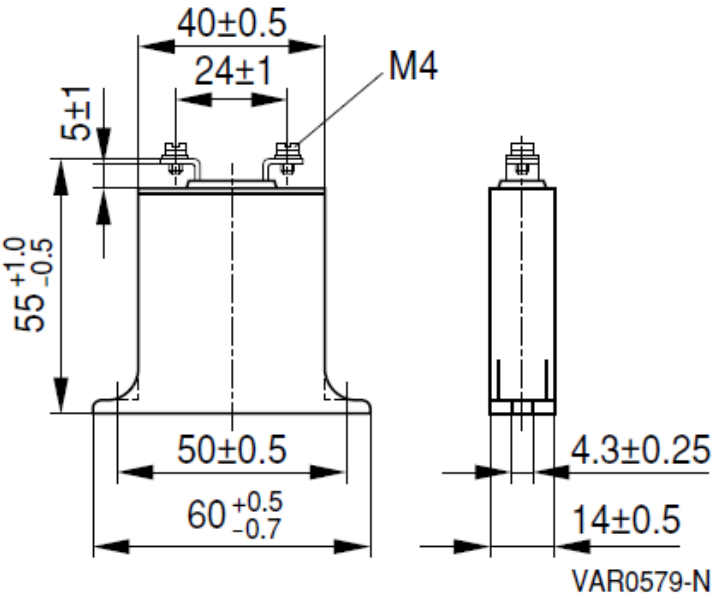
Specification available from: Österreichischer Verband für Elektrotechnik (ÖVE) A-1010 Wien, Eschenbachgasse 9	**IEC 61051-2-2 AT0005** **Issue 1 / 2017-04** QC 420102 AT0005
Electronic components of assessed quality in accordance with: IEC 61051-1: 2007-04 IEC 61051-2: 1991-01 IEC 61051-2 Amendment 1: 2009-05 IEC 60950-1: 2013-05 Annex Q IEC 62368-1: 2014-02 Annex G.8.2 QC 42000025	IEC 61051-2-2: 1991-01 QC 420102
Outline and dimensions for Standard types series B40  	ZINC OXYDE SURGE SUPPRESSION VARISTORS Insulated -Varistor element potted in plastic housing, screw terminals. Assessment level 'E'

NOTES

1 - Different voltage class in same size housing.
2 - The undimensioned details do not affect the performance of the device.
3 - The terminations are suitable for screwing..

SECTION ONE – GENERAL DATA

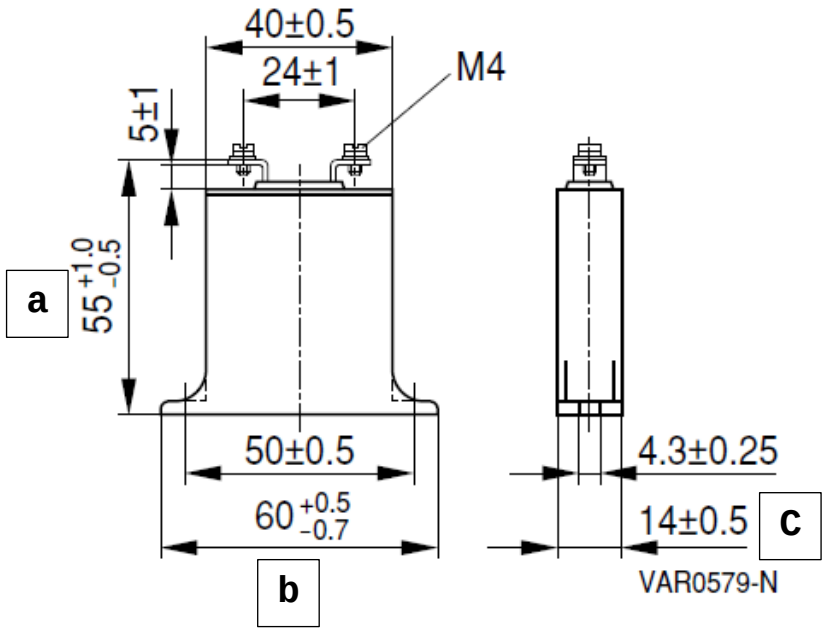
1 General data

1.1 Recommended method(s) of mounting

The varistors shall be mounted by their normal means in such a manner that there shall be no parasitic vibration (Screw terminals M4).

1.2 Dimensions, ratings and characteristics

1.2.1. Dimensions (All dimensions are in millimeters)

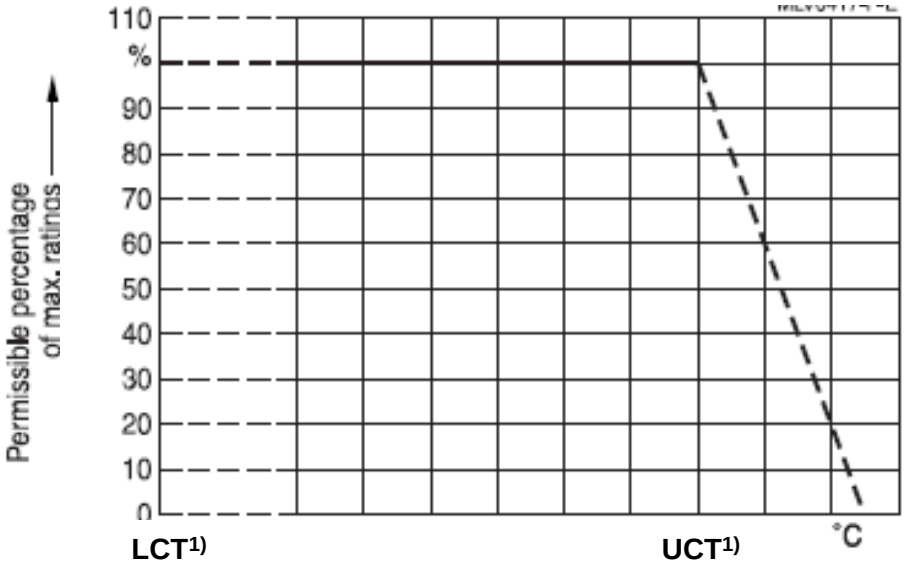


1.2.2 Ratings and characteristics (at 25 ℃)

LCT/UCT (Lower/Upper category temperature) 1)		-40/85°C
Maximum continuous a.c. voltage:	:	see table 1
Maximum continuous d.c. voltage:	:	see table 1
Voltage at specified current (1 mA):	:	see table 1
Voltage at class current (protection level):	:	see table 1
Maximum surge current:	:	see table 1
Maximum energy absorption (2 ms square wave):	:	see table 1
Maximum capacitance:	:	see table 1
Average power dissipation:		see table 1
Maximum temperature coefficient of the voltage at reference current	:	$-(0.05\ \%\ /\ K)_{max.}$
Isolation voltage:	:	2500 V (a.c.)
Climatic category	:	40/85/56
Dimensions (detailed)		See 1.2.1

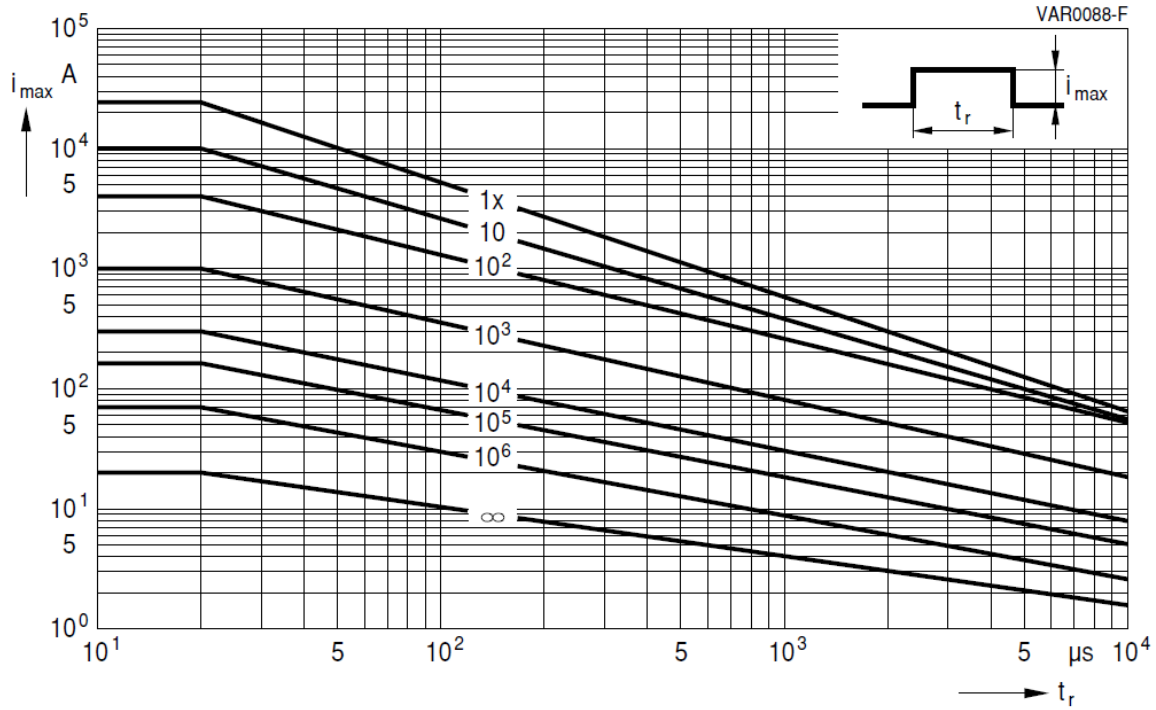
1.2.3 Derating Curves

Maximum continuous a.c. or d.c. voltage with temperature

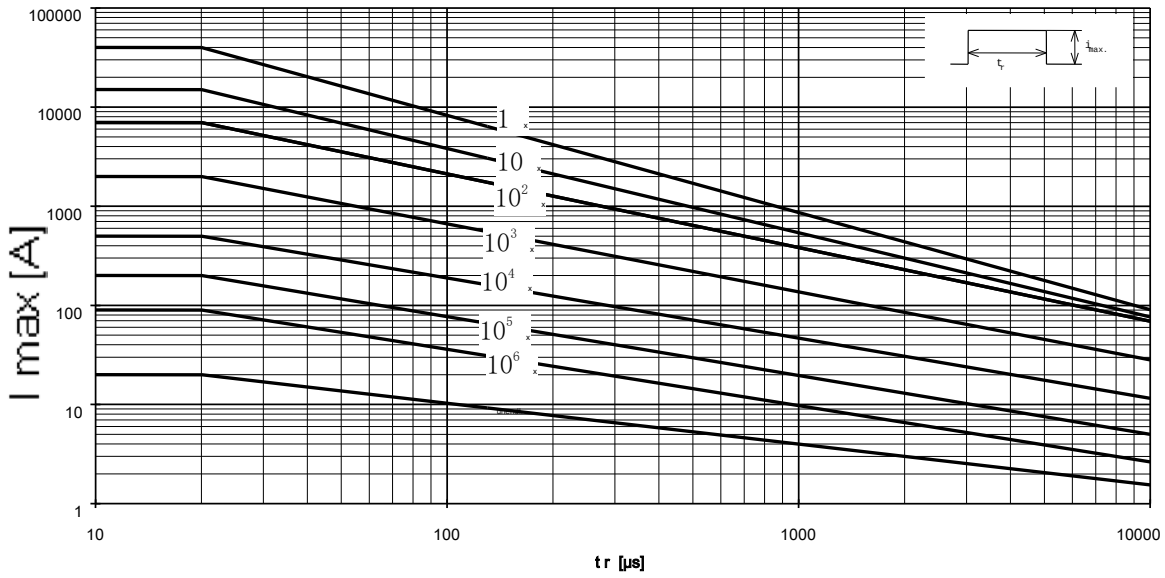


Reduction factor of maximum peak current for various numbers of pulses versus pulse duration.

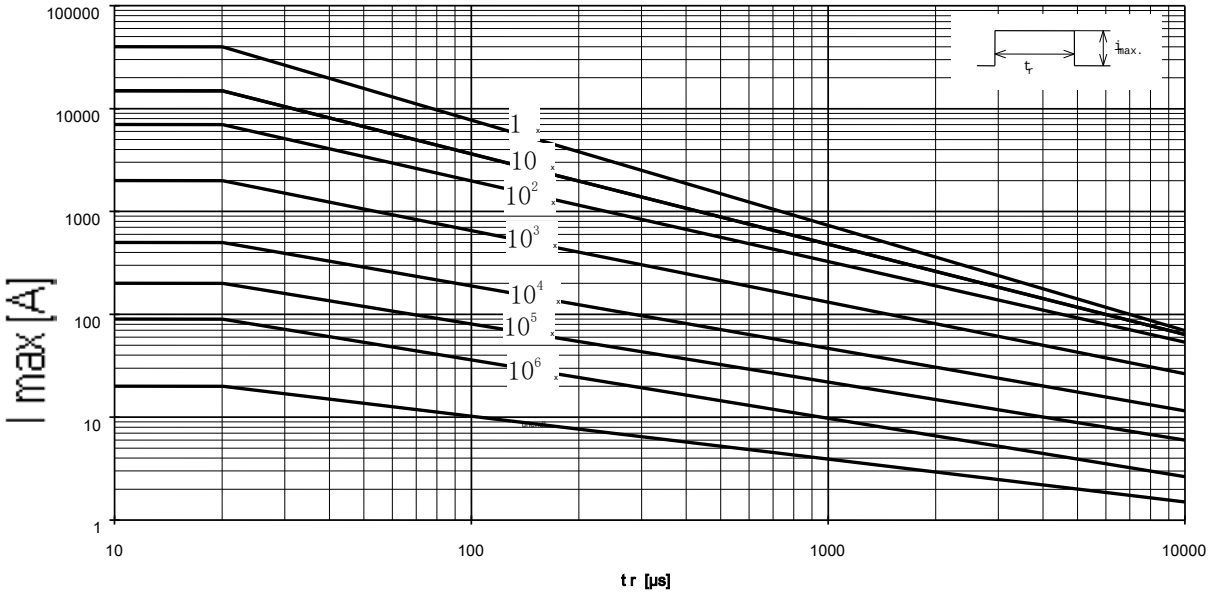
B40K75:



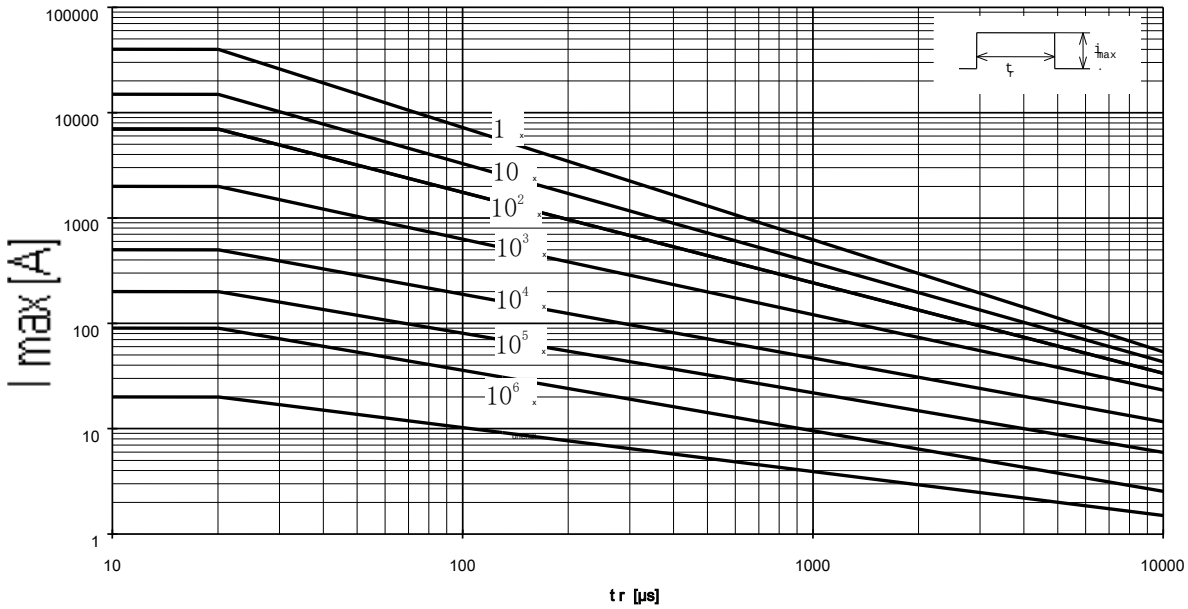
B40K130~K150:



B40K230~K460:



B40K550~K750:



1.3 Related documents

Generic specification:	IEC Publication 61051-1: Varistors for Use in Electronic Equipment. Part 1: Generic Specification.
Sectional specification:	IEC Publication 61051-2: Varistors for Use in Electronic Equipment. Part 2: Sectional Specification for Surge Suppression Varistors.

Table 1

Style	Supply Voltage	Maximum continuous voltage		Voltage at 1 mA ± 10%	Voltage at class current (8/20µs)		Max. surge current (8/20 µs, 1 time)	Max. peak current (8/20µs, combination pulse, 10 times)	Maximum energy absorption (2 ms, 1 time)	Maximum capacitance	Average power dissipation
(1),(2)	(3)										
	(Vac)	r.m.s. (V)	(V_{DC})	(V)	Class current(A)	Max. volt (V)	(kA)	(-)	(J)	(pF)	(W)
B40K75	60	75	100	120	300	220	25	6kV/3kA	190	26000	1.4
B40K130		130	170	205	300	340	40	6kV/3kA	310	11200	1.4
B40K150		150	200	240	300	395	40	6kV/3kA	360	9600	1.4
B40K230	140	230	300	360	300	595	40	6kV/3kA	460	6400	1.4
B40K250		250	320	390	300	650	40	6kV/3kA	490	5800	1.4
B40K275		275	350	430	300	710	40	6kV/3kA	550	5500	1.4
B40K320	240	320	420	510	300	840	40	6kV/3kA	640	4600	1.4
B40K385		385	505	620	300	1025	40	6kV/3kA	800	3800	1.4
B40K420		420	560	680	300	1120	40	6kV/3kA	910	3600	1.4
B40K440		440	585	715	300	1180	40	6kV/3kA	950	3400	1.4
B40K460		460	615	750	300	1240	40	6kV/3kA	1000	3200	1.4
B40K550	380	550	745	910	300	1500	40	6kV/3kA	960	2800	1.4
B40K680		680	895	1100	300	1815	40	6kV/3kA	1100	2200	1.4
B40K750		750	970	1200	300	2000	40	6kV/3kA	1200	2000	1.4

(1) All types are covering IEC 60950-1 Annex Q requirements.
(2) All types are covering IEC 62368-1 G.8.2 and IEC 60950-1 Annex Q requirements
(3) In acc. to IEC 62368-1 G.8.2 and IEC60950-1 Annex Q (Maximum continuous voltage of the Varistors shall be at least 1.25 times rated voltage of equipment/ rated voltage range): (only typical AC mains supply voltage are indicated.

1.4 Marking

The varistors are marked with their:

- manufacturer's code or trade mark
- Varistor type name : B40KXXX (Maximum continious voltage AC)
- date of manufacture (YY, WW)

e. g.

EPCOS
B40K275

16 15

1.5 Ordering information

Orders for varistors covered by this specification shall contain the following information:

SIOV-	B	40	K	275
I	II	III	IV	V

I. Series Prefix: Optional:
SIOV

II. Fixing:
B= Block Varistor

III. Nominal Disc Dimensions:
40 = 40 mm disc diameter

IV. Tolerance of Varistor Voltage at 1 mA:

K = ±10%

V. Maximum Rated Operating Voltage (RMS).

1.6 Certified records or released lots

Not required.

1.7 Additional information (not for inspection purposes)
The voltage indicated on the component is the maximum allowable steady state sinusoidal voltage at 50 - 60 Hz. When use is made of a supply voltage, the maximum continuous a.c. r.m.s. voltage = 1.1 x supply voltage. Should the varistor be subjected to voltage above the indicated voltage, it may fail by package rupture or expulsion material, causing a major problem in the equipment

Housing information:

Material: PBT
Ref. No.: PBT302-G0 …
Supplier: Beijing Huateng Hightech Co., LTD …

1.8 Additional or increased severities or requirements to those specified in the generic and/or sectional specification
None.

SECTION TWO - INSPECTION REQUIREMENTS

2. Inspection requirements

2.1 Procedures

2.1.1 For Qualification Approval the procedure shall be in accordance with the Sectional Specification, IEC Publication 61051-2, Sub-clause 3.2.
2.1.2 For Quality Conformance Inspection the test schedule (Table II) includes sampling, peridicity, severities and requirements. The formation of inspection lots is covered by Sub-clause 3.3.1 of the Sectional Specification.

TABLE II

Notes

1. - Sub-clause numbers of tests and performance requirements refer to the Generic Specification, IEC Publication 61051-1.
2. - Inspection Levels and AQL's are selected from IEC Publication 60410 (alternatively IEC 61193-2):
   Sampling Plans and Procedures for Inspection by Attributes.
3. - In this table:
   p = periodicity (in months)
   n = sample size
   c = acceptance criterion (permitted number of defectives)
   D = destructive
   ND = non-destructive
   IL = inspection level
   AQL = acceptable quality level } IEC 60410 (alternatively IEC 61193-2)
4. - The bump test and shock test are considered to be alternative. The detail specification shall indicate which test is to be performed.
5. - Where d.c. has been applied to the varistor, the reference voltage shall be measured in the same direction.
7. - The manufacturer shall only be required to perform one of these tests.
8. - The varistors shall be mounted by their normal means in such a manner that there shall be no parasitic vibration.

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	IL (see Note 2)	AQL	Performance requirements (see Note 1)
GROUP A INSPECTION (lot-by-lot)					
Sub-group A1	ND		II	1,0%	
4.4.1 Visual examination					As in 4.4.1
4.4.2 Marking					Legible marking and as specified in 1.4 of this specification
Sub-group A2	ND		I	0,65%	
4.5 Voltage		Voltage at specified current			As specified in 1.2.2 of this specification
Sub-group A3	ND		S-4	1,0%	
4.4.3 Dimensions (gauging)		Not applicable. Measuring dimensions a, b,c			As specified in 1.2.1 of this specification
GROUP B INSPECTION (lot-by-lot)					
Sub-group B1	D		S-3	2,5%	
4.11 Robustness of terminations		IEC 60068-2-21, Test Ua1: tensile F=40N Test Ud: torque M=1Nm Visual examination Voltage at specified current			No visible damage $\left\|\frac{\Delta U}{U}\right\| \leq 10\%$
4.13 Solderability (if applicable)		IEC 60068-2-20,Test Ta,Method 1 Not applicable			
4.22 Solvent resistance of the marking (if applicable)		IEC 60068-2-45,Test XA (3.1.1, Method 1): T = 23±5°C, t = 5±0,5 min Solvent mixture (70±5% Diethylenglycoldibutylether, 30±5% 2-propanol) Rubbing material: Cotton wool F = 5±0,5 N, 10 strokes. Visual examination			Legible marking

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	IL (see Note 2)	AQL	Performance requirements (see Note 1)
Sub-group B2	D		S-2	1,0%	
4.7 Voltage under pulse condition		At class current: See table 1.			As specified in the detail specification
4.9 Voltage proof		Metal balls method (4.8.1.2) 2500V, 60 s			As in 4.8

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size & criterion of acceptability (see Note 3) p	n	c	Performance requirements (see Note 1)
GROUP C INSPECTION (periodic)						
Sub-group C1	D		6	13	1	
4.6 Pulse current		Pulse current Combination pulse 10 pulses (combination pulse), in one direction, 1 per min Visual examination Voltage at specified current				No visible damage $\left\|\frac{\Delta U}{U}\right\| \leq 10\%$
Sub-group C2	D		12	13	1	
4.6 Pulse current		10 pulses 2ms square wave in one direction, 1 pulse per 2 min, at the maximum surge current (see derating curve) Visual examination Voltage at specified current				No visible damage $\left\|\frac{\Delta U}{U}\right\| \leq 10\%$

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size & criterion of acceptability (see Note 3) p	n	c	Performance requirements (see Note 1)
Sub-group C3A Part of sample of Sub-group C3	D		12	7		As specified in 1.2.2 of this specification
4.8 Capacitance		f = 1 kHz Signal level ≤ 1V Zero bias				
4.12 Resistance to soldering heat (if applicable)		IEC 60068-2-20,Test Tb, Method 1A Not applicable				
4.23 Component solvent resistance (if applicable)		IEC 60068-2-45,Test XA (3.1.1, Method 2): T = 23±5°C t = 5±0,5 min Solvent mixture (70±5% Diethylenglycoldibutylether, 30±5% 2-propanol). Recovery: 48h Visual examination Voltage at specified current				$\left\|\frac{\Delta U}{U}\right\| \leq 5\%$ No visible damage Legible marking
4.14 Rapid change of temperature		IEC 60068-2-14,Test Na N = 5 cycles, d = 30 min θ_A = -40±3°C θ_B = 85±2°C Visual examination Voltage at specified current				$\left\|\frac{\Delta U}{U}\right\| \leq 5\%$ No visible damage Legible marking $\left\|\frac{\Delta U}{U}\right\| \leq 5\%$

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size & criterion of acceptability (see Note 3) p	n	c	Performance requirements (see Note 1)
Sub-group C3B Other part of sample of Sub-group C3	D		12	6		
4.16 Shock		IEC 60068-2-27,Test Ea Pulse shape: half-sine a = 500 m/s^2 , d = 11ms N = 6 x 3 shocks. Visual examination Voltage at specified current				No visible damage Legible marking $\left\|\frac{\Delta U}{U}\right\| \leq 5\%$
4.15 Bump (or shock)		IEC 60068-2-27,Test Ea Not specified				
4.17 Vibration		IEC 60068-2-6,Test Fc, Method B4 Frequency range: 10 Hz to 55 Hz a = 0,75 mm or 98 m/s^2 (whichever is the less) d = 3x2 h Visual examination Voltage at specified current				No visible damage Legible marking $\left\|\frac{\Delta U}{U}\right\| \leq 5\%$

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size & criterion of acceptability (see Note 3) p	n	c	Performance requirements (see Note 1)
<u>Sub-group C3</u> Combined sample of specimens of Sub-groups C3A and C3B 4.18 Climatic sequence - Dry heat - Damp heat, cyclic, Test Db, first cycle - Cold - Damp heat, cyclic, Test Db, remaining cycles - Final measurement	D	(Low air pressure test not applicable) IEC 60068-2-2,Test Ba 16±2h, T = 85±2°C; IEC 60068-2-30,Test Db 24h, T = 55±2°C; IEC 60068-2-1,Test Aa 2h, T = -40±3°C; IEC 60068-2-30,Test Db 24h, T = 55±2°C; Visual examination Voltage at specified current Insulation resistance U = 500V Voltage proof	12	13	1	 No visible damage Legible marking $\left\|\frac{\Delta U}{U}\right\| \leq 10\%$ ≥ 100 MΩ No breakdown or flashover
<u>Sub-group C4</u> 4.21 Endurance at upper category temperature	D	T = 85±2°C, Duration: 1000 h Voltage: max. a.c. voltage Examination at 48 h, 500 h and 1000 h: Visual examination Voltage at specified current Examination at 1000 h: Voltage at class current Insulation resistance U = 500V	12	13	1	 No visible damage Legible marking $\left\|\frac{\Delta U}{U}\right\| \leq 10\%$ 1,1 x the initial limit ≥ 1 GΩ

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size & criterion of acceptability (see Note 3) p	n	c	Performance requirements (see Note 1)
GROUP D INSPECTION						
Sub-group D1	D		24	8	1	
4.19 Damp heat, steady state		IEC 60068-2-78, Test Ca T = 40±2°C, RH = 93(+2/-3)%, 56d 4 specimens: No voltage applied Other 4 specimens: Applied voltage: 10% of the max. d.c. voltage				
		Visual examination				No visible damage Legible marking
		Voltage at specified current				$\left\|\frac{\Delta U}{U}\right\| \leq 10\%$
		Insulation resistance U = 500V				≥ 100 MΩ
Sub-group D2	ND		24	8	1	
4.4.4 Dimensions (detail)						As specified in 1.2.2 of this specification
4.5 Voltage (if applicable)		At specified current At following temperatures: LCT (-3/+0)°C and UCT (-0/+3)°C				As specified in 1.2.2 of this specification $\frac{U_{25°C} - U_{LCT}}{\Delta T} \cdot \frac{100\%}{U_{25°C}} \leq 0{,}09\% K^{-1}$ $\frac{U_{25°C} - U_{UCT}}{\Delta T} \cdot \frac{100\%}{U_{25°C}} \leq 0{,}09\% K^{-1}$
Sub-group D3	D		24	5	0	
4.20 Fire hazard (Needle flame test)		IEC 60695-11-5 Severity: Vertical 10 s				Duration of burning: 5 s max.