GS BATTERY — CANADA

CFAA Ottawa Chapter – November 19, 2014

1. The “UL” mark on the battery – what it means to system designers and service technicians.

2. Environment and usage factors that affect battery life

3. Conductance Testing

4. Suggested practices for annual battery inspection - Trouble-shooting battery issues.

The “UL” mark on the battery…

What it means to system designers and service technicians.

1. The battery is equipped with a "Safety Valve“ per UL Category BAZR2: Batteries, Standy-by Component

The valve must open and release gasses when the internal pressure exceeds a specified value; this prevents explosion. The valve also prevents oxygen from entering the battery; this prevents negative plate failure which in turn causes a decrease in capacity.

2. As a UL listed component, it may be used in systems certified by various safety authorities*.

*Ex: UL, cUL, CSA and many other domestic and international authorities. The use of UL listed components are usually mandatory for a system to gain and maintain safety certification. Most authorities submit to UL, which submits to the JIS Standard.

Environment and usage factors that affect battery life

1. Charge (Float) Voltage

2. Ambient Temperature

3. Discharge Frequency

4. Discharge Depth

The Relationship between Charge Voltage and Life - Standby Applications

Translated from the JSB (PE, PX, PXL) domestic Technical Guide published 1998.10.01 (Pg.15, Fig.22)

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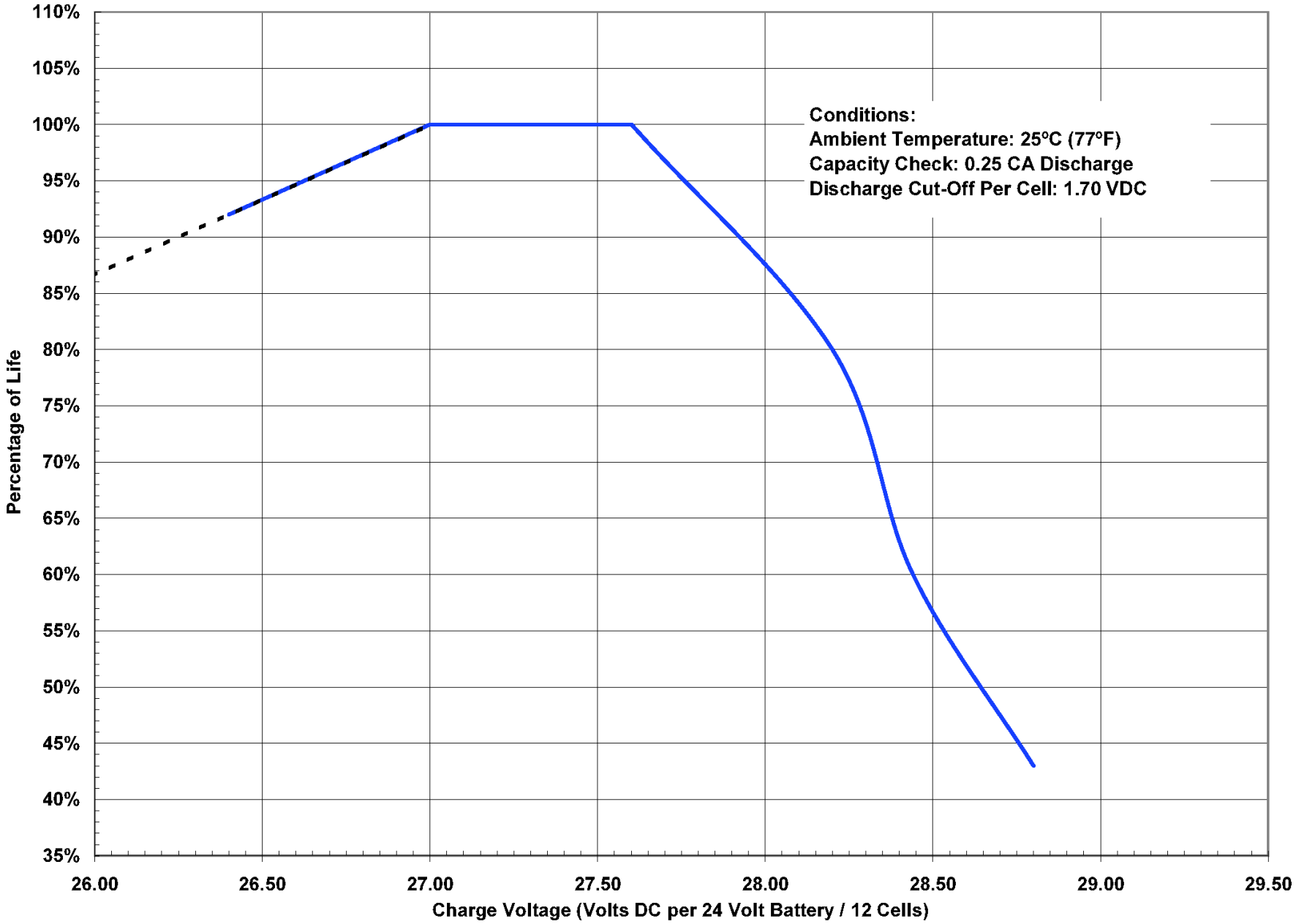
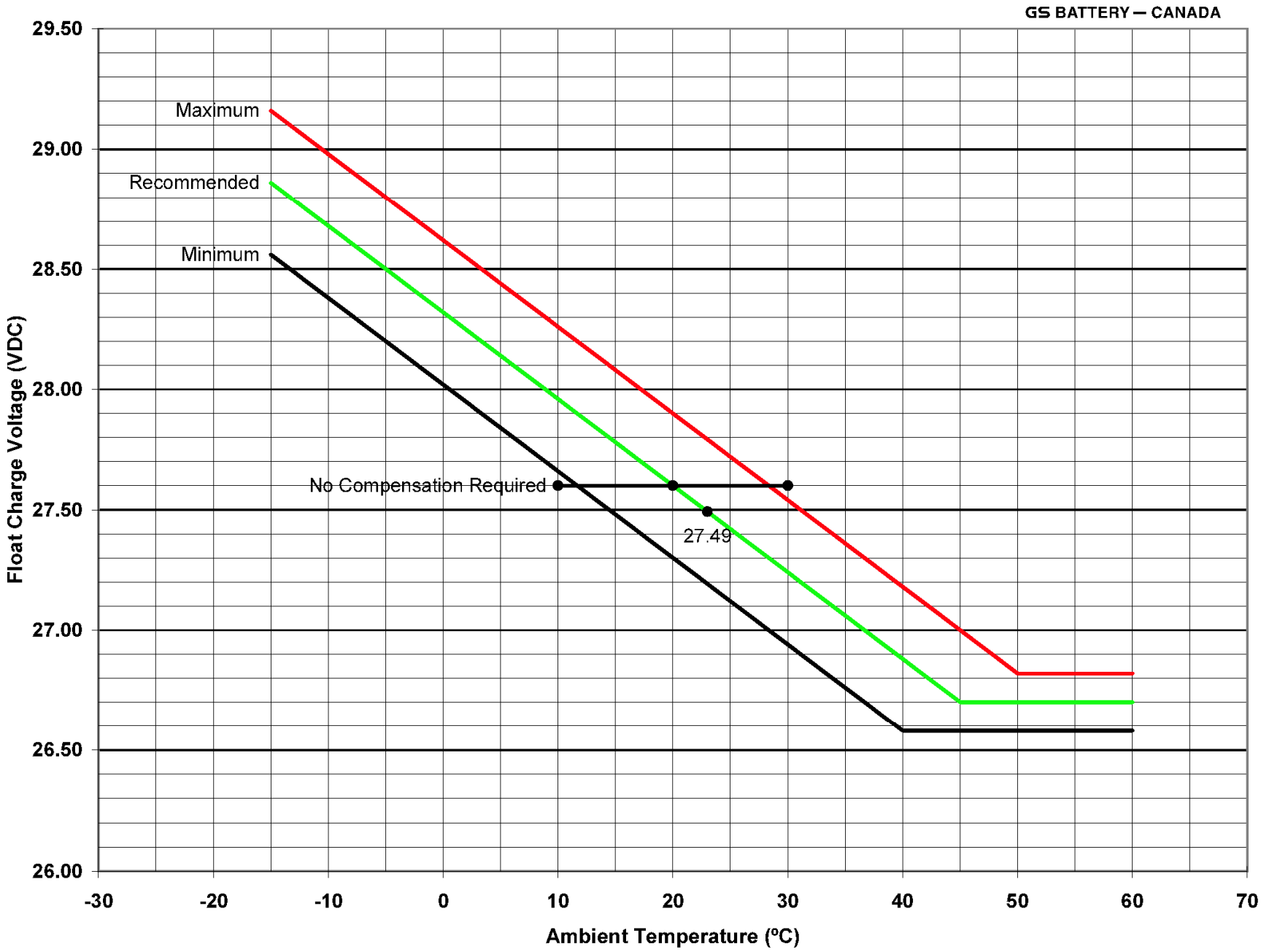


Charge Voltage (Volts DC per 24 Volt Battery / 12 Cells)



The Relationship bewteen Temperature and Standby Life (without Compensation)

Translated from the JSB (PE, PX, PXL) domestic Technical Guide published 1998.10.01 (Pg.13, Fig.19)

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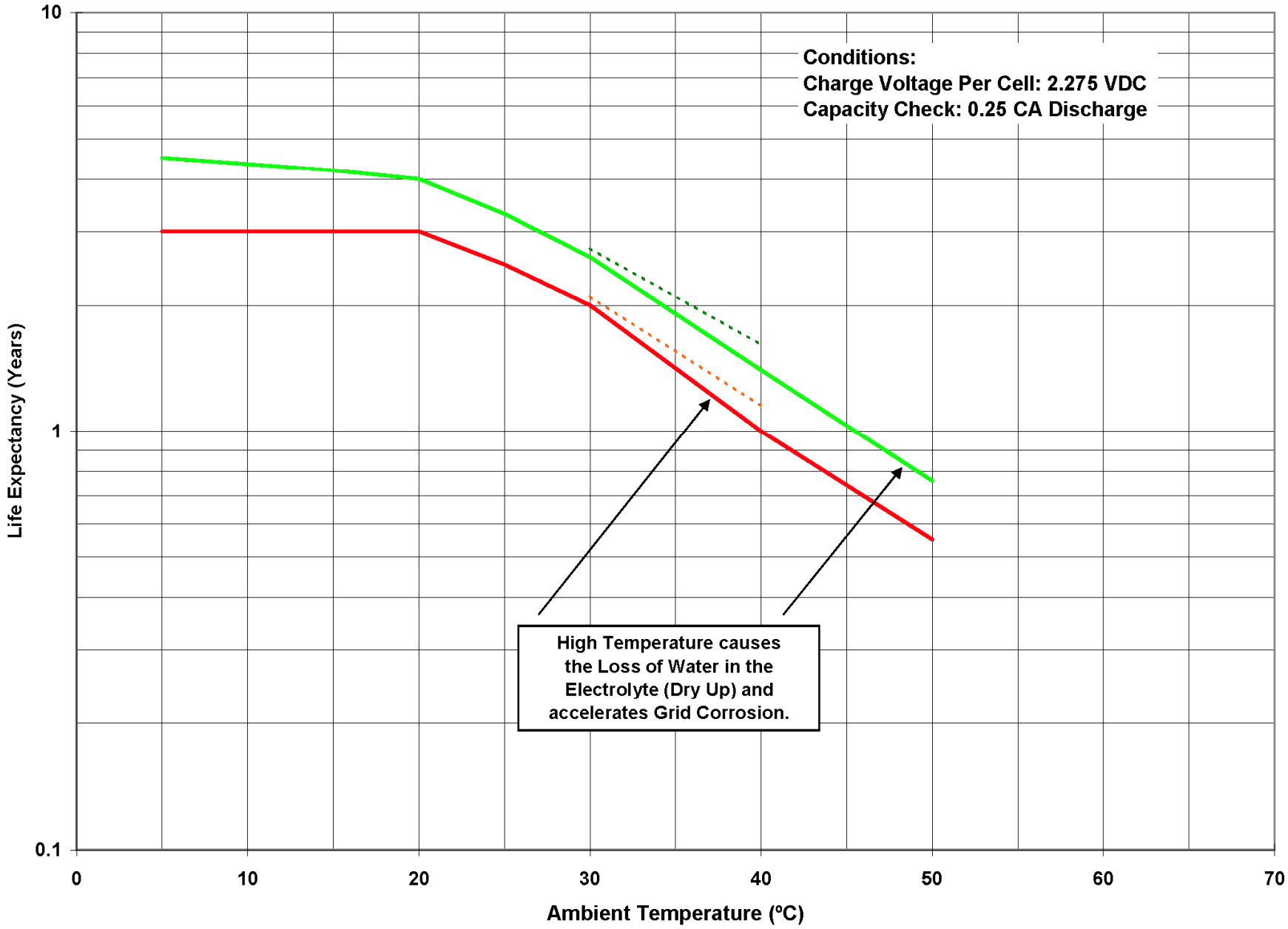

The Relationship between Discharge Frequency and Life

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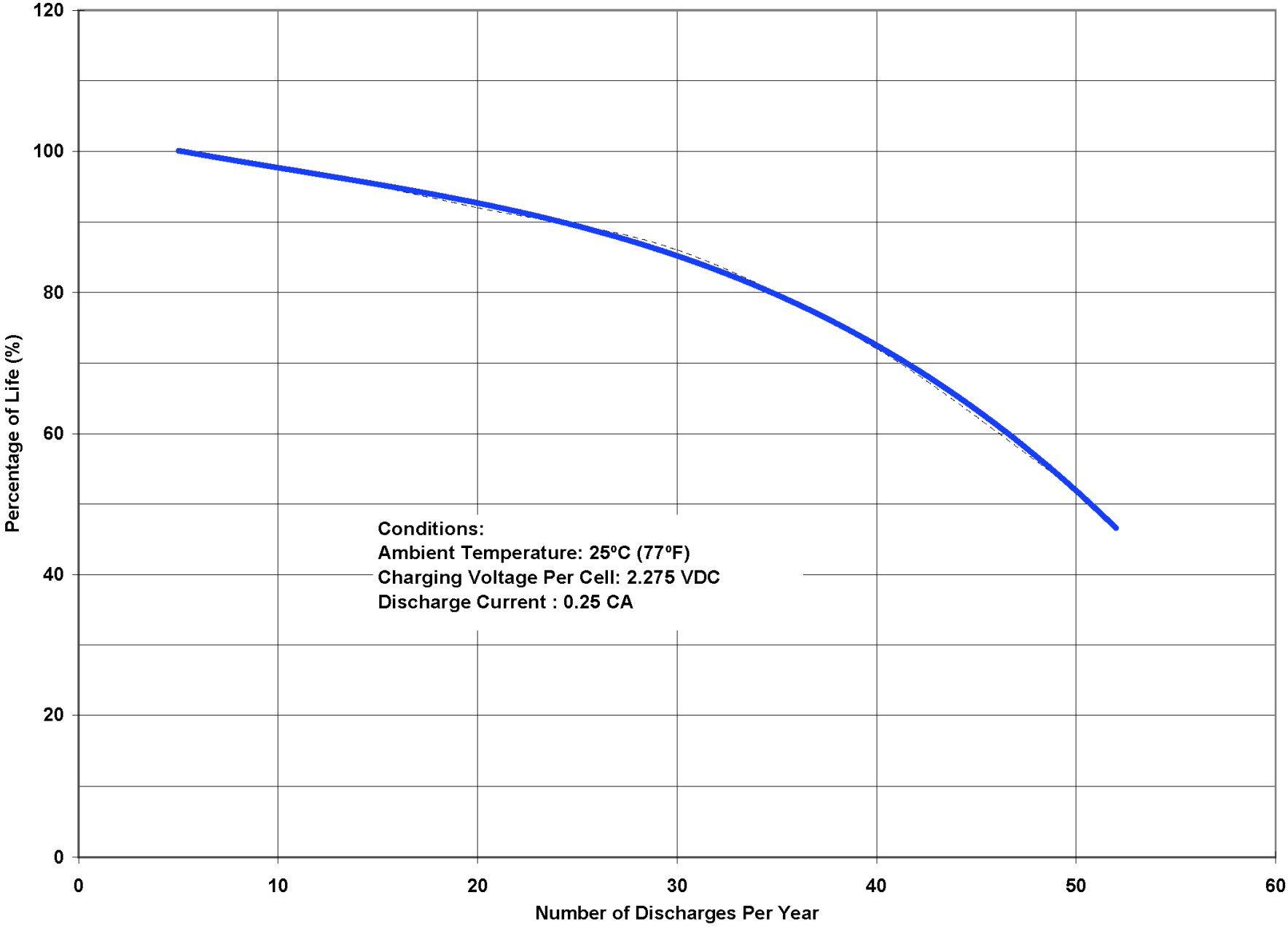


Conductance Testing

(Characteristic examples using Midtronics SCP-100)

1. The Relationship between Internal Resistance & Conductance

   In the following charts we'll review the relationship between Internal Resistance, Conductance, and State of Health (SOH).

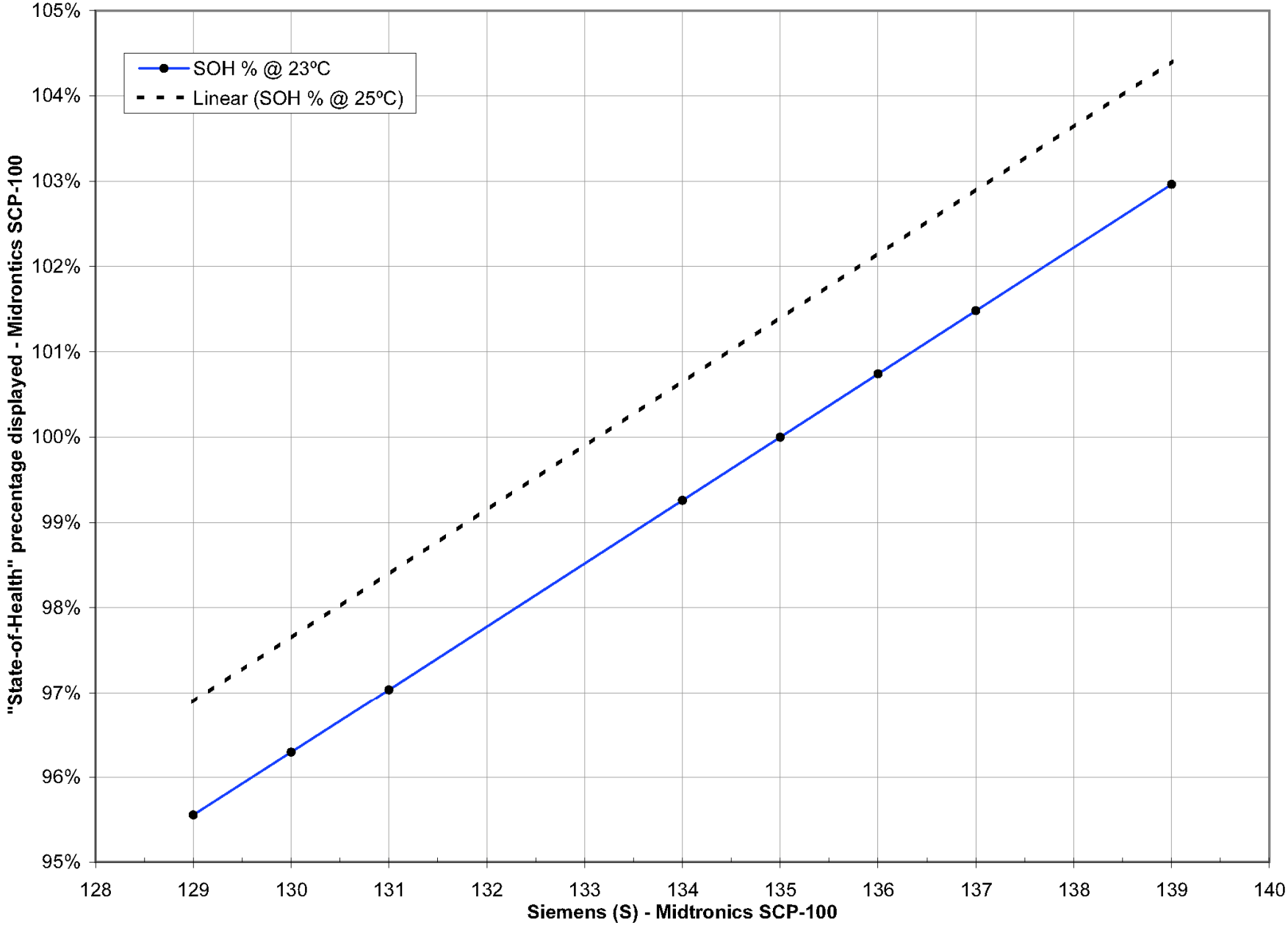
2. The effects of temperature, on the battery and meter display.

   In the following charts we'll review how the battery and meter are very sensitive to ambient Temperature, and how Conductance meters behave and provide State of Health (SOH) given certain "Baseline" values.

3. Other factors affecting the establishment of "Baseline" Values.

   State of Charge, Ambient Temperature and Expected variance*, both within batches and between batches (date codes), the greater challenge*…

The Relationship between Internal Resistance & Conductance - PK12V4.5F1 @23ºC, 24 hours after 72 hour Top Charge.
(Date code Sep.4/12 > 14 units Average OCV: 13.29 VDC) - Midtronics SCP-100, Siemens Baseline 135S



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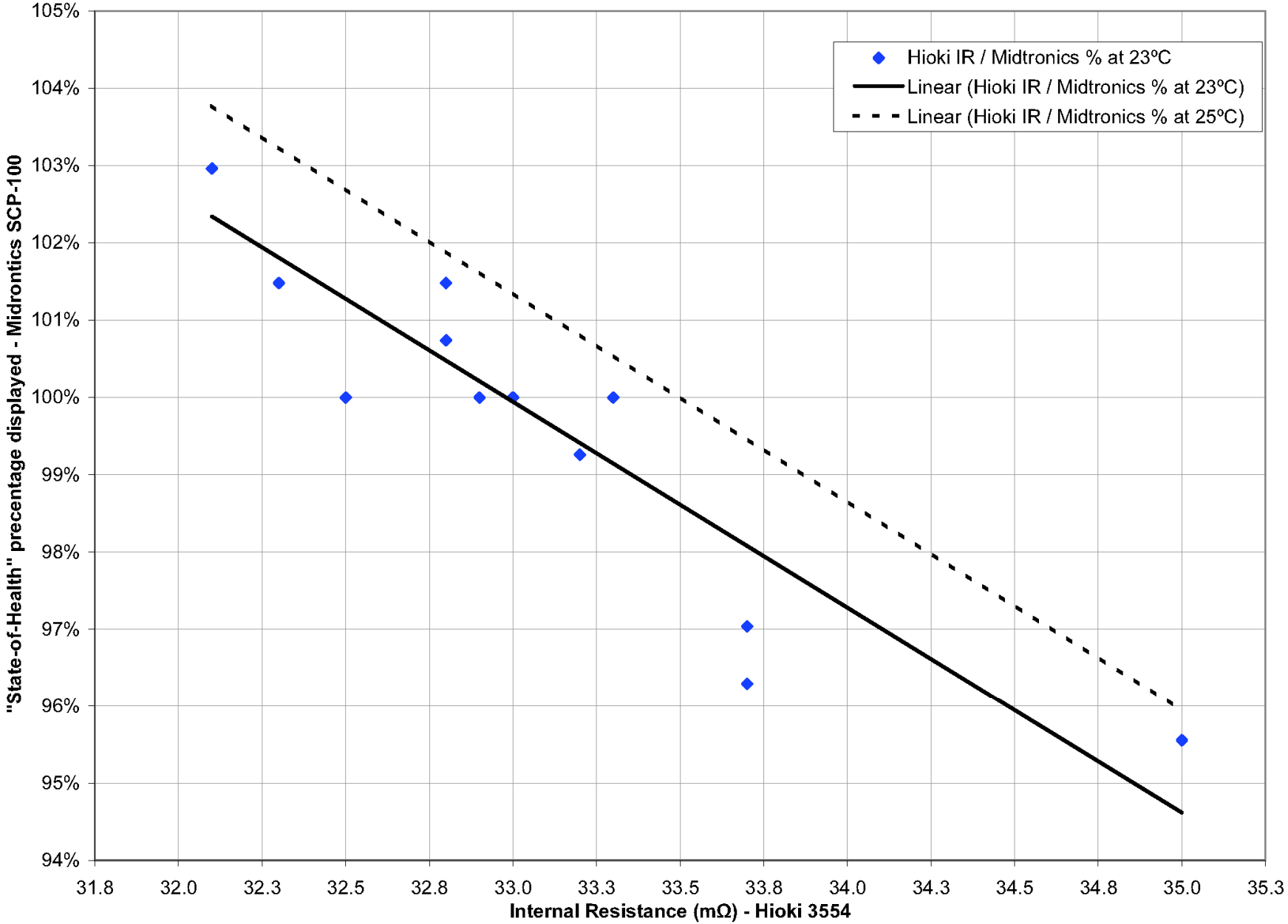
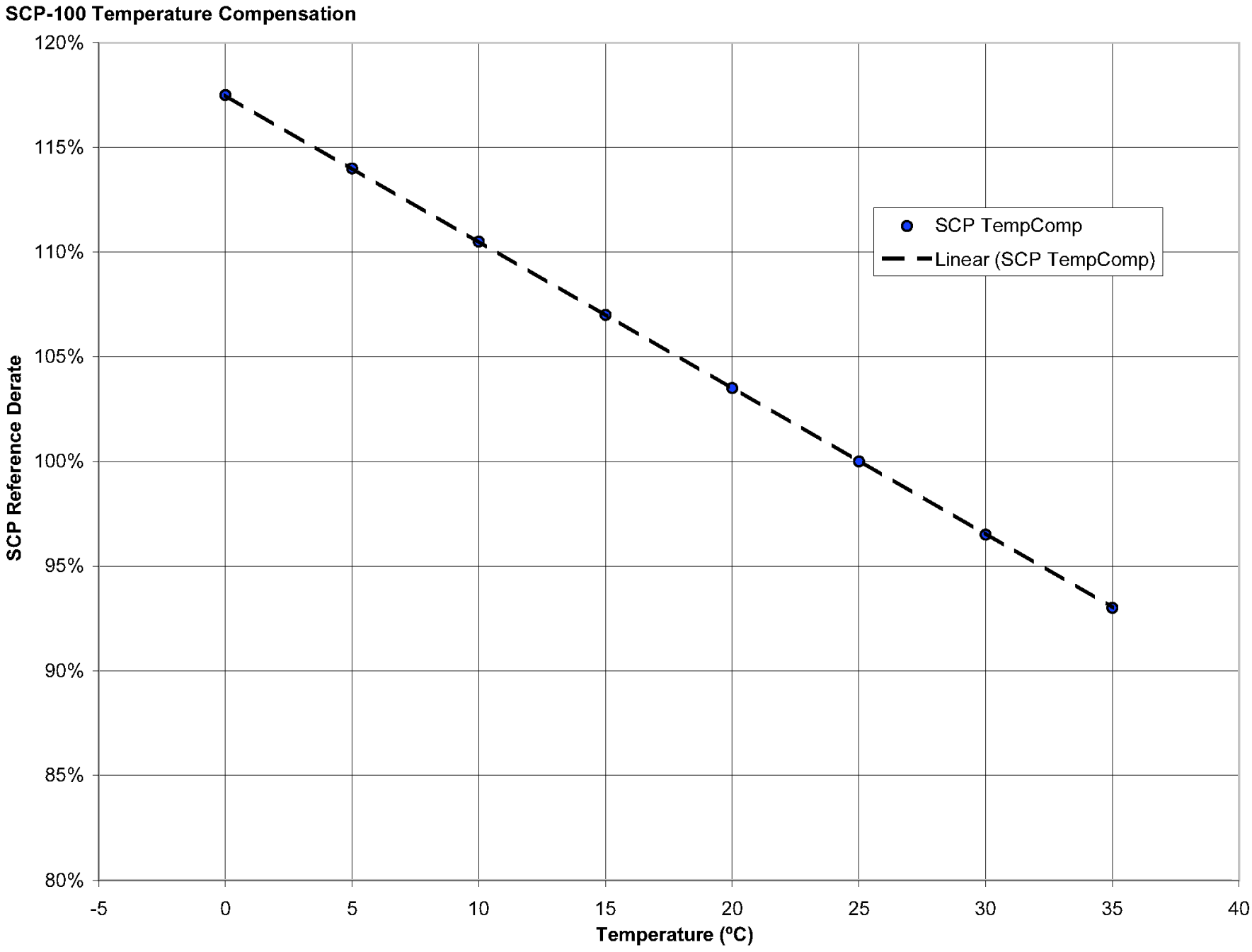
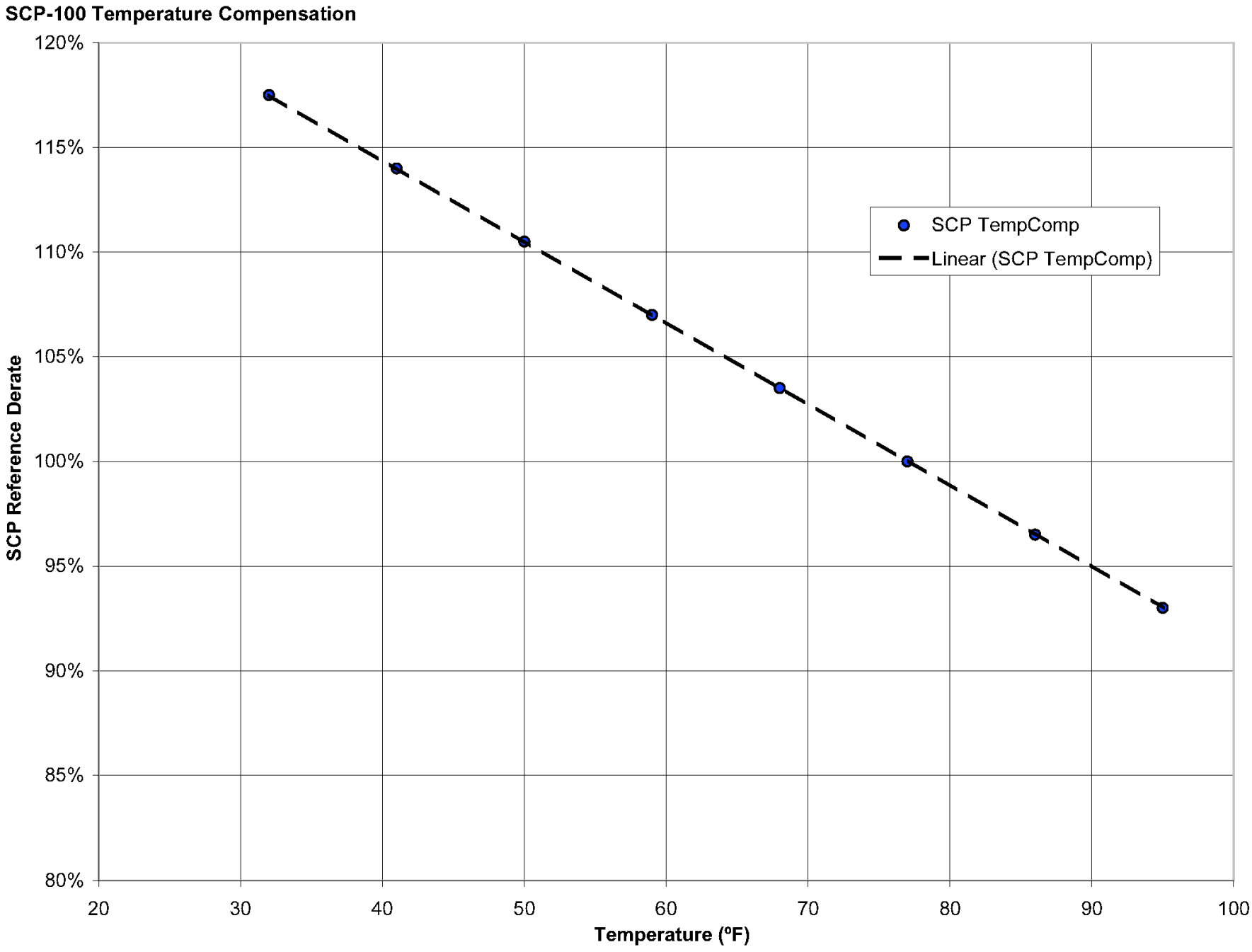



SCP-100 Temperature Compensation
120%
115%
110%
105%
100%
95%
90%
85%
80%
SCP Reference Derate
-5
0
5
10
15
20
25
30
35
40
Temperature (ºC)
SCP TempComp
Linear (SCP TempComp)


SCP-100 Temperature Compensation
120%
115%
110%
105%
100%
95%
90%
85%
80%
SCP Reference Derate
20
30
40
50
60
70
80
90
100
Temperature (ºF)
SCP TempComp
Linear (SCP TempComp)

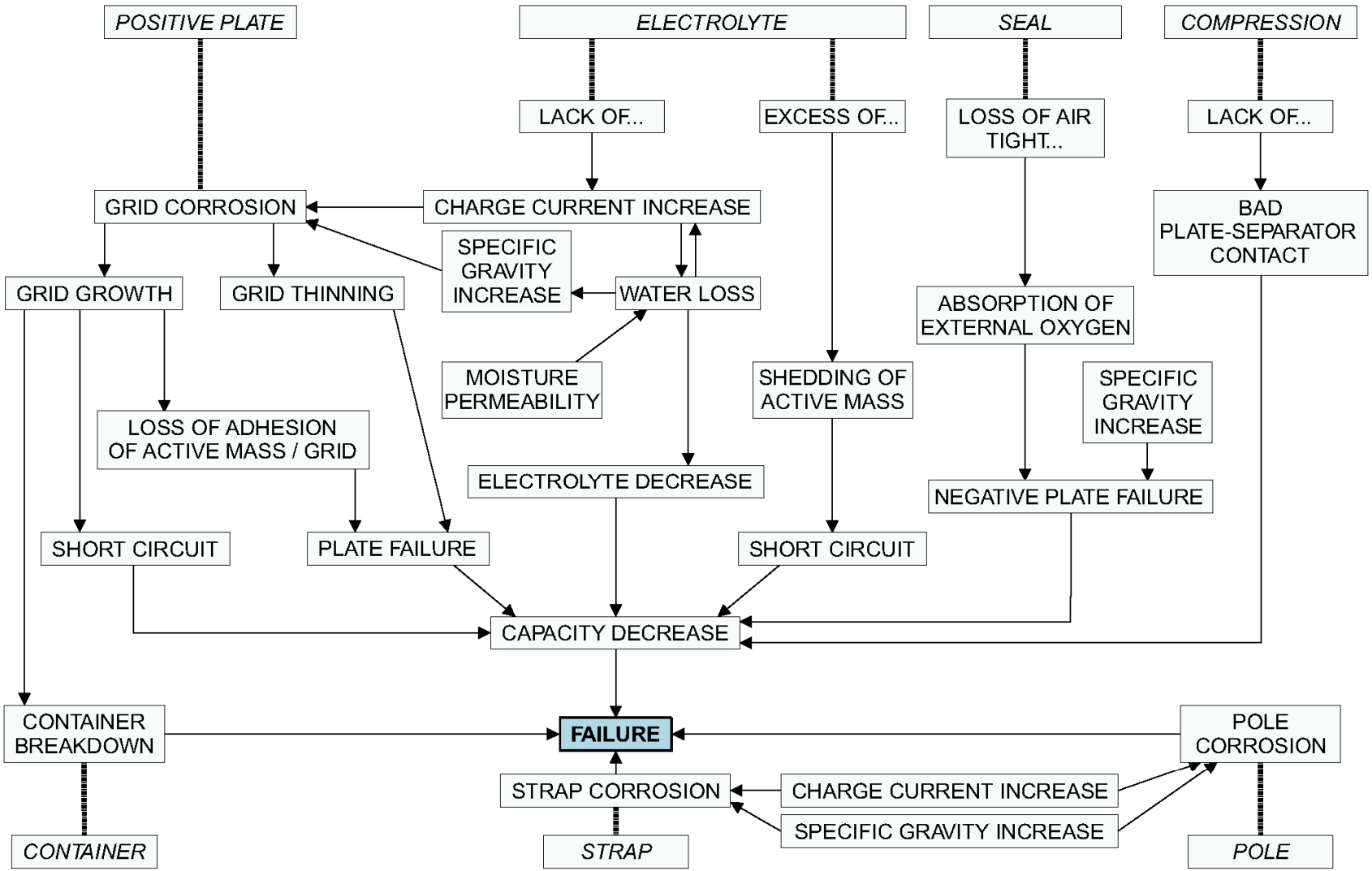
Suggested practices for annual battery inspection - Trouble-shooting battery issues

1. Observe the Ambient Temperature

   Before touching any equipment, the environmental temperature should be measured. It is the battery temperature which is used to help estimate life. Measure the battery face & terminals' temperature; use the highest of the two.

2. Check the Charge (Float) Voltage

   Before performing any other tests, the Charging (or Float) Voltage should be measured. This should be done immediately after opening the service panel, so that the (lower) room or ambient temperature does not cool the battery. If the Charging voltage is outside the recommended range, employ temperature compensation if permitted, at the rate of -3mV / Cell / ºC (from 20ºC).



S.L.A. BATTERY "CAUSE OF FAILURE" FLOWCHART

The UL Mark…is it real?

1. Go to UL.com
2. Click on the “Certifications” link
3. Enter the “UL File Number” to be searched
4. Search the next pages for the model number

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