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CERTIFICATE OF QUALITY

Manganese Dioxide Lithium Primary Battery

CR2/3 8-L-F1ST4S

No.7879

ADMISSION

Date _____

Sign _____



April 26, 2005

FDK CORPORATION

FDK ENERGY CO.



SPECIFICATION OF PRODUCTS

CR2/3 8-L-F1ST4S

FDK ENERGY CO., LTD.
QUALITY CONTROL DEPARTMENT
2nd QUALITY CONTROL SECTION



Y. WAKAMATSU
(DUPTY GENERAL MANAGER)

1. Scope

This quality specification is relevant to the Manganese Dioxide Lithium Primary Battery CR2/3 8-L-F1ST4S of FDK CORPORATION to FYRNETICS(HONG KONG)LIMITED.

2. Rated Standard

- 2.1 Type designation : CR2/3 8-L (UL File No.MH13421)
- 2.2 Nominal voltage : 3 V
- 2.3 Typical capacity : 2,000 mAh (Rated capacity at 100 μ A at 20 degrees C.)
(End-point voltage : 2.0V)
- 2.4 Shape and dimension : Refer to attached Fig.1
- 2.5 Typical weight : 16×10^{-3} kg
- 2.6 Operating temperature range : $-20^{\circ}\text{C} \sim 60^{\circ}\text{C}$ and 5 \sim 95%RH
humidity range (Under condition above 45 $^{\circ}\text{C}$ or above 90%RH,
up to 30 days)
- 2.7 Storage temperature and : $-20^{\circ}\text{C} \sim 70^{\circ}\text{C}$ and 5 \sim 95%RH
humidity range (Under condition above 45 $^{\circ}\text{C}$ or above 90%RH,
up to 30 days)

3. Appearance

There shall be no dirt, flaw nor deformation detrimental to operation on the appearance of a battery. Further, the marking shall not be unclear.

4. Marking

4.1 Manufacturing Code

First numeral shows year and second numeral shows month as follows.

2004 = 4	January = 1	October = 0
2005 = 5	February = 2	November = Y
2006 = 6		December = Z

4.2 Other marking

At least, type designation, nominal voltage, polarity and manufacturer's name shall be marked.

5. Electric properties

5.1 Off-load voltage

Test temp.: 20 °C.

Initial	After storage of 12 months at ordinary temperature
3.10 V ~ 3.40 V	3.10 V ~ 3.40 V

5.2 Internal impedance

Test temp.: 20 °C.

Initial	After storage of 12 months at ordinary temperature
5 Ω max.	10 Ω max.

5.2 Battery drain voltage(1000 ohms, After 0.5 second)

Test temp.: 20 °C

Initial	After storage of 12 months at ordinary temperature
Above 3.0 V	Above 3.0 V

5.3 Service output (Continuous discharge at 1000 ohms)

Test temp.: 20 °C. , end-point voltage: 2.0 V

Initial	After storage of 12 months at ordinary temperature
Above 460 hrs	Above 455 hrs

6. Resistance to leakage

No leakage of electrolyte that affects performance in actual use shall be found by visual check when the battery is subjected to the test of the following conditions.

- 1) Test temperature and humidity : 45 ± 2 degrees C. , 70% or less
- 2) Test period: 30 days
- 3) Test method: Allow to stand

7. Test condition and apparatus

7.1 Voltmeter

The precision of the voltmeter shall be within $\pm 0.005V$ per volt, and the internal resistance shall be 10M-ohms or more.

7.2 Load resistance

The resistance of all external circuits shall be included in the load resistance and the tolerance on load resistance shall be $\pm 0.5\%$.

Furthermore, the specified allowance shall not be exceeded as a result of heat evolution in a resistor due to discharge.

7.3 Apparatus for measuring dimensions

The venire calipers having the minimum graduation of 0.05 mm specified in JIS B 7507 or at least the equivalent in precision shall be used for measuring the height. A micrometer or dial gauge at least equivalent in precision may be used. The micrometer specified in JIS B 7502 or a dial gauge at least equivalent in precision may be used as the measuring the diameter.

7.4 Temperature and humidity

Unless otherwise specified, temperature shall be 20 ± 2 degrees C. and relative humidity shall be $65 \pm 20\%$.

7.5 Initiation of discharge

Discharge test shall be started after the battery has been allowed to stand at a temperature of 20 ± 2 degrees C. for at least 8 hrs.

7.6 End of discharge

It is the time at which the on-load voltage drops below the end-point voltage (2.0V).

8. Packaging

Packaging shall be a standard form of FDK CORPORATION.

9. Information of handling for safety

9.1 Safety precautions during handling of batteries

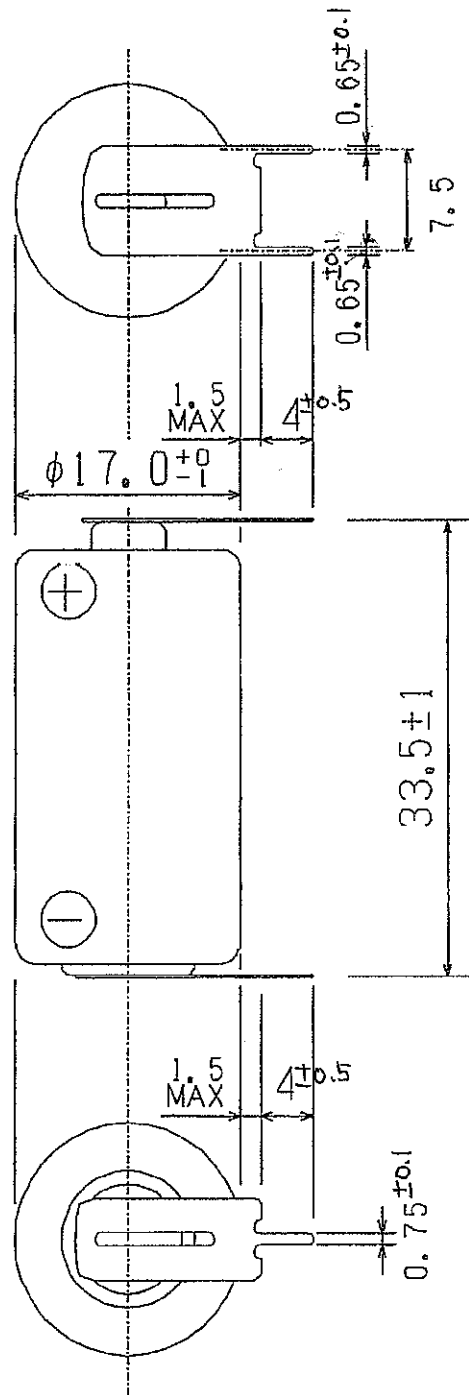
- ① Always insert batteries correctly with regard to polarity (+ and -) marked on the battery and equipment.
- ② Do not short-circuit batteries.
- ③ Do not charge batteries.
- ④ Do not mix old and new batteries or batteries of different types and brand.
- ⑤ Do not heat batteries.
- ⑥ Do not solder directly to batteries.
- ⑦ Do not dismantle batteries.
- ⑧ Do not deform batteries.
- ⑨ Do not dispose of batteries in fire.
- ⑩ Always select the correct size and type of battery most suitable for the intended use.

9.2 For storage

- (1) Store batteries in well ventilated, dry and cool condition.
- (2) Avoid storing or displaying batteries in direct sun or in places where they get exposed to rain.
- (3) Battery cartons should be handled with care. Rough handling may result in batteries being short circuited or damaged.

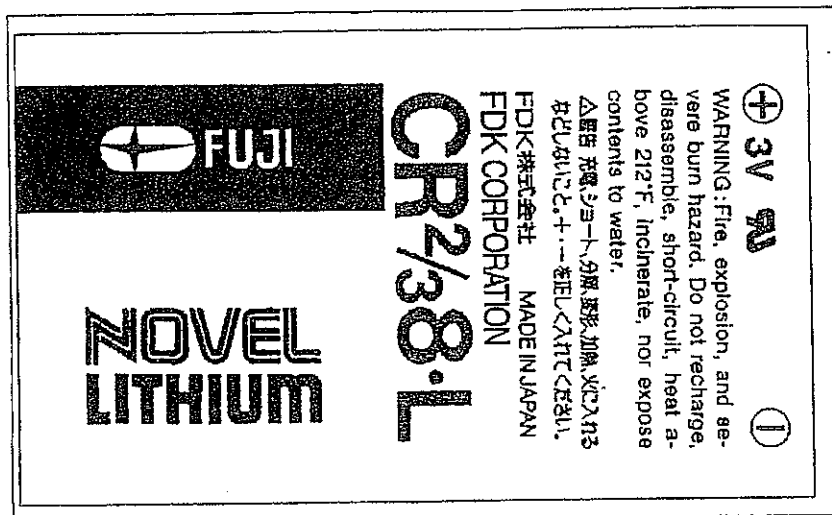
Fig.1 Shape and Dimensions
Item : CR2/3 8·L-F1ST4S

Unit:mm

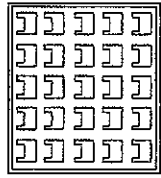


- Note 1) Tab : Nickel plated stainless steel plate of 0.25t.
 2) Tab welding : Spot welding (2~4 points)
 3) Welded strength of tab : The tab shall be endure a pulling force at 19.6N for 10 sec..
 (at a right angle with the terminal of the battery)
 4) Condition of soldering : Temp.; 250~270°C, Time; less than 5 sec..
 5) The gap between the center of tab and center of battery shall be less than 1mm.

Fig.2 Design for CR2/3 8·L

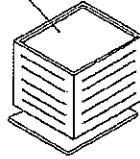


CR2/3 8L - F1ST4S Packing way

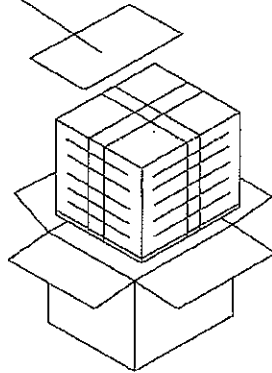


25pcs. Tray

25pcs. Tray × 10set

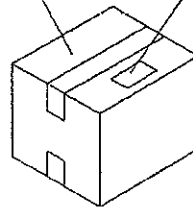


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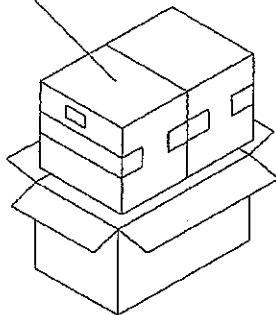


250pcs. Pack

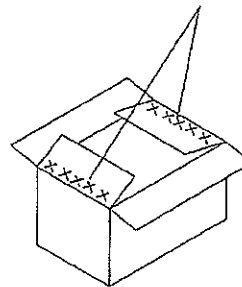
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250pcs. Pack × 2set



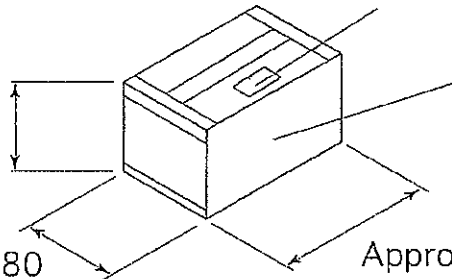
PASTE



NOTES



Approx. 260



500pcs. Pack
(weight: approx. 10kg)

Approx. 280

Approx. 450

25pcs. Tray	1/25
250pcs. Pack	1/250
500pcs. Pack	1/500