ST1637827
REVISION LEVEL	-	SHEET 4

5.2.2 Masking of internal and external threads. Internal and external threads shall not be painted unless specifically required by the drawing.

5.2.3 Anodic coating. The following restrictions apply to all aluminum parts which are anodized per MIL-A-8625 and supersede any conflicting allowances in that document:

NOTE

Section 7 of this document outlines acceptable touchup procedures for anodized parts.

- A. The preferred location for racking is in holes with a tolerance greater than 0.002 in. and no surface finish requirement.
- B. Racking is not permissible on any internal or external surface that has a surface finish callout or a tolerance of 0.002 in. or less.
- C. Racking is not permissible on any exterior surface of parts that are dyed.
- D. Small contact marks from the racks are permissible on the allowable racking surfaces. Scratches created by dragging the part off the rack without removing the contact pressure are not permissible on any surface.

5.3 Parallelism. Unless otherwise specified on the drawing, when a parallelism condition exists between two surfaces less than 12 in. in length, a tolerance of 0.006 in. per linear inch of length will be allowed, not to exceed a total of 0.030 in. or the tolerance of the locating dimension, whichever is less. Surfaces greater than 12 in. in length are required to be produced within the prescribed dimensional boundaries.

5.4 Perpendicularity. Unless otherwise specified on the drawing, when a perpendicular condition exists between two surfaces less than 12 in. in length, a tolerance of 0.006 in. per linear inch will be allowed, not to exceed a total of 0.030 in. or the tolerance of the locating dimension, whichever is less. Surfaces greater than 12 in. in length are required to be produced within the prescribed dimensional boundaries.

5.5 Flatness. Unless otherwise specified on the drawing, all machined flat surfaces less than 12 in. in length (or diameter) must be flat within 0.006 in. per linear inch, not to exceed 0.030 in. total, or the tolerance of the locating dimension, whichever is less. This applies with the part unrestrained. Surfaces greater than 12 in. in length (or diameter) are required to be produced within the prescribed dimensional boundaries.

5.6 True position. Unless otherwise specified on the drawing, all machined circular features shown about a common axis, and not subject to feature position control by the drawing, shall be produced with a mutual true position of not more than 0.010 in., regardless of feature size (RFS).

5.7 Die break. Unless otherwise specified on the drawing, when die break is permitted by the applicable drawing, a maximum of 80 percent of the thickness (T) of the die finished (i.e., sheared or punched) surfaces may exceed the tolerance of the locating or size dimension up to a maximum of 10 percent of the thickness. (See figure 1.)

SIZE A	CAGE CODE 99251	ST1637827
REVISION LEVEL	-	SHEET 5

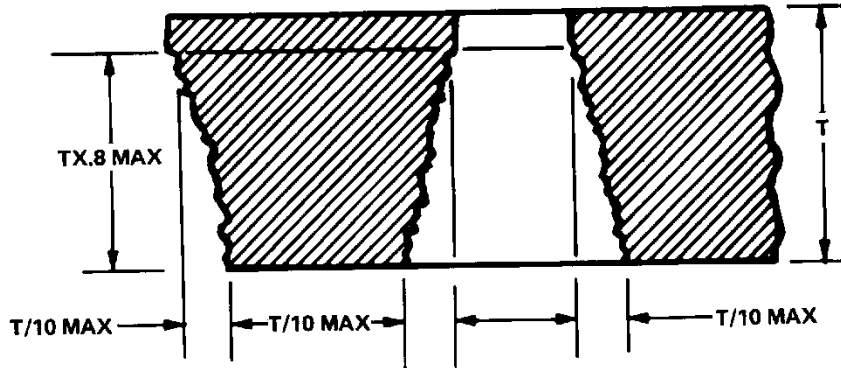


Figure 1. Example of Die Break

5.8 Corner breaks, chamfers, countersinks, and radii.

5.8.1 Chamfers and countersinks. Unless otherwise specified on the drawing, all chamfers and countersinks of less than 0.040 in. width are allowed a tolerance on the angle of ± 5 degrees.

5.8.2 Outside corners. Unless otherwise specified on the drawing, all outside corners must be broken with a chamfer or radius of 0.001 in. minimum to 0.010 in. maximum. On thin flanges, short hubs, shallow counterbores, or other applicable situations, the corner break cannot reduce the length or width of the remaining surface to less than 1/2 of the minimum allowable dimension.

5.8.3 Inside corners. Unless otherwise specified on the drawing, all inside corners shall have a radius of 0.010 in. maximum. On short hubs, shallow counterbores, or other applicable situations, the inside corner radius cannot reduce the length or width of the remaining surface to less than 3/4 of the minimum allowable dimension.

5.9 Hole locations.

5.9.1 Undimensioned centerlines. Unless otherwise specified on the drawing, when a hole is shown on a drawing as located on the intersection of two centerlines, but is dimensioned on only one of the centerlines, the tolerance on the location of the undimensioned centerline shall be the same as the tolerance on the location of the dimensioned centerline.

5.9.2 Bolt circles. Unless otherwise specified on the drawing, when holes are specified as being equally spaced on a bolt circle diameter, the spacing shall be within a true position diameter equal to the total (diametral) tolerance of the bolt circle.

5.10 Threads.

5.10.1 Inspection of threads. Threads may be accepted if all complete threads can enter in or be entered by the "no go" gauge, provided that a definite drag results from metal to metal contact on or before the third turn of entry.

5.10.2 Threads in thin materials. Where material thickness or length will not allow more than four full threads, the "no-go" gauge shall not enter the threads more than 1/3 the total thread length.

THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO CARLETON LIFE SUPPORT SYSTEMS INC. ANY REPRODUCTION, DISCLOSURE, OR USE OF THIS DOCUMENT IS EXPRESSLY PROHIBITED EXCEPT AS CARLETON LIFE SUPPORT SYSTEMS INC. MAY OTHERWISE AGREE IN WRITING.

SIZE A	CAGE CODE 99251	ST1637827
REVISION LEVEL	-	SHEET 6

5.10.3 Inspection of UNF and UNC. Gauging of unified (UNF and UNC) threads shall be accomplished in accordance with FED-STD-H28.

5.10.4 Inspection of UNJ threads. Gauging of unified (UNJ) threads shall be accomplished in accordance with AS 8879.

5.11 Tapped hole chamfers. When a tapped hole must be chamfered and no size is specified, the maximum diameter chamfer shown in the following table shall apply:

Thread size	Maximum Chamfer Diameter (in.)	Thread size	Maximum Chamfer Diameter (in.)
00	0.067	8	0.184
0	0.080	10	0.210
1	0.093	12	0.236
2	0.106	1/4	0.270
3	0.119	5/16	0.333
4	0.132	3/8	0.395
5	0.145	over 3/8	0.030 larger than O.D. of thread
6	0.158		

6 SURFACE TOUCH-UP PROCEDURES

The following paragraphs pertain to the surface rework required to ensure corrosion protection and piece-part aesthetics.

6.1 Surface preparation prior to touchup. Chemicals used in solvent cleaning shall be compatible with all materials in the assembly being cleaned.

6.2 Touchup of anodic coatings. Unless otherwise specified on the drawing, anodic coatings shall be worked in accordance with MIL-A-8625.

6.2.1 Color matching of reworked anodic coatings. Color of reworked area may be matched after reworking in accordance with paragraph 6.2. Materials used in matching color shall not compromise the corrosion protection of the underlying coating.

6.2.1.1 Color matching of reworked black anodic coatings. Surfaces shall be reworked in accordance with paragraph 6.2 prior to color matching. Materials used to match color shall be compatible with the substrate materials and not compromise the corrosion protection of the coating.

6.3 Touchup of organic finishes. Touch up of organic finishes, such as primer and paint, shall meet the engineering drawing requirements of the original finish. Substitution of materials for touchup is not permitted without prior written approval.

6.4 Touchup of metallic plating or other finishes. Touchup of metallic plating or other finishes is not permitted without prior written approval.

7 OBLITERATE PART MARKING

When the drawing says to "obliterate part mark" on a vendor part, the preferred method of obliteration is to stamp the letter "X" over the existing characters, making them unreadable.

THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO CARLETON LIFE SUPPORT SYSTEMS INC. ANY REPRODUCTION, DISCLOSURE, OR USE OF THIS DOCUMENT IS EXPRESSLY PROHIBITED EXCEPT AS CARLETON LIFE SUPPORT SYSTEMS INC. MAY OTHERWISE AGREE IN WRITING.

SIZE A	CAGE CODE 99251	ST1637827
REVISION LEVEL	-	SHEET 7

7.1 Obliteration of meaningless numbers. Meaningless numbers do not have to be removed. If there is an MS, AN, or AS with no number after it, the MS, AN, or AS does not have to be removed. Care must be taken to not damage the face of the fitting or "X" too close to the edge that may cause burrs.

7.2 Part marking obliteration on plastic or electronic components. For plastic parts or electronic components that could be damaged by the "X"-ing method above, a vibrating engraver may be used to only scratch out enough to make the markings unreadable.

7.3 Obliteration of vendor markings. When the print says "obliterate the vendor markings," part marks and any other markings that identify the vendor must be removed. Meaningless numbers do not have to be removed.

7.4 Bare metal exposed by part marking. Obliterate part marking shall be performed prior to application of finishes. In cases where the engineering drawing permits obliteration of part marking after application of finishes (i.e. at the assembly level), bare metal created by the operations mentioned above shall be touched up per section 6.

8 ELECTRICAL AND ELECTRONIC ASSEMBLIES

8.1 Soldering of electrical and electronic assemblies. Unless otherwise specified on the drawing, soldered electrical and electronic assemblies shall meet the requirements of ANSI J-STD-001, Class 3 (High Performance Electronic Products).

8.2 Marking of electrical and electronic assemblies. Prior to Conformal Coating: Printed Wiring Assemblies shall be marked with the assembly dash number and the Revision of the assembly drawing per AS478-30. When necessary, a label may be used. On assemblies where marking is not possible, the assembly shall be put in an anti-static bag and labeled with the assembly number including the dash number and the revision.

8.3 Fabrication of printed wiring boards. Legacy prints released prior to 07/31/2012 shall conform to ST1637822 when obsolete specifications are listed on the print. Copper weight and all other specific call outs on the print shall prevail.

8.4 Handling of electrical and electronic assemblies.

8.4.1 Printed wiring assemblies. Printed wiring assemblies shall be handled in accordance with ST1637819 "Standard for Electrostatic Discharge Sensitivity."

8.4.2 Handling of printed circuit boards. Printed circuit boards shall be stored and handled in accordance with ST1637822 "Manufacturing and Storage Standard for Printed Circuit Boards."

9 DEVIATION REQUESTS AND NON-CONFORMANCES

9.1 Process for submitting deviation requests. Supplier Deviation Requests shall be submitted per QSP-7.4.2.2.1 "Supplemental Purchase Order Condition (SPOC) Manual" using Form SCSP-741.02.01.

THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO CARLETON LIFE SUPPORT SYSTEMS INC. ANY REPRODUCTION, DISCLOSURE, OR USE OF THIS DOCUMENT IS EXPRESSLY PROHIBITED EXCEPT AS CARLETON LIFE SUPPORT SYSTEMS INC. MAY OTHERWISE AGREE IN WRITING.

SIZE A	CAGE CODE 99251	ST1637827
REVISION LEVEL -		SHEET 8

9.2 Process for submitting non-conformances. Non-conformances shall be processed per QSP-830 "Control of Non-conforming Material."

10 NOTES

Changes to this document shall be made using the applicable procedures described in ST1637815.

THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO CARLETON LIFE SUPPORT SYSTEMS INC. ANY REPRODUCTION, DISCLOSURE, OR USE OF THIS DOCUMENT IS EXPRESSLY PROHIBITED EXCEPT AS CARLETON LIFE SUPPORT SYSTEMS INC. MAY OTHERWISE AGREE IN WRITING.

SIZE A	CAGE CODE 99251	ST1637827
REVISION LEVEL	-	SHEET 9