

# Batteries with Terminals

## Highly Reliable Terminal Welding

### (1) Using a laser to weld terminals

Panasonic uses a laser welding method to weld the terminals onto the batteries so they can be mounted onto PC boards by soldering. This method has the effect of boosting the tensile strength accompanying a welding strength to approximately 1000 N (approx. 10Kgf) compared with 20N to 50N (approx. 2 to 5 kgf) yielded by conventional resistance welding in a battery with a diameter of 20mm. Laser welding also, more or less, cuts in half the individual variations occurring in the welding. Furthermore, it enables terminals to be welded onto thin batteries, such as those with a thickness of 1.6 mm, and it improves compatibility with many other uses. This highly reliable terminal soldering method can be used in a wide range of applications, eliminating the need for reinforcement or other such means.

### (2) Pre-soldering

The tips of the terminals are pre-soldered in order to enhance the reliability of the soldering.



## Complete Line-up

Panasonic offers a full range of batteries with terminals for PCB mounting. Since the terminals come in a variety of types, please contact Panasonic for further details. A more limited selection of simple battery holders to support the batteries is also available.

# Soldering

### (1) Using a soldering iron

Do not allow the soldering iron to make direct contact with the bodies of the batteries. Complete the soldering within 5 seconds while maintaining an iron tip temperature of about 350°C, and do not allow the temperature of the battery bodies to exceed 85°C.

### (2) Automatic dip-soldering bath

Soldering with a dip-soldering bath can be used but do not allow the temperature of the battery bodies to exceed 85°C. It is important to note, depending on the temperature conditions inside the dipping device, that the battery body temperature may rise after dipping due to the residual heat retained. When a post-dipping temperature rise is observed, review the temperature conditions and consider a dipping time reduction or a way of forcibly cooling the batteries after dipping.

| Basic conditions               |                     |
|--------------------------------|---------------------|
| Dip-soldering bath temperature | Not to exceed 260°C |
| Dipping duration               | Within 5 sec.       |
| Number of dips                 | Within 2 times      |



## Never Use Reflow Soldering

Never use reflow soldering other than with ML-R series, since doing so directly heats the battery surface to high temperatures, causing electrolyte leakage, deterioration of battery characteristics and risk of bursting or ignition.

## Precautions

Do not attempt to weld terminals to the batteries\*

Example where the terminals were soldered straight onto a coin-type lithium battery, the terminals were connected to a PC board or other electronic components, and the heat generated by the soldering adversely affected the battery, resulting in a deterioration of the battery characteristics:

The heat generated when terminals are mounted using solder causes lithium to melt.

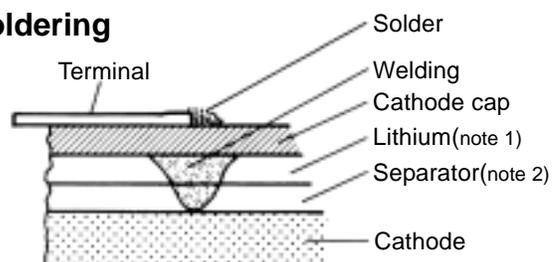
The separator melts and becomes perforated.

The positive and negative poles are welded together, causing "internal shorting."

In terms of the battery characteristics, the open-circuit voltage and electrical capacity are both reduced.

The battery loses its function or it bursts some in rare cases.

## Soldering



(note 1) Metal whose melting point is about 180°C

(note 2) Non woven cloth of polypropylene whose melting point is about 165°C

\*Terminals should only be welded to the batteries by qualified personnel with the proper equipment.