

APPLICATION FOR CERTIFICATION

2014 MODEL YEAR

Durability Group:	EGMXEEENN001
Test Group:	EGMXV00.0001
Summary Sheet No:	NA
Durability Group Description:	BATTERY ELECTRIC VEHICLE
Durability Vehicle:	NA
OBD Group:	NA
Test Group Description:	ZEV - BATTERY ELECTRIC VEHICLE
Applicable Standards:	CALIFORNIA ZEV AND FEDERAL BIN1 LDV PC
Carlines Covered by Evaporative Family:	0.0L Chevrolet SPARK EV NA
Vehicles Tested:	00MBEV4012
For Questions, Contact:	D. S. McGuire (248)444-0239

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TEST VEHICLE DESCRIPTION

	<u>Durability</u> <u>Vehicle Selection - NA</u>	<u>Emission-Data Vehicle Selection</u>
Test Group	NA	EGMXV00.0001
Evaporative Family		NA (BEV) – Battery Electric Vehicle
Displacement – Liters		100 kW – Electric Motor
Engine Code		1
Emission Control System		
Exhaust		NA (BEV)
Evap		NA (BEV)
Model		1CZ48
Transmission Type/Code		AV/1
Shift Schedule		NA
(LVW/ALVW) Test Weight – Lbs		3250
GVWR		NA
Roadload HP		10.3
Final Drive		3.17
N/V Ratio – rpm/mph		26.2
Tires		185/55R15 (Front) - HW3 195/55R15 (Rear) – HW3
Vehicle/EPA Config No./GM Config No.		
UDDS		00MBEV4012/00/001
HFEDS		00MBEV4012/00/001

NOTE: For complete vehicle information, see vehicle information submitted in VERIFY database.

Data Vehicle Selection Justification – This vehicle represents the heaviest test weight class, highest total roadload, and highest N/V ratio that is expected to be the worst case for emissions.

Certification Summary Information Report

Manufacturer	General Motors LLC	Manufacturer Code	GMX
Test Group	EGMXV00.0001	Evaporative/Refueling Family	N/A
Certificate Number	N/A	CARB Executive Order #	N/A
Certificate Issue Date	N/A	Certificate Revision Date	N/A
Certificate Effective Date	N/A	Conditional Certificate	--
CSI Revision #	N/A	CSI Submission/Revision Date	01/25/2013
Model Year	2014		

Test Group Information

CSI Type	Update for Correction	Running Change Reference Number	N/A
GHG Exempt Status	Not Exempt		

Drive Sources and Fuel(s)

Drive Source #1: Electric Motor

Fuel	Basic Fuel Metering System	Lean Burn Strategy Indicator
Electricity	--	N

Hybrid Indicator	No		
Multiple Fuel Storage	--	Rechargeable Energy Storage System Indicator	Yes
Multiple Fuel Combustion	--	Off-board Charge Capable Indicator	Yes
Fuel Cell Indicator	No	EPA Vehicle Class	LDV
Federal Clean Fuel Vehicle	No	Federal Clean Fuel Vehicle Standard	--
Federal Clean Fuel Vehicle ILEV	No	California Partial Zero Emissions Vehicle Indicator	No
Durability Group Name	EGMXEEENN001	Durability Group Equivalency Factor	5
Reduced Fee Test Group	No	Certification Region Code(s)	FA, CA
Complies with HD GHG 2b/3 regulations?	No		
Introduction into Commerce Date	--	CAP2000 Conditional Certificate?	N/A
Independent Commercial Importer?	--	Alternative Fuel Converter Certificate?	--
SFTP Compliance Indicator	No	SFTP Composite CO Option	--
OBD Compliance Type	CARB	OBD Demonstration Vehicle Test Group	EGMXV00.0001
Mfr Test Group Comments	--		
Mfr Exhaust / Evap Standards Comments	--		

Models Covered by this Certificate

Carline Manufacturer	Division	Carline	Certification Region Code(s)	Drive System	Trans - Type	- # of Gears	Trans - Lockup
General Motors LLC	3 - Chevrolet	953 - SPARK EV	Federal	2-Wheel Drive, Front	Automatic	1	No
General Motors LLC	3 - Chevrolet	953 - SPARK EV	California + CAA Section 177 states	2-Wheel Drive, Front	Automatic	1	No

Certification Summary Information Report

Test Group	EGMXV00.0001	Evaporative/Refueling Family	N/A							
Engine Description										
Hybrid Type	--	Hybrid Description	--							
Engine Type		Mfr Engine Description	--							
Engine Block Arrangement	--	Mfr Engine Block Arrangement Description	--							
Camless Valvetrain Indicator	--	Oil Viscosity/Classification								
Number of Cylinders/Rotors	--									
After Treatment Device(s) (ATD)										
Mfr After Treatment Device (ATD) Comments	--									
Direct Ozone Reduction (DOR) Device										
Mfr Emission Control Device Comments	--									
Official Test Numbers										
Test Group Fuel	FTP	US06	SC03	Cold CO	Highway	EPA City Litmus Value	EPA City Litmus Threshold	EPA Highway Litmus Value	EPA Highway Litmus Threshold	CREE Weighting Factor
Electricity	--	--	--	--	--	N/A	N/A	--	N/A	N/A
Official Charge Depleting Test Numbers										
Test Group Fuel	UDDS	Highway								
Electricity	EGMX10023925	EGMX10023926								
Hybrid Electric Vehicle And Fuel Cell Information										
Rechargeable Energy Storage System	Battery(s)	Rechargeable Energy Storage System, if Other	--							
Battery Type	Lithium Ion	Number of Battery Packs	1							
Total Voltage of Battery Packs	370	Battery Energy Capacity	60							
Battery Specific Energy	83	Battery Charger Type	Both							
Number of Capacitors	N/A									
Capacitor Rating (In Farads)	--	Mfr Capacitor Comments	--							
Hydraulic System Description										
Regenerative Braking Type	Electrical Regen Brake									
Regenerative Braking Source	Front Wheels	Driver Controlled Regenerative Braking	No							
Mfr Regenerative Braking Description	--									
Drive Motor(s)/Generator(s)	1									
Motor/Generator Type 1	AC Permanent Magnet	Rated Motor/Generator Power	104							
Mfr Fuel Cell Description										
Fuel Cell On-Board H2 Storage Capacity (kg)	--	Usable H2 Fill Capacity (kg)	--							
Mfr Hybrid Electric/ Electric Vehicle Comments	Electric Vehicle									

Certification Summary Information Report

Test Group	EGMXV00.0001	Evaporative/Refueling Family	N/A
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Emission Data Vehicle Information

Vehicle ID / Configuration 00MBEV4012 / 0

Vehicle Model

Represented Test Vehicle Make CHEVROLET **Represented Test Vehicle Model** SPARK BEV

Drive Sources and Fuel System Details

Drive Source and Fuel#	Drive Source	Fuel
1	Electric Motor	Electricity

Hybrid Indicator N

Multiple Fuel Storage -- **Multiple Fuel Combustion** --

Fuel Cell Indicator N **Rechargeable Energy Storage System Indicator** Y

Rechargeable Energy Storage System Battery(s) **Rechargeable Energy Storage System, if 'Other'** --

Off-board charge Capable Indicator Y

Transmission Type Electric Motor **# of Transmission Gears** 1

Engine Code 1 **Axle Ratio** 3.17

Displacement (liters) 99.999 **Rated Horsepower** 139

Equivalent Test Weight (pounds) 3250 **Air Aspiration Method** Naturally Aspirated

Drive Mode While Testing 2-Wheel Drive, Front **SIL Usage** Not equipped

Aged Emission Components 4,000 (mi)

Dynamometer Coefficients:

Target Coefficients			Set Coefficients			EPA Calculated Total Road Load Horse Power for City/Highway/Evap Coefficients	
Coefficient Category	A (lbf)	B (lbf/mph)	C (lbf/mph**2)	A (lbf)	B (lbf/mph)		C (lbf/mph**2)
City/Highway/Evap	22.64	0.1828	0.01806	7.25	0.2088	0.0166	10.3

Manufacturer Test Vehicle Comments 2014 SPARK EV

Certification Summary Information Report

Test Group	EGMXV00.0001	Evaporative/Refueling Family	N/A																								
Test #	EGMX10023925	Test Procedure	81 - Charge Depleting UDDS																								
Exhaust Test # for this Evap Test	N/A	Test Fuel Type	62 - Electricity																								
Test Date	01/10/2013	Fuel	Electricity																								
Vehicle Class	LDV/Passenger Car	DF Type	Mfr. Assigned																								
Verify Test Lab ID	EPA																										
PHEV/EV TEST INFO																											
Recharge Event Voltage	240	Recharge Event Energy (kiloWatt-hours)	23.046																								
Charge Depleting Range (Calculated miles)	125.4	Charge Depleting Range (Actual miles)	125.4																								
Equivalent All Electric Range	125.4																										
Number of Charge Depleting Bags/Phases Conducted	1																										
Charge Depleting Bag/Phase																											
<table border="1"> <thead> <tr> <th>Charge Depleting Bag/Phase #</th> <th>Test Result/Emission Name</th> <th>Unrounded Test Result</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Actual Distance Driven (miles)</td> <td>125.4</td> </tr> <tr> <td>1</td> <td>Average System Voltage</td> <td>0</td> </tr> <tr> <td>1</td> <td>Carbon-Related Exhaust Emissions</td> <td>0</td> </tr> <tr> <td>1</td> <td>Integrated Amp-hours</td> <td>53.249</td> </tr> <tr> <td>1</td> <td>Manufacturer Fuel Economy</td> <td>183.5</td> </tr> <tr> <td>1</td> <td>System End State of Charge Watt-hours</td> <td>0</td> </tr> <tr> <td>1</td> <td>System Start State of Charge Watt-hours</td> <td>0</td> </tr> </tbody> </table>				Charge Depleting Bag/Phase #	Test Result/Emission Name	Unrounded Test Result	1	Actual Distance Driven (miles)	125.4	1	Average System Voltage	0	1	Carbon-Related Exhaust Emissions	0	1	Integrated Amp-hours	53.249	1	Manufacturer Fuel Economy	183.5	1	System End State of Charge Watt-hours	0	1	System Start State of Charge Watt-hours	0
Charge Depleting Bag/Phase #	Test Result/Emission Name	Unrounded Test Result																									
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1	System End State of Charge Watt-hours	0																									
1	System Start State of Charge Watt-hours	0																									
Manufacturer Test Comments																											
4K CDEM TEST - CONFIRMATORY AT EPA																											
Certification Region	Useful Life	Standard Level	Emission Name	Rounded Result	RAF	NMOG/NM HC Ratio	Diesel Adjustment Factor	Add DF	Mult DF	Certification Level	Standard	Pass/Fail															
Fed	4,000 miles	Federal Tier 2 Bin 1	CREE	0	--	--	--	0	--	0	--	--															
CA	4,000 miles	California ZEV	CREE	0	--	--	--	0	--	0	--	--															

Certification Summary Information Report

Test Group	EGMXV00.0001	Evaporative/Refueling Family	N/A																								
Test #	EGMX10023926	Test Procedure	84 - Charge Depleting Highway																								
Exhaust Test # for this Evap Test	N/A	Test Fuel Type	62 - Electricity																								
Test Date	01/10/2013	Fuel	Electricity																								
Vehicle Class	LDV/Passenger Car	DF Type	Mfr. Assigned																								
Verify Test Lab ID	EPA																										
PHEV/EV TEST INFO																											
Recharge Event Voltage	240	Recharge Event Energy (kiloWatt-hours)	23.056																								
Charge Depleting Range (Calculated miles)	106.8	Charge Depleting Range (Actual miles)	106.8																								
Equivalent All Electric Range	106.8																										
Number of Charge Depleting Bags/Phases Conducted	1																										
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1	System End State of Charge Watt-hours	0																									
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Manufacturer Test Comments																											
4K CDHW TEST - CONFIRMATORY AT EPA																											
Certification Region	Useful Life	Standard Level	Emission Name	Rounded Result	RAF	NMOG/NM HC Ratio	Diesel Adjustment Factor	Add DF	Mult DF	Certification Level	Standard	Pass/Fail															
Fed	4,000 miles	Federal Tier 2 Bin 1	CREE	0	--	--	--	0	--	0	--	--															
CA	4,000 miles	California ZEV	CREE	0	--	--	--	0	--	0	--	--															

Certification Summary Information Report

Test Group		EGMXV00.0001			Evaporative/Refueling Family			N/A		
Consolidated List of Standards										
Exhaust Standards										
Cert Region		Federal			Cert/In-Use Code			Cert		
Vehicle Class		LDV/Passenger Car			Standard Level			Federal Tier 2 Bin 1		
Fuel		Electricity			Test Procedure			Charge Depleting Highway		
Useful Life	Emission Name	Rounded Result	RAF	NMOG / NMHC	Upward Diesel Adjustment Factor	Downward Diesel Adjustment Factor	Mult DF	Add DF	Std	
4,000 miles	CO	--	--	--	--	--	--	0	0	
4,000 miles	CREE	--	--	--	--	--	--	0	0	
Cert Region		Federal			Cert/In-Use Code			Cert		
Vehicle Class		LDV/Passenger Car			Standard Level			Federal Tier 2 Bin 1		
Fuel		Electricity			Test Procedure			Charge Depleting UDDS		
Useful Life	Emission Name	Rounded Result	RAF	NMOG / NMHC	Upward Diesel Adjustment Factor	Downward Diesel Adjustment Factor	Mult DF	Add DF	Std	
4,000 miles	CO	--	--	--	--	--	--	0	0	
4,000 miles	CREE	--	--	--	--	--	--	0	0	
Cert Region		California + CAA Section 177 states			Cert/In-Use Code			Cert		
Vehicle Class		LDV/Passenger Car			Standard Level			California ZEV		
Fuel		Electricity			Test Procedure			Charge Depleting UDDS		
Useful Life	Emission Name	Rounded Result	RAF	NMOG / NMHC	Upward Diesel Adjustment Factor	Downward Diesel Adjustment Factor	Mult DF	Add DF	Std	
4,000 miles	CO	--	--	--	--	--	--	0	0	
4,000 miles	CREE	--	--	--	--	--	--	0	0	
Cert Region		California + CAA Section 177 states			Cert/In-Use Code			Cert		
Vehicle Class		LDV/Passenger Car			Standard Level			California ZEV		
Fuel		Electricity			Test Procedure			Charge Depleting Highway		
Useful Life	Emission Name	Rounded Result	RAF	NMOG / NMHC	Upward Diesel Adjustment Factor	Downward Diesel Adjustment Factor	Mult DF	Add DF	Std	
4,000 miles	CO	--	--	--	--	--	--	0	0	
4,000 miles	CREE	--	--	--	--	--	--	0	0	

Certification Summary Information Report

Test Group		EGMXV00.0001			Evaporative/Refueling Family		N/A		
Cert Region		Federal			Cert/In-Use Code		Cert		
Vehicle Class		LDV/Passenger Car			Standard Level		Federal Tier 2 Bin 1		
Fuel		Electricity			Test Procedure		Federal fuel 3-day exhaust		
Useful Life	Emission Name	Rounded Result	RAF	NMOG / NMHC	Upward Diesel Adjustment Factor	Downward Diesel Adjustment Factor	Mult DF	Add DF	Std
4,000 miles	CO	--	--	--	--	--	--	0	0
4,000 miles	CREE	--	--	--	--	--	--	0	0

Certification Summary Information Report

Test Group		EGMXV00.0001	Evaporative/Refueling Family		N/A
Glossary					
Useful Life					
4	4,000 miles		120	120,000 miles	
50	50,000 miles		150	150,000 miles	
100	100,000 miles				
Emission Name					
HC-TOTAL	Total Hydrocarbon		FE BAG 3	Bag 3 Fuel Economy	
CO	Carbon Monoxide		FE BAG 4	Bag 4 Fuel Economy	
CO2	Carbon dioxide		MFR FE	Manufacturer Fuel Economy	
CREE	Carbon-Related Exhaust Emissions		HC	Hydrocarbon for Running Loss and ORVR	
OPT-CREE	Optional Carbon-Related Exhaust Emissions		METHANE	CH4 - Methane	
NOX	Nitrogen Oxide		METHANOL	CH3OH - Methanol	
PM	Particulate Matter		N2O	Nitrous Oxide	
PM-COMP	SFTP Composite Particulate Matter		SPITBACK	Spitback Hydrocarbon in grams	
HC-NM	Non-methane Hydrocarbon		AMP-HRS	Integrated Amp-hours	
OMHCE	Organic material Hydrocarbon Equivalent		START-SOC	System Start State of Charge Watt-hours	
OMNMHCE	Organic material non-methane HC equivalent		END-SOC	System End State of Charge Watt-hours	
NMOG	Non-methane organic gas (California)		ACT-DISTANCE	Actual Distance Driven (miles)	
HCHO	Formaldehyde		AS-VOLT	Average System Voltage	
H3C2HO	Acetaldehyde		CO2 BAG 1	Bag 1 Carbon Dioxide	
HC-NM+NOX	SFTP Non-methane Hydrocarbon + Nitrogen Oxides for US06 or SC03		CO2 BAG 2	Bag 2 Carbon Dioxide	
HC-NM+NOX-COMP	SFTP Composite Non-methane Hydrocarbon + Nitrogen Oxides		CO2 BAG 3	Bag 3 Carbon Dioxide	
CO-COMP	SFTP Composite Carbon Monoxide		CO2 BAG 4	Bag 4 Carbon Dioxide	
ETHANOL	C2H5OH - Ethanol		NMOG+NOX	Non-methane organic gases plus Nitrogen Oxides	
FE BAG 1	Bag 1 Fuel Economy		NMOG+NOX-COMP	SFTP Composite Non-methane Organic Gases + Nitrogen Oxides	
FE BAG 2	Bag 2 Fuel Economy				
Certification Region					
CA	California + CAA Section 177 states		FA	Federal	
Exhaust Emission Standard Level					
B1	Federal Tier 2 Bin 1		L2SULEV30	California LEV-II SULEV30	
B2	Federal Tier 2 Bin 2		L2LEV395	California LEV-II LEV395	
B3	Federal Tier 2 Bin 3		L2ULEV340	California LEV-II ULEV340	
B4	Federal Tier 2 Bin 4		L2LEV630	California LEV-II LEV630	
B5	Federal Tier 2 Bin 5		L2ULEV570	California LEV-II ULEV570	
B6	Federal Tier 2 Bin 6		L3LEV160	California LEV-III LEV160	
B7	Federal Tier 2 Bin 7		L3ULEV125	California LEV-III ULEV125	
B8	Federal Tier 2 Bin 8		L3ULEV70	California LEV-III ULEV70	
B9	Federal Tier 2 Bin 9		L3ULEV50	California LEV-III ULEV50	
B10	Federal Tier 2 Bin 10		L3SULEV30	California LEV-III SULEV30	

Certification Summary Information Report

Test Group		EGMXV00.0001	Evaporative/Refueling Family		N/A
B11	Federal Tier 2 Bin 11		L3SULEV20	California LEV-III SULEV20	
HDV1	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)		L3LEV395	California LEV-III LEV395	
HDV2	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)		L3ULEV340	California LEV-III ULEV340	
L2	California LEV-II LEV		L3ULEV250	California LEV-III ULEV250	
L2OP	California LEV-II LEV Optional		L3ULEV200	California LEV-III ULEV200	
U2	California LEV-II ULEV		L3SULEV170	California LEV-III SULEV170	
S2	California LEV-II SULEV		L3SULEV150	California LEV-III SULEV150	
ZEV	California ZEV		L3LEV630	California LEV-III LEV630	
OT	Other		L3ULEV570	California LEV-III ULEV570	
T1	Federal Tier 1		L3ULEV400	California LEV-III ULEV400	
PZEV	California PZEV		L3ULEV270	California LEV-III ULEV270	
L2LEV160	California LEV-II LEV160		L3SULEV230	California LEV-III SULEV230	
L2ULEV125	California LEV-II ULEV125		L3SULEV200	California LEV-III SULEV200	
Transmission Type Code					
AMS	Automated Manual- Selectable (e.g. Automated Manual with paddles)	M	Manual		
A	Automatic	OT	Other		
AM	Automated Manual	SA	Semi-Automatic		
CVT	Continuously Variable	SCV	Selectable Continuously Variable (e.g. CVT with paddles)		
Drive System Code					
4	4-Wheel Drive	P	Part-time 4-Wheel Drive		
F	2-Wheel Drive, Front	A	All Wheel Drive		
R	2-Wheel Drive, Rear				
Additional Terms and Acronyms					
AFC	Alternative Fuel Converter	ICI	Independent Commercial Importer		
CSI	Certificate Summary Information	ORVR	Onboard Refueling Vapor Recovery		
DF	Deterioration Factor	SIL	Shift Indicator Light		
Evap	Evaporation, Evaporative	Trans	Transmission		

2014 MODEL YEAR BATTERY CHARGING and TESTING PROCEDURE INFORMATION

General Battery Charging Procedures

Reference Owner's Manual for additional information

Charging Plug-In Charging AC/DC Charge Cord Handle

1. Release Button
2. AC Charge Port

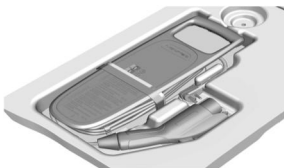


3. DC Charge Port (If Equipped – See Owner's Manual 9-32 to 9-34)

The high voltage battery can be charged using a household electrical outlet. When using a 240-volt charging station, it will take approximately seven hours to charge the vehicle from empty to full. When using a 120-volt AC wall outlet, it will take approximately 20 hours to charge the vehicle with the 12 amp AC current setting, and considerably longer using the default 8 amp AC current setting. Charge times will vary with outside temperature. There are three ways to program how the vehicle is charged. See *Charging on page 5-20*. If equipped, the vehicle can be charged using DC charging equipment found at service stations and other public locations. When using a DC charging station with at least 50kW of available power, it will take approximately 20 minutes to recharge from a depleted battery to a level of 80% of the driving range available for use. This time estimate is applicable to nominal temperature ranges. In extreme hot or cold conditions, this time may be lengthened. When a full charge is desired, the charging time will be increased. **While the charge cord is plugged into the vehicle, the vehicle cannot be driven.**

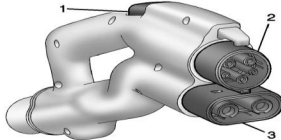
AC Charging Start Charge

1. Make sure the vehicle is parked and turned off.
2. Push the rearward edge of the charge port door in and release to open the door. In cold weather conditions, ice may form around the charge port door. The charge port door may not open on the first attempt. Remove ice from the area and repeat attempting to open the charge port door.
3. Open the rear hatch, lift the load support floor covering, and remove the charge cord. It is located near the tire sealant and compressor kit. Pull up on the charge cord handle to release it from the handle clip. Lift the charge cord up and rearward to remove it from the vehicle. The vehicle plug is stored as shown.



2014 MODEL YEAR BATTERY CHARGING and TESTING PROCEDURE INFORMATION

4. Plug the charge cord into the electrical outlet. See *Electrical Requirements for Battery Charging on page 9-39*. Verify the charge cord status. See the charge cord user manual. See *Charge Cord on page 9-38*. Select the appropriate charge level using the Charge Level Preference setting on the center stack. See “Charge Level Selection” under *Charging on page 5-20*. 5. Plug in the vehicle plug of the charge cord into the charge port on the vehicle. Verify that the Charging Status Indicator illuminates on top of the instrument panel and a horn chirp occurs. See *Charging Status Feedback on page 9-35*.



The vehicle has a Charging Status Indicator (CSI) at the center of the instrument panel near the windshield. When the vehicle is plugged in and the vehicle power is off, the CSI indicates the following:



- Solid Green – Vehicle is plugged in. Battery is not fully charged. Battery is charging.
- Slow Flashing Green – Vehicle is plugged in. Battery is not fully charged. Battery charging is delayed.
- Fast Flashing Green – Vehicle is plugged in. Battery is fully charged.
- Solid Yellow – Vehicle is plugged in. It is normal for the CSI to turn yellow for a few seconds after plugging in a compatible charge cord. The solid yellow may be extended depending on the vehicle and if there is a total utility interruption via OnStar. See *Utility Interruption of Charging on page 9-39*. This may also indicate that the charging system has detected a fault and will not charge the battery. See “Charge Cord Status Indicators” in the charge cord user manual.

The system may be thermally conditioning the battery during any of the states above, requiring electrical energy to be transferred to the vehicle. If the vehicle is plugged in and vehicle power is on, the CSI will be on solid green. The same is true during a remote start if the vehicle is plugged in.

If the vehicle is plugged in and the CSI is off, a total utility interruption using OnStar or a charging fault has been detected. See *Utility Interruption of Charging on page 9-39* or “Charge Cord Status Indicators” in the charge cord user manual. This chart indicates vehicle feedback when the charge cord is plugged in.

2014 MODEL YEAR BATTERY CHARGING and TESTING PROCEDURE INFORMATION

End Charge

1. Unlock the vehicle with the RKE transmitter to disarm the charge cord theft alert.
2. Unplug the vehicle plug of the charge cord from the vehicle.
3. Close the charge port door by pressing firmly in the center to latch properly.
4. Unplug the charge cord from the electrical outlet.
5. Place the charge cord into the storage compartment.

General Testing Procedures

EV Electric Range Test Sequence for GM Vehicles:

- SAE J1634 (As Cancelled 2002) shall be followed for all EV testing for GM Test Group EGMXV00.0001

Vehicle Verification

Verify that vehicle has at least 30miles worth of charge for the dyno determination sequence. Verify that the Hioki center loop (contact GM for support) is installed and secured in the backseat of the vehicle

Crabbing Vehicle

Vehicle shall be crabbed or pushed to charging station, test site, etc. while in any test sequence.

Dyno Determination

Starting and Stopping the vehicle

Starting Procedure

Move the shift lever to P (Park) or N (Neutral). The propulsion system will not start in any other position. The Remote Keyless Entry (RKE) transmitter must be in the vehicle. The vehicle has an electronic push button start. Press the brake pedal and push and release the POWER button.



ON/RUN: This position is for starting and driving. With the vehicle off, and the brake pedal applied, pressing the POWER button once will place the vehicle in ON/RUN. When the vehicle ready light is on in the instrument cluster, the vehicle is ready to be driven. This could take up to 15 seconds at extremely cold temperatures. See *Vehicle Ready Light* on page 5-17.



2014 MODEL YEAR BATTERY CHARGING and TESTING PROCEDURE INFORMATION

A vehicle ready light displays in the lower right corner of the instrument cluster when the vehicle is ready to be driven. The instrument cluster also displays an active battery gauge when the vehicle is ready to be driven.

STOPPING THE VEHICLE/OFF: To turn the vehicle off, push the POWER button with the vehicle in P (Park). Retained Accessory Power (RAP) will remain active until the driver door is opened. See *Retained Accessory Power (RAP)* on page 9-15. When turning off the vehicle, if the vehicle is not in P (Park), the vehicle will go to ACC/ACCESSORY and display the message SHIFT TO PARK in the Driver Information Center (DIC). See *Electric Drive Unit Messages* on page 5-31.

UDDS Range Test

Soak/Charging

Charge time not to exceed soak time Minimum charge time of 12 hours 240 VAC
CONTINUOUS Charging Disconnect the charger just prior to crabbing vehicle to site

Prior to test

- Verify that all Vehicle Accessories are turned off
- Fixed speed fan on during test
- Hood up
- Emission Bags off
- Make sure no battery chargers are connected to 12VDC system
- Vehicle rear hatch closed
- Disable Dyno Augmented Braking from Dyno controller Start vehicle by placing foot on brake and pressing the power button (Confirm “Ready” light on cluster is green (icon is on lower right side of cluster by PRNDL)

- Start vehicle by placing foot on brake and pressing the power button (Confirm “Ready” light on cluster is green (icon is on lower right side of cluster by PRNDL)
- Turn off the HVAC system completely by turning off auto and setting the fan to off
- Turn off Radio console stack completely by holding the radio power button until the display asks if you want to fully shut down the console stack. Select yes and the display should turn off.

During 10min soak periods

- Vehicle keyed off and put in Park
- Shifter button completely released
- Driver door open and closed
- Vehicle hood closed
- Fixed speed fan off

2014 MODEL YEAR BATTERY CHARGING and TESTING PROCEDURE INFORMATION

End of test criteria

- The official end of test criteria is when a drive trace error occurs due to the vehicle being unable to keep up with the trace (two second driver violation), per SAE J1634.
- Bring the vehicle to a controlled stop with the brake within 10 seconds

HIGHWAY RANGE TEST

Soak/Charging

Charge time not to exceed soak time Minimum charge time of 12 hours 240 VAC
CONTINUOUS Charging Disconnect the charger just prior to crabbing vehicle to site

Prior to test

- Verify that all Vehicle Accessories are turned off
- Fixed speed fan on during test
- Hood up
- Emission Bags off
- Make sure no battery chargers are connected to 12VDC system
- Vehicle rear hatch closed
- Disable Dyno Augmented Braking from Dyno controller Start vehicle by placing foot on brake and pressing the power button (Confirm “Ready” light on cluster is green (icon is on lower right side of cluster by PRNDL)
- Start vehicle by placing foot on brake and pressing the power button (Confirm “Ready” light on cluster is green (icon is on lower right side of cluster by PRNDL)
- Turn off the HVAC system completely by turning off auto and setting the fan to off
- Turn off Radio console stack completely by holding the radio power button until the display asks if you want to fully shut down the console stack. Select yes and the display should turn off.

During 15sec soak periods

- Vehicle keyed on
- Vehicle hood open
- Fixed speed fan on

During 10min soak periods

- Vehicle keyed off and put in Park
- Shifter button completely released
- Driver door open and closed
- Vehicle hood closed
- Fixed speed fan off

2014 MODEL YEAR BATTERY CHARGING and TESTING PROCEDURE INFORMATION

End of test criteria

- The official end of test criteria is when a drive trace error occurs due to the vehicle being unable to keep up with the trace (two second driver violation), per SAE J1634.
- Bring the vehicle to a controlled stop with the brake within 10 seconds

After UDDS and Highway Test Sequence(s)

- To place vehicle in neutral for moving and Dyno alignment:
- Use key in slot to the right of the shifter to release from park with vehicle off then place the vehicle in neutral
- Disconnect all CAN equipment on driver and passenger side OBD-II ports.
- Verify that car systems power down:
- With keys left in car
- Close all doors – horn will sound 3 quick beeps
- If no beeps, cycle accessory power again

2014 MODEL YEAR

COMPLIANCE STATEMENTS

CALIFORNIA VEHICLE EMISSION CONTROL LABEL (TUNE-UP) COMPLIANCE

GM attests that the vehicle emission control label complies with the label durability requirements of the "California Motor Vehicle Emission Control and Smog Index Label Specifications", Title 13, CCR, Section 1965.

FLEXIBLE OR ALTERNATE FUELS

Battery Electric Vehicle (BEV) System Description

Electric Drive Unit

One 3-phase asynchronous electric motor
104 kW 10 second peak Power
540 Nm peak torque

Battery

Lithium Ion Ion-Phosphate (LiPeP04) battery pack
21.2 kWh pack energy capacity
65 kW charge power

Transmission

Electric Drive

Regenerative braking system

During coasting and during brake applies, the electric motor will be used to decelerate the vehicle and provide electricity to the high voltage battery. The amount of charge the high voltage battery will accept will vary during normal operation depending on the battery state of charge and temperature.

Additional information provided in owner's manual documents:

Proper recharging procedure outlines
Description of warning system(s) for malfunctions
Starting and shifting procedures
Vehicle safety with the following subtopics:
 Information supplied to the customer for safe operation of the vehicle
 Information on safe handling of the battery system
 Description of emergency procedures

Engine Code Information

Base Engine Code	1
EC Derivatives	A
Test Group	EGMXV00.0001
Durability Group	EGMXEEENN001
Engine RPO	EN0
Disp, liters	0.0
Trans RPO	MME
Trans Type	Electric Motor
Product Code	--
Emission RPO	NT7,NC9
Emissions Category	Tier 2
Vehicle Type	CAR
Regulatory Agencies	F
Sales Area	FA/CA
Design Altitude	Both
A/C Equipped	Yes
Driver Select Device	YES - Normal/Sport
Police Only	No
Horsepower @ RPM	NA
Torque @ RPM	NA
Emission Ctrl Sys	BEV
TapUp/TapDown	No
Active Fuel Management	No
Description	Spark EV

Vehicle Parameters - Certificate Coverage

Durability Group				EGMXEEENN001																			
TestGroup				EGMXV00.0001																			
EC	EC Der	Eng RPO	Eng Disp	Evap Family	Evap Code	Model	Car Line	Trans Type/Code	Final Drive Ratio	GVWR	Tire	N/V	Loaded Weight Veh/DA	TWC Meth	TWC	TLHP	F0	F1	F2	RLHP RPO	Drv Sys	Note	
1	+A	EN0	0.0	EGMXNA	NA	1CZ48	SPARK EV	AV/1	/	3.17	--	185/55R15 HW3 BRI	26.2	3290/1671	LVW	3250	10.3	22.64	0.1828	0.01806	--	FD	1

GM elects to test at the next higher test weight class where applicable (reference 40CFR86.1831-01(b)(3)).

TRANSMISSION INFORMATION

Test Group ID	EGMXV00.0001
Transmission Code	1
Transmission RPO	MME
Transmission Type	Electric Motor
Drive Gear Ratios	3.17,0.55
Chain Drive Ratio	NA
Shift Calibrations	PCM Controlled
Torque Converter Diameter	NA
Torque Converter Stall Torque Ratio	NA
Torque Converter Lockup RPM'S	PCM Controlled
Torque Converter Stall Torque Speed	NA
Multimode Feature - # of Modes	2
Shift Indicator Light	NO
Description	MME
TapUp/TapDown	NO

SPECIAL TEST INSTRUCTIONS – BEV

Advanced Hybrid System – Battery Electric Vehicle (BEV):

- Radio Off
- HVAC Control set to Off
 - o Fan only selection and fan at 0 %
 - o Verify that HVAC energy display on HVAC display (lower left corner) is at 0%
- Please contact General Motors Compliance & Certification organization for instructions on vehicle setup required for testing on a 2WD dynamometer.
- Please contact General Motors Compliance & Certification organization for additional instructions on attaching battery state of charge (SOC) measurement equipment for testing or set-up.

Disabling Traction Control – Battery Electric Vehicle (BEV):

For General Motors Battery Electric Vehicles, traction control must be disabled using a secondary piece of hardware (CANLOG4 device). These instructions are provided for each test.

*** Perform these steps for every engine start*

- Make sure CANLOG4 connector is unplugged and ignition is off.
- Plug in CANLOG4 connector into ALDL port.
- Vehicle can now be started; traction control will be disabled for duration of test.
- Upon completion of prep or test, key down and unplug CANLOG4 after ignition is off to prevent draining the 12V battery.

Placing Vehicle in Neutral for Moving – Battery Electric Vehicle (BEV):

- Power-up (accessory mode) without engaging traction system by pressing and holding start button for four seconds. Do not depress brake pedal. Shift into neutral
- When vehicle move is complete, shift to Park and press Power button to turn the vehicle off. Verify that the vehicle systems power down by leaving the keys in the vehicle and closing all doors. If done properly, the horn will sound three quick beeps. If no beeps, cycle accessory power again.

SPECIAL TEST INSTRUCTIONS

DRIVER SELECTABLE SWITCHES

Traction Control:

Some vehicles are equipped with an electronic traction control system which continuously operates in a default mode. Before each emission test, the system must be disabled. The system can be disabled by pushing a traction control button, if equipped, located in the center dash board. After an engine restart, the traction control system is automatically reactivated. See “Disabling Traction Control – Extended Range Electric Vehicle (EREV):” for more specific information regarding disabling traction control.

Performance Control:

Some vehicles are equipped with a performance mode switch. Before each emission test, to operate the vehicle in the performance mode, the system must be engaged by depressing the performance switch. The switch is located on the center information panel. Upon an engine restart, the performance mode must be reactivated.

OTHER

Parking Brake:

All front wheel drive vehicles must have the parking brake set prior to any dynamometer emission testing.

Anti-Lock Braking System (ABS):

Some vehicles come equipped with ABS systems. During dynamometer testing, the ABS system will detect the difference in wheel speed between the front and rear wheels. The ABS system will interpret this as a system malfunction and illuminate the ABS warning lamp on the instrument cluster. This will have no effect on test results. ABS codes must be cleared when testing is complete.

Emission Test Special Vehicle Cooling:

When conducting an emission test, the front cooling fan is placed on the floor to match the vehicle air inlet area. For the highway test, the variable speed fan used on the US06 was approved for use in place of the Hartzell fan. This special cooling provision does not apply to the FTP, SC03 or 20°F FTP emission test.

Automatic Headlight Systems:

Automatic headlight systems must be disabled prior to any emission or fuel economy testing. DRL can be turned off via a switch on the end of the turn signal stalk. Please contact General Motors Compliance and Certification organization for instructions on how to disable the automatic headlight system.

Daytime Running Lights (DRL):

Daytime running lights must be disabled prior to fuel economy testing. DRL can be turned off via a switch on the end of the turn signal stalk. Please contact General Motors Compliance and Certification organization for instructions on how to disable the daytime running lights.

VEHICLE STARTING INSTRUCTIONS

Warm or Cold Engine

Do not press down on the accelerator pedal. Press your foot down on the brake pedal and press and hold the “Power” button, located in the lower left-hand corner on the center information panel, for 4 seconds. Release the “Power” button and your foot off the brake.

Reference Owner’s Manual for complete starting instructions.

SHIFT SCHEDULES – NA

<u>Trans Code</u>	<u>Shift Schedule</u>				<u>Recommended Shift Speeds (mph)</u>			
	<u>FTP</u>	<u>Hwy</u>	<u>SC03</u>	<u>US06*1</u>	<u>1-2</u>	<u>2-3</u>	<u>3-4</u>	<u>4-5</u>

*1 The speeds and acceleration rates encountered in the US06 driving schedule may require shift speeds different from the other schedules.

NA – Not Applicable

STATE OF CHARGE (SOC) DATA

EMISSION DATA VEHICLE 00MBEV4012

CD UDDS Test (Test #EGMX10023925)

AC Recharge Energy: 23.05 kWh
Rcda (AER) Unadjusted: 125.4 miles
CD FE Equivalent Unadjusted: 183.5 mpg_e
CO2 Composite Adjusted: 0 g/mi (factors into 0 g/mi on FE label)

CD Highway Test (Test #EGMX10023926)

AC Recharge Energy: 23.06 kWh
Rcda (AER) Unadjusted: 106.8 miles
CD FE Equivalent Unadjusted: 156.3 mpg_e
CO2 Composite Adjusted: 0 g/mi (factors into 0 g/mi on FE label)

Note: Design capacity of energy storage box is 60 amp-hours.

EMISSION DATA RATIOS

TO BE USED FOR ASSEMBLY LINE TESTING

	<u>Data Ratios</u>
NMHC (G/MI) *1	NA
NMOG (G/MI) *2	NA
HCHO (G/MI) *3	NA
NMOG:NMHC *2	NA
HCHO:NMHC *2	NA

*1 NMHC includes methane response factor.

*2 Effective with the 2004 model year, both EPA and CARB have, through regulatory change, established an industry 1.04 NMHC to NMOG factor which can be used for cert testing for all gasoline tests (does not apply to alcohol fuels).

*3 HCHO requirements will now be met by a compliance statement for both EPA and CARB (does not apply to alcohol fuels).

*** VEHICLE INFORMATION ***

Model Year	2014	Certifying Agent	GM
Test Vehicle	00MBEV4012	GM Config	001
		Run Date	01/21/2013 11:00:27

VEHICLE NO:	00MBEV4012	CONFIGURATION NO:	001	EPA VERSION NO:	00
ENG FAM/TEST GRP:	EGMXV00.0001	ENGINE CODE:	1	ORIGINAL CERT YEAR:	2014
EVAP FAMILY:	EGMXNA	EVAP CODE:	NA		
TEST PURPOSE:	DATA	DISPL:	0.0	SALES LOC:	BOTH
VEH TYPE: FED=	PC	CAL=	PC	EMIS CATEGORY: FED=	BIN1 CAL= ZEV
DURA GRP:	EGMXEEENN001	DURA VEH NO:		DURA CONFIG:	
FUEL METER:		BOOST TYPE:		VALVES PER CYL:	0

TRANS: TYPE=	AV	CODE= 1	MODE= Normal	SIL EQUIPPED:	No	SIL VERSION:	N/A
SHIFT SCHEDULE:	N/A	SHIFT SCHED NO:					
EVAP CANISTER SIZE(L):	0	AUX=				PRIMARY FUEL:	ELEC
TANK CAPACITY (GAL): PRIM=	0	USAGE: F=	FA	C=	CA		
PREMIUM FUEL RECOM'D:	N	REAR=	35	A/C EQ:	Y		
DYNAMOMETER DRIVE AXLE:	F	F1= 0.1828		F2= 0.01806		TRLHP 68d:	10.3
TIRE PRESS(Psi): FRT=	35	F1= 0.2011		F2= 0.01987		TRLHP 20d:	11.3

WEIGHTS (LBS):		TIRES:			
ETW: 3250	EPA CURB: 2990	GVWR:		VENDOR:	BRI
				TREAD TYPE:	HW3
	CURB WEIGHT/TEST WT CLASS TYPE	DRIVE AXLE		SIZE:	185/55R15, 195/55R15
DESIGN:	2990/LVW	1527.8			

REP VEH MODEL:	1CZ48	FIN DR RATIO:	3.17	N/V:	26.2	ENG RPO:	EN0
ACTUAL MODEL NO:	1CZ48	TCC:	N				
RATED HP:	139	CREEPER:	N	PS:	YES	PB:	YES
OVERDRIVE:	Y	C/O CONF:		SIL LINK CONF:			
MODE LINK CONFS:		ODO CORR:	1.00				
ZERO-MILE ODO:	0						

RECHARGEABLE ENERGY STORAGE:	BATTERY
OFF-BOARD CHARGE CAPABLE:	YES
NOMINAL HYBRID BATTERY VOLT:	370
MAXIMUM HYBRID BATTERY CURRENT:	400

COMMENTS 2014 Spark BEV

2014 MODEL YEAR AIR RESOURCES BOARD SUPPLEMENTAL DATA SHEET ZEV-PASSENGER CARS, LIGHT-DUTY TRUCKS AND MEDIUM-DUTY VEHICLES

Manufacturer: GENERAL MOTORS LLC Engine Family: EGMXV00.0001Vehicle Class(es): PC X , LDT1___, LDT2___, MDV2___, MDV3___, MDV4___, MDV5___No. of ZEV Credits per vehicle: 3Fuel Type: Electro-chemical Battery X , Fuel Cell___, Capacitor___, Other (specify)___Battery Type(s): Lead Acid___, Nickel Cadmium___, SBLA___, Sodium Sulfur___, Sodium Nickel Chloride___, Nickel Metal Hydride___, Lithium Metal Disulfide___, Zinc Air___, Zinc Bromine___, Lithium polymer___, Other (specify) LITHIUM-ION PHOSPHATETotal Battery Weight: 560 LBS Total Battery Volume: 133L Battery specific energy: 83 Wh/kgNo. of batteries or modules per vehicle: 1 Total Battery Voltage: 370Charger(s): On-board X , Off Board X , Conductive___, Inductive___Drive Motor(s): AC Induction___, DC Brush___, DC Brushless___, Switched Reluctance___, Other(specify) PERMANENT MAGNETNo. of Drive Motors 1 Rated motor power 104 @ 2500 rpm Max rpm: 4500Drive: FWD X , RWD___, 4WD-FT___, 4WD-PT___Regenerative Braking: No___, Yes X , FW X , RW___, AW___Driver Controlled Regen Braking: Yes___, No X Coast Regen Braking: Yes X , No ___Air Conditioning: Yes X , No___

Fuel Fired Heater: Fuel Type: Gas___, Diesel___, CNG___, LNG___, LPG___, Other (specify)___ Rated Heat Power___kW

Vehicle Models (If coded, see attachments)	Trans Type M4, A4 (If applicable)	GVWR	Curb Weight	ETW Or Test Weight	DPA / RLHP Or Dyno Coeff a=, b=, c=
Chevrolet Spark 1CZ48	Direct Drive	3,675	2989.6	3250	RLHP = 10.3

2014 MODEL YEAR AIR RESOURCES BOARD SUPPLEMENTAL DATA SHEET ZEV-PASSENGER CARS, LIGHT-DUTY TRUCKS AND MEDIUM-DUTY VEHICLES

Manufacturer: GENERAL MOTORS LLC Engine Family: EGMXV00.0001

Range Test Results							
Vehicle ID	Trans	(Check one) ☒ TW ____ ETW	(Check one) ____ DPA ☒ RLHP Or dyno coeff	City Range	System AC (Wh/mi)	System DC (Wh/mi)	Vehicle DC (Wh/mi)
00MBEV4012	Direct Drive	3250	10.3	125.4	183.78	Not measured	Not measured
				Hwy Range	System AC (Wh/mi)	System DC (Wh/mi)	Vehicle DC (Wh/mi)
				106.8	215.88	Not measured	Not measured

Battery Test Results

Specific Energy: Wh/kg 83.46

Fuel Fired Heater Test Results (emissions results in grams/mile): NA

NMHC	CO	NOx

Remarks:

Date Issued:

Revisions:

-----ARB USE ONLY -----

Application

Processed by: _____ Date _____ Reviewed by: _____ Date _____



95333940



GENERAL
MOTORS LLC

VEHICLE EMISSION CONTROL INFORMATION

Conforms to regulations : 2014

U.S. EPA class / stds : LDV / TIER2

California class / stds : PC / ZEV

Group : EGMXV00.0001

Evap : NA

PARTS LIST

1 of 1

Testgroup - EGMXV00.0001
Displacement - 0 Liter
Transmission Type - AV
Product Code -

Engine Code	1	1A
Miscellaneous		
BATTERY ASM-DRV MOT <SEE GUIDE/CONTACT BFO>	23110414	23110414
Controls		
MODULE ASM-HYBRID PWRT CONT 2	22867490	23120593
DATA FILE-CALIBRATION	23133400	95352544
DATA FILE-CALIBRATION		95368559
DATA FILE-CALIBRATION		95383435
DATA FILE-OPERATIONAL SOFTWARE	23111633	23133798
DATA FILE-OPERATIONAL SOFTWARE		23152233
DATA FILE-OPERATIONAL SOFTWARE		23160293
DATA FILE-CALIBRATION	23133401	95352545
DATA FILE-CALIBRATION		95368560
DATA FILE-CALIBRATION		95375643
MODULE ASM-BAT ENGY CONT	23110417	23110417
DATA FILE-PIM OPERATING SYSTEM	24268541	24268541
MODULE ASM-DRV MOT PWR INV (W/ 2ND MPU) ECCN=3A999.A	24268540	24268540
Engine		
CHARGER ASM-DRV MOT BAT	24267451	24267451

CALIBRATION INFORMATION

TEST GROUP: EGMXV00.001

ALL ENGINE CODES

COMPONENT	PARAMETER	CALIBRATION
FUEL SYSTEM		
Fuel Pump	Fuel Flow	NA - BEV
Fuel Pressure Regulator	Fuel Pressure	NA - BEV
EGR SYSTEM		
EGR Valve	Exhaust Gas	NA - BEV
EGR Vacuum Regulator	Vacuum to EGR Valve	NA - BEV
EGR Orifice	EGR Gases	NA - BEV
IGNITION SYSTEM		
Tune-Up Specifications	Basic Timing	NA - BEV
	Timing rpm	NA - BEV
	Idle rpm (N)	NA - BEV
	Idle rpm (D)	NA - BEV
Spark Plugs	Spark	NA - BEV
MISCELLANEOUS		
Oxygen Sensor	$\text{Lambda} = (\text{engA/F}) / (\text{stoichA/F})$	
Heated – (Yes)		NA - BEV
		NA - BEV
		NA - BEV
Thermostat	Coolant Flow: Starts to Open	NA - BEV
	Fully Open by	NA - BEV