

Meggitt Avionics Proprietary Information

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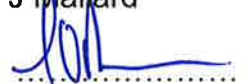
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Document Issue	Date	Modification Number (where applicable) Brief Record of Change and Reason for Change
1	24.11.10	Data sheet re-drafted from issue H to meet current requirements of Meggitt Avionics.
2	01.07.11	RFC 112371 Document restructured with the following changes: Sect 2.2.1 (p10) BS added to spec refs Table 2.2.1-1 BS EN 10088-3 was EN 10088-3 Table 2.2.2-1 BS EN 10088-3 was EN 10088-3 Sect 2.5 to 2.8 moved to Sect 3 to 3.4 New Section 2.5 & 2.6 added Sect 3 Processes & Process Specs moved, to new Sect 4 Sect 4.2 Alternate Process Listings added Sect 5 Fixing Systems added Sect 6 PCB & Processes added Contents sheet 3-4 updated accordingly.
3	17.01.12	RFC112982 Section 3.2 Recompiled Table 3.2 Added Section 3.6 Added
4	22.03.12	RFC113268 Materials Section: Update aluminium Tables 2-1 and 2-2 with new specs. Add new table for aluminium tube. Update stainless steel Table 2-4 with new specs. Add new tables for Carbon Steel, Spring Steel and Miscellaneous Steel. Update Copper/Brass/Phosphor Bronze table 2-6 with new specs. Add new table for Copper, Beryllium Copper, Brass and Phosphor Bronze Strip/Sheet Add new sub section 2.7 – Tungsten Alloys Update Finish (Anodise) table 3-1 with new spec.
5	29.10.15	RFC200154 – Addition of MOD [DSTAN] Definitions. Sect 3.2.2 Addition of Anodised Finish table. Sect 4.1 Update to process specifications list PS0356 and SIAe34 removed.
6	14.06.16	RFC200541 – Update Table 6-1 to cover CSMU build document and processes cross references.
7	11.08.16	RFC200683 & RFC200617 – Update to specifications in table 2-10 and sect 3.2.3
8	17.02.17	RFC200951 – Addition of Section 3.3.2 'Steels (Non-Stainless)'

Document Issue	Date	Modification Number (where applicable) Brief Record of Change and Reason for Change
9	10.08.17	RFC201498 – Addition of Sect 2.7 Monel and added Table 2-13 Approved Nickel Alloy - Alternative Materials Listing
10	09.01.18	RFC201627 – Page 21 para 3.2.2 Class 1 & 2 Anodising added; Page 23 para 3.3.2 clarification to use BS EN ISO 2081 Fe//Zn'X'//C standard; Page 26 para 4.2.2.1 delete line 1. Replace use of Touch-N-Prep with Surtec 650; Page 23 para 3.3.1 Clarification to use AMS2700 as standard

NOTE: All alterations must be verified by re-authorisation and approval of the complete document.

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1 INTRODUCTION

The purpose of this document is to list materials, finishes or processes as required to manufacture the range of company products.

The list cross references to equivalent or acceptable materials, finishes and processes which may be used where applicable.

The listed equivalents / alternatives are suitable for use as a direct replacement without detriment to quality and design.

There are various reasons for the requirement of equivalents / alternatives to aid the smooth and efficient day to day manufacture of components and execution processes:

- Controlling standards quoted on documents being superseded by intermediate or current standards.
- Using of existing, old obsolescent material stock.
- Rationalisation of material range stock.
- Superior material specification resulting in an improved manufactured, engineered and quality product.
- Availability.

Deviation to the material, finish used or process followed must strictly be made in accordance with this list.

Circumstances are never static and therefore Data Sheet 124 will need revising to meet the continual material, finish or procedural changes.

1.1 Definitions

The enclosed listings are not exhaustive, therefore any request to provide additional equivalents / alternatives should be forwarded to Meggitt Avionics design department with supporting documentation for consideration and inclusion in this specification.

Standards Status and their meanings:

Current	The document is the current one available
Confirmed	Standard has been reviewed and confirmed as being current
Withdrawn	Document is no longer current, but has been withdrawn
Superseded	Standard has been replaced by one or more other standards
Obsolescent	Indicating by amendment that the standard is not recommended for use for new equipment, but needs to be retained to provide for the servicing of equipment that is expected to have a long working life, or due to legislative issues

1.2 MOD[STAN] Definitions

EXTANT & INTERIM	These standards may be used in support of new and existing equipment
OBSOLESCE	These standards are no longer required for the procurement of new equipment but retained for maintenance purposes in support of existing in-service equipment
CANCELLED	These standards have been superseded or are of no further service use, also these documents are no longer available on line

2 MATERIALS

2.1 Aluminium and Aluminium Alloys

2.1.1 General

Aluminium Alloys for the Aerospace series of British Standards are prefixed BS Lxxx e.g. BS L168.

These standards may also be prefixed BS 2L168 whereby the 2 indicates the issue status of the standard.

Where the issue status against standards are listed in the following tables it will be indicated with an '*'.

To reduce the need to continually update documents when the issue status of standards changes Meggitt Avionics have adopted the practice of not indicating the issue status against these standards unless specified for a specific reason.

Therefore the current issue for the standard indicated should be employed.

2.1.2 Bars and Extruded Sections of Aluminium

Aluminium alloy BS L168 has been adopted as the preferred standard for aluminium alloys as the materials specified within the standard is a very high mechanical strength alloy and can be used for critical applications and is the most widely used aluminium bar alloy in the aerospace industry.

It has very good machinability and is thus used for the production of complex machined parts.

2.1.3 Temper Types

The most common tempers for BS L168 aluminium and adopted by Meggitt Avionics are:

T6 - Solution heat treated and artificially aged

T6510 - Solution heat treated and stress-relieved by stretching then artificially aged with no straightening after aging.

T6511 - Solution heat treated and stress-relieved by stretching then artificially aged with minor straightening after aging.

2.1.4 Alternative Material Listings

When selecting an alternative material grade from Table 2-1 and Table 2-2 the alternative grade shall always be a higher specification i.e. T6 to T6510, under no circumstances should a lower grade be used as an alternative i.e. T6510 to T6.

The R Codes i.e. R2092 are a Meggitt Avionics internal material reference code.

Drawing Material Grade Specified	Alternative Material Grades		
	1	2	3
BS *L21	BS L168 T6	BS L168 T6510	BS L168 T6511
BS *L34	BS 1470 1200		
BS *L44 (R2064)	BS L168 T6	BS L168 T6510	BS L168 T6511
BS *L65	BS L168 T6	BS L168 T6510	BS L168 T6511
BS *L111 (R2095)	BS L168 T6511	---	---
BS *L111 T6511	BS L168 T6511	---	---
BS L168 (R2525)	BS L168 T6	BS L168 T6510	BS L168 T6511
BS L168 T6 (R2092)	BS L168 T6510	BS L168 T6511	---
BS L168 T6510	BS L168 T6511	---	---
BS L168 T6511	---	---	---
BS L168 T651X (R2093)	BS L168 T6510	BS L168 T6511	---

Table 2-1 Approved Aluminium Bar – Alternative Grades

Drawing Material Grade Specified	Alternative Material Grades		
	1	2	3
BS L70	BS EN 2395 AL-P2014A T4 or T42		
BS 1470 NS4 H3	BE EN 485-1 5251 H22		
BS L156	BS EN AL-P2014A T42		
BS 1470 1200 H14	BS *L16 1200 H14		
BS 1470 5251 H27	BS EN 485-2 5251 H32		
BS L165	BS L165 T6	---	---
BS L115	BS L115 T651	---	---
BS1470 2014A T4 R2007	BS EN485-2 AW-2014 T4, T6 or T651	BS EN485-2 AW-6062 T4, T6 or T651	BS L93 2014 T4, T6 or T651

Table 2-2 Approved Aluminium Sheet\Plate – Alternative Grades

In some circumstances where an Aluminium plate spec and grade is specified on a drawing it may be appropriate to utilise bar material to manufacture the component.

Table 2-3 lists the alternative Plate to Bar grades.

Plate Material Grade Specified	Alternative Bar Material Grades		
	1	2	3
BS L165	BS L168 T6	BS L168 T6510	BS L168 T6511
BS L115	BS L168 T6511	---	---

Table 2-3 Approved Aluminium Plate to Aluminium Bar Grades

Plate Material Grade Specified	Alternative Bar Material Grades		
	1	2	3
BS 1471 5251 0	BS EN 754-1 5251 0	---	---
BS 1471 6082 T6	BS EN 754-1 6082 T6	---	---

Table 2-4 Approved Aluminium Tube - Alternative Grades

2.2 Stainless Steels

2.2.1 General

BS 970 which encompassed Stainless Steel bar grades and BS 1449 which encompassed Stainless Steel sheet and plate grades have been superseded by European (EN) based standards.

Most of the previous BS grades do not have an exact EN equivalent grade.

In some circumstances one EN grade has replaced more than one BS grade whilst in other cases more than one EN grade could be considered in place of a BS grade.

The issue status for BS standards is shown by the year stamp that the standard was made current i.e. BS EN10088-2:2005

To reduce the need to continually update documents when the issue status of standards changes Meggitt Avionics have adopted the practice of not indicating the issue status against these standards unless specified for a specific reason i.e. BS EN10088-2.

Therefore the current issue for the standard indicated should be employed.

2.2.2 Alternative Material Listings

When selecting an alternative material grade from Table 2-5 and Table 2-6 the alternative grade shall always be equal to or a higher, under no circumstances should a lower grade be used as an alternative.

The R Codes i.e. R2092 are a Meggitt Avionics internal material reference code.

Drawing Material Grade Specified	Alternative Material Grades		
	1	2	3
BS 970: 303S21 (R3071)	BS EN 10088-3: 1.4305	---	---
BS 970: 303S41 (R3074)	BS EN 10088-3: 1.4305	---	---
BS 970: 303S31 (R3005 / R3098)	BS EN 10088-3: 1.4305	---	---
BS 970: 304S11 (R3109)	BS EN 10088-3: 1.4306	---	---
BS 970: 316S11 (R3067 / R3101)	BS EN 10088-3: 1.4404	---	---
BS 970: 347S31 (R3012)	BS EN 10088-3: 1.4550	---	---
BS 970: 410S21 (3013)	BS EN 10088-3: 1.4006	---	---
BS970: 416S21 (R3014)	BS EN 10088-3: 1.4005	---	---
BS*S124D	BS EN 10088-3: 1.4005	---	---
BS 970 316S16	BS EN 10088-3: 1.4305	---	---
BS 970 316 (R3123)	BS EN 10088-3: 1.4404	---	---
BS 970 431S29 (R3020)	BS EN 10088-3: 1.4057	---	---
BS 2056 302S26 (R3043)	BS EN 10088-3: 1.4310	---	---
BS 970 316S31	BS EN 10088-3: 1.4401	---	---
KE40A	BS EN 10088-3: 1.4005	---	---

Table 2-5 Approved Stainless Steel Bar – Alternative Grades

Drawing Material Grade Specified	Alternative Material Grades		
	1	2	3
BS 1449: 303S31	BS EN 10088-2: 1.4305	---	---
BS 1449: 304S11	BS EN 10088-2: 1.4306	---	---
BS 1449: 302S25	BS EN 10088-2: 1.4310	---	---
BS 1449: 304S31	BS EN 10088-2: 1.4301	---	---
BS 1449: 304S15	BS EN 10088-2: 1.4301	---	---
BS 1449: 430S17	BS EN 10088-2: 1.4016	---	---

Table 2-6 Approved Stainless Steel Sheet/Plate – Alternative Grades

Drawing Material Grade Specified	Alternative Material Grades		
	1	2	3
BS 970 EN2	PD970 040A04	---	---

Table 2-7 Approved Mild Steel Bar - Alternative Grades

Drawing Material Grade Specified	Alternative Material Grades		
	1	2	3
BS CS80	BS EN 10132-4 C85S	---	---

Table 2-8 Approved Spring Steel – Alternative Grades

Drawing Material Grade Specified	Alternative Material Grades		
	1	2	3
MUmetal	ASTM A753	MIL-N-14411	---

Table 2-9 Approved Steel Bar - Alternative Grades

2.3 **Copper, Beryllium Copper, Brass & Phosphor Bronze**

2.3.1 General

The British standards for Copper bar grades and Copper sheet / plate grades have been superseded by European (EN) based standards.

The issue status for BS standards is shown by the year stamp that the standard was made current i.e. EN13601:2002.

To reduce the need to continually update documents when the issue status of standards changes Meggitt Avionics have adopted the practice of not indicating the issue status against these standards unless specified for a specific reason.

Therefore the current issue for the standard indicated should be employed.

2.3.2 Alternative Material Listings

When selecting an alternative material grade from Table 2-10 the alternative grade shall always be equal to or a higher, under no circumstances should a lower grade be used as an alternative.

The R Codes i.e. R2034 are a Meggitt Avionics internal material reference code.

Drawing Material Grade Specified	Alternative Material Grades	
	1	2
BS 1432: C101 (Bar) (R1044)	EN 13601: CW004 (Bar)	EN 13599: CW004 (Strip)
BS2874: CZ112 (R1020) Brass (Bar)	EN 12164: CW712R (Bar)	---
BS2874: CZ121 3PB (R1023) Brass (Bar)	EN 12164: CW614N – R430 (R1414) Brass (Bar)	---
BS2874: CZ121 4PB (R1024) Brass (Bar)	EN 12164: CW609N – R430 (R1413) Brass (Bar)	---
BS2870: CZ120 HARD (R1004)	BS EN 1652 CuZn38Pb2	BS EN 1652 CW608N H165
BS249 Brass Rod	BS EN 12164 CW614N	
BS 251	BS EN 12164: CW7121R	
BS 369	BS EN 1216:4 CW451	

Table 2-10 Approved Copper, Brass & Phosphor Bronze – Alternative Grades

Drawing Material Grade Specified	Alternative Material Grades	
	1	2
BS2870: CZ108	BS EN 1652: CW508L	
BS 2870: CZ120H	BS EN 1652: CW608N H165	---
BS 407	BS EN 1652: CW451	---
Brush Alloy 25 (R1008)	BE EN 1652: CW101C	ASTM B194: C17200
BS 2870 C101-0 (R1072)	BS EN 1652: CW004A	

Table 2-11 Approved Copper, Beryllium Copper, Brass and Phosphor Bronze Strip/Sheet Alternative Grades

2.4 Titanium

2.4.1 General

Titanium Alloys for the Aerospace series of British Standards are prefixed BS TAxxx e.g. BS TA11.

These standards may also be prefixed BS 2TA11 whereby the 2 indicates the issue status of the standard.

Where the issue status against standards are listed in the following tables it will be indicated with an '*’.

To reduce the need to continually update documents when the issue status of standards changes Meggitt Avionics have adopted the practice of not indicating the issue status against these standards unless specified for a specific reason.

Therefore the current issue for the standard indicated should be employed.

2.4.2 Alternative Material Listings

When selecting an alternative material grade from Table 2-12 the alternative grade shall always be equal to or a higher, under no circumstances should a lower grade be used as an alternative.

The R Codes i.e. R2034 are a Meggitt Avionics internal material reference code.

Note: Ti-6AL-4V is also known as Ti6AL4V, T. 6-4 and grade 5

Drawing Material Grade Specified	Alternative Material Grades	
	1	2
BS *TA11: 6AL-4V (Bar) (R2034 / R3129)	BS TA11: Ti 6AL-4V (Bar)	AMS 4928: Ti 6AL-4V (Bar)
BS *TA10: 6AL-4V (Sheet / Plate)	BS TA10: Ti 6AL-4V (Sheet / plate)	AMS 4911: Ti 6AL-4V (Sheet / Plate)
---	---	---

Table 2-12 Approved Titanium – Alternative Grades

2.5 Non Metallic Materials

2.5.1 Plastics

Drawing Grade Specified	Material	Alternative Materials		
		1	2	3
Delrin 150 NC010 Acetal Homopolymer		Tecaform AD Acetal Homopolymer (Esinger) See Note 1		

Notes:

1. The approved alternative is only acceptable for use on the following parts:

57-20001	Light Guide
046-102146	Fixing Block
046-106810	Bracket Insulation
085-102145	Fixing Block Assembly

2.6 Materials with Company References

Previous material listings used internal company references to produce a procurement document / specification:

Referenced documents:

P1161: Free machining austenitic stainless steel – rods and bars to BS970 Grade 303S31.

Replace by: BS EN 10088-3 Grade 1.4305

For additional approved alternatives see Table 2-5 Approved Stainless Steel Bar – Alternative Grades

2.7 Tungsten Alloys

2.7.1 General

Mallory 1000 is a brand name material for a tungsten alloy (Manufactured by Mallory).

To reduce the need to continually update documents when the issue status of standards changes Meggitt Avionics have adopted the practice of not indicating the issue status against these standards unless specified for a specific reason.

Therefore the current issue for the standard indicated should be employed.

R Codes i.e. R2034 are a Meggitt Avionics internal material reference code.

Drawing Material Grade Specified	Alternative Materials		
	1	2	3
Mallory 1000 (R4014)	ASTM B777 Class 1 90W-Ni-Cu	SAE-AMS-T-21014 Class 1 90W-Ni-Cu	

Table 2-13 Approved Tungsten Alloy – Alternative Grades

2.8 Monel

Monel® alloys are nickel-base alloys that contain between 29 and 33 percent copper. Alloy 400 is a solid solution alloy.

To reduce the need to continually update documents when the issue status of standards changes Meggitt Avionics have adopted the practice of not indicating the issue status against these standards unless specified for a specific reason.

Therefore the current issue for the standard indicated should be employed.

R Codes i.e. R2034 are a Meggitt Avionics internal material reference code.

Drawing Material Grade Specified	Alternative Materials		
	1	2	3
Monel 400 (R1081)	BS3076	ASTM B 164	
Nickel Alloy NA13 10mm BAR	BS3076	Monel 400 10mm BAR ASTM B 164	
Nickel Alloy NA13 0.5 BAR (R1081001)	BS3076	Monel 400 0.5" BAR ASTM B 164	
Nickel Alloy NA13 0.0937 BAR (R1081002)	BS3076	Monel 400 0.937" BAR ASTM B 164	
Nickel Alloy NA13 40mm BAR (R1081003)	BS3076	Monel 400 40mm Bar ASTM B 164	
Nickel Alloy NA13 50mm BAR (R1081004)	BS3076	Monel 400 50mm Bar ASTM B 164	
Nickel Alloy NA13 16mm BAR (R1081006)	BS3076	Monel 400 16mm Bar ASTM B 164	
Nickel Alloy NA13 16mm BAR (R1081007)	BS3076	Monel 400 16mm Bar ASTM B 164	
Monel Alloy BS 3076 NA13 COLD DRAWN (1500632 / 1501208)	Monel Alloy ASTM B 164 NA13 COLD DRAWN		

Table 2-14 Approved Nickel Alloy – Alternative Grades

3 FINISHES / TREATMENTS

3.1 General

The following paragraphs list the approved alternative finishes / treatments for components.

Legacy drawings and documents may specify both British Standards and or American QQ Standards.

Where the issue status against standards has previously been listed on drawings / documents, the following lists will indicate with an '*'.

Unless otherwise indicated within the following paragraphs references to finish / treatment types and classes should remain the same:
i.e. Anodise to MIL-A-8625 Type 1 Class 1.

To reduce the need to continually update documents when the issue status of standards changes Meggitt Avionics have adopted the practice of not indicating the issue status against these standards unless specified for a specific reason.

Therefore the current issue for the standard indicated should be employed.

3.2 **Aluminium and Aluminium Alloys**

3.2.1 Approved Alternative Finishes / Treatments for Aluminium

Reference should always be made to the drawing or purchase order with regards to the finish class i.e. whether the item is to have a natural finish or dyed a specific colour.

Where the issue status against standards are listed in the following tables it will be indicated with an ‘*’.

To reduce the need to continually update documents when the issue status of standards changes Meggitt Avionics have adopted the practice of not indicating the issue status against these standards unless specified for a specific reason.

Therefore the current issue for the standard indicated should be employed.

The use of chromic anodising is becoming more difficult due to the hazards involved in the process. Therefore the use of the alternative sulphuric process may be allowable provided that the parts are not for use in explosive, propellant or pyrotechnics applications. The supplier should apply to Meggitt Avionics for a production permit prior to using sulphuric anodising in place of chromic anodising to ensure the above conditions are met.

3.2.2 Anodising

Anodised Finish specified on current drawing	Preferred Anodic Treatment
DEF STAN 151 Type 1	MIL-A-8625 Type 2
DEF STAN 03-25	MIL-A-8625 Type 2
SAE AMS03-25	MIL-A-8625 Type 2
DEF STAN 151 Type 2	MIL-A-8625 Type 1
DEF STAN 03-24	MIL-A-8625 Type 1
SAE AMS03-24	MIL-A-8625 Type 1
DEF STAN 03-26	MIL-A-8625 Type 3 or BS ISO 10074: 2010
BS5599	MIL-A-8625 Type 3 or BS ISO 10074: 2010

Table 3-1 Approved Aluminium Chromic/Sulphuric Anodic Coating

- The standards details listed are the direct alternatives with regards to the finish type i.e. Chromic or Sulphuric.
- For DEF STD 151 references
 - Type 1 – Sulphuric acid anodising
 - Type 2 – Chromic acid anodising
- For MIL-A-8625 references
 - Type 1 – Chromic acid anodising
 - Type 2 – Sulphuric acid anodising
- Class 1 – Non-Dyed
- Class 2 – Dyed (Colour to be specified)

Example 'MIL-A-8625 Type 1, Class 2, Tint Black'

3.2.3 Chromate Conversion

All current issue drawings and process documents which quote the following standards and phrases for the treatment of aluminium and aluminium alloys where a chromate passivation corrosion treatment is specified, such as Alocrom/ Alocrom 1200 / Alochrom / Alochrome/ Alchromate/ Alodine/ Alodine 1200/Iridite/DEFSTAN 03-18/SAE AMS03-18/ MIL-DTL-5541/SI Ae 34 will now comply with the following specification MIL-DTL-5541 Type II Class IA or Class 3. PS0851 covers the chromate passivation treatment procedure for MIL-DTL-5541 Type II Class IA and 3 for internally treated aluminium components.

Drawing Finish Specified	Class 3 (Preferred) Preferred Finish	Alternative Finish 1	DEF STAN 1200 Alternative Finish 2
Iridite to MIL-C-5541*	MIL-DTL-5541 Type II Class 3 (Preferred)	MIL-C-5541 Class 3	Alocrom 1200 DEF STAN 1200
MIL-C-5541 Type I (Hex, Chromium)	MIL-DTL-5541 Type II Class 3 (Preferred)	Alocrom 1200 DEF STAN 1200	Alodine 1200 MIL-C-5541
Alocrom 1200 DEF STAN 03-18	MIL-DTL-5541 Type II Class 3 (Preferred)	MIL-C-5541 Class 3	Alodine 1200 MIL-C-5541
Alocrom SI Ae 34 (Harlow spec)	MIL-DTL-5541 Type II Class 3 (Preferred)	MIL-C-5541 Class 3	Alocrom 1200 DEF STAN 1200
Alodine 1200 MIL-C-5541	MIL-DTL-5541 Type II Class 3 (Preferred)	MIL-C-5541 Class 3	Alocrom 1200 DEF STAN 1200
MIL-C-5541 Class 3	MIL-DTL-5541 Type II Class 3 (Preferred)	Alocrom 1200 DEF STAN 1200	

Table 3-2 Approved Aluminium Chromate Conversion Coating

- DEF STAN 03-18 specifies neither type nor class
 - For drawings which quote DEF STAN 03-18 or MIL-C-5541 where the type and class have been omitted the preferred alternative is Type II, Class 3. This covers painted surfaces and areas of low resistance such as bonding area, earth points, paint free countersunk and counter board holes etc.
- MIL-DTL-5541 references:
 - Type II – Compositions containing no Hexavalent chromium
 - Class 1A – For maximum protection against corrosion, painted or unpainted.
 - Class 3 – For protection against corrosion where low electrical resistance is required.

3.3 Stainless Steels

3.3.1 Approved Alternative Finishes / Treatments for Stainless Steel

Where current issue drawings specify various passivation standards such as QQ-P-35, DEF-STAN, Si Ae, BS etc. all previous passivation standards quoted on drawing will be superseded by AMS 2700 (see notes)

Note: AMS 2700 classification.

Methods: Method 1 shall be used unless Method 2 is authorized by the cognizant engineering organization.

Types: Where no type is specified, the processor may use any of the listed types that meet the requirements of the standard.

Classes: When no class is specified, class 2 shall apply.

3.3.2 Steels (Non-Stainless)

Approved alternative finishes and treatments for steels

Where current issue drawings specify various Zinc Plate and Passivation standards and their relevant coating thicknesses such as DEF-STAN, Si Ae, BS & BS EN etc. all previous standards quoted on drawings will be superseded by BS EN ISO 2081 Fe//Zn'X'//c

Zinc plate and passivate

Zinc plate and passivate

BS EN 12329 Fe//ZnX//C

BS EN ISO 2081 Fe//ZnX//C

Zn thickness value 'X' is defined on the current drawing this value will be added to treatment request (TR) form which accompanies the parts.

(C Denote passivation colour)

Materials

Fe - Iron/Steels

Zn - Zinc

Cu - Copper

Code	Name	Typical Appearance
A	Clear	Transparent, clear to bluish
B ^a	Bleached	Transparent slight iridescence
C	Iridescent	Yellow iridescence
D	Opaque	Olive Green
F	Black	Black

3.4 Copper and Brass

3.4.1 Approved Alternative Finishes / Treatments for Copper / Brass.

Electroless Nickel Plate to
MIL-C-26074*

Electroless Nickel Plate to
AMS-C-26074

Electroless Nickel Plate to
MIL-DTL-26074*

Electroless Nickel Plate to
AMS-C-26074/26074

3.5 Painting of Engraved Buttons (Knobs)

Where drawings indicate the infill of engraving with a white paint the following alternative method may be used:

White matt enamel paint (Typically Humbrol 34 model paint).

3.6 Part Identification

Where drawings, specifications and idents are marked with a Cage Code onto the component or packaging and this is of any other than the Meggitt Avionics K0100 reference they are to be marked with Meggitt Avionics Cage Code K0100 instead.

4 PROCESSES / PROCESS SPECIFICATIONS

4.1 General

Process specifications are specifications written and controlled by Meggitt Avionics.

These specifications have been written by Meggitt Avionics to aid the manufacturing of components and equipment.

The following list indicates the former specs against the latest specs:

Process Spec: WISJ 21009	Installation of 'Helicoil' wire thread inserts (Metric and Unified Series).
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Replaced By: PS20015	Installation of 'Helicoil' wire thread inserts (Metric and Unified Series).
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Process spec: COP-E-019/74 PS20021 PS2004	Procedure for the identification, handling and protection of electrostatic sensitive devices (ESSD).
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Replaced By: PS0764	Packaging and handling of electrostatic sensitive boards and electronic components.
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4.2 **Alternative Process Listings**

4.2.1 Abrasive blasting of components to remove process marks from components

Machines surfaces to be Vac blasted using 100/150 Micron Glass Beads for 1 to 2 minutes prior to final treatment as specified on the Meggitt Avionics drawing / manufactured document.

Alternative methods of producing the required finished can be in accordance with sub-contractors standard procedures.

4.2.2 Application of Chromate Conversion Coatings

Chromate conversion coatings are generally defined in MIL-DTL-5541 with the process available in various proprietary forms.

4.2.2.1 MIL-DTL-5541 Chemical Conversion Coatings of Aluminium and Aluminium alloys makes reference to the reworking of mechanically damaged areas.

The damaged areas shall be touched up with MIL-DTL-81706 material approved on the qualified products list QPL-81706-16 for the applicable class and method of application.

Approved Materials / Application Methods:

Surtec 650 Chromital Retouche Pen (R7504)

A no rinse chromate conversion coating chemical in a magic marker type applicator for use on aluminium, steel and galvanized surfaces.

5 **FIXING SYSTEMS**

The following references list proprietary fixing items / systems which have previously been listed within drawing and documents and have either been withdrawn, superseded or a suitable alternative can be utilised to assist manufacture.

5.1 **Wire Inserts (Heli-Coil)**

Various terminologies are used to describe the Wire Insert and are usually describe as a Heli-Coil which is a trade name reference.

If a listed wire insert is no longer available it may be replaced by an equivalent wire insert of Size, Shape and Standard i.e. M3, 2D (Length) and either free running or screw locking.

Where ever possible a tangless wire insert should be fitted and under no circumstances should a tanged wire insert be fitted when replacing a tangless insert.

Under no circumstances should the replacement wire insert detract from the existing design and performance requirements.

Typical systems are Armstrong and KATO-Precision.

6 PCB ASSEMBLY AND PROCESSES

6.1 General

Meggitt Avionics, have over the years, acquired various companies and absorbed their designs.

This has left Meggitt Avionics with a variety of designs with differing design and manufacturing standards.

Many of these designs and manufacturing standards call up generic process specifications for the assembly of the Printed circuit boards.

In addition, many of the older designs now call up obsolete or superseded specs.

To avoid having to constantly update these drawings, the following table, Table 6-1 Approved Process Specifications, refers to approved alternate specifications.

Manufacturing Process	Drawing / BOM / Document Specified Item	Approved Replacement Documents, Standards and Materials
MANUFACTURING STANDARDS	IS1000: Manufacturing Standard Mechanical. IS6000: Standards Manual Part 2, Volume 6, General Instructions.	For any application relevant to PCB assembly, refer to the relevant sections of ANSI/IPC-A-610 (latest Issue) Class 3 requirements. PS11000, Manufacture & Inspection Of Critical Parts.
	IS2000: Manufacturing Standard Electrical. ED 600: Quality Instructions.	Printed circuit boards are to be assembled in accordance with Class 3 requirements of IPC/EIA J-STD-001 (latest issue) and inspected in accordance with Class 3 requirements of ANSI/IPC-A-610 (latest issue).
	MIL-STD-454 : Standard General Requirements for Electronic Equipment. Requirement 5: Soldering. MIL-STD-2000 has been discontinued, Requirement 9: Workmanship.	MIL-STD-454 Requirement 5: Specifies Soldering Standard MIL-STD-2000. PS17001, Presoldering of Gold Plated Leads. PS17010, Components With Gold Plated Leads Must Have Gold Removed. ANSI J-STD-001, Requirements For Soldering Electrical & Electronic Assembly. ANSI J-STD-004/005/006, Requirements For Soldering Fluxes, Pastes & Solder Alloys. Use IPC-A-610 / J-STD-001 as suitable alternatives. MIL-STD-454 Requirement 9: Specifies Workmanship Criteria. All requirement of sections 5 & 9 are covered by the appropriate sections of IPC-A-610 / J-STD-001. PS20002, Repairs and Modification of PWB and Assemblies. IPC-7711, Rework, Modification and Repair of Electronic Assemblies.
ESD	MIL-E-17555: Electronic and Electrical Equipment Accessories and Provisioned Items (Repair Parts) Packaging Of. Para 3.6: Packaging and Marking of Sensitive Electronic items. Para 3.11.10: Protection and Handling of Sensitive Electronic Components. MIL-STD-1686 CLASS 1 (IS2004): Electrostatic Discharge Controls. DOD-STD-1686: Electrostatic Discharge Control Programme. DOD-HDBK-263: Electrostatic Discharge Controls Handbook. IS2004: Handling Instructions for Electrostatic Discharge Sensitive Items.	Manufacture, handle and store in accordance with the latest revision of BS EN/IEC 61340-5-1, 2 and IPC-A-610 sections 3.1 thru 3.3. PS20021, Electrostatic Handling Process Specification.

Table 6-1 Approved Process Specifications

Manufacturing Process	Drawing / BOM / Document Specified Item	Approved Replacement Documents, Standards and Materials
ADHESIVES	MIL-A-46106: Adhesive-Sealants, Silicone, RTV, General Purpose (For Electrical and Mechanical Sealing). Eccobond,	Apply and cure in accordance with the Manufacturers recommendations and IPC-A-610 section 7.2.2. PS16001, Adhesive - Eccobond 45 Mixed to a Semi Rigid Formulation PS16005, Adhesive Bonding Of Electronic Components PS16011, Adhesive Conductive Johnson Matthey A500 PS16028, Adhesive Scotchgrip 1099 PS23003, Adhesive Bonding Processing And Inspection Requirements WIS J11101, DOW CORNING Silicone Adhesive/Sealant 732 RTV AND 738 RTV
LOCTITE	MIL-S-22473: Sealing, Locking and Compounds. IS4002: A Guide to Adhesives.	Loctite 222 MOD grade is no longer available to MIL-S-22473. Use Loctite 222M, Type II, Grade M Compound supplied and tested to MIL-S-46163A. (conforms to Meggitt part No P309671). Store, apply and cure in accordance with the Manufacturers recommendations. PS20028, Lock Screws Using Anaerobic Compound PS20029, Locking Of Screws, Nuts & Bolts (Anaerobic Adhesive)
CONFORMAL COATING	MIL-I-46058: Insulating Compound Electrical	PS0577: Requirements for Conformal Coating of Printed Board Assemblies PS16014, Conformal Coating of PWB Assemblies Using Acrylic Resin to MIL-I-46058 PS16021, Application Of Humiseal 1A33 Conformal Coating
LABELLING		PS18011, Protection Of Markings PS20025, Self Adhesive Labels Fitting Instructions WIS E800700, Marking

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Table 6-1 Approved Process Specifications