

2014 Mazda Mazda3 i-ELOOP

Advanced Vehicle Testing – Baseline Vehicle Testing Results



VEHICLE SPECIFICATIONS¹

Vehicle Features

VIN: JMIBM1W38E1189972
 Class: Compact
 Seatbelt Positions: 5
 Type: ICE Vehicle
 CARB²: LEV-II ULEV
 EPA Fuel Economy: 28 mpg/39
 mpg/32 mpg
 (City/Highway/Combined)

Engine

Model: SKYACTIV-G, DOHC, I-4 with VVT and Direct Injection
 Displacement: 2.5 L
 Power: 137 kW @ 5,700 rpm
 Torque: 251 Nm @ 3,250 rpm
 Fuel Tank Capacity: 13.2 gal
 Fuel Type: Regular Unleaded

Ultracapacitor

Type: Electric Double-Layer
 Weight: 6.0 kg
 Available Energy Capacity: 6.9 Wh
 Voltage Range: 12-25 V
 Max. Power: 725 W
 Max. Discharge Current: 50 A @
 14.5 V
 Min. Discharge Time: 40 s
 Min Charge Time Range: 8-10 s

Tires

Manufacturer: Dunlop
 Model: SP Sport
 Size: 215/45R18
 Pressure F/R: 36 psi/36 psi
 Spare Installed: Dunlop Space Miser, T125/70D16 96M Tubeless

Weights

Design Curb Weight: 3,232 lb
 Delivered Curb Weight: 3,108 lb
 Distribution F/R (%): 61/39
 GVWR: 4,072 lb
 GAWR F/R: 2,189 lb/1,883 lb
 Max. Payload: 840 lb

Dimensions

Wheelbase: 106.3 in
 Track F/R: 61.2 in/61.4 in
 Length/Width: 108.3 in/70.7 in
 Height: 57.3 in
 Ground Clearance: 6.1 in

Transmission

Model: SKYACTIV-Drive, Six-Speed Automatic Transmission with Sport

NOTES:

1. Vehicle specifications were supplied by the manufacturer, measured, or derived from a literature review.
2. The vehicle was designated as a LEV-II ULEV by the California Air Resources Board (CARB).

PERFORMANCE STATISTICS¹

TRACK TESTING²

Acceleration 0-60 mph³

Measured Time: 8.6 s

Performance Goal: ≤13.5 s

Maximum Speed

At ¼ Mile: 87.2 mph

At 1 Mile⁴: 121.7 mph

Performance Goal: ≥90 mph at one-mile mark

Braking from 60-0 mph⁵

Measured Time: 3.0 s

Distance: 121 ft

Peak Power into Capacitor: 699 W

Deceleration 60-10 mph⁶

Measured Time: 67.2 s

Distance: 3,183 ft

Peak Power into Capacitor: 612 W

Total Energy into Capacitor: 6.7 Wh

DYNAMOMETER TESTING⁷

Cycle Results⁸

	72 °F	20 °F	95 °F + 850 W/m ²
UDDS (Cold Start)	31.1 mpg	23.6 mpg	28.5 mpg
UDDS	34.6 mpg	32.0 mpg	30.5 mpg
HWFET	50.6 mpg	32.3 mpg	49.5 mpg
US06	31.8 mpg	30.8 mpg	31.5 mpg
SC03	33.0 mpg		29.2 mpg

Fuel Economy at Steady-State Speed, 0% Grade

10 mph	51.6 mpg	50 mph	60.5 mpg
20 mph	52.8 mpg	60 mph	49.8 mpg
30 mph	62.1 mpg	70 mph	43.4 mpg
40 mph	66.4 mpg	80 mph	37.4 mpg

Duration of Passing Maneuver at Grade⁹

	0% Grade	3% Grade	6% Grade
35-55 mph	4.1 s	4.4 s	4.8 s
55-65 mph	2.9 s	3.1 s	3.5 s
35-70 mph	7.4 s	8.2 s	9.4 s
55-80 mph	6.9 s	7.8 s	9.5 s
Maximum Speed at 25% Grade from Stop: 63.0 mph			

NOTES:

- Performance numbers based on "Normal" vehicle mode. Performance numbers are averages from multiple tests.
- Vehicle track testing occurs when the vehicle has achieved its "break-in mileage" of between 4,000 to 6,000 miles, and at the delivered curb weight plus 332 ± 10 lb (including driver and test equipment), distributed in a manner similar to the original curb loading of the vehicle. Track testing took place between October 1 and October 3, 2014 with a beginning vehicle odometer reading of 4,141 miles. The ambient temperatures ranged from 75 °F to 94 °F. No accessories were used except for headlights as required by track regulation. The ultracapacitor in the vehicle cannot assist in propulsion; however, energy can be captured by the ultracapacitor during braking and deceleration events that is later used to power auxiliary components.
- The acceleration is measured from the point at which the vehicle begins to move. The acceleration and maximum speed results were averaged from 12 runs. The peak power value was taken from a single run.
- The maximum speed was reached before the one-mile mark.
- Controlled braking on dry surface. The test is not run at a set SOC value in charge-sustaining mode. The peak power into the capacitor value was taken from a single run.
- Coasting in 'Drive' on dry surface. Test run data were cut off when the vehicle reached 10 mph, as vehicle creep speeds are typically below this threshold. The peak power into the capacitor value and total energy into the capacitor value were both taken from a single (but different) run.
- Dynamometer testing occurs after the track testing is complete. Dynamometer testing began on November 5, 2014, with a vehicle odometer reading of 4,445 miles. A comprehensive explanation of the dynamometer facility and methodology can be found at <http://www.transportation.anl.gov/D3/>, titled "Chassis Dynamometer Testing Reference Document". The ABC coefficients derived from track coastdown testing and matched on the dynamometer were A: 23.1341 lb, B: 0.66597 lb/mph, and C: 0.01111 lb/mph².
- The Cycle Results table presents the fuel economy achieved by the vehicle on five EPA drive cycles at three different ambient temperatures: (1) 72 °F with vehicle climate-control off, (2) 20 °F with vehicle climate-control set to 72°F Auto, and (3) 95 °F with vehicle climate-control set to 72°F Auto. The vehicle is also subjected to 850 W/m² of solar load at 95 °F to simulate direct sunlight. The drive cycles include a hot start unless otherwise indicated.
- The passing maneuver value indicates the amount of time required for the vehicle to transition from the first to the second speed, at the specified grade.

Values in red indicate that the Performance Goal was not met.

As a production vehicle, this vehicle is assumed to meet all Federal Motor Vehicle Safety Standards (FMVSS) for Internal Combustion Engine Vehicles.

This information was prepared with the support of the U.S. Department of Energy (DOE) under Award No. DE-EE0005501. However, any opinions, findings, conclusions or recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the DOE.