4.2 SAFETY TESTS

UL-Recognition

All **VARTA** Microbattery Lithium Cells and Batteries listed below are recognized by Underwriters Laboratories Inc. under UL-file number MH13654.

The cells are marked with the Recognized Component Mark.

Underwriters Laboratories requires for lithium cells/ batteries a circuit, which must contain a protective component to **prevent charging**. In case of diode failure a current limiting resistor must be chosen according to the values listed in Table below, which are the maximum safe reverse currents according UL 1642 Test in order to prevent fire or explosion. (These are not the maximum continuous reserve currents in a regular use. Refer to Design-in considerations in Section 3).

For safety tests of the cells, “UL” requires either an additional diode, or a resistor, limiting the current to a safe level as “portable“. (See also Section 3.2)

It should be noted that the value of the resistor has to be calculated using the higher power supply voltage – not the battery voltage.

The supply voltage to the load can be calculated by the battery voltage drop across the diode and the resistor.

Please also pay attention to the Safety Guidelines given in the safety data sheet (Section 4.3).

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Model	Primary Type (a)	Max. Abnormal Charging Current, mA	Max. Charge Voltage	Replacement (b), (c)
ER 1/2 AA	Lithium/thionyl chloride	15	12	Technician
ER AA	Lithium/thionyl chloride	15	12	Technician
ER A	Lithium/thionyl chloride	60	12	Technician
ER C	Lithium/thionyl chloride	15	4.2	Technician
ER D	Lithium/thionyl chloride	150	4.2	Technician

(a) These cells and batteries are not rechargeable. The circuit containing these cells or batteries is to contain a protective component which prevents charging. The circuitry is to include a current-limiting component intended to protect the cell or battery, in the event the protective component malfunctions, from a charging current in excess of the maximum abnormal charging current indicated.

(b) Technician – These cells and batteries are intended for use in applications subject to replacement only by a trained service.

(c) The Max. Charge Voltage noted in the column is the maximum voltage employed during the abnormal charging test of the secondary lithium cell. However, the maximum recommended charging voltage for lithium cells is 4.2 V, unless indicated otherwise in the individual Recognitions.

Marking: Company name, model designation, date of manufacture and the Recognized Component Mark on the individual cell/battery or the smallest shipping container.

Printed Circuit Board Mounting

Never solder on the body of the battery directly, use a battery equipped with PC-mount terminals. When using automatic soldering apply 260–280 °C within 5 seconds. Make sure that the battery is not suspended or dropped into the soldering bath.

Do not heat above 80 °C to avoid leakage caused by deterioration in the battery’s performance.