
LG ICR 18650 1800mAh, 2000mAh
- SAFETY RESULTS

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Battery Research Institute
LGCHEM Research Park

1. CELL CONSTRUCTIONS

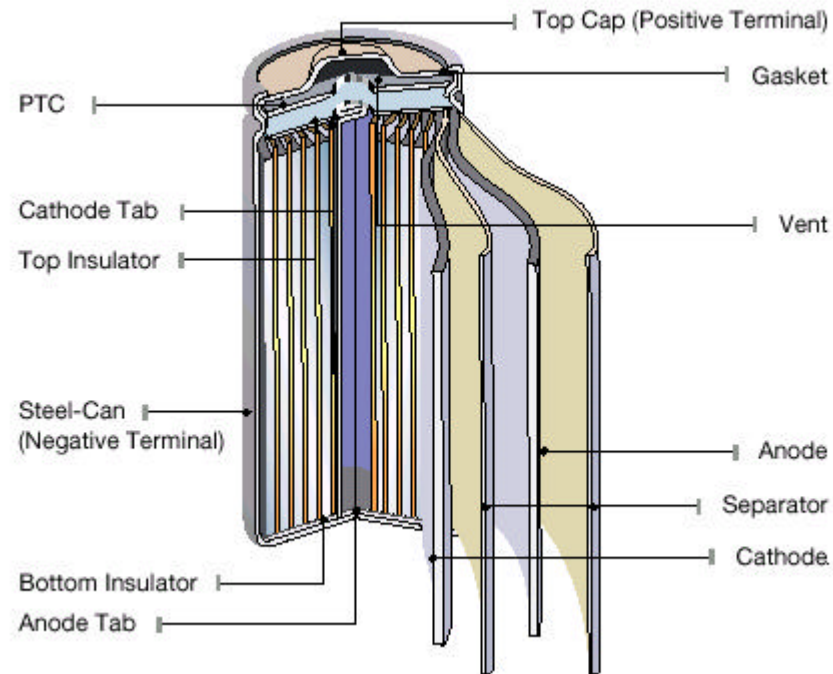
- A. Internal Structure
- B. Safety Device – Top Cap Structure
- C. Safety Device – CID and VENT
- D. Safety Device – PTC

2. SAFETY TEST RESULTS

- A. Safety – UL, JSBA, LG Standard

1-A INTERNAL STRUCTURE

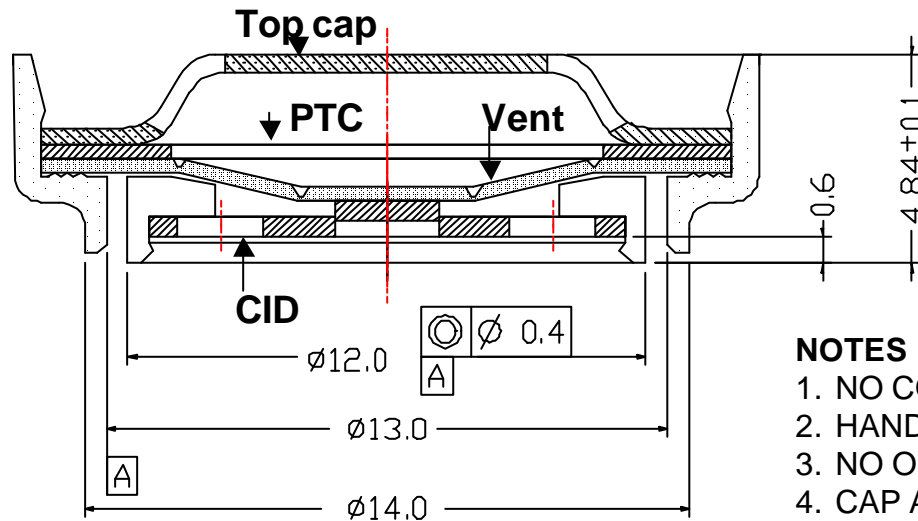
LG's ICR 18650 has a Jelly-Roll in the steel-can which is composed of Cathode, Anode, and Separator bet' n them by the way of winding.



1-B SAFETY DEVICES – TOP CAP STRUCTURE

Top cap is composed of 3 types of safety devices which protect the cell from abusive events.

1. **PTC** becomes a electrical insulator when large current flows through cell.
2. **CID** disconnects when internal pressure (caused by gas evolution) builds up in the cell and shuts down the electrical path.
3. **SAFETY VENT** opens and releases internal gas.



NOTES

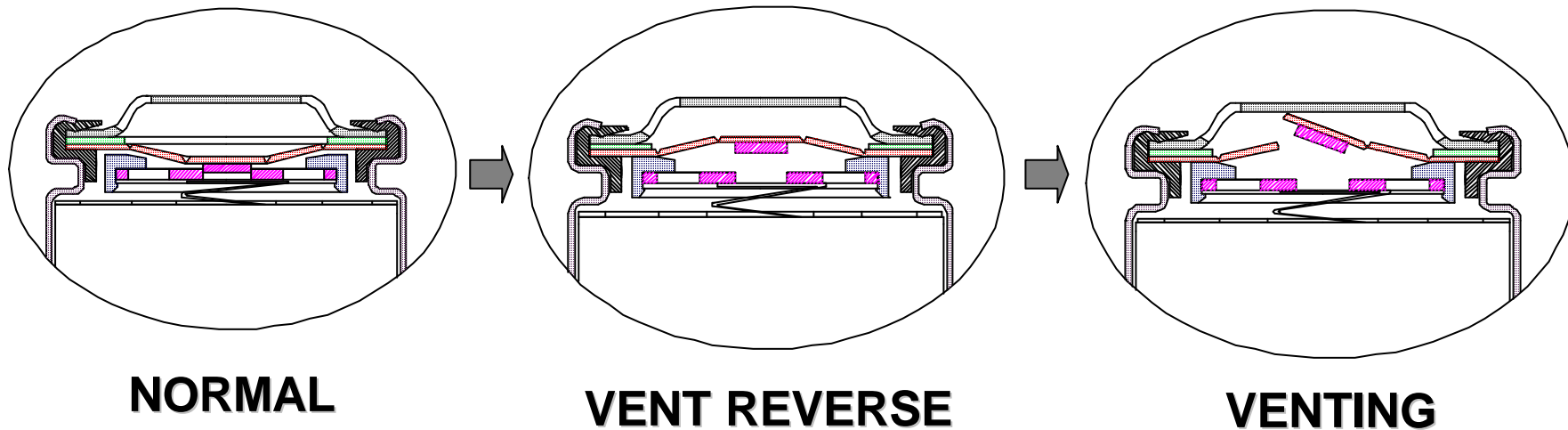
1. NO COMPRESSION THE FILTER ASSEMBLY.
2. HANDLED WITH FINGER COAT.
3. NO OIL ON SURFACE OF FILTER.
4. CAP ASS'Y LEAK CONDITION : NO BUBBLE AT **5kgf/cm²**
5. DISCONNECTION Pr. : **10 ~ 15kgf/cm²** WITH NO LEAK
6. RUPTURE Pr. : **19 ~ 23kgf/cm²**

1-C SAFETY DEVICES – CID, VENT

When the internal pressure due to gas evolution increases, CID (Current Interrupting Device) and VENT will function in the following steps ;

1st STEP (VENT REVERSE) : Disconnects the electrical path within the cell and protects the cell from additional current flow.

2nd STEP (VENTING) : Releases internal pressure.

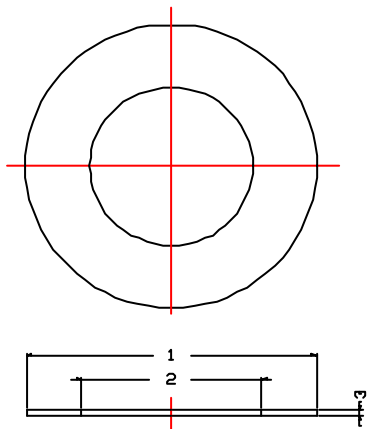


1-D SAFETY DEVICES - PTC

PTC protects the cell from large current charging or discharging.

PTC has 2 important parameters.

- 1. HOLD CURRENT** : at which the impedance of PTC starts to increase.
- 2. TRIP CURRENT** : at which the impedance of PTC becomes infinite.
(i.e., PTC becomes electrical insulator)



NOTES : 1. TRIP CURRENT : 4.0A AT 20°C

(:mm)

	SPEC
1	16.0+/-0.05
2	10.0+/-0.05
3	0.31+/-0.05
TRIP CURRENT	20 4.0A

R2-type For 1800mAh

HOLD FOR REFEAENCE ONLY	CURRENT TRIP LIMITS							
	FOR REFERENCE ONLY							
	AMPS AT 0		AMPS AT 20		AMPS AT 60		AMPS AT 80	
AMPS 20 HOLD	HOLD	TRIP	HOLD	TRIP	HOLD	TRIP	HOLD	TRIP
1.5	2	5.2	1.5	4	0.9	2.4	-	-

R4-type For 2000mAh

HOLD FOR REFEAENCE ONLY	CURRENT TRIP LIMITS							
	FOR REFERENCE ONLY							
	AMPS AT 0		AMPS AT 20		AMPS AT 60		AMPS AT 80	
AMPS 20 HOLD	HOLD	TRIP	HOLD	TRIP	HOLD	TRIP	HOLD	TRIP
2.1	2.6	5.8	2.1	4.7	1.6	3.6	-	-

2-A SAFETY – UL, JSBA, LG STANDARD

LG's ICR 18650 passes all of the safety test item required by UL1642, JSBA (G1101-1997), and LG Standard.

Test ITEM		UL1642 (3rd ed.)	JSBA (G1101-1997)	LG Standard
Electrical	Overcharge	no explosion and fire	no explosion and fire	no rupture and fire
	External Short	no explosion and fire	no explosion and fire	no smoke and fire
	High current charge	-	no explosion and fire	no rupture and fire
	Ovedischarge	no explosion and fire	no explosion and fire	no rupture and fire
Mechanical	Nail	-	no explosion and fire	no rupture and fire
	Crush	no explosion and fire	no explosion and fire	no rupture and fire
	Impact	no explosion and fire	no explosion and fire	no rupture and fire
	Drop	no explosion and fire	no explosion and fire	no leakage
Environmental	Vibration	no explosion and fire	no explosion and fire	no leakage
	High Temp.	-	no explosion and fire	no appearance change
	Humidity	no explosion and fire	no explosion and fire	no physical change
	Thermal Shock	-	no appearance change	no appearance change
	Heat	no explosion and fire	no explosion and fire	no explosion and fire