Overview of Vishay Draloric IECQ-CECC Approved Products

This document serves as a supplement to several datasheets for resistors with IECQ-CECC approval. It provides the exact listing of all approved products, with given conditions and affected resistance ranges, as confirmed by the respective marks' licenses. For a start, below are a few basics to this quality assessment system:

QUALITY ASSESSMENT SYSTEM

The INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) supports the QUALITY ASSESSMENT SYSTEM FOR ELECTRONIC COMPONENTS (IECQ system) by means of a dedicated sub-organization, the IECQ.

The IECQ provides a set of rules and procedures, which are available on their website at https://www.iecq.org. While the actual work related to the quality assessment of electronic components, including the auditing of the applicants, is executed by designated IECQ Certification Bodies (IECQ CB), the IECQ operates a database for publication of the approval certificates at https://certificates.iecq.org.

Whereas the IECQ has established other quality assessment systems before, the Quality Assessment System for Electronic Components has been adopted from the HARMONIZED SYSTEM OF QUALITY ASSESSMENT FOR ELECTRONIC COMPONENTS established by the CENELEC ELECTRONIC COMPONENTS COMMITTEE (CECC), then a part of the COMITÉ EUROPÉEN DE NORMALISATION ELECTROTECHNIQUE (CENELEC, European Committee for Electrotechnical Standardization). In the CECC system, the certification body has been addressed as NATIONAL SUPERVISING INSPECTORATE (NSI, or ONS). Reference to the origin of this Quality Assessment System is maintained by our continued use of the designation IECQ-CECC.

CECC ceased its operations in 2003, after which CENELEC leased the renowned CECC MARK OF APPROVAL to the IECQ.

APPROVAL OF MANUFACTURER

Prerequisites to the manufacturer's quality management system apply for obtaining any certification within the IECQ Quality Assessment System for Electronic Components (IECQ System), as detailed in IECQ 03-1, Clauses 8 and 9, with detailed references to IEC 9001 and to ISO/IEC 17025.

Note

- Prior to the release of IECQ 03-1, these prerequisites were covered by a separate approval of an organization, e.g. approval of a manufacturer, with the requirements given in IEC QC 001002-3, Clause 2, and before in EN 100114-1 or its predecessor CECC 00 114/I

The Approval of Manufacturer has been achieved by Draloric, Selb, continuously since 1974 (online certificate IECQ-P VDE 18.0005), followed by the respective approvals for the production in Fichtelberg (DE) (IECQ-P VDE 18.0004-01) and in Dolní Rychnov (CZ) (IECQ-P VDE 18.0004-02) in 1993, These approvals are granted by the VDE Testing and Certification Institute and registered as No. 4820/10.74 and No. 4820/01.93.

QUALIFICATION APPROVALS

IECQ offers as part of its IECQ APPROVED COMPONENT PRODUCTS, RELATED MATERIALS & ASSEMBLIES SCHEME for qualification of electronic components the IECQ APPROVED COMPONENT CERTIFICATION. While the procedural requirements are detailed in IECQ 03-3, the technical requirements, including test schedules, severities, and performance requirements, are applied from the respective specification documents.

For resistors, the CENELEC detail specifications, e.g. CECC 40 201-801, or EN 140401-803, which relate to subordinate sectional and generic specifications from the EN 60115-x series, provide the required details.

Note

- Prior to the release of the IECQ 03-3-1, the Qualification Approval was covered by IEC QC 001002-3, Clause 3, and before by EN 100114-2 and its predecessor CECC 00 114/II

Qualification approvals have been achieved by Draloric since 1974 for their variety of leaded film resistors, since the mid 1980s for their thin film SMD MELF resistors.

1. POWER WIREWOUND RESISTORS, VITREOUS ENAMEL COATED, WITH LEADS

The CENELEC Specification

CECC 40 201-801, Detail Specification: Fixed power resistors – Wirewound, vitreous enamel – Stability class 5

provides a suitable basis for the qualification of wirewound power resistors with leads, hence for our family of FD_ vitreous axial leaded wirewound resistors.

Further to an elaborate test schedule for the initial qualification of the concerned resistors, the detail specification CECC 40 201-801 prescribes an extensive schedule for quality conformance inspections, consisting of lot by lot tests and of periodic tests scheduled for a frequency of 3 months, 12 months, or 36 months, as appropriate.

1.1 APPROVAL TO VERSION A REQUIREMENTS

CECC 40 201-801 defines version A for the approval of products that are 100 % tested for their resistance value.

Product approval to version A is established in order to support the characteristic functional, performance, and reliability requirements of high performance electronic equipment, where one or more of the following criteria apply: uninterrupted performance is desired or mandatory, operation in harsh environmental conditions, and / or extended lifetime.

Applications demanding such criteria are typically found in the fields of industrial electronics, telecommunication infrastructure, and in all kinds of mobility.

The requirements for the approval of the products are graduated to climatic categories (given as: negative lower category temperature / upper category temperature / duration of damp heat, steady state test), and to stability classes, summarizing stability requirements to individual tests in appropriate groups.

1.1.1 PRODUCTION IN FICHTELBERG (DE) AND IN DOLNÍ RYCHNOV (CZ)

PRODUCTS APPROVED TO CECC 40 201-801, VERSION A APPLYING CLIMATIC CATEGORY 55 / 200 / 56 AND STABILITY CLASS 5

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE [1]	%	CODE			
FDG	A	n/a	**FDG E0** [G202 - FDG E0]	± 250	U	± 5	J	0.10 Ω to 10 kΩ	5	E12
						± 2	G			E24
FDK			**FDK E0** [G204 - FDK E0]			± 5	J	0.10 Ω to 39 kΩ		E12
						± 2	G	0.10 Ω to 22 kΩ		E24
FDP			**FDP E0** [G206 - FDP E0]			± 5	J	0.15 Ω to 68 kΩ		E12
						± 2	G	0.15 Ω to 33 kΩ		E24

Notes

- Related datasheet:
  FDG, FDK, FDP, Axial Vitreous Leaded Wirewound Resistors With CECC Approval, Available With Established Reliability, Document 21046, see www.vishay.com/doc?21046

(1) TCR code as per IEC 60062. There is no TCR code used in the Vishay part number for these products

The Qualification Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0007 for the Fichtelberg (DE) site, and IECQ-C VDE 18.0007-01 for the Dolní Rychnov (CZ) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 40016957 for both sites.

Vishay Electronic GmbH - Draloric has been assigned the manufacturer code **DE VEF** for their resistor production of wirewound resistors in Fichtelberg (DE) and in Dolní Rychnov (CZ) within the CECC Harmonized System of Quality Assessment for Electronic Components. This manufacturer code is used on the labels of the IECQ-CECC approved power wirewound resistors, vitreous enamel coated, with leads (Version A) produced in Fichtelberg (DE) and in Dolní Rychnov (CZ).

1.2 APPROVAL TO VERSION E REQUIREMENTS

CECC 40 201-801 defines version E for the approval of products that are 100 % tested for their resistance value, in addition to the assessment of a failure rate level (FRL) based on accumulated true long term endurance test performance of an extended sample size.

Product approval to version E is established in order to support the characteristic functional, performance, and reliability requirements of high performance and high reliability electronic equipment, where the requirement for established reliability and an assessed failure rate level applies, in addition to the criteria stated above for version A.

Applications demanding such criteria are typically found in the fields of military and aeronautic electronics.

The requirements for the approval of the products are graduated to climatic categories (given as: negative lower category temperature / upper category temperature / duration of damp heat, steady state test), and to stability classes, summarizing stability requirements to individual tests in appropriate groups.

1.2.1 PRODUCTION IN FICHTELBERG (DE) AND IN DOLNÍ RYCHNOV (CZ)

PRODUCTS APPROVED TO CECC 40 201-801, VERSION E APPLYING CLIMATIC CATEGORY 55 / 200 / 56 AND STABILITY CLASS 5

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE [1]	%	CODE			
FDG	E	E7	**FDG E7** [G202 - FDG E7]	± 250	U	± 5	J	0.10 Ω to 10 kΩ	5	E12
						± 2	G			E24
FDK			**FDK E7** [G204 - FDK E7]			± 5	J	0.10 Ω to 39 kΩ		E12
						± 2	G	0.10 Ω to 22 kΩ		E24
FDP			**FDP E7** [G206 - FDP E7]			± 5	J	0.15 Ω to 68 kΩ		E12
						± 2	G	0.15 Ω to 33 kΩ		E24

Notes

- Related datasheet:
  FDG, FDK, FDP, Axial Vitreous Leaded Wirewound Resistors With CECC Approval, Available With Established Reliability, Document 21046, see www.vishay.com/doc?21046

[1] TCR code as per IEC 60062. There is no TCR code used in the Vishay part number for these products

The Qualification Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0007 for the Fichtelberg (DE) site, and IECQ-C VDE 18.0007-01 for the Dolní Rychnov (CZ) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 40016957 for both sites.

Vishay Electronic GmbH, business unit Draloric, has been assigned the Commercial and Government Entity (CAGE) code **D1018** on account of the approval of their products by the German Federal Office for Defense Technology and Procurement (BWB). This CAGE code is used on the labels of the IECQ-CECC approved power wirewound resistors, vitreous enamel coated, with leads (Version E) produced in Fichtelberg (DE) and in Dolní Rychnov (CZ).

2. LOW POWER THIN FILM MELF RESISTORS FOR SMD ASSEMBLY

The European Standard

EN 140401-803, Detail specification: Fixed low power film SMD resistors - Cylindrical - Stability classes 0.05; 0.1; 0.25; 0.5; 1; 2

provides a suitable basis for the qualification of low power thin film MELF resistors for SMD assembly, hence for our SMM0204 thin film MINI-MELF resistors.

Further to an elaborate test schedule for the initial qualification of the concerned resistors, the detail specification EN 140401-803 prescribes an extensive schedule for quality conformance inspections, consisting of lot by lot tests and of periodic tests scheduled for a frequency of 3 months, 12 months, or 36 months, as appropriate. An additional requirement of EN 140401-803 is the application of a suitable screening method for the reduction of an early failure rate.

2.1 APPROVAL TO VERSION A REQUIREMENTS

EN 140401-803 defines version A for the approval of products that are 100 % tested for their resistance value.

Product approval to version A is established in order to support the characteristic functional, performance, and reliability requirements of high performance electronic equipment, where one or more of the following criteria apply: uninterrupted performance is desired or mandatory, operation in harsh environmental conditions, and / or extended lifetime.

Applications demanding such criteria are typically found in the fields of industrial electronics, telecommunication infrastructure, and in all kinds of mobility.

The requirements for the approval of the products are graduated to climatic categories (given as: negative lower category temperature / upper category temperature / duration of damp heat, steady state test) and to stability classes, summarizing stability requirements to individual tests in appropriate groups.

2.1.1 PRODUCTION IN SELB (DE)

PRODUCTS APPROVED TO EN 140401-803, VERSION A APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5; 2

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE [1]	%	CODE			
RC3715M	A	n/a	**SMM0204 EN803 E0**	± 50	R	± 1	F	1 Ω to < 10 Ω	0.5	No prescription of E-Series
								10 Ω to 332 kΩ	0.25	
								> 332 kΩ to 2.21 MΩ	2	
				± 25	Q	± 0.5	D	10 Ω to 332 kΩ	0.25	
						± 0.25	C	22 Ω to 332 kΩ		
						± 0.1	B	43 Ω to 332 kΩ		
				± 15	P	± 0.25	C	22 Ω to 221 kΩ		
						± 0.1	B	43 Ω to 221 kΩ		
			OMM0204 EN803 E0	n/a		n/a		0 Ω	n/a	-

Notes

- Related datasheet:
  SMM0204, Thin Film MINI-MELF Resistors, Document 20004, see www.vishay.com/doc?20004

(1) TCR code as per IEC 60062, applied in EN 140401-803, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

The Qualification Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0008 for the Selb (DE) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 115578.

Vishay Electronic GmbH, business unit Draloric, has been assigned the manufacturer code **DE VEM** within the CECC Harmonized System of Quality Assessment for Electronic Components. This manufacturer code is used on the labels of the IECQ-CECC approved low power thin film MELF resistors for SMD assembly (Version A) produced in Selb (DE).

2.2 APPROVAL TO VERSION E REQUIREMENTS

EN 140401-803 defines version E for the approval of products that are 100 % tested for their resistance value, in addition to the assessment of a failure rate level (FRL) based on accumulated true long term endurance test performance of an extended sample size.

Product approval to version E is established in order to support the characteristic functional, performance, and reliability requirements of high performance and high reliability electronic equipment, where the requirement for established reliability and an assessed failure rate level applies in addition to the criteria stated above for version A.

Applications demanding such criteria are typically found in the fields of military and aeronautic electronics

The requirements for the approval of the products are graduated to climatic categories (given as: negative lower category temperature / upper category temperature / duration of damp heat, steady state test), and to stability classes, summarizing stability requirements to individual tests in appropriate groups.

2.2.2 PRODUCTION IN SELB (DE)

PRODUCTS APPROVED TO EN 140401-803, VERSION E APPLYING CLIMATIC CATEGORY 55 / 125 / 56 AND STABILITY CLASSES 0.25; 0.5; 2

STYLE	VERSION	FRL	PRODUCT DESIGNATION	TCR		TOLERANCE		RESISTANCE RANGE	STABILITY CLASS	E-SERIES
				ppm/K	CODE (1)	%	CODE			
RC3715M	E	E8	SMM0204 EN803 E8 MS1 EN803 E8	± 50	R	± 1	F	1.00 Ω to 9.76 Ω	0.5	E96
								10.0 Ω to 332 kΩ	0.25	
								340 kΩ to 2.21 MΩ	2	
				± 15	P	± 0.1	B	75.0 Ω to 100 kΩ	0.25	E192

Notes

- Related datasheets:
  SMM0204 … EN803 E8, MINI-MELF Resistors With Established Reliability
  Document 28786, see www.vishay.com/doc?28786
  MS1 …. EN803 E8, Lead (Pb)-Bearing MINI-MELF Resistors With Established Reliability
  Document 28787, see www.vishay.com/doc?28787

(1) TCR code as per IEC 60062, applied in EN 140401-803, which differs from the legacy TCR codes used in Vishay part numbers, see Annex 1

The Qualification Approval achieved within the IECQ Approved Component Scheme is presented as online certificate IECQ-C VDE 18.0008 for the Selb (DE) site. The approval is granted by the VDE Testing and Certification Institute and documented by the VDE Marks Approval No. 115578.

Vishay Electronic GmbH, business unit Draloric, has been assigned the Commercial and Government Entity (CAGE) code **D1018** on account of the approval of their products by the German Federal Office for Defense Technology and Procurement (BWB). This CAGE code is used on the labels of the IECQ-CECC approved low power thin film MELF resistors for SMD assembly (Version E) produced in Selb (DE).

ANNEX 1

TCR CODES			
TCR value	± 50 ppm/K	± 25 ppm/K	± 15 ppm/K
TCR coding as per IEC 60062	R	Q	P
TCR coding in Vishay Draloric part numbers	C	D	E

ANNEX 2
RELEVANT NORMATIVE DOCUMENTS

a) RULES OF PROCEDURE

IEC CA 01, *IEC Conformity Assessment Systems - Basic Rules*

IECQ 01-S, *IEC Quality Assessment System for Electronic Components (IECQ System) - IECQ Supplement to Harmonized Basic Rules IEC CA 01*

IECQ 03-1 [(1)], *IEC Quality Assessment System for Electronic Components (IECQ System) - Rules of procedure - Part 1: General Requirements for all IECQ Schemes*

IECQ 03-3 [(1)], *IEC Quality Assessment System for Electronic Components (IECQ System) - Rules of Procedure - Part 3: IECQ Approved Component Products, Related Materials & Assemblies Scheme*

Note

[(1)] The rules of procedure IECQ 03-x are successors of the prior IECQ documents IEC QC 001002-x, which have adopted the prior EN 100114-x and thereby the essence of the original CECC 00 114-x rules of procedure

b) RESISTOR SPECIFICATIONS

IEC 60115-1, *Fixed resistors for use in electronic equipment - Part 1: Generic specification*

EN 60115-1 [(1)], *Fixed resistors for use in electronic equipment - Part 1: Generic specification (IEC 60115-1, modified)*

IEC 60115-4, *Fixed resistors for use in electronic equipment - Part 4: Sectional specification - Fixed power resistors*

EN 140200 [(2)], *Sectional specification - Fixed power resistors*

IEC 60115-8, *Fixed resistors for use in electronic equipment - Part 8: Sectional specification - Fixed surface mount resistors*

EN 60115-8 [(3)], *Fixed resistors for use in electronic equipment - Part 8: Sectional specification - Fixed surface mount resistors (IEC 60115-8, modified)*

CECC 40 201-801 [(4)], *Detail specification: Fixed power resistors - Wirewound, vitreous enamel - Stability class 5*

EN 140401-803 [(5)], *Detail specification: Fixed low power film SMD resistors - Cylindrical - Stability classes 0.05; 0.1; 0.25; 0.5; 1; 2*

Notes

[(1)] EN 60115-1 has succeeded the prior generic specification EN 140000, which has been the successor of CECC 40 000

[(2)] EN 140200 has succeeded the prior sectional specification CECC 40 200

[(3)] EN 60115-8 has succeeded the prior sectional specification EN 140400, which has been the successor of CECC 40 400

[(4)] CECC 40 201-801 has succeeded the prior national detail specification CECC 40 201-012 (DIN 45921-210)

[(5)] EN 140401-803 has succeeded the prior detail specification CECC 40 401-803, which has been the harmonized successor of the prior national detail specifications CECC 40 401-005 (DIN 45921-403), merged for Version A, and CECC 40 401-001, merged for Version E