



DC Fast Charging at Different Temperatures for the 2015 Chevrolet Spark

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/2015SparkDCFCATTempBOT.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

Battery type

19 kWh

Total capacity

Active Cooling - Liquid

Battery climate control system

October 2015

Date tested

50° C (122° F)

82 miles

EPA estimated range

0° C (32° F)

74.2%

Average SOC at 30 minutes

47 minutes

Average charge duration

18.56 kWh

Average DC charge electricity

0.73 kWh

Average electricity used by the BCCS during charge events

Four

Test vehicles

25° C (77° F)

88.1%

Average SOC at 30 minutes

43 minutes

Average charge duration

18.47 kWh

Average DC charge electricity

1.00 kWh

Average electricity used by the BCCS during charge events

50° C (122° F)

40.1%

Average SOC at 30 minutes

85 minutes

Average charge duration

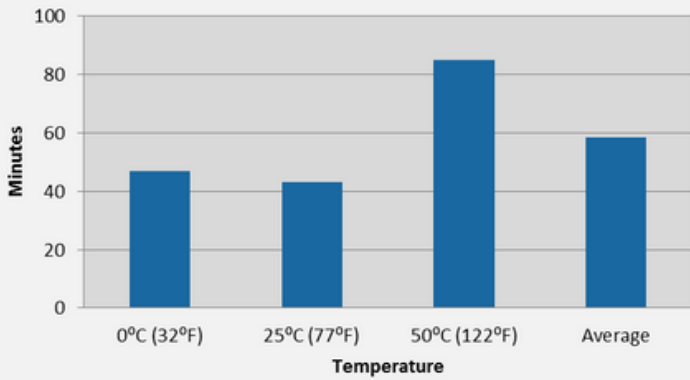
18.24 kWh

Average DC charge electricity

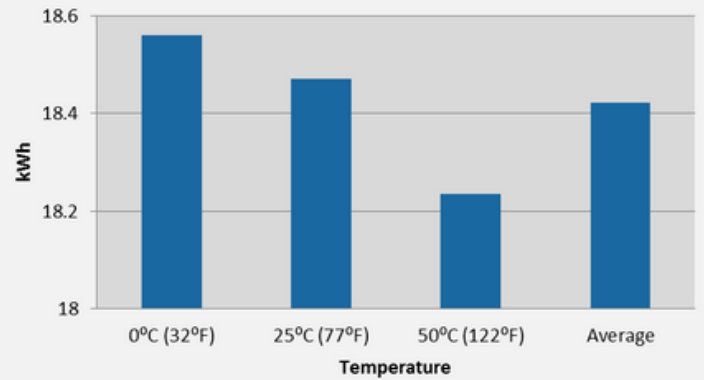
1.87 kWh

Average electricity used by the BCCS during charge events

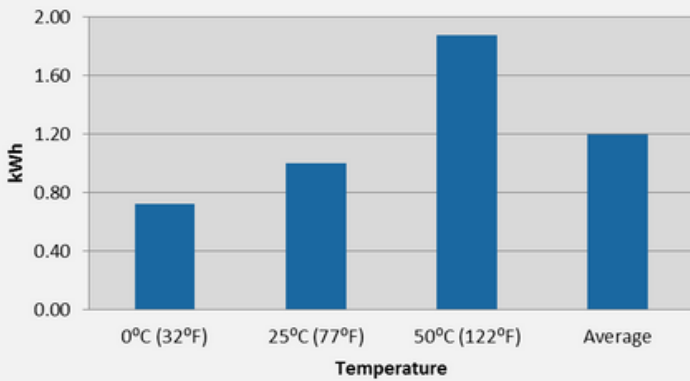
Average Charge Duration 8% to 80% 2015 Chevrolet Spark



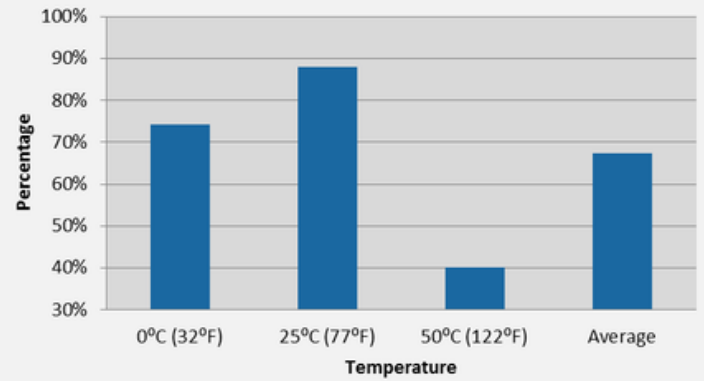
Average DC Charge Electricity 2015 Chevrolet Spark



Average Electricity Used by the BCCS 2015 Chevrolet Spark



Average SOC at 30 Minutes 2015 Chevrolet Spark



2015 Chevrolet Spark battery pack top view when removed from the vehicle