

# 规格书 SPECIFICATION SHEET

Customer name:		
BERYL SERIES:	RD	TYPE: RADIAL
DESCRIPTION:	2.2uF/400V	Ф6.3*9
Apply date :	2022-04-12	

BERYL		CUSTOMER				
P/N:RD400M2R2LO6.3*9TH-2A	P/N:					
PREPARED	APPROVAL	PREPARED	CHECKED	APPROVAL		
董桂茹	张业维					

After approved, please sign back 1 Approval Sheet before order. If not, we will treat it as tacitly acknowledged and accepted our relative standard and technical index.

# Zhao Qing Beryl Electronic Technology Co., Ltd.

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# Revise record

NO.	Date	ate Revise reason Revise content		Prepared
01	2022.04.12	First issue	First issue	董桂茹

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## 1, Application

This specification applies to Aluminum electrolytic capacitor (foil type) used in electronic equipment. Designed capacitor's quality meets IEC 60384.

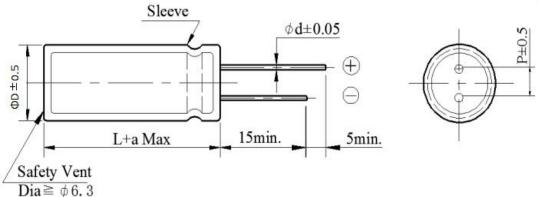
## 2. Table of specification and characteristics

Series	Cap(uF) 120Hz/20°C	WV(V)	Size	(mm)	Temperature (°C)		Capacitance Tolerance	Life(hours) @105(°C)
	120112/20 C		D	L			Toterance	(6)
RD	2.2	400	6.3	9	-40~+1	105	±20%	6000
,	%)(MAX) 0Hz/20°C	LC(μA)(1 2min/2	·	,	(MAX) Hz/25°C	RC (mA rms) (MAX)105°C/120Hz		Surge voltage(V)
	≤24	≤28	3		-	68		440

Other: /

## 3, Product Dimensions

Type

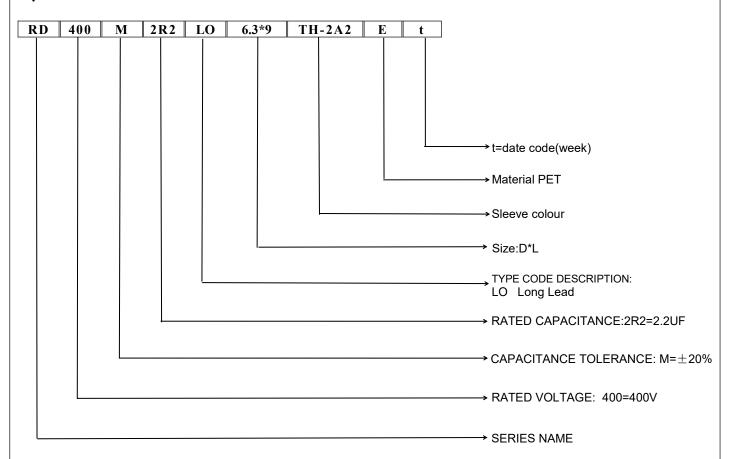


ФD	5	6.3	8	10	13	16	18	22
P	2	2.5	3.5	5	5	7.5	7.5	10
Фd	0.5	0.5	0.5/0.6	0.6	0.6	0.8	0.8	0.8
а			(L< 20)	± 1.5	(L≥2	$0) \pm 2.0$		

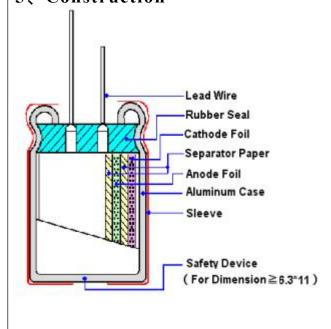
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#### 4. Part Number



## 5, Construction



Material name	Composition	Supplier name
Lead	Al and (Fe+Cu+Sn)	NM、JX
Rubber	EPT / IIR	LHX、LA、TH、LM2
Case	Aluminum	OX、YJ、HL、LY2
Paper	Wood / Fibrous plant materials	KE、DF
Anode foil	$Al + Al_2O_3$	HY1、HY2、HF、HY3、 LD、FQ
Cathode foil	Aluminum	GY、LY1
Electrolyte	Glycol + Water +Ammonium salt	XZB、LM1、JZ2、FS
Sleeve	PET	YL, CY

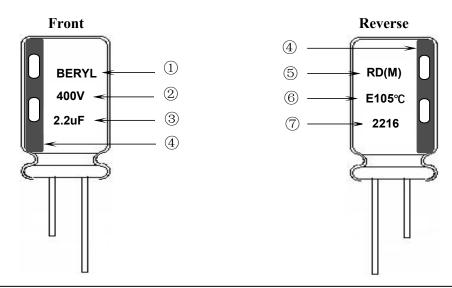
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# **BERYL** 绿宝石

## **ALUMINUM ELECTROLYTIC CAPACITORS**

# 6. Product Marking

#### Marking Sample:



#### **Marking Details:**

Capacitor shall be marked the following items:

- 1) Trademark (BERYL)
- 2) working voltage(400V)
- 3) Nominal capacitance(2.2uF)
- 4) Cathode marked
- 5) Series symbol & Nominal capacitance tolerance (M:  $-20\% \sim +20\%$ )
- 6) Sleeve material(E: PET)

Maximum operating temperature(105°C)

7) Date code (2216)

22: Manufactured year 2022

Code	19	20	21	22	23	24	25	26	
Year	2019	2020	2021	2022	2023	2024	2025	2026	

16: Manufactured week (01、02、03、04......52、53)

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#### 7. Characteristics

#### **Standard atmospheric conditions**

Unless other specified, the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient temperature : 15°C to 35°C
Relative humidity : 45% to 85%
Air pressure : 86kPa to 106kPa

If there is any doubt about the results, measurement shall be made within the following conditions:

Ambient temperature :  $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Relative humidity : 60% to 70%Air pressure : 86kPa to 106kPa

#### **Operating temperature range**

The ambient temperature range at which the capacitor can be operated continuously at rated voltage is  $(160\sim400\text{WV})$  -40°C to +105°C  $(450\sim500\text{WV})$  -25°C to +105°C

#### **Table**

	ITEM	PERFORMANCE
1	Nominal capacitance (Tolerance)	<b>Condition&gt;</b> Measuring Frequency: 120Hz±12Hz Measuring Voltage: Not more than 0.5Vrms +1.5~2.0V.DC Measuring Temperature: 20±2°C <b>Criteria&gt;</b> Shall be within the specified capacitance tolerance.
2	Leakage current	$ \begin{array}{l} \textbf{} \\ \textbf{Connecting the capacitor with a protective resistor } (1k\Omega\pm10\Omega) \text{ in series for} \\ \textbf{2 minutes, and then, measure leakage current.} \\ \textbf{} \\ \textbf{I: Leakage current } (\mu A) \\ \textbf{I } (\mu A) \leqslant 0.02\text{CV} + 10(\mu A) \text{ ,} \\ \textbf{measurement circuit refer to right drawing.} \\ \textbf{C: Capacitance } (\mu F) \\ \textbf{V: Rated DC working voltage } (V) \\ \end{array} $
3	Dissipation factor	<b>Condition&gt;</b> Nominal capacitance, for measuring frequency, voltage and temperature. <b>Criteria&gt;</b> Must be within the parameters (See page 3)

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	ITEM				P	ERF	ORMA	NCE		
4	Impedance	<b>Condition&gt;</b> Measuring frequency:100kHz; Measuring temperature:20±2°C Measuring point: 2mm max. from the surface of a sealing rubber on the lead wire. <b>Criteria&gt;</b> (20°C) Must be within the parameters (See page 3)								
5	Load life test	Maximu current : exceed recover <criteria> The cha Leaka; Capac</criteria>	ng to IEC60384- um operating tem for Rated life +48 the rated working ing time at atmos racteristic shall n ge current itance Change ation Factor	peratur 8/0hour g voltag spheric neet the Not With	re ±2°C rs. (The ge) The condi- e follo- more more more	C with the sum of the	h DC bi m of DC e product. The reserved required the spect of initial 200% of	as voltage p and ripple p et should be sult should n ments.	lus the rated peak voltage tested after ineet the follow	ripple shall not l6 hours
6	Shelf life test	tempo from leaka <b>Criteria&gt;</b> The chara Leakage Capacita	citors are then st erature±2°C for10 the test chamber ge current cteristic shall me current ance Change ion Factor	et the f Not m Within	i/0 hou allow iore the n ±209	ing rean 20% of	ollowing stabiliz stabiliz equirement of the initial value of the initia	g this period ed at room t ents.	value.	Maximum operating ors shall be removed for 16 hours. measure
7	Maximum permissible (ripple current, temperature coefficient)	applied a Table-3 The comboding voltage a Frequency Cap	mum permissible t maximum opera bined value of D. nd shall not rever Multipliers: Freq (Hz) p. (μF) 2.2 re Coefficient: Temperature (°C	C voltarse volt	mperange and age.	d the				

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# **ALUMINUM ELECTROLYTIC CAPACITORS**

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	ITEM			PER	FORMAN	CE		
8	Terminal strength	Fixed the cap seconds. Be Fixed the cap 2~3 seconds.  Diameter 0.5m  0.6	gth of terminals pacitor, applied for and then bent it er of lead wire mand less ~0.8 mm	f terminals. Force to bening for 90° to it  Tensile  10 (1)	the termina s original po e force N kgf) (0.51) 1.02)	Bending for 2.5 (0.5)	om the rubbe 2~3 seconds ce N (kgf)	er) for 90° within
9	Temperature characteristics	Criteria> <ul> <li>a. At +105°C</li> <li>Dissipatio</li> <li>The leakage</li> <li>b. In step 5, one</li> <li>Dissipatio</li> <li>The leakage</li> </ul>		ance shall be easured at + within the lared shall no sured at +20 within the late more than	Time to re Time to re Time to re Time to re e measured 20°C shall be imit of Item t more than °C shall be imit of Item n the specific t exceed the	be within $\pm 25\%$ 7.3 10 times of its within $\pm 10\%$ 7.3 ied value.	quilibrium quilibrium quilibrium quilibrium quilibrium % of its origina s specified v of its origina following ta	alue. I value.
10	Surge test	series for 30±5 s 1000 times. The before measurer CR: Nominal <criteria>  Leakage curr Capacitance Dissipation F Appearance  Attention:</criteria>	ent No Change W actor No Th	5±0.5 minus shall be left  ot more than tithin ±15% ot more than here shall be	ttes at 15~35 under norm	ed value. lue. ed value. of electrolyte	shall be report 1-2 hours	eated



	ITEM		PERFORMANCE					
		<condition> Temperature cycle: According to IEC60384-4 No according as below:</condition>	.4.7 methods, capacitor	shall be placed in an oven, the cond	ition			
			nperature	Time				
		(1) +20°C		3 Minutes				
	Change of	(2) Rated low temperatu	are (-40°C) (-25°C)	30±2 Minutes				
11	temperature test	(3) Rated high temperate	ure (+105°C)	30±2 Minutes				
		(1) to (3) =1 cycle, total	5 cycle					
		<b>Criteria&gt;</b> The characteristic shall meet t	he following requireme	nt.				
		Leakage current	Not more than the sp					
		Dissipation Factor	Not more than the sp	pecified value.				
		Appearance	There shall be no lea	akage of electrolyte.				
12	Damp heat test	Humidity test: According to IEC60384-4 No. be exposed for 500±8 hours in 40±2°C, the characteristic cha <criteria>  Leakage current  Capacitance Change  Dissipation Factor  Appearance</criteria>	an atmosphere of 90~9	95%R H .at wing requirement.  cified value.  I value.  of the specified value.				
13	Solderability test	Condition> The capacitor shall be tested used to soldering temperature is 245. Dipping depth is 2 m Dipping speed is 255. Dipping time is 3±0. Soldering wetting time. Soldering wetting time	5 ±5°C m ±2.5mm/s	ditions:				
		Coating quality	A minimum of 95%	of the surface being				

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	ITEM	PERFORMANCE	
14	Vibration test	Condition> The following conditions shall be applied for 2 hours in each 3 mutually directions. Vibration frequency range: 10Hz ~ 55Hz each to peak amplitude: 1.5mm Sweep rate: 10Hz ~ 55Hz ~ 10Hz in about 1 minute Mounting method: The capacitor with diameter greater than 12.5mm or must be fixed in place with a bracket. 4mm or less After the test, the following items shall be tested:	
		Inner construction  No intermittent contacts, open or short circui No damage of tab terminals or electrodes.  No mechanical damage in terminal. No leake of electrolyte or swelling of the case. The markings shall be legible.	
15	Resistance to	Condition> Terminals of the capacitor shall be immersed into solder bath at 260±5°C or400±10°Cfor3 -0 seconds to 1.5~2.0 mm from the body of capacitor. T shall be left under the normal temperature and normal humidity for 1~2 measurement. Criteria> Leakage current Not more than the specified value.	hen the capacitor
	solder heat test	Capacitance Change Within ±5% of initial value.	
		Dissipation Factor Not more than the specified value.	
		Appearance There shall be no leakage of electrolyte	·.
16	Vent test	<b>Condition&gt;</b> The following test only apply to those products with vent products at dia vent. D.C. test The capacitor is connected with its polarity reversed to a DC power sor selected from Table 2 is applied. <b>Table 2&gt;</b> Diameter (mm) DC Current (A)	
		22.4 or less   1   Criteria>   The vent shall operate with no dangerous conditions such as flames of the capacitor and/or case.	r dispersion of pieces of

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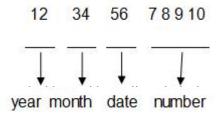


## 8. Packing Information

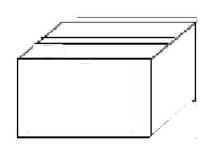
Packing Label Marked (the following items shall be marked on the label) (Inside box or bag)

(1)Clint order number (2)Client part number (3)Beryl part number (4)Capacitance (5)Voltage (6)Dimension (7)Packaging quantity (8)Capacitance tolerance (9) QC Marking (10) Lot number (11) Series

#### LOT Number:



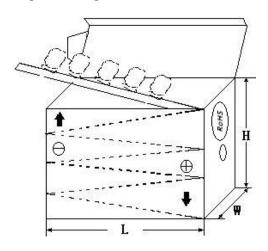
#### 1) Bulk Packing:



#### 3) Outer box



#### 2) Taped Packing:



#### 4) Outer box label:

		Ltd.		
C.S.R:				B HA HE
C.S.R P/O:				ROHS HE
C.S.R P/N:	1			
S.P.R P/N:			QC	
SPEC:				
QTY:	PCS	TOL:	%	
L/N:		S.P.R:		

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#### 9. Prohibition to Use Environment- related Substances

We are hereby to certify the followings:

Our company hereby warrants and guarantees that all or part of products, including, but not limited to, the peripherals, accessories or package, delivered to your company (including your subsidiaries and affiliated companies) directly or indirectly by our company are free from any of the substances listed below.

The latest version of <Substances Prohibited as per RoHS or <Sony-SS-00259>

	1 ,		
	Cadmium and cadmium compounds		
Accord with	Lead and lead compounds		
heavy metal	Mercury and mercury compounds		
	Hexavalent chromium compounds		
Organic chlorin compounds	Polychlorinated biphenyls (PCB)		
	Polychlorinated naphthalenes (PCN)		
	Polychlorinated terphenyls (PCT)		
	Chlorinated paraffins (CP)		
	Other chlorinated organic compounds		
Organic	Polybrominated biphenyls (PBB)		
bromine	Polybrominated diphenylethers (PBDE)		
compounds	Other brominated organic compounds		
Tributyltin compo	ounds		
Triphenyltin compounds			
Asbestos			
Specific azo com	pounds		
Formaldehyde			
Polyvinyl chlorid	e (PVC) and PVC blends		
F、Cl、Br、I			
REACH			

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NEV4700M50HB NEV.47M100AA NEVH1.0M250AB NEVH3.3M250BB NEVH3.3M450CC KM4700/16 KME50VB100M-8X11.5

SG220M1CSA-0407 ES5107M016AE1DA ESMG160ETD102MJ16S ESX472M16B 227RZS050M 476CKH100MSA 477RZS050M

UVX1V101KPA1FA UVX1V222MHA1CA KME25VB100M-6.3X11 VTL100S10 VTL470S10 VTL470S16A 511D336M250EK5D

052687X ECE-A1CF471 NRE-S560M16V6.3X7TBSTF RGA221M1CTA-0611G ERZA630VHN182UP54N UPL1A331MPH

SK035M0100AZS-0611 MAL214658821E3 NEV1000M6.3DE NEV100M16CB NEV100M50DD-BULK NEV2200M16FF NEV220M50EE

NEV2.2M50AA NEV330M63EF NEV4700M35HI NEV4.7M100BA