Specification for Space Grade Capacitors

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE (10uF, CWR29D Capacitor, Part No. CWR29HC106JCDC or equivalent with Compliance to Technical Specifications and QA Annexure)

SI No	Specification	Specification Value	Compliance
1	Package Style	SMD	
2	Capacitor Value	10uF	
3	Dielectric Material	Tantalum	
4	Tolerance	5%	
5	Rated Voltage	15V	
6	Capacitor Size	CWR29, Case Size D	
7	Termination Finish	Hot Solder Dipped	
8	Part No.	CWR29HC106JCDC	

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE (10uF, CWR29H Capacitor, Part No. CWR29MC106JCHC or equivalent with Compliance to Technical Specifications and QA Annexure)

SI No	Specification	Specification Value	Compliance
1	Package Style	SMD	
2	capacitor Value	10uF	
3	Dielectric Material	Tantalum	
4	Tolerance	5%	
5	Rated Voltage	35V	
6	Capacitor Size	CWR29, Case Size H	
7	Termination Finish	Hot Solder dipped	
8	Part No.	CWR29MC106JCHC	

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE (150uF, CWR29H Capacitor, Part No. CWR29FC157JCHC or equivalent with Compliance to Technical Specifications and QA Annexure)

SI No	Specification	Specification Value	Compliance
1	Package Style	SMD	
2	capacitor Value	150uF	
3	Dielectric Material	Tantalum	
4	Tolerance	5%	
5	Rated Voltage	10V	
6	Capacitor Size	CWR29, Case Size H	
7	Termination Finish	Hot solder dipped	
8	Part No.	CWR29FC157JCHC	

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE (1uF,CKS54 Capacitor, Part No. M123A13BXB105KS or equivalent with compliance to Technical Specifications and QA annexure)

SI No	Specification	Specification Value	Compliance
1	Package Style	SMD	
2	capacitor Value	1uF	
3	Dielectric Material	Ceramic	
4	Tolerance	10%	
5	Rated Voltage	50V	
6	Capacitor Size	CKS51	
7	Termination	Solder Coated	
8	Mil Part No.	M123A13BXB105KS	

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE (0.1 uF, CKS53 Capacitor, Part No. M123A12BXB104KS or equivalent with Compliance to Technical Specifications and QA annexure)

SI No	Specification	Specification Value	Compliance
1	Package Style	SMD	
2	Capacitor Value	0.1uF	
3	Dielectric Material	Ceramic	
4	Tolerance	10%	
5	Rated Voltage	50V	
6	Termination Finish	Solder coated	
7	Capacitor Size	CKS53	
8	Mil Part No.	M123A12BXB104KS	

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE (0.22uF, CKS54Capacitor, Part No.M123A13BXB224KS or equivalent with compliance to Technical Specifications and QA Annexure)

SI No	Specification	Specification Value	Compliance
1	Package Style	SMD	
2	Capacitor Value	0.22uF	
3	Dielectric Material	Ceramic	
4	Tolerance	10%	
5	Rated Voltage	50V	
6	Termination Finish	Solder Coated	
7	Capacitor Size	CKS54	
8	Mil Part No.	M123A13BXB224KS	

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE (1nF, CKS51 Capacitor, Part No. M123A10BXB102KS or equivalent with compliance to Technical Specifications and QA Annexure)

SI No	Specification	Specification Value	Compliance
1	Package Style	SMD	
2	Capacitor Value	1 nF	
3	Dielectric Material	Ceramic	
4	Tolerance	10%	
5	Rated Voltage	50V	
6	Termination Silver -	Solder Coated	
7	Capacitor Size	CKS51	
8	Mil Part No.	M123A10BXB102KS	

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE(0.47nF,CDR31BP Capacitor ,Part No.CDR31BP471AKU or equivalent with compliance to Technical Specifications and QA Annexure)

SI No	Specification	Specification Value	Compliance
1	Package Style	SMD	
2	Capacitor Value	0.47nF	
3	Dielectric Material	Ceramic	
4	Tolerance	10%	
5	Rated Voltage	50V	
6	Termination Finsh	Solder Finish	
7	Capacitor Size	CDR31	
8	Part No.	CDR31BP471AKU	

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE (0.01uF,CDR31BX capacitor ,Part No.CDR31BX103AKSR or equivalent with compliance to Technical Specifications and QA annexure)

SI No	Specification	Specification Value	Compliance
1	Package Style	SMD	
2	Capacitor Value	0.01uF	
3	Dielectric Material	Ceramic	
4	Tolerance	10%	
5	Rated Voltage	50V	
6	Termination Finish	Solder Finish	
7	Capacitor Size	CDR31	
8	Part No.	CDR31BX103AKSR	

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE (0.47uF ,CDR35BX ,Part No.CDR35BX474AKUS or equivalent with compliance to Technical specifications and QA Annexure)

SI No	Specification	Specification Value	Compliance
1	Package Style	SMD	
2	Capacitor Value	0.47uF	
3	Dielectric Material	Ceramic	
4	Tolerance	10%	
5	Rated Voltage	50V	
6	Termination Finish	Solder Finish	
7	Capacitor Size	CDR35	
8	Part No.	CDR35BX474AKUS	

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE(22nF, 0805 capacitor ,Part No. 300904103223JE or Equivalent with Compliance to Technical Specifications and QA Annexure)

SI No	Specification	Specification Value	Compliance	
1	Package Style	SMD		
2	Capacitance Value	22nF		
3	Dielectric Material	Ceramic		
4	Capacitance Tolerance	5%		
5	Voltage Rating	100V		
6	Termination Finish	Sn/Pb Plating		
7	Capacitor Size	0805		
8	ESCC part No.	300904103223JE or		
		Equivalent		

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE(4.7uF,1812 capacitor Part No.300904106475KC or equivalent with Technical Compliance to Technical Specifications and QA Annexure)

SI No	Specification	Specification Value	Compliance
1	Package Style	SMD	
2	Capacitance Value	4.7uF	
3	Dielectric Material	Ceramic	
4	Capacitance Tolerance	10%	
5	Voltage Rating	50V	
6	Termination Finish	Sn/Pb Plating	
7	Capacitor Size	1812	
8	ESCC Part No.	300904106475KC or equivalent	

Specification for GENERAL ELECTRONICS COMPONENTS HIREL SPACE GRADE(68uF,CH74,Part No.300103041B686KC or equivalent with Technical Compliance to Technical Specifications and QA Annexure)

SI No	Specification	Specification Value	Compliance
1	Package Style	SMD	
2	Capacitance Value	68uF	
3	Dielectric Material	Ceramic	
4	Capacitance Tolerance	10%	
5	Voltage Rating	50V	
6	Capacitor Size	CH74	
7.	Lead Finish	Hot solder dipped with nickel under plating	
8.	ESCC part No.	300904106475KC	

6b	A copy of the authorization letter endorsed by the Original Part Manufacturer.	
6c	Ordering information, Details of marking on components and marking on the component bag/package/label.	
7	The following details shall be supplied along with the deliverable components.	
7a	The Certificate of Conformance (CoC) from the Original Part Manufacturer.	
7b	The Certificate of Conformance (CoC) from the vendor if quote is not from OEM.	
7c	Soft copy of Test data Group A summary	
8	Important notes	
8a	Point by point compliance with supporting documents as described above in para 1 to 7 shall be submitted along with the technical quote. Additionally, if supplier is HRPPA/authorized representative of HRPPA, all the details as per para 6c shall be submitted along with quote with the supporting technical documents/certificates. Failing so the offer is liable to be rejected.	

QA REQUIREMENTS FOR CKS STYLE CAPACITORS			
Sr. No.	SAC requirement description	Compliance Remark(s)	
	Indent Line item- 4 to 7		
1	The capacitors, shall be qualified to and as per the latest MIL-PRF-123 applicable specifications.		
2	The offered part(s) and the Part-manufacturer should be listed on the latest QML-123.		
3	The capacitors, to be delivered, shall have a Single Lot Date Code (preferable) not older than two years from the date of shipment to SAC(mandatory).		
4	The PIN (Part Identification Number) / Marking on the parts and the marking on the part package/container shall be as per the MIL-PRF-123 specification.		
5	The capacitors shall be supplied in the standard waffle packages. Tape & reel packaging shall not be acceptable.		
6	The following details shall be supplied along with proposal.		
6a	Name of the original part manufacturer.		
6b	The vendor(s) authorized by original part manufacturer to source and sell parts in INDIA shall only be considered. Latest copy of authorization letter and point by point compliance endorsed by the Original Part Manufacturer in case quote is not from OEM. OR		
	If quote is from Authorized Representative of HI-REL Parts Procurement Agency (HRPPA); Copy of latest authorization letter and point by point compliance endorsed by the HRPPA.		
6c	If supplier is HI-REL Parts Procurement Agency (HRPPA) OR Representative of HRPPA; in addition to all the quality requirement of this Indent compliance		

	with the supporting documents/certificates for the following shall be provided
	along with the quote-
	The vendor should have more than 5 years of experience as HRPPA. Details regarding the same shall be supplied.
	Details of EEE parts supplied to other customers with name of space programs supported and Space agencies / Satellite payload manufacturers.
	Supplied parts shall meet Manufacturer recommended storage & cleanliness condition
	Outline of the Vendor's operating procedure, for compliance to quality requirements of this document; including details of mechanism for traceability up to Original Parts Manufacturer.
	Details of Quality documents that will be supplied along with deliverables
	For off-the-shelf parts following shall be provided along with quote-
	 Date-code of supplied parts Storage and inspection criteria to be supplied whenever applicable Technical and Quality Procurement specifications Acceptability of such off-the-shelf parts will be at SAC's discretion
6d	The latest data sheet of the offered part(s) indicating electrical, mechanical, environmental specifications and engineering drawing.
6e	Ordering information, Details of marking on components and marking on the component bag/package/label.
7	The following details shall be supplied along with the deliverable components.
7a	The CoC from the original part manufacturer.
7b	The data package, as per the mandatory requirements of the MIL-PRF-123, if ordered in PO
7c	The Certificate of Compliance (CoC) from the supplier/vendor.
7d	The data sheet of the delivered part(s) indicating electrical, mechanical, environmental specifications and engineering drawing.
8	Important notes
	Point by point compliance with supporting documents as described above in para 1 to 7 shall be submitted along with the technical quote.
8a	Additionally, if supplier is HRPPA/authorized representative of HRPPA, all the details as per para 6c shall be submitted along with quote with the supporting technical documents/certificates.
	Failing so the offer is liable to be rejected.

		QA REQUIREMENT	rs for CDR STYLE CA	PACITORS	
Sr. No.		SAC requirer	nent description		Compliance Remark(s)
	Indent Line item- 8 to	o 10			
	The capacitors shall be qualified to and as per the latest specification MIL-PRF-55681 applicable specifications, Established Reliability `S' level Failure rate.				
	Table - I Additional Testing Requirements for <50V rated Capacitors				
	Inspection Test	Test method/ condition	Sample size per lot having Single Date Code	No of Rejection allowed	
1		MIL-PRF-123B,	12	0	
	state, low voltage	Table XI, Group B,			
		Subgroup 2			
	Destructive Physical Analysis (DPA)	MIL-PRF-123B, Table X, Group A, Subgroup 3	5	0	
2	The offered part(s) and the Part-manufacturer should be listed on the latest QML-55681.				
3	The deliverable capacitors shall have a Single Lot Date Code (SLDC) notolder than two years from the date of shipment to SAC.				
4	The PIN (Part Identification Number) / Marking on the parts as well as marking on the part label/package/container shall be as per the MIL-PRF-55681 specification.				
5	The capacitors shall b	oe supplied in standa	rd anti-corrosive pacl	kages.	
6	The following details	s shall be supplied alo	ong with proposal.		
6a	Name of the original	part manufacturer.			
6b	The vendor(s) authorized by original part manufacturer to source and sell parts in INDIA shall only be considered. Latest copy of authorization letter and point by point compliance endorsed by the Original Part Manufacturer in case quote is not from OEM. OR				
	If quote is from Authorized Representative of HI-REL Parts Procurement Agency (HRPPA); Copy of latest authorization letter and point by point compliance endorsed by the HRPPA.				
6c	If supplier is HI-REL Parts Procurement Agency (HRPPA) OR Representative of HRPPA; in addition to all the quality requirement of this Indent compliance with the supporting documents/certificates for the following shall be provided along with the quote-			-	
	The vendor should have more than 5 years of experience as HRPPA. Details regarding				

	the same shall be supplied.	
	the same shall be supplied.	
	Details of EEE parts supplied to other customers with name of space programs	
	supported and Space agencies / Satellite payload manufacturers.	
	Supplied parts shall meet Manufacturer recommended storage & cleanliness condition	
	Outline of the Vendor's operating procedure, for compliance to quality requirements of this document; including details of mechanism for traceability up to Original Parts Manufacturer.	
	Details of Quality documents that will be supplied along with deliverables	
	For off-the-shelf parts following shall be provided along with quote- • Date-code of supplied parts • Storage and inspection criteria to be supplied whenever applicable • Technical and Quality Procurement specifications	
	Acceptability of such off-the-shelf parts will be at SAC's discretion	
6b	Ordering information, Details of marking on components and marking on the component bag/package/label.	
6c	A copy of the authorization letter issued by the original part manufacturer.	
6d	The details of previous QCI Group `C' inspection (carried out as a mandatory requirement to retain the qualification status on QML-55681). A copy of test report/detail of the same shall be provided with quote.	
6e	The status of qualification (to MIL-PRF-55681), of offered part and part- manufacturer. A copy of Qualification Certificate and relevant pages of the QML-55681 be attached in the quote.	
6f	The latest data sheet of the offered part(s) indicating electrical, mechanical, environmental specifications and engineering drawing.	
7	The following details shall be supplied along with the deliverable components.	
7a	The Certificate of Compliance (CoC) from the Original Part Manufacturer.	
7b	The Certificate of Compliance (CoC) from the supplier/vendor.	
7c	The data sheet of the delivered part(s) indicating complete electrical, mechanical, environmental specifications and engineering drawing.	
8	Important notes	
8a	Point by point compliance with supporting documents as described above in para 1 to submitted along with the technical quote. Additionally, if supplier is HRPPA/authorized representative of HRPPA, all the details as p shall be submitted along with quote with the supporting technical documents/certificates. Failing so the offer is liable to be rejected.	

	QA REQUIREMENTS FOR BME CERAMIC CAPACITORS			
Sr. No.	SAC requirement description	Compliance Remark(s)		
	Indent line item-11 & 12			
1	The capacitors, to be supplied, shall fully comply with any one of the quality requirements described in 1a/1b as below:			
1a	Qualified to and as per the latest ESCC 3009/041 applicable specification with in process inspection, chart F2 and F3 testing.			
1b	Qualified to and as per the latest MIL-PRF-32535 applicable specification with high reliability 'T' level including Group A & B.			
2	Parts shall be listed on QPL of applicable MIL/ESCC specification.			
3	The deliverable capacitors shall have a Single Lot Date Code (SLDC) (preferable) and not older than two years (mandatory) from the date of shipment to SAC.			
4.	PIN marking on component/component bag shall be as per applicable ESCC/MIL standard with logo.			
5	Capacitors shall be clean, dry, and packaged as per the part number designation, in an electrostatic discharge (ESD) safe <i>waffle package</i> , in a secure manner that will offer adequate protection against corrosion, deterioration, and physical damage.			
	Tape & reel packaging shall not be acceptable.			
6	The following details shall be supplied along with proposal.			
6a	Name of the Original Part Manufacturer.			
6b	The vendor(s) authorized by original part manufacturer to source and sell parts in INDIA shall only be considered. Latest copy of authorization letter and point by point compliance endorsed by the Original Part Manufacturer in case quote is not from OEM. OR			
	If quote is from Authorized Representative of HI-REL Parts Procurement Agency (HRPPA); Copy of latest authorization letter and point by point compliance endorsed by the HRPPA.			
	If supplier is HI-REL Parts Procurement Agency (HRPPA) OR Representative of HRPPA; in addition to all the quality requirement of this Indent compliance with the supporting documents/certificates for the following shall be provided along with the quote-			
6с	The vendor should have more than 5 years of experience as HRPPA. Details regarding the same shall be supplied. Details of EEE parts supplied to other customers with name of space			
	programs supported and Space agencies / Satellite payload manufacturers.			

	Supplied parts shall meet Manufacturer recommended storage & cleanliness condition.	
	Outline of the Vendor's operating procedure, for compliance to quality requirements of this document; including details of mechanism for traceability up to Original Parts Manufacturer.	
	Details of Quality documents that will be supplied along with deliverables	
	For off-the-shelf parts following shall be provided along with quote-	
	 Date-code of supplied parts Storage and inspection criteria to be supplied whenever applicable Technical and Quality Procurement specifications 	
	Acceptability of such off-the-shelf parts will be at SAC's discretion	
7	The followings shall be supplied along with the deliverable components.	
7a	Certificate of Conformance (CoC) from the original part manufacturer.	
7b	Certificate of Conformance (CoC) from the vendor/supplier.	
7c	Soft copy of test data summary as per applicable.MIL/ESCC standard	
7d	A copy of guideline/application note pertaining to the handling, storage, mounting, soldering/fabrication of the offered capacitors if any.	
8	Important notes:	
	Point by point compliance with supporting documents as described above in para 1 to 7 shall be submitted along with the technical quote.	
8a	Additionally, if supplier is HRPPA/authorized representative of HRPPA, all the details as per para 6c shall be submitted along with quote with the supporting technical documents/certificates.	
	Failing so the offer is liable to be rejected.	

	QA REQUIREMENTS FOR ESCC CH STYLE CAPACITORS				
Sr. No.	SAC requirement description	Compliance Remark(s)			
1	Indent line item-13 Capacitors shall be qualified to and as per the latest ESCC 3001/030 specifications with chart F2 & F3 testing. The offered part(s) and the part manufacturer should be listed on the latest ESCC QPL				
2	The deliverable capacitors shall preferably have a Single Lot Date Code (SLDC). Parts should not be older than two years from the date of shipment to SAC.				
3	PIN/marking on the parts as well as marking on its label/container/package shall be as per the applicable ESCC specification bearing the ESCC logo.				
4	The capacitors shall be supplied in standard packages.				
5	The following details shall be supplied along with proposal.				
5a	Name of the Original Part Manufacturer.				
5b	The vendor(s) authorized by original part manufacturer to source and sell parts in INDIA shall only be considered. Latest copy of authorization letter and point by point compliance endorsed by the Original Part Manufacturer in case quote is not from OEM. OR				
	If quote is from Authorized Representative of HI-REL Parts Procurement Agency (HRPPA): Copy of latest authorization letter and point by point compliance endorsed by the HRPPA.				
	If supplier is HI-REL Parts Procurement Agency (HRPPA) OR Representative of HRPPA; in addition to all the quality requirement of this Indent compliance with the supporting documents/certificates for the following shall be provided along with the quote-				
	The vendor should have more than 5 years of experience as HRPPA. Details regarding the same shall be supplied.				
	Details of EEE parts supplied to other customers with name of space programs supported and Space agencies / Satellite payload manufacturers.				
5c	Supplied parts shall meet Manufacturer recommended storage & cleanliness condition.				
	Outline of the Vendor's operating procedure, for compliance to quality requirements of this document; including details of mechanism for traceability up to Original Parts Manufacturer.				
	Details of Quality documents that will be supplied along with deliverables				
	 For off-the-shelf parts following shall be provided along with quote- Date-code of supplied parts Storage and inspection criteria to be supplied whenever applicable Technical and Quality Procurement specifications 				

	Acceptability of such off-the-shelf parts will be at SAC's discretion	
5d	The exact ESCC part no. of the offered part(s) and its cross reference with the generic/manufacturer' part no.	
5e	The latest data sheet(s) of the offered part(s) indicating electrical, mechanical, environmental specifications and engineering drawing. The attached data-sheet shall be endorsed by the vendor/supplier.	
6	The followings shall be supplied along with the deliverable components.	
6a	Certificate of Compliance (CoC) from the original part manufacturer.	
6b	Certificate of Compliance (CoC) from the vendor/supplier.	
6c	Soft copy of test data package as per the applicable ESCC 3001 specification if ordered.	
6d	A copy of guideline/application note pertaining to the handling, storage, mounting, soldering/fabrication of the offered capacitors.	
7	Important notes:	
72	Point by point compliance with supporting documents as described above in para 1 to 6 shall be submitted along with the technical quote. Additionally, if supplier is HRPPA/authorized representative of HRPPA, all the	
7a	details as per para 6c shall be submitted along with quote with the supporting technical documents/certificates.	
	Failing so the offer is liable to be rejected.	