

Control
number

02020-02E-006-1

REFERENCE

PIDSA

Specification	
Lithium Primary Battery	
Ordering code	CR-2PE/BN
Model code	CR-2

This is the PROVISIONAL SPECIFICATION just only for the engineering review on our product herein. Also, this is a reference documents for reviewing characteristics of our product, which is for prevention any trouble or misuse. Since this is just for customer's reference, the description for warranty herein shall be handled with the formal specification, which shall be agreed upon between the customer and IS Company of Panasonic Corporation. Please note that all descriptions specify this product maybe possibly changed without notification if we decide it is required.

Approved by

Division/Department

Name

Signature/date

Date of Issue : Feb,12,2020
Industrial Solutions Company
Panasonic Corporation

Drafted

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1. Application Range

This specification is applied to Manganese dioxide lithium batteries, CR-2PE/BN (the products) which are manufactured by Industrial Solutions (IS) Company, Panasonic Corporation.

2. Nominal Specification

2-1 Model Number	CR-2PE/BN (Bare cell: CR2)
2-2 Nominal Voltage	3V
2-3 Nominal Capacity	850mAh (Nominal capacity is based on the standard discharge current and cut-off voltage 1.8V at 20°C.)
2-4 Standard Discharge Current	20mA
2-5 Maximum Continuous Discharge Current	1A at 20°C
2-6 Dimensions	See attached drawing
2-7 Mass (bare cell)	Approximately 11g
2-8 Appearance	No noticeable deformation
2-9 Temperature	Operating; -40 to +70°C (Non condensing) (Note: Contact Panasonic in case of using the battery out of the specified temperature range above.)
2-10 Recommendable Storage Condition	Temperature: 5°C to 35°C Humidity: Less than 70%RH
2-11 Battery Composition	Lithium primary battery is composed of cathode from Manganese dioxide, anode from Lithium, and electrolyte from organic solvent and lithium salt.

3. Characteristics

3-1 Open Circuit Voltage	
3-1-1 Initial	Between 3.0 and 3.5V (The measuring method is described in item 5-4-1.)
3-1-2 After 1 year storage at 25±5°C (humidity : less than 70%RH)	Between 3.0 and 3.5V (The measuring method is described in item 5-4-1.)
3-2 Impedance	
3-2-1 Initial	Between 0.1 and 1.0 Ω (The measuring method is described in item 5-4-2.)
3-2-2 After 1 year storage at 25±5°C (humidity : less than 70%RH)	Between 0.1 and 1.0 Ω (The measuring method is described in item 5-4-2.)
3-3 Duration(Pulse cycles)	
3-3-1 Initial	950 cycles MIN. (20±3°C) 500 cycles MIN. (-20±3°C) (The measuring method is described in item 5-4-3.)
3-3-2 After 1 year storage at 25±5°C (humidity : less than 70%RH)	950 cycles MIN. (20±3°C) 500 cycles MIN. (-20±3°C) (The measuring method is described in item 5-4-3.)
3-4 Vibration Resistance	Deterioration of performance (3-1) shall not occur after the test described in item 5-4-4.
3-5 High Temperature Storage	The battery shall not show leakage or salting after the high temperature storage described in item 5-4-5.

4. Test Condition

4-1 Test Condition	Unless otherwise specified the test shall be carried out at, Temperature : $25 \pm 5^{\circ}\text{C}$ Humidity : $65 \pm 20\%\text{RH}$
4-2 Test Timing	The test shall be started within a month from delivered day.
4-3 Measurement Instrument	
4-3-1 Voltage Meter	Input impedance : $\geq 10\text{M}\Omega$
4-3-2 Battery Impedance Meter	Measurement error : $\leq 0.5\%$ Sine-wave AC method (1kHz, 0.1mA) (As a general, Hioki LCR Meter IM5323 with DC BIAS VOLTAGE UNIT 9268-10 is recommended.)
4-3-3 Caliper	Class 1 of JIS B 7507:1993
4-3-4 Balance	Sensitivity : $\leq 100\text{mg}$

5. Measuring Method

5-1 Dimensions	This shall be measured with the caliper described in item 4-3-3.
5-2 Mass	This shall be measured with the balance described in item 4-3-4.
5-3 Appearance	Deformation or tarnish shall be checked by visual observation method.
5-4 Characteristics	
5-4-1 Open Circuit Voltage	This shall be measured with the voltage meter described in item 4-3-1.
5-4-2 Impedance	This shall be measured with the impedance meter described in item 4-3-2.
5-4-3 Duration(Pulse cycles)	This shall be measured by constant resistance discharge method. Test temperature : $20 \pm 3^{\circ}\text{C}$ $-20 \pm 3^{\circ}\text{C}$ Pulse pattern : 0.9A 3secON \Leftrightarrow 27secOFF End voltage : $1.55\text{V}(20 \pm 3^{\circ}\text{C})$ $1.20\text{V}(-20 \pm 3^{\circ}\text{C})$
5-4-4 Vibration Test	This test shall be carried out by the following condition according to UN Manual of Test and Criteria, Part III, sub-section 38.3.4.5, Amplitude: 0.8mm Frequency: 7 \Leftrightarrow 200Hz Directions: X, Y, Z Duration: 15 minutes, 12 times (each direction)
5-4-5 High Temperature Storage	The battery shall be stored at 60°C for 1 month. After the storage, the battery shall be kept in dry place at $25 \pm 5^{\circ}\text{C}$ during 4hours, then leakage and appearance shall be checked by visual observation method.

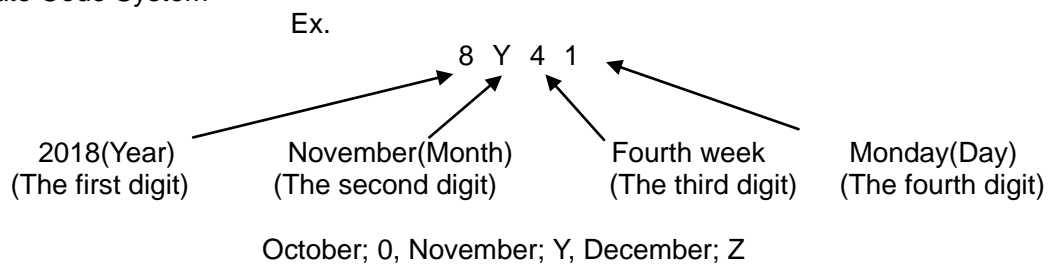
6. Indication

6.1 Below items are indicated on the side surface of the battery.

(Design of indication is possibly modified without prior announcement.)

Model code	CR2
Nominal voltage	3V
Manufacture or its brand	Panasonic
Production	U.S.A.

6.2 Date Code System



6.3 UL Standard

This battery is UL1642 recognized component. The UL file number is MH12210.

6.4 Production Site

Panasonic Energy Corporation of America (PECA)
One Panasonic DR Columbus 31907/GA U.S.A.

7. Operations and Modification of This Specification

Revision and modification must be carried out after the prior mutual agreement.

All accidents or issues caused by any events that are neither defined nor described in this specification, mutual discussion shall take place for the resolution.

If the customer fails to sign and return this specification, this specification will be automatically deemed to be accepted by the customer upon the earlier of (a) six (6) months from the issue date of this specification or (b) the issue date of the first P/O for the Products from the customer.

8. Important Notes (Warranty)

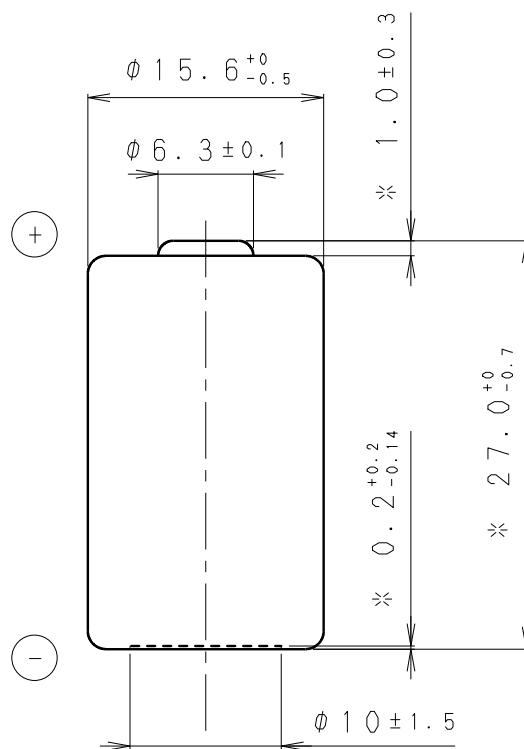
- 1) The Products are warranted to conform to the description contained in this specifications for a period of twelve 【12】 months from the ex-factory date the Products is shipped and any claim by the customer (apparatus manufacturer or distributor) must be made within such period. During that warranty period, if the customer finds a non-conformity of the Products and presents sufficient evidence that (i) such defect was caused by Panasonic's negligence, and (ii) the usage and handling of the Products were appropriate, Panasonic will independently analyze the cause of such non-conformity in the Products. If Panasonic's analysis confirms the non-conformity is solely attributable to the negligence of Panasonic, Panasonic agrees to supply conforming Products as a replacement at its sole expense. The customer agrees that the rights and remedies of the customer will be strictly limited to those contained in this warranty with respect to any matter relating to the use of the Products and this specification. To the maximum extent permitted by law, the customer waives all other rights and remedies with respect to any matter in any way relating to the use of the Products and this specification.
- 2) Confirm and assure the matching and reliability of the Products on actual set or unit application with the customer's responsibility.
- 3) Panasonic shall not warrant or be responsible in any case where the customer fails to carry out proper handling, operating, installation, testing, service and checkout of the Products and/or to follow the instruction, cautions, warnings, notes provided in this specifications, or other Panasonic's reasonable instructions or advise.
- 4) Panasonic will not be held responsible for any issues caused by modifications to the Products taken place after that the Products are delivered to the customer.
- 5) If the customer intends to use or incorporate the Products for or into devices for which failure or malfunction of the Products may directly jeopardize life or cause threat of personal injury, such as for medical equipment, vehicle equipment, aircraft and aerospace equipment, aircraft electronics equipment, explosion-proof equipment or any other similar equipment ("Specific Application Devices"), the customer agrees to obtain prior written approval from Panasonic. Unless otherwise approved by Panasonic in advance, Panasonic shall not take any responsibility for the use or incorporation of the Products for or into any Specific Application Devices.
- 6) To the maximum extent permitted by applicable law, irrespective of whether the said prior written approval from Panasonic is obtained, Panasonic shall not be liable for any claims from third parties arising from, or in connection with the use of the Products and this specification.

9. Others

- 1) CR2 is developed for Camera use only, and requested to replace within two years if its used for another usage, out of Camera use.
- 2) This battery is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, sub-section 38.3.
This battery is manufactured in ISO9001 certified factory.
- 3) This battery does not contain any toxic materials, such as mercury, cadmium or lead.

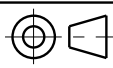
10. Precautions for use

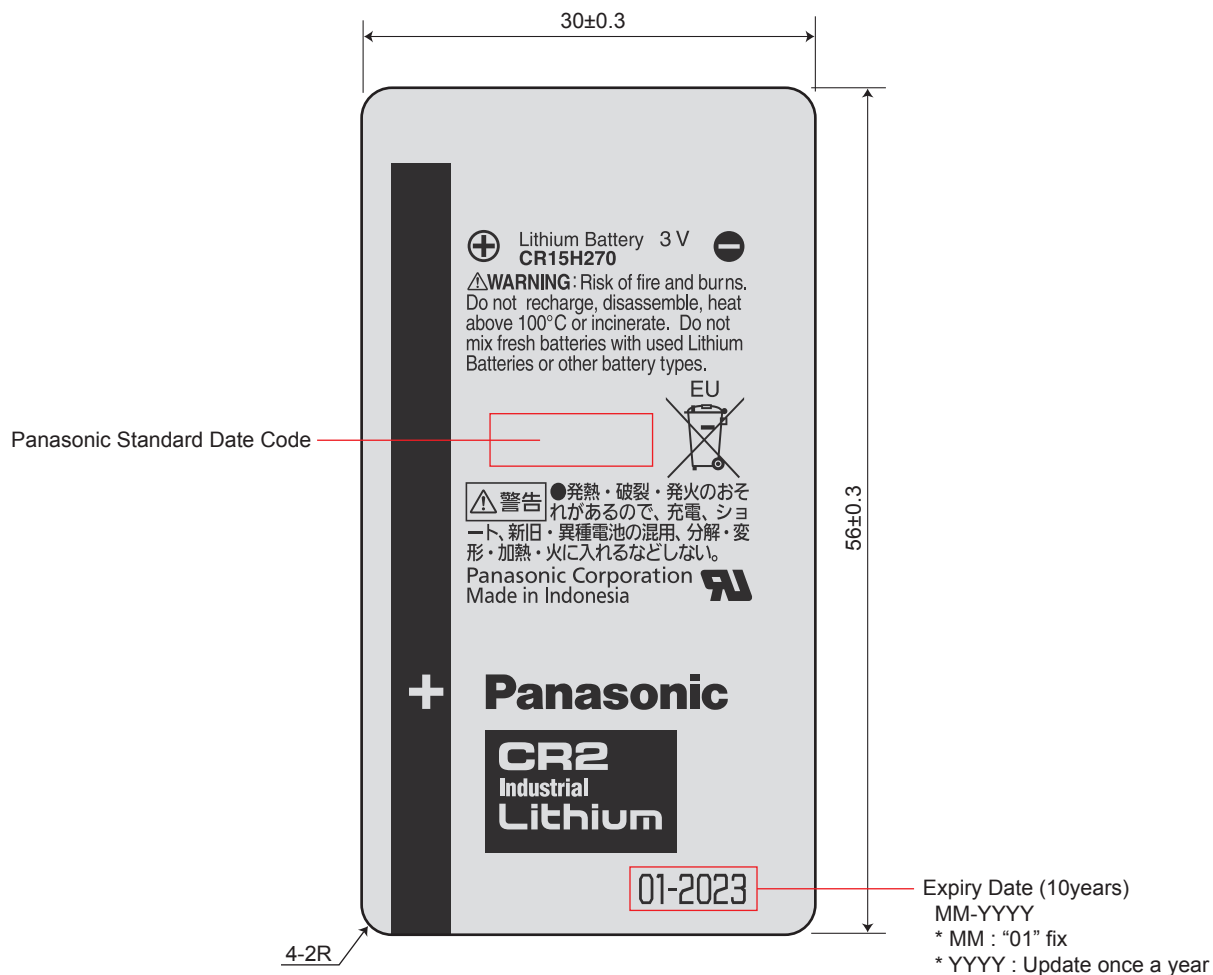
- 1) The battery shall not be stored at temperatures in excess of 45°C.
Storage at less than 35°C is recommended. Storage at less than -20°C can deform the plastic parts and may cause leakage. To prevent self-discharge caused by corrosion or decrease of insulation, humidity during storage shall be less than 70%RH.
Do not expose batteries to direct sunlight or moisture in order to prevent deterioration of performance.
- 2) The battery has an explosion resistant construction. But the following cautions should be taken, because combustible materials such as Lithium metal and organic electrolyte are contained in the battery.
 - * Do not use except in applicable model or equipment.
 - * Do not connect other cell in series.
 - * Do not mix new (fresh) and old (end of life) batteries.
 - * Do not force-discharge.
 - * Do not mix different types (chemistries) of batteries.
 - * Do not short circuit.
 - * Do not dispose in fire.
 - * Do not charge.
 - * Do not disassemble.
 - * Do not heat up more than 100°C.
 - * Do not solder directly onto batteries.
 - * Do not soak in water.
 - * Do not deform.
 - * Do not inadequately modify and remodel for installation.
 - * Insert the batteries in correct polarity position.
- 3) Keep away from heat source or flame.
- 4) Do not wash by ultrasonic wave washer.
- 5) Keep away from children and infants to prevent the possibility of swallowing by mistake.



* NOTE [注記]

1. *: DIMENSIONS DO NOT INCLUDE DOUBLE SEAMS OF OUTER FILM LABEL.
[* : ラベルの合わせ目は除く寸法]
2. THE FOLLOWING ITEMS ARE INDICATED ON BATTERIES. [電池に下記の表記を行う]
BATTERY NAME, BATTERY PN, NOMINAL VOLTAGE, CAUTIONS AND etc.
[電池名称・素電池品番・公称電圧及び注意事項等]

MODEL NO.	CR2		SCALE
			2 : 1
DRAWING NO.	P_CR2	REV.	 UNIT: mm
		0	



		PET		Color:Black,Varnish	
Symbol	Name	Material	Qty	Process & Finishing	Remark
Panasonic CR2 for Industry			Part Name		
			Drawing Name	CR2 Label	
			Drawing Number	13-720-A2	

Packaging Specification

Drawing
Number

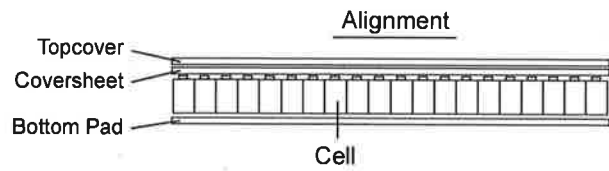
232-CR2-911UL_A

CR2 Lithium battery

Bulk×Tray for 200pcs.×Outer Carton for 400pcs.

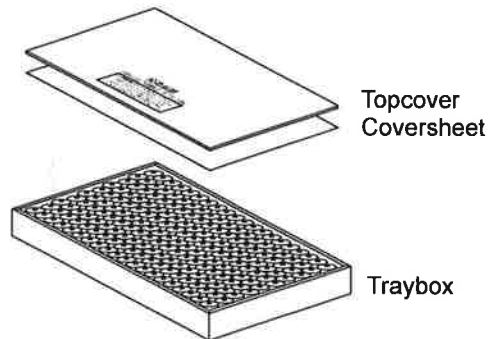
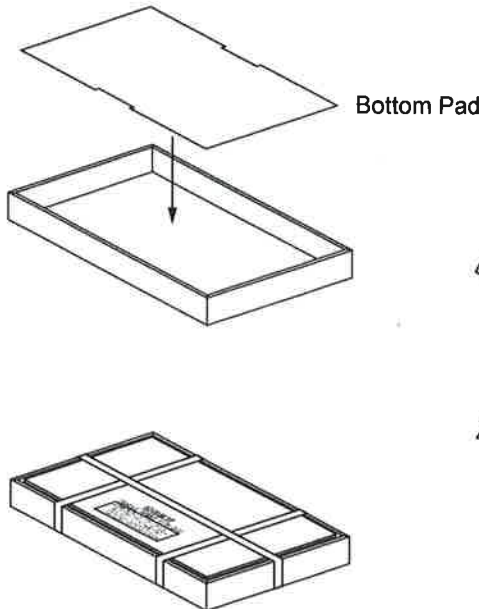
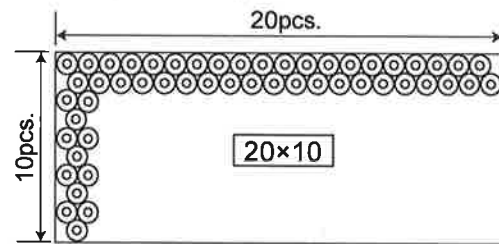
1-Product

Refer to the product drawing



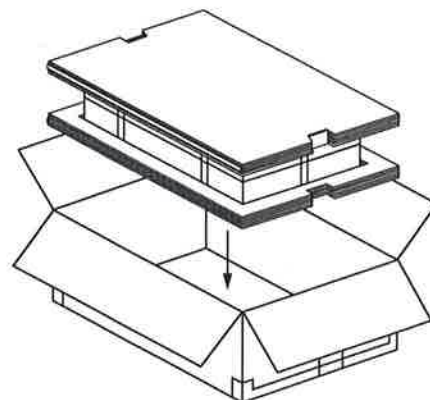
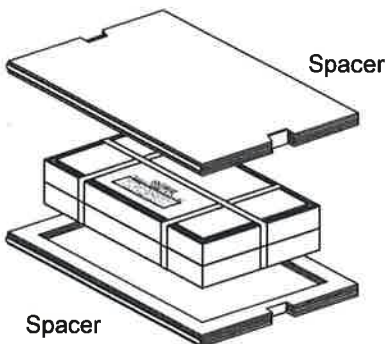
2-Tray for 200pcs.

*The battery shape is different by product number

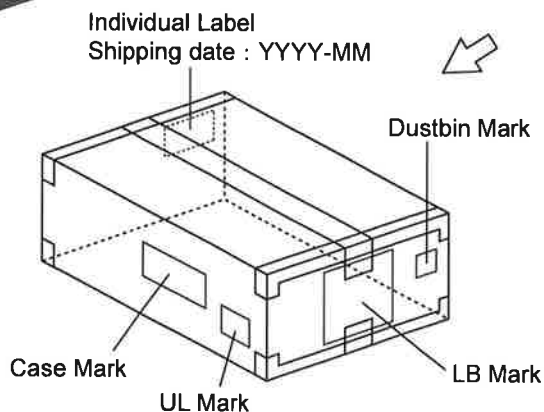


3-Outer Carton for 400pcs.

*Refer to the individual label for shipping date



※ Fill the space with the buffer material



Packing List

Dimension : 443x240x164mm
M3 : 0.0174m³
Net : 4.4kg
Gross : 5.8kg



Panasonic Corporation

Battery Safety Practices

Avoiding hazards in lithium battery handling



Warning

Mishandling batteries can cause battery leakage, heat generation, rupture, ignition etc., that can lead to possible fire or injury.

Both of coin type and cylinder type of lithium batteries contain flammable materials such as lithium, organic solvent and other chemical ingredients. Improper handling of lithium batteries may result in heat generation, fire or explosion, with a risk of personal injury or damage. To prevent these accidents in battery handling, be sure to observe the following precautions.

1. Do not Short circuit

Direct connection of plus(+) and minus(-) poles may result in leakage, heat generation, explosion and/or fire.

Do not store and/or carry batteries with metallic product such as necklace. (Refer fig.1)

2. Do not stack and/or jumble batteries

Stacked and/or jumbled batteries may cause short circuit and/or forced discharge by the contact of other batteries. This may result in leakage, heat generation, explosion and/or fire.

Especially, a connection with the 006P(9V) type batteries may have a high risk of leakage, heat generation, explosion and/or fire.

(Refer fig.2 & 3)

3. Do not make forced discharge batteries

Forced discharge by external power source, the battery voltage goes to negative and this cause gas generation in inside of the battery. This may result in leakage, heat generation, explosion and/or fire.

(Refer fig.3)

* In your disposal and/or storage of the batteries, please isolate plus and minus poles by adhesive tape. A connection with other metals and/or batteries may result in leakage, heat generation, explosion and/or fire.

* When using the stored battery, please remove the tape perfectly to avoid high contact resistance problem. (Refer fig.4)

4. Do not dispose of batteries in fire

Disposal of batteries in fire is extremely dangerous with a risk of explosion and violent flaring.

5. Do not heat batteries

Heating batteries above 100°C (212°F) may damage the resin in crimping, separator and other parts, causing electrolyte leak, internal short circuit, fire and explosion.

6. Do not solder directly onto batteries

Direct soldering onto batteries may damage the resin in crimping, separator and other parts, causing electrolyte leak, internal short circuit, fire and explosion.

7. Do not charge batteries

Charging of primary batteries may result internal gas generation, causing electrolyte leak, battery swelling, fire and explosion.

8. Do not disassemble batteries

Disassembly batteries may cause gas generation that may irritate your throat. Lithium may also react with moisture to generate heat and fire.

9. Do not deform batteries

Applying extreme pressure to batteries may cause deformation of the crimping and internal short circuit, causing electrolyte leak, battery swelling, fire and explosion.

10. Do not mix different type batteries

For some applications, mixing of different type batteries, or new and old batteries, can cause over discharge due to differences in voltage and discharge capacities. This may lead to the risk of swelling and/or explosion.

11. Do not insert batteries with opposite polarity

For some applications, battery insertion with opposite polarity (reverse insertion of plus and minus) may result in leakage, heat generation, explosion and/or fire.

Please ensure the above precautions are strictly observed by related divisions including production departments, sales departments and external subcontractors. For additional details and information, please contact our sales representatives.

Fig. 1 Short circuit

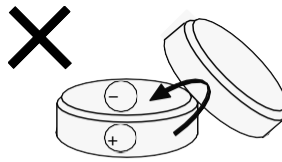
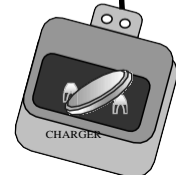


Fig. 2 stacked & jumble batteries



Connection with battery charger



Fig. 3
Examples of forced discharge

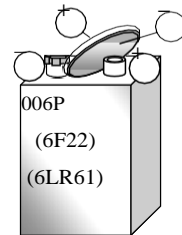


Fig. 4
Examples of isolation in disposal and/or storage

