Detail Specification
for ASP custom magnetics parts

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1 GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics and test and inspection data for the component type variants and/or the range of components specified below. It supplements the requirements of, and shall be read in conjunction with, the Generic Specification listed under Applicable Documents.

1.2 APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:

AD	No.	Document	Issue
AD-01	PR 0000-0000 ASP/07	Specification for Magnetics Manufacturing - PID	6

Table 1-1: Applicable documents

1.3 REFERENCED DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:

AD	No.	Document	Issue
RD-01	MIL-STD-981	Design, Manuf. & Quality Standards for Custom Electromagnetic Devices for Space Applications	C w/change 2
RD-02	ESCC 21300	Terms Definitions Abbreviations Symbols and Units	5
RD-03	MIL-PRF-27	Performance Specification Transformers & Inductors	G
RD-04	MIL-STD-202 method 301	Dielectric Withstanding Voltage	G
RD-05	MIL-STD-202 method 302	Insulation Resistance	G

Table 1-2: Referenced documents

1.4 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. 21300 shall apply.

1.5 ASP COMPONENT NUMBER AND COMPONENT TYPE VARIANTS

1.5.1 ASP component number

The ASP Component Number shall be constituted as follows. Any other customer number system upon request.

Example: 1234-ASP-UP-12345A78

- Component Type: 1234 (as applicable) where:
  - A unique 4 digits code, allocated by ASP to a specific magnetic design: 1234 (as applicable)
- Manufacturer identification: ASP-UP
- Manufacturer Specific Magnetic Identification: 12345A78 (as applicable) where:

- A unique 8 digits code, allocated by ASP to a specific magnetic design: 12345A78 (as applicable)

1.5.2 ASP component type variants

Not applicable.

1.5.3 ASP Specific Magnetic Identification

Magnetic Sheet shall be produced by ASP, after negotiation with the Ordered, that, as a minimum, specifies all the requirements unique to the specific magnetic component design that are identified herein as being specified in the Magnetic Sheet.
The Magnetic Sheet shall be held under configuration control by ASP.
For identification and traceability purposes, ASP shall allocate a unique Manufacturer Specific Magnetic Identification to the Magnetic Sheet and the specific magnetic design, as specified in Para. 1.4.1.

1.6 MAXIMUM RATINGS

The maximum ratings shall not be exceeded at any time during use or storage.
Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the Generic Specification.

Characteristics	Symbols	Maximum Ratings	Units	Remarks
Power	P	Note 1	W	
Rated DC Current	I_R	Note 1	A	
Dielectric Withstanding Voltage	DWV	Note 1	Vrms	
Operating Frequency	f	Note 1	Hz	
Operating Temperature Range	T_{op}	Note 1	°C	
Storage Temperature Range	T_{stg}	Note 1	°C	
Soldering Temperature	T_{sol}	Note 1	°C	

Table 1-3: Maximum ratings

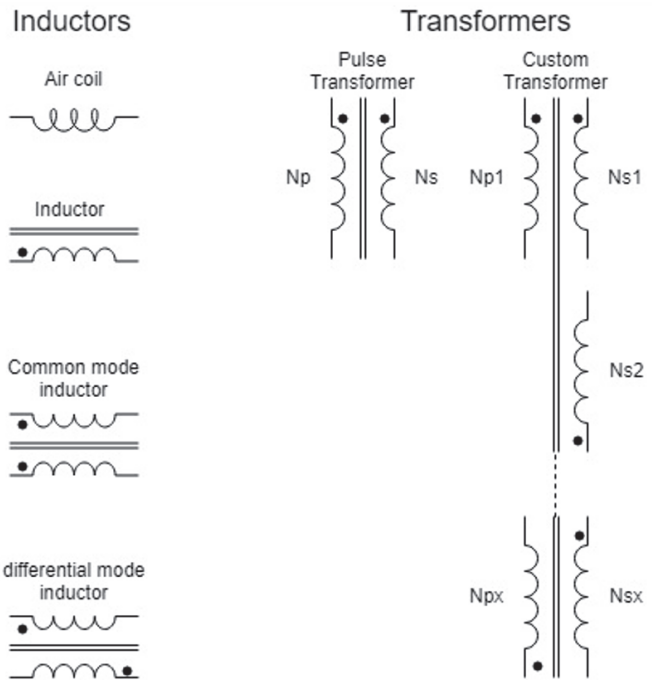
Note 1. Maximum Ratings for a particular component will be specified in the applicable Magnetic Sheet.

1.7 PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

The physical dimensions and terminal identification for a particular component will be specified in the applicable Magnetic Sheet.

1.8 FUNCTIONAL DIAGRAM

The functional diagram for a particular component will be specified in the applicable Magnetic Sheet. Examples of the available ranges of inductors and transformers are as follows:



2 REQUIREMENTS

The complete testing requirements for procurement of the component specified herein are as stated in this specification.

2.1 PRODUCTION CONTROL

The full production control provisions are defined in the PID.
The production of ASP's customized in-house manufactured magnetics is described in the PID.
All used parts and materials undergo the process of incoming inspection including:
visual inspection, physical and electrical measurements (where applicable) and review of the manufacturer CoC.
Prior to assembly, the different elements of the components shall be inspected.

2.2 SCREENING

Unless otherwise specified herein or in the applicable Magnetic Sheet, all lots of components shall be subjected to tests and inspections in the sequence shown.
Any components which do not meet these requirements shall be removed from the lot and at no future time be resubmitted to the requirements of this specification.

No:	Inspection/Test	Sampling
1	Visual Inspection	100%
2	Electrical measurements at room temperature	100%
3	Temperature Cycling	100%
4	Temperature Rise	2

No:	Inspection/Test	Sampling
5	Burn-in	100%
6	Induced Voltage	100%
7	Electrical measurements at room temperature	100%
8	Visual Inspection	100%
9	Check for Lot failure	100%

Table 2-1: Screening test flow

2.2.1 Visual inspection

External Visual Inspection shall be performed in accordance with MIL-STD-1580B, par. 15.1.1.1.

2.2.2 Electrical tests

Electrical measurements including:

- DC resistance
- IR will be tested with 500V_{DC} (MIL-STD-202, Method 302)
- Transfer ratio
- Winding direction
- Inductance

Electrical measurements during screening shall be performed at room temperature: T_{amb}=25±5°C (note 1)

No.	Characterization	Symbol	Test conditions	Limits		Unit	Remarks
				Min.	Max.		
1	Insulation Resistance	IR	MIL-STD-202, Method 302 V=500V_{DC}	10.0	-	MΩ	-
2	Inductance	L	As specified in Magnetic Sheet			mH	Note 2
3	D.C. Resistance	R_{DC}				mΩ	Note 3
4	Transfer Ratio	T				-	Note 4
5	Winding direction	POL				-	Note 4

Table 2-2: Electrical measurements (screening)

Notes:

1. All measurements shall be read and recorded against serial number.
2. Pre and post thermal cycling delta L limit shall be less than 5 percent.
3. Pre and post thermal cycling delta R limit shall be less than 5 percent.
4. Will be performed at the first electrical test only

2.2.3 Temperature Cycling

Temperature cycling conditions:

25 cycles -40 to +100 °C, dwell time = 30min.

Temperature extremes will be adjusted to project requirements. Temperature change rate = 3 K / min

2.2.4 Temperature Rise

Temperature rise on two samples shall be performed upon request.

2.2.5 Burn-in

Burn-in shall be performed upon request.
MIL-STD-202, Method 108 with the following details:
• Duration: 96 (+24 -0) hours unless otherwise specified.
• Test conditions: T_{amb} = +100 (+0 -3) °C in a non-operating condition, unless otherwise specified.
• Data Points: On completion of testing, the components shall be visually examined. There shall be no evidence of any damage or loosening of terminals.

2.2.6 Induced Voltage

Induced voltage shall be performed upon request.
Test method and conditions: MIL-PRF-27 paragraph 4.7.10. 2x rated voltage.

For saturating core, applied voltage shall be two times rated peak to peak voltage at two times rated frequency. For pulse transformers, the applied voltage shall be as specified in Table XIV of MIL-PRF-27.

2.2.7 Electrical tests

Electrical measurements including:

- DC resistance will be measured and compared to specification and prior measurements
- Inductance will be measured and compared to specification and prior measurements
- DWV will be tested with 500V_{AC}, ≤100 µA (MIL-STD-202, Method 301)
- IR will be tested with 500V_{DC} (MIL-STD-202, Method 302)

2.2.8 Visual inspection & Check for lot Failure

External Visual Inspection shall be performed in accordance with MIL-STD-1580B, par. 15.1.1.1.

Environmental and Mechanical Test Failure.
The following shall be counted as component failures:
Components which fail during tests for which the pass/fail criteria are inherent in the test method, i.e. Thermal Shock and External Visual Inspection.

Parameter Limit Failure.
A component shall be counted as a limit failure if one or more parameters exceed the limits shown in Room Temperature Electrical Measurements or High and Low Temperatures Electrical Measurements in the Magnetic Sheet.

Other Failures.
A component shall be counted as a failure in any of the following cases:

- Visual failure.
- Mechanical failure.
- Handling failure.
- Lost component.

Any component which exhibits a limit failure prior to the submission to Burn-in shall be rejected and not counted when determining lot rejection

If the number of components failed on the basis of the failure criteria exceeds 5% (rounded upwards to the nearest whole number) or 1 device, whichever is greater, of the components submitted to Burn-in, the lot shall be considered as failed.

2.3 LOT ACCEPTANCE TEST

Lot acceptance test will be performed upon customer request. It will be specified in the applicable Magnetic Sheet. All lots of components shall be subjected to tests and inspections in the sequence shown.

No:	Inspection/Test	Samples
1	Resistance to soldering heat	2
2	Solderability	2
3	Initial electrical measurements incl. DWV	2
4	Visual inspection	2
5	Life test	2
6	Electrical measurements incl. DWV	2
7	Visual inspection	2
8	Microsection	1
9	Check for LOT failure	2

Table 2-3: Lot Acceptance test flow

2.3.1 Resistance to soldering heat.

Terminals to be used for soldered connections shall be tested in accordance with MIL-PRF-27, with MIL-STD-202 Method 210.
Sample size: 2pcs.

2.3.2 Solderability

Terminals to be used for soldered connections shall be tested in accordance with MIL-PRF-27, with MIL-STD-202 Method 208.
Sample size: 2pcs.

2.3.3 Initial electrical measurements including DWV.

- Inductance will be measured
- DWV will be tested with $500V_{AC}$, ≤100 µA (MIL-STD-202, Method 301)
- IR will be tested with $500V_{DC}$ (MIL-STD-202, Method 302)
- Sample size: 2pcs

Electrical measurements during LAT shall be performed at room temperature: T_{amb}=25±5°C (note 1)

No.	Characterization	Symbol	Test conditions	Limits		Unit	Remarks
				Min.	Max.		
1	Insulation Resistance	IR	MIL-STD-202, Method 302 V=$500V_{DC}$	10.000	-	MΩ	-
2	Dielectric Withstanding Voltage	DWV	MIL-STD-202, Method 301 V=$500V_{AC}$, ≤100 µA	AS per Magnetic Sheet		V_{rms}	-

No.	Characterization	Symbol	Test conditions	Limits		Unit	Remarks
				Min.	Max.		
3	Inductance	L	As specified in Magnetic Sheet			mH	-
4	D.C. Resistance	R_{DC}				mΩ	-

Table 2-4: Electrical measurements (LAT)

Notes:

1. All measurements shall be read and recorded against serial number.

2.3.4 Visual inspection

External Visual Inspection shall be performed in accordance with MIL-STD-1580B, par. 15.1.1.1.
Sample size: 2pcs.

2.3.5 Life Test

Operating life test performed according MIL-STD-202, Method 108 with the following details:

- Operating conditions: the component shall be loaded with 100% rated power as specified in the Magnetic Sheet (see Annex I).
  - Transformers are biased, but not loaded[1].
  - Inductors are not biased
- Test duration: 2016 hours.
- Test temperature: 115°C max.
- Sample size: 2pcs

2.3.6 Electrical measurements including Dielectric Withstanding Voltage

- Inductance will be measured and compared to prior measurements
- DWV will be tested with 500V_{AC}, ≤100 µA (MIL-STD-202, Method 301)
- Insulation Resistance will be tested with 500V_{DC} (MIL-STD-202, Method 302)
- Sample size: 2pcs

2.3.7 Visual Inspection

External Visual Inspection shall be performed in accordance with MIL-STD-1580B, par. 15.1.1.1.
Sample size: 2pcs.

2.3.8 Microsection

A microsection will be performed on one sample of each type according to MIL-STD-1580B, par. 15.1.1.5.
Sample size: 1pc.

2.3.9 Check for LOT failure

No failure allowed

[1] Powered life test available on request