

Possible Path Forward for EV Durability and Collaboration with WLTP

From EVE IWG Leading Team

(11/1/2017)

Background

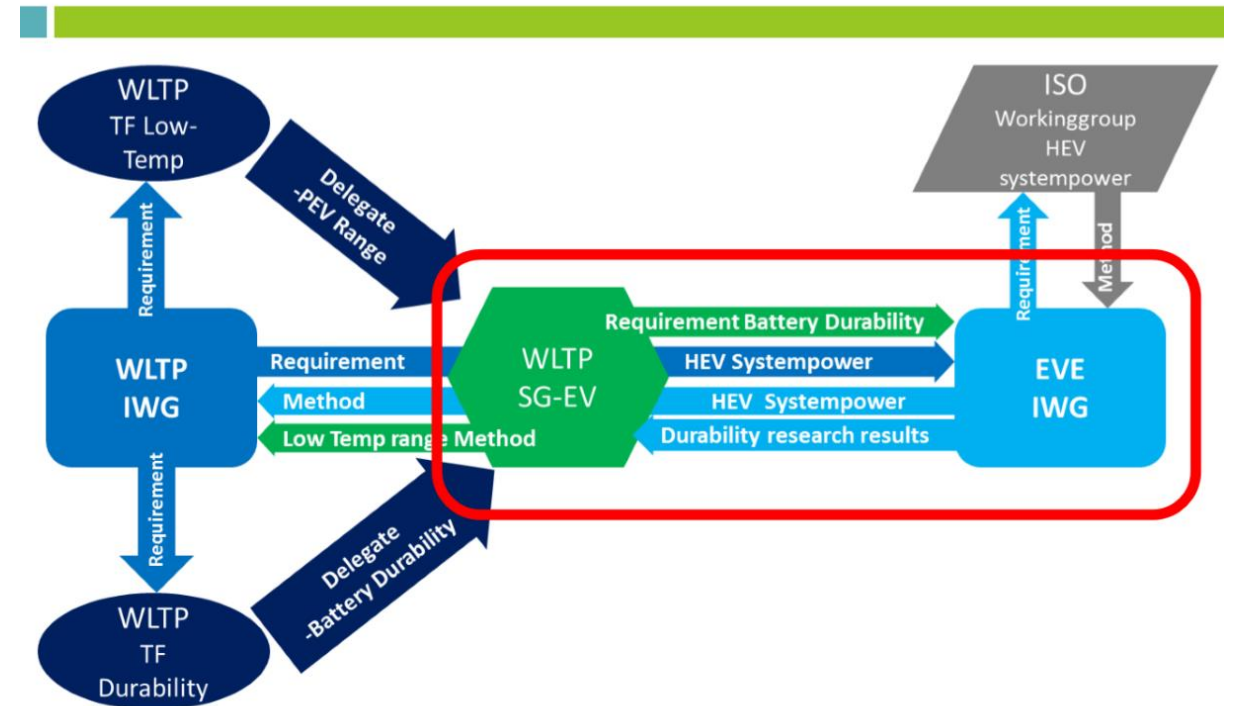
- The degradation of a battery's performance(charge/discharge capacity, power) strongly depends on usage condition of the battery.
- The major factors to represent the usage condition are charge/discharge patterns, duration and temperature in use.
- Determination of representative condition(which is based on charge/discharge patterns, duration and temperature) for WLTP is required.
- In order to determine the representative condition, the major factors (on charge/discharge patterns, duration and temperature) under vehicle drive condition by WLTP should be clarified.
- As an additional input, durability TF of WLTP IWG is working on the investigation on correlation between SRC and WLTC.

Suggestion on collaboration between WLTP and EVE

EVE leading team suggests both WLTP and EVE IWG to start creating a provisional test pattern for the evaluation of battery performance degradation under the WLTP based use condition.

This approach is expected to provide a common understanding on technical communication between the two IWGs.

Communication with WLTP



Example of steps in the approach

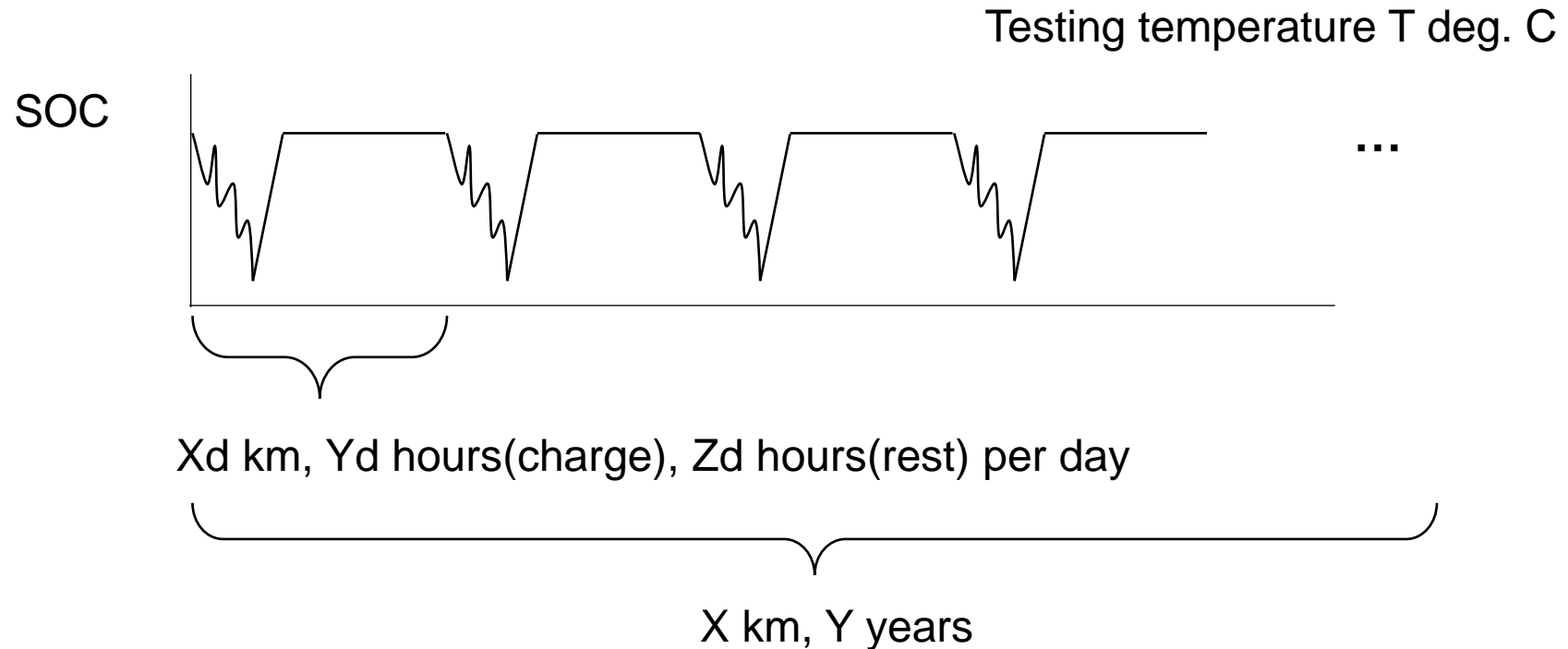
1. A representative battery test pattern for no accelerated condition
 - Identifying factors(parameters) to determine the representative condition
 - Reviewing the representative battery test pattern
conducting battery testing will be required

Factors		WLTP condition	EVE condition
Charge/ discharge pattern	Driving basis	○	
	Charging basis		○
Driving time		○	
Vehicle life and millage		○	
Temperature		○	

This table will be clarified through the process of 1st step.

2. A representative battery test pattern for accelerated condition
Investigating accelerated test validating with results from ISC(for example)

Image of the first order representative condition(no accelerated condition)



Xd km >> calculated by Average speed of WLTP and daily millage(from utility factor)

Yd hours >> calculated by delta SOC and charge rate

Zd hours >> 24hours – driving and charge

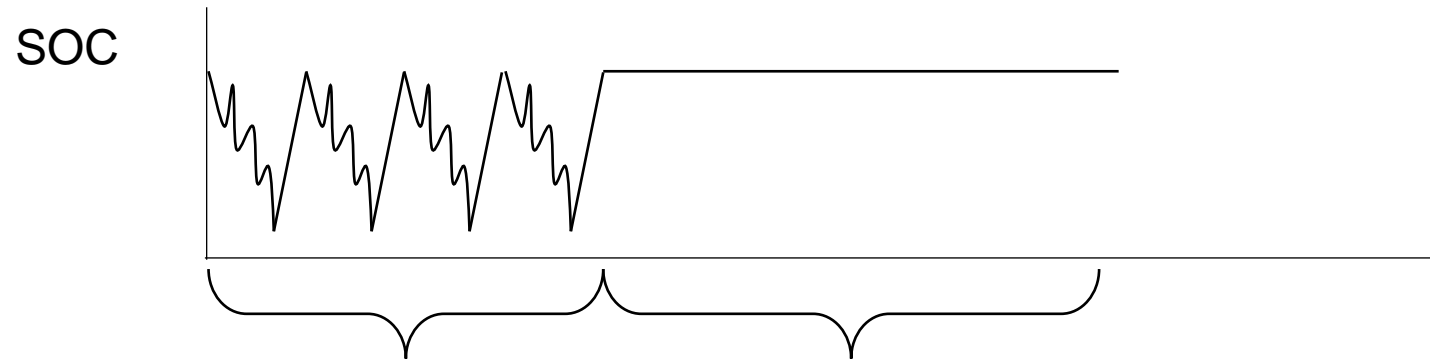
X km >> based on condition in line with WLTP Durability TF

Y years >> based on condition in line with WLTP Durability TF

T deg. C >> 23 deg. C

Image of the first order representative condition(accelerated condition)

Testing temperature T_{acc} deg. C



Based on no accelerated condition

Based on Arrhenius equation(?)