



# DC Fast Charging at Different Temperatures for the 2015 Kia Soul

The ambient air temperature around the car may heat or cool an electric vehicle's (EV's) battery pack when it is not being used. The temperature of the battery pack at the start of a direct current (DC) fast charge can make an impact on how long it takes to fast charge EVs. For this reason, testing was performed to determine how fast DC fast charging can recharge EVs when they have been sitting for 24 hours at 0, 25, and 50° C (32, 77, and 122° F) temperatures.

The testing measured the battery state of charge (SOC) after 30 minutes, total charge time and electricity used, and how much electricity was used by the vehicle's battery climate control system (BCCS) to heat or cool the battery during DC fast charging events. The testing results and highlights are listed below and the full testing report can be found at: <https://avt.inl.gov/sites/default/files/pdf/fsev/2015SoulDCFCAtTempBOT.pdf>.

These tests were performed as part of the U.S. Department of Energy's Advanced Vehicle Testing Activity (<http://avt.inl.gov>), which is conducted by Idaho National Laboratory and the Intertek Center for Evaluation of Clean Energy Technology.

## Lithium-ion Polymer

Battery type

27 kWh

Total capacity

## Active - Air

Battery climate control system

March 2015

Date tested

50° C (122° F)

69.6%

Average SOC at 30 minutes

57 minutes

Average charge duration

24.1 kWh

Average DC charge electricity

1.29 kWh

Average electricity used by the BCCS during charge events

93 miles

EPA estimated range

0° C (32° F)

75.4%

Average SOC at 30 minutes

49 minutes

Average charge duration

24 kWh

Average DC charge electricity

0.67 kWh

Average electricity used by the BCCS during charge events

Four

Test vehicles

25° C (77° F)

79.3%

Average SOC at 30 minutes

41 minutes

Average charge duration

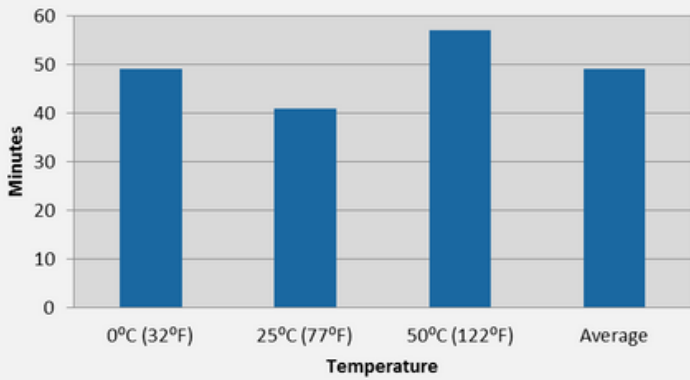
23.6 kWh

Average DC charge electricity

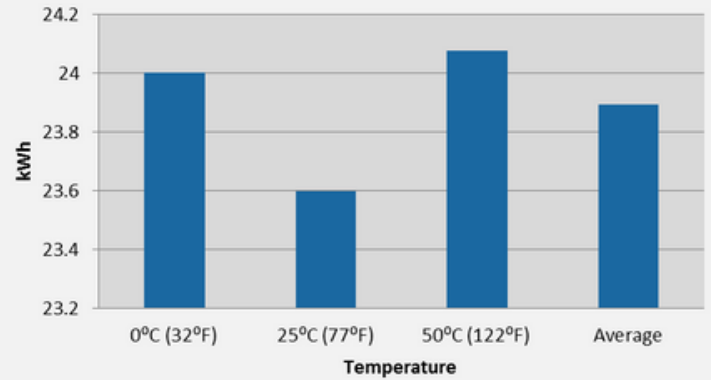
0.81 kWh

Average electricity used by the BCCS during charge events

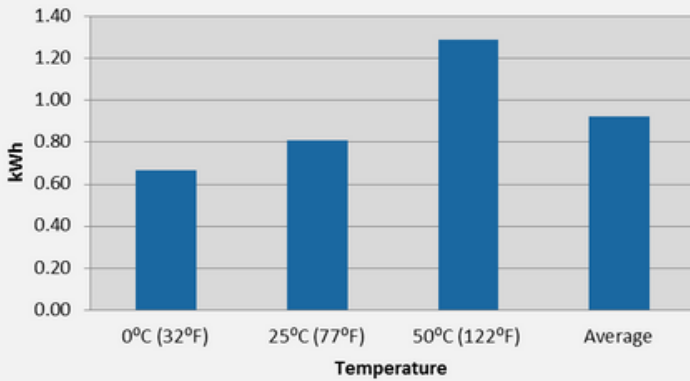
**Average Charge Duration 8% to 80%  
2015 Kia Soul**



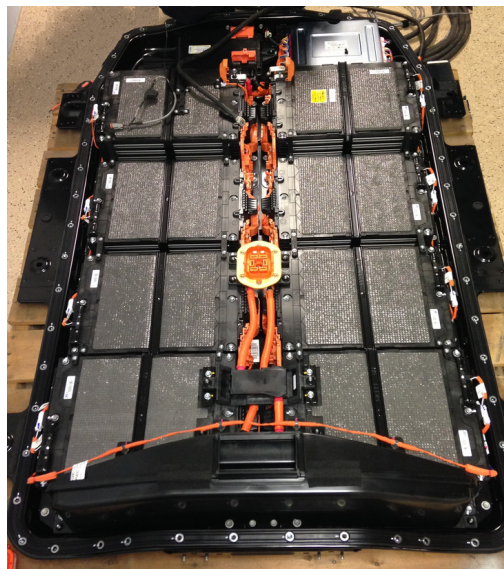
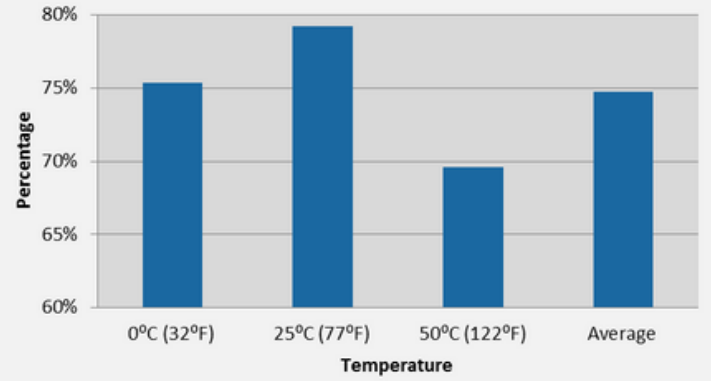
**Average DC Charge Electricity  
2015 Kia Soul**



**Average Electricity Used by the BCCS  
2015 Kia Soul**



**Average SOC at 30 Minutes  
2015 Kia Soul**



2015 Kia Soul battery pack top view when removed from the vehicle