

RELIABILITY PRINCIPLES OVERVIEW GENERAL PRODUCTION

In order to guarantee highly reliable products to their customers, SRT-Microcéramique follows a strict quality policy which is explained below:

- According to AECQ philosophy, each component belongs to a family, which most restrictives members (four corners) have been fully qualified.
- PME components are produced in our Vendôme facility, with very stable process and equipments, in order to ensure Reliability and reproductibility.
- Reliability is based on batch tests, new product or equipment-specific qualifications and periodic requalifications.
- In addition to those regular tests, our quality departement launches regular accelerated tests to further deepens our reliability datas.
- Tests and qualifications of our standard products are based on AECQ methodology and are qualified according to the following limits.
- In accordance to AECQ methodology, specifics tests and limits can be adapted to fit our clients' needs.
- A whole range of stricter reliability tests can be offered for high Reliability products (burn-in, shocks, pulses...) for medical, space and defense applica-
- Based on our reliability database, FIT datas can be provided if necessary.

PRODUCTION CONTROL

Test conducted on each lot according to AECQ-200 framework

FREQUENCY	TEST/STRESS	REFERENCE	AEC-Q	DETAIL		
100%	Capa, DF, IR	CECC-32100-4.6		according to datasheet		
100%	Visual	CECC-32100-4.5	AEC-Q200-9	no visual defects		
50/lot	DPA		AEC-Q200-5	internal component integrity		
5/lot	Dimension	CECC-32100-4.5	AEC-Q200-5	according to datasheet		
5/lot	Resistance to soldering heat	CECC-32100-4.10	AEC-Q200-15			
5/lot	Solderability	CECC-32100-4.11	AEC-Q200-18			
10/lot	Voltage Breakdown	CECC-32100-4.6.4				
1/ceramic lot	Temperature coefficient	CECC 32100-Prgph4,7		according to datasheet		

QUALIFICATIONS

Each component family has been qualified according to CECC and AECQ tests methodology, which are renewed on a periodic basis.

FREQUENCY	TEST/STRESS	REFERENCE	AEC-Q	DETAIL	
Qualif	Electrical Characterization	CECC-32100-4.6 4.7	AEC-Q200-19	measure before test according to datasheet and after test according to post environmental limits	
Qualif	Temperature Cycling	JESD22 Method-JA method 104	AEC-Q200-4	1,000 cycles -55°C to +125°C Measurement at 24 \pm 2 hours after test conclusion	
Qualif	Biased Humidity	MIL-STD-202 Method 103	AEC-Q200-7	1,000 hours 85°C/85%RH. Rated voltage. Measurement at 24 ± 2 hours after test conclusion	
Qualif	Operational Life	MIL-STD-202 Method 108 condition D	AEC-Q200-8	8 1,000 hours at 125°C with apllied Voltage : 2xRV RV≤500V, 1.2xRV 500V <rv≤1250v, rv="">1250V</rv≤1250v,>	
Qualif	Terminal Strength	CECC-32100-4.8	AEC-Q200-6	1.8kg 60 seconds	
Qualif	Vibration	MIL-STD-202 Method 204	AEC-Q200-14	5g 20min 12cycles 3 orientations 10-2000Hz	
Qualif	Board Flex	CEC 32100-4.9	AEC-Q200-21	3mm Type 1, 2mm Type 2, Measurement at 24 \pm 2 hours after test conclusion	

POST ENVIRONMENTAL STRESS LIMIT

DIELECTRIC	DISSIPATION FACTOR (MAXIMUM)	CAPACITANCE SHIFT	INSULATION RESISTANCE	
NPO	≤ 4 10-3	±2%	10% initial limit	
N2T	≤ 6 10-3	±4%	10% initial limit	
X7R	≤ 0.035	±15%	10% initial limit	

This document is subject to change without notice







Tests and Qualifications Space applications



SPACE LEVEL COMPONENT SCREENED AND QUALIFIED ACCORDING TO ESCC-3009

SRT-Microcéramique can propose a wide range of BME and PME component from its catalog qualified and tested according to ESCC-3009 Revision 5 specifications for space applications. Both for development en evaluation and flight ready with full lot validation and ESCC standard documentation. Specific qualification programms can be included to meet final customer requirement.

SRT manufactured PME with standard production control or requalified source BME components directly or after termination change or mounting enter the following screening process:

SCREENING D3009

FREQUENCY	TEST/STRESS REFERENCE		DETAIL		
100%	Voltage conditioning	IEC Publication No. 60384-1 clause 4.23	100% 96H Tmax 2Un PDA 5%		
100%	Capa, DF, IR, VP (25°C)	ESCC3009 Chart F3	According to datasheet		
5/Lot	High and Low Temperatures Electri-	ESCC3009 Chart F3	According to datasheet, 0 fail or 100%		
5/lot	Dimension	ESCC Basic Specification No. 20500	According to datasheet (done in manufacturing, requalification process)		
5/lot	DPA	ESCC Basic Specification No. 23400	Internal component integrity		
100%	Visual	ESCC Basic Specification Nos. 20400 and 20500	No defect		
5/lot	Solderability	IEC Publication No. 60068-2-58	0 fail		

LOT VALIDATION D3009

GROUP	NB PCS	TEST/STRESS	REFERENCE	DETAIL		
<u> </u>	20	Mounting	ESCC3009 8.6	20 serialized pcs on PCB		
SUBGROUP 1		Thermal Shock	ESCC3009 8.7, IEC No. 60068-2-14	10 Cycles 30mn/1mn		
nBG		Humidity	ESCC3009 8.2	For Un<500V 1000h 85/85 Un≥500V not applicable		
0,		Criteria	ESCC3009	No visual/electrical default		
B		Mounting	ESCC3009 8.6	40 serialized pcs on PCB		
SUBGROUP 2A	40	Operationnal Life	ESCC3009 Chart F4, IEC No. 60384-1 clause 4.23.	1000h ±24 125°C (optionnal 2000h) 2U U<500V 1.5U 500≤U<1000 1.2U 1000≤U≤2000 1U U>2000		
S		Criteria	ESCC3009	No visual/electrical default		
<u> </u>		Mounting	ESCC3009 8.6	6 serialized pcs on PCB		
SUBGROUP 2B	6	TC	ESCC3009 8.10	IR at 125°C, CP at -55°C/25°C/125°C		
UBG	0	Shear Test	ESCC3009 8.7, IEC No. 60384-1	5N 10s		
O)		Criteria	ESCC3009	No visual/electrical default		
₽.	6	Solderability	ESCC3009 8.11, IEC No. 60068-2-58	Solder bath 235°C 5s ncluded in screening		
SUBGROUP 3		Permanence of Marking	ESCC3009 8.12	ESCC24800 when applicable		
SUE		Criteria	ESCC3009	No visual/electrical default		

LAT3=LVT3 = Subgroup 3/LAT2=LVT2 = Subgroup 2A + Subgroup 2B + Subgroup 3/LAT1=LVT1 = Subgroup 1 + Subgroup 2A + Subgroup 2B + Subgroup 3

SPACE LEVEL COMPONENT SCREENED ACCORDING TO COTS+ ECSS-Q-ST-60-13C-REV1

SRT-Microcéramique can apply the COTS+ qualification framework to any suitable component AEQ-200 or not, with or without termination change, to make them fly ready, offering a wide range of possibilities at competitive cost, either in Class 1 (COTS1), Class 2 (COTS2) or Class 3 (COTS3).

EVALUATION/SCREENING/LAT COTS1/COTS2/COTS3

Class 1 (COTS1), Class 2 (COTS2), Class 3 (COTS3)

AECQ-200	CLASS 1	CLASS 2	CLASS 3	CATEGORY	TEST TYPE	SAMPLE	PROCEDURE
Yes	Χ	Χ	Χ	Evaluation	Construction Analysis	5	ESCC21001
Yes	Χ	Χ	X	Evaluation	Temperature characterization	5	ESCC3009 8.10
Yes	Χ			Evaluation	Life Test 2000h	40	ESCC3009 8.6 + 8.9
Yes	Χ			Screening	Complete screening	100%	ESCC3009 chart F3
Yes	Χ	X	Χ	LAT	DPA	3	ESCC21001
Yes	Χ	Х		LAT	Life Test 1000h	20	ESCC3009 8.6 + 8.9
No	Χ	Χ	Χ	Evaluation	Construction Analysis	5	ESCC21001
No	Χ	X	Χ	Evaluation	Temperature characterization	5	ESCC 3009 8.10
No	Χ	Χ		Evaluation	Complete evaluation	72	ESCC 3009 chart F4
No			Χ	Evaluation	Life Test 1000h	40	ESCC3009 8.6 + 8.9
No	Χ	Χ	Χ	Screening	Complete screening	100%	ESCC3009 chart F3
No	Χ	Х	Χ	LAT	DPA	3	ESCC21001
No	Χ			LAT	Complete LAT	52	ESCC 3009 chart F4
No		Χ	Χ	LAT	Life Test 1000h	20	ESCC3009 8.6 + 8.9

TINNING

All component for space application can be proposed with dipped SnPb termination (Sn62 Pb36 Ag2) or SAC 305 (Sn96.5 Ag3 Cu0.5) for maximum reliability and whiskers avoidance.

This document is subject to change without notice.







