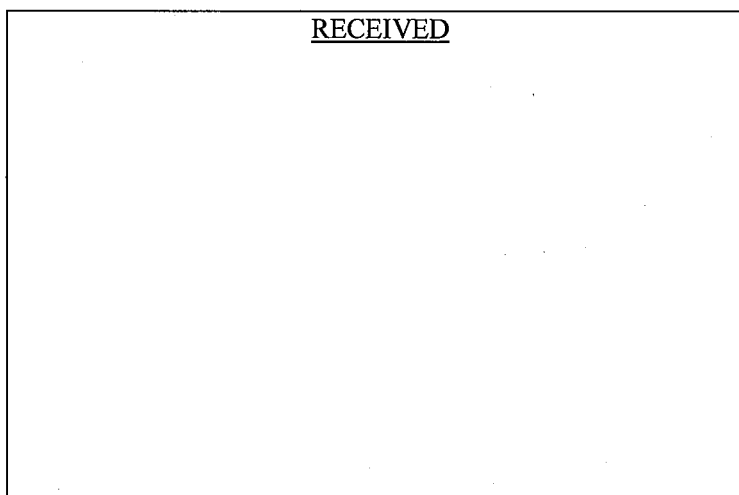


SPECIFICATION FOR
MANGANESE DIOXIDE LITHIUM BATTERY
Type : CR2032PW [TOSHIBA Brand]



January 29,2014

TOSHIBA HOME APPLIANCES CORPORATION
Battery Business Div.

G. Manager	Manager	Issued by

PRODUCT SPECIFICATION

1. Applicability : This specification is applicable to the following product :
Coin Type Manganese Dioxide Lithium Battery CR 2 0 3 2 PW

2. Ratings :
 2.1 Battery Type : CR2032
 2.2 Nominal Voltage : 3.0 V
 2.3 Standard Capacity : 245 mAh
 (on continuous discharge at 20°C under 15kΩ load to 2.0V end-voltage)
 2.4 Dimensions : Shape and dimensions shall be as shown in Fig.1.
 2.5 Standard Weight : 3.2 g
 2.6 Operating Temperature : -20 ~ 65°C
 2.7 Chemical System :
 Anode : Lithium
 Cathode : Manganese Dioxide
 Electrolyte : Organic Solvent with Lithium Salt

3. Quality requirements :
 3.1 Dimensions : Shape and dimensions shall be as shown in Fig.1.
 3.2 Appearance : Batteries shall have no deformation, dent, flaw, stain and leakage, that spoils commercial value of the product.
 3.3 Characteristics : The characteristics shown below in Table 1 should be satisfied.
 3.4 Use recommendation limit : Recommended date of use shall be within 5 years after battery manufacture.

(Table 1)

No	Test Item		Characteristic		Test Condition
			Initial*1	After 1 Year	
1	Open-Circuit Voltage	20℃	3.00 ~ 3.40 V	3.00 ~ 3.40 V	
2	Closed-Circuit Voltage	20℃	3.00 ~ 3.40 V	3.00 ~ 3.40 V	Load Resistance : 15k Ω 0.8sec
3	Duration	60℃	1170 h minimum	—	Load Resistance : 15k Ω Cutoff Voltage : 2.0 V
		20℃	1200 h minimum	1180 h minimum	
		0℃	1050 h minimum	—	
4	Duration (Acceleration)	20℃	1150 h minimum		After storage at 60℃ for 20 days Load Resistance : 15k Ω Cutoff Voltage : 2.0 V
			1060 h minimum*2		After storage at 60℃ for 100 days Load Resistance : 15k Ω Cutoff Voltage : 2.0 V
5	Leakage		No leakage being obstacles to practical use.		After storage at 60℃ for 30 days

*1 Initial : within 1 month after delivery.

*2 Duration after storage at 60°C 100 days are reference value.

4. Test :

4.1 Test Condition and Storage Condition

(1) Test Condition :

Unless otherwise specified elsewhere, tests shall be conducted at ordinary temperature ($20\pm 2^{\circ}\text{C}$) and ordinary humidity ($60\pm 15\%$)RH.

(2) Storage Condition :

Unless otherwise specified elsewhere, Storage shall be conducted at ordinary temperature ($20\pm 2^{\circ}\text{C}$) and ordinary humidity ($60\pm 15\%$)RH.

4.2 Measuring instruments and devices

(1) Dimension Measuring Instruments :

Micrometers, dial gauges and vernier callipers specified by JIS or those having equal or better precision shall be used for measuring dimensions.

(2) Voltmeter :

The tolerance shall be $\pm 0.005\text{V}$ and input resistance shall be $1\text{M}\Omega$ or more.

(3) Load Resistance :

Load resistance shall include resistance throughout external circuits, and its tolerance shall be $\pm 0.5\%$.

4.3 Test methods

(1) Dimension :

The diameter and overall height of batteries shall be measured with instruments specified in Subparagraph 4 above, provided that either one or both sides of such instruments shall be insulated in measuring the overall height of batteries.

(2) Appearance :

Appearance of batteries shall be inspected by visual means.

(3) Open-Circuit Voltage :

Test specimen batteries shall be kept standing open for 8 hours or longer at the ambient temperature specified in Table 1 above, and the voltage between both terminals at the same ambient temperature shall be measuring with a voltmeter as specified in Subparagraph 4 above.

(4) Closed-Circuit Voltage :

Test Specimens shall be kept standing open for 8 hours at the ambient temperature specified in Table 1 above, and then the voltage between both terminals shall be measured with a voltmeter as specified in Subparagraph 4 above while the specified load is connected between both terminal at the same ambient temperature as specified above; provided that the measured value shall be based on meter readings taken 0.8 seconds after the circuit is closed.

(5) Discharge :

Test specimen batteries shall be kept for 8 hours at the ambient temperature specified in Table 1 above, and then be continuously discharged at the same ambient temperature and through the specified load resistance. The discharge shall be continued until the terminal voltage of the test specimens falls below the end voltage of 2.0V.

The time during which the terminal voltage has been maintained equal to and above the end voltage shall be taken as the service life.

(6) Duration (Acceleration) :

Test specimens shall be discharged while they are kept at ordinary temperature ($20\pm 2^{\circ}\text{C}$) and at ordinary humidity ($60\pm 15\%$)RH after having been stored at the temperature specified in Table 1 above.

(7) Leakage :

Test specimens shall be examined for electrolyte leakage while they are kept for 8 hours at ordinary temperature ($20\pm 2^{\circ}\text{C}$) and at ordinary humidity ($60\pm 15\%$)RH after having been stored at the temperature specified in Table 1 above.

5. Marking of Batteries:

5.1 Polarity	+ (— shall not be indicated)
5.2 Brand of Battery	TOSHIBA
5.3 Battery System	LITHIUM BATTERY
5.4 Battery Type	CR2032
5.5 Nominal Voltage	3V
5.6 Country of Origin	MADE IN CHINA

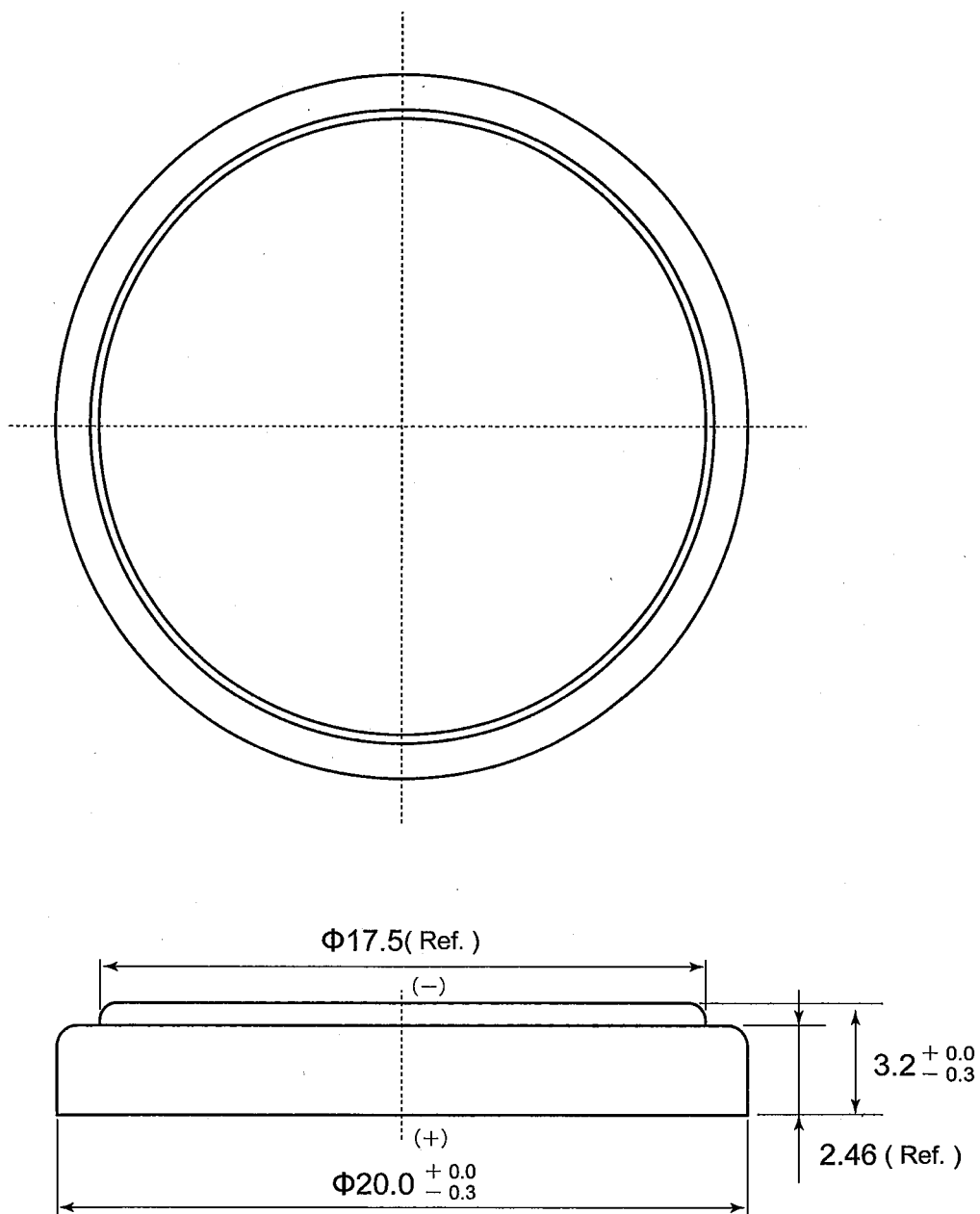
6. Safe Certification : Our products are recognized by Underwriters Laboratories Inc. (an American organization testing for public safety) that they are meeting UL requirements.

Our products are highly appraised for their reliability and safety.

Approval No.: UL file No.MH12828

7. Term of Guarantee : 12 months after delivery.

(Fig.1) Dimension



Unit : mm