

Lithium Ion Battery Lifetime

This document serves to provide general guidance on care and expected lifetime of the Lithium Ion Battery used with the Vocera Communication Badge.

Vocera has previously provided documents on the care and use of Vocera batteries, which indicated that after approximately 18 months use, Vocera batteries should be replaced.

A key reason for replacement is due to the charge capacity of the cells diminishing over time as they undergo discharge and recharge cycles, resulting in a battery not being able to support powering a badge for a full work shift. Another factor is the 24x7 operation of Vocera badges where batteries are frequently moved between many badges during their operational life. The continual handling of the batteries introduces a much higher likelihood of physical damage occurring to the batteries.

Batteries are consumable items and as with most Lithium Ion batteries used in mobile electronics, the structure of the Lithium Ion cell inside the battery pack degrades over time. As a consequence of this degradation, metal impurities in the cell can cause the cell to be more susceptible to internal shorts. Should an internal short occur, the Lithium Ion cell may experience thermal runaway creating heat and releasing gases which can cause the plastic enclosure of the battery pack to melt.

The gases caused by the thermal runaway event could contain oxides of carbon, aluminum, lithium and copper, although these gases are released in small quantities they should be considered toxic and not inhaled.

The gases seen and the visible damage to a battery pack when thermal runaway takes place are expected occurrences and do not indicate that the battery has caught fire. However, among the gases that might be emitted is Hydrogen and if exposed to a spark or naked flame this may be the cause of combustion. To mitigate this occurrence Vocera battery chargers are built using flame resistant PC-ABS and each battery slot is isolated from adjacent slots. These events can be alarming to end users who are not familiar with the characteristics of Lithium-Ion batteries. These events will usually only occur when a Lithium-Ion battery has been in operation for far longer than its intended lifetime.

As general guidance, Lithium-Ion batteries should be replaced every 18 months, and no Lithium-Ion battery should be in service after 3 years of use. Any battery that displays

physical damage should be discarded to avoid the battery cell itself becoming damaged and triggering a thermal runaway event.

To provide guidance on the health of batteries the Vocera battery chargers use LEDs in the charging slots. If the charging LED is blue or flashing blue, this indicates that the charge capacity of the battery is down to 60% and the battery should be replaced soon. If the charging LED is red this indicates that the battery did not fully re-charge within its allocated time frame. On an initial occurrence Vocera recommends removing and reinserting the battery to see if it will complete its charge cycle. If the LED returns to a red state the battery should be removed from service.

For any incident of a battery displaying signs of thermal runaway or damage while in a battery charger, please contact the Vocera Technical Support team to RMA the battery and battery charger so that Vocera can investigate the incident.

VOCERA TECHNICAL SUPPORT

Australia

Toll Free: [1.800.242.132](tel:1800242132)

EMEA

Toll Free:
[+44 \(0\) 800.731.0586](tel:+4408007310586)

New Zealand

Toll Free: [088.444.409](tel:088444409)
(Land line only)

Singapore

Toll Free: [800.101.3244](tel:8001013244)

US/Canada

Toll Free: [800.473.3971](tel:8004733971)
Direct: [408.882.5700](tel:4088825700)

Online

Email: support@vocera.com

Website:
www.vocera.com/services-support