

Los Angeles County
Sheriff's Department

16TH ANNUAL
LAW ENFORCEMENT MOTORCYCLE TEST
AND
EVALUATION PROGRAM
MOTORCYCLE MODEL YEAR 2024

Robert Luna, SHERIFF

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INTRODUCTION

The Los Angeles County Sheriff's Department first implemented its police vehicle testing program in 1974, and motorcycle testing in 2008. Since that time, our Department has become nationally recognized as a major source of information relative to police vehicles and their use.

This year's motorcycle evaluation was conducted June 17 – 19th, 2024 by the Los Angeles County Sheriff's Department.

All major manufacturers of police motorcycles were invited to participate. BMW, Harley Davidson, Zero, each submitted motorcycles for evaluation. The motorcycles submitted were:

*2024 BMW R 1250 RT-P
*2024 Harley - Davidson Road Glide
*2024 Zero DSRP (Electric Bike)
*2024 Zero FXP (Electric Bike)

All of the motorcycles submitted completed the test satisfactorily**.**

The testing process is designed to address the law enforcement officer's operational requirements in terms of motorcycle performance, safety, and comfort. The fleet maintenance interest is addressed by performing an extensive mechanical evaluation on each motorcycle submitted.

Each test is designed and executed to simulate actual field use conditions as closely as possible. Law enforcement motorcycle personnel conduct the evaluations on city streets, freeways, and the performance track.

This book is not intended as a recommendation for any specific motorcycle contained within, nor is it designed to rank the motorcycles in any order. Our motorcycle testing program is conducted in order to accomplish two primary goals; provide law enforcement agencies with the data necessary to assist those in the motorcycle selection process and provide the various motorcycle manufacturers with the input necessary to better meet the needs of law enforcement.

We recognize the fact that individual agency needs can be influenced by cost, operational considerations and other factors. As such, interpretation of test results is the responsibility of each agency and should be made based upon the agency's needs.

It is our goal to provide law enforcement agencies with the information they require to successfully evaluate and select the right motorcycle for their needs. We believe that we have accomplished that goal.

ACKNOWLEDGEMENTS

The Los Angeles County Sheriff's Department, Fleet Management Bureau would like to thank all those who contributed their time and efforts in making this year's test a success.

Vehicle Test Track Riders

Deputy Jeff Houle – LASD
Deputy Hector Renteria – LASD
Officer James York – LAPD
Officer Derek Vaughn – LAPD

Motorcycle Manufactures

BMW Police Motorcycles
Harley Davidson Police Motorcycles
Zero Motorcycles

Support Personnel

Lieutenant Robert Furman (CFMB)
Sergeant David Davis (CFMB)
Larry Rottweiler (CFMB)
Hugo Cisneros (CFMB)
George Ramirez (CFMB)
Stephen Adebanjo (CFMB)
Juan Amaya (FSB)

Lap Timers / Flag Personnel

Wendel Aguilar (Centerra)
Nick Saykhamphone (Centerra)

Photography

Deputy Sam Paul

Vehicle Evaluation Team

Ergonomic Drivers

Deputy Jeff Houle, LASD
Deputy Hector Renteria, LASD

MOTORCYCLE SPECIFICATIONS

MOTORCYCLE SPECIFICATIONS

2024 BMW POLICE MOTORCYCLE R1250 RT-P

Vehicle Description: Factory developed authority motorcycle
Engine Type: Air/water cooled flat twin 4-stroke engine, central balancer shaft
Bore and Stroke: 102.5 mm x 76 mm
Compression Ratio: 12.5:1
Valve Train: Two camshafts / four radially aligned valves /cylinder – BMW Shift Cam VVT
Carburetor / Fuel Injection: Electronic intake pipe injection / BMS-X+ electronic engine management with E-Gas electronic throttle actuator, ride mode control (rain / road)
Ignition: BMS-X+ EU4 Standard / pursuit approved with 87 octane fuel
Horsepower: 136 hp (100 kW) at 7,750 rpm
Torque: 105 ft-lb (143 Nm) at 6,250 rpm
Final Drive: Shaft drive with integral torsion damper, std. ABS and traction control
Dry Weight: Wet Weight 650 lbs.
Alternator Output: Three-phase alternator 504W w/auxiliary battery and GMSF power management for all circuits from parasitic loads / low voltage battery protection
Battery: 12V / 16 Ah, AGM maintenance free (two total - one main and one auxiliary battery)
Transmission: Constant mesh 6-speed gearbox with helical gear teeth
Clutch Dry/Wet: Self-energizing wet clutch, 8-plates, hydraulic self-adjusting
Suspension: BMW Motorrad Telelever front / BMW Motorrad EVO Paralever rear
Front: Central spring strut 4.7 inches of travel, hydraulic steering damper
Rear: WAD (travel related damping) spring strut 5.4 inches of travel, hydraulically adjustable spring preload and adjustable rebound damping
Brakes: BMW partial-integral ABS with traction control, independent rear brake control
Front: Dual disc brake, floating brake discs, diameter 320 mm, four-piston radial caliper
Rear: Single disc brake, diameter 275 mm, double piston floating caliper
Tires: Fr-120/70 ZR 17 Michelin Road 6 GT Rr-180/55 ZR 17 Michelin Road 6 GT
Wheels: Cast aluminum wheels, MTH2 rim profile
Wheelbase: 58.5 inches Rake: 64.1 degrees Trail: 3.92 inches
Fuel Tank Capacity: 6.6 gallons with approximately 1 gallon reserve
EPA Fuel Mileage: 47 MPG (WMTC)
Seat Height: 31.7 / 32.5 inches Std (high seat 32.7 / 33.5 inches; low seat 29.9 / 30.7 inches)
Adjustments Yes/No: Yes, low, standard or high seat each have two height adjustments
Windscreen: Polycarbonate, continuously adjustable (electronically) windshield
Adjustable / Fixed: Electronically adjustable / fully adjustable while riding
Foot Peg / Floorboard: Foot pegs with replaceable ground clearance pegs
Saddlebag Storage Capacity:23 liters each, top-opening, glove friendly latches, lockable
Warranty: 36 months / 60,000 miles including all supplied authority equipment
Maintenance Interval: 600 mile initial, then 6,000 miles thereafter including oil changes

MOTORCYCLE SPECIFICATIONS

2024 HARLEY-DAVIDSON POLICE ROAD GLIDE

Vehicle Description: 2024 Police Road Glide Motorcycle
Engine Type: 4 stroke, 2 cylinder, 1868cc/114cid - - - Milwaukee Eight
Bore and Stroke: 4.016 in. x 4.5 in.
Compression Ratio: 10.5: 1
Valve Train: Pushrod operated, overhead valves with hydraulic self-adjusting lifters, 4 valves per cylinder.
Carburetor / Fuel Injection: Electronic Sequential Port Fuel Injection
Ignition: Electronic
Horsepower: N/A **Torque :**122 ft-lb @ 2750 rpm
Final Drive (shaft, chain, belt): Drive belt
Dry Weight: 809 lbs.
Alternator Output: 32amp.
Battery: 12V
Transmission: 6 speed Cruise Drive Constant mesh
Clutch: Dry/Wet: Hydraulically Actuated, 10 plate wet assist with slip clutch
Suspension: N/A
Front: 49 mm telescopic with Showa® Dual bending Valve technology
Rear: Swing arm with hand adjustable with emulsion shocks
Brakes: Reflex™ Electronically linked brakes with ABS
Front: Hydraulic dual disc with floating rotors and 32mm 4 piston calipers
Rear: Hydraulic single disc with fixed rotor and 32mm 4 piston caliper
Tires: Fr – BW130/80B17 65H Rr – BW180/65B16 81H
Wheels: Impeller™ Cast aluminum
Wheelbase: 63.9 inches
Rake: 26 degrees
Trail: 5.3 inches
Fuel Tank Capacity: 6 gallons
EPA Fuel Mileage: Combined City/HWY 43 mpg
Seat Height: 27.3 in. laden, 31.7” Unladen
Adjustments: Yes/ See dealer
Windscreen: Fixed detachable Polycarbonate
Foot peg / Floorboard Position: Pivoting Floorboard
Saddlebag Storage Capacity: Approx. 2000 cubic inches

MOTORCYCLE SPECIFICATIONS

2024 ZERO DSRP ELECTRIC MOTORCYCLE

Vehicle Description: 2024 Zero DSRP electric Motorcycle
Engine Type: Electric 15.6 kWh
Bore and Stroke: N/A
Compression Ratio: N/A
Valve Train: N/A
Carburetor / Fuel Injection N/A
Ignition: N/A
Horsepower: 80 HP **Torque :**144 ft-lb @3650 RPM
Final Drive (shaft, chain, belt): Drive belt
Dry Weight: 534 lbs.
Alternator Output: N/A
Battery: 12V
Transmission: Direct drive no transmission
Clutch: N/A
Suspension: N/A
Front: 47mm Showa® Separate function cartridge forks with adjustable spring preload, compression and rebound damping.
Rear: Showa® 46 mm piggyback reservoir shock with adjustable tool less spring preload, compression and rebound damping.
Brakes: J Juan disc 4 piston caliper. Bosc base MSC with combined braking eCBS and offroad mode.
Front: 320 X 5
Rear: 320 X 5
Tires: Pirelli Scorpion trail II Fr – 120/70-19 Rr – 170/60-17
Wheels: Cast aluminum FT 3.0x19, RR 4.5x17
Wheelbase: 57.1 inches
Rake: N/A
Trail: N/A
Fuel Tank Capacity: N/A
EPA Fuel Mileage: City 155 mi/HWY 100 mi
Seat Height: 32.6 in Unladen
Adjustments: Yes/ See dealer for adjustment
Windscreen: Fixed detachable polycarbonate
Foot peg / Floorboard Position: N/A
Saddlebag Storage Capacity: See manufacturer

MOTORCYCLE SPECIFICATIONS

2024 ZERO FXP ELECTRIC MOTORCYCLE

Vehicle Description: 2024 ZERO FXP police motorcycle
Engine Type: Electric 7.2 kWh
Bore and Stroke: N/A
Compression Ratio: N/A
Valve Train: N/A
Carburetor / Fuel Injection: N/A
Ignition: N/A
Horsepower: 46 HP @ 4,300 rpm
Torque: 78 ft-lb
Final Drive (shaft, chain, belt): Belt drive
Dry Weight: 302 lbs.
Alternator Output: N/A
Battery: 12 volt
Transmission: Direct drive no transmission
Clutch: N/A
Suspension N/A
Front: Showa 41 mm inverted cartridge fork with adjustable spring preload, compression and rebound damping.
Rear: Showa 40 mm piston, piggyback reservoir shock with adjustable spring preload, compression, and rebound damping.
Brakes: J Juan disc with Bosch Gen 9 ABS. Dual piston caliper.
Front: 240 X 4.5 mm disc.
Rear: 240 X 4.5 mm disc.
Tires: Pirelli Scorpion Fr – 90/90-21 Rr – 120/80-18
Wheels: Spoked with aluminum rim FT 1.85 X21, RR 2.50 X 18
Wheelbase: 56.6 inches
Rake: N/A
Trail: N/A
Fuel Tank Capacity: N/A
EPA Fuel Mileage: 97 mi City, 55 mi H
Seat Height: N/A
Adjustments: Yes / Seat
Windscreen: Yes
Adjustable / Fixed: N/A
Foot Peg / Floorboard Position: Footpegs
Saddlebag Storage Capacity: N/A

BASIC MOTORCYCLE

PATTERNS

Five circle patterns will be used to determine each motorcycle's minimum turning radius. The diameters of the circles will be 20, 19, and 18 feet. The circle pattern will be entered at a speed of 2-3 mph. Once inside the circle, the rider will make three revolutions in one direction, exit the circle and make three more revolutions in the opposite direction. The circle pattern will be ridden in first gear.

Each motorcycle will be ridden in five different 180 degree U-Turn patterns. The diameters of the U-Turns will be 20, 19, 18, 17, and 16 feet. The U-Turn will be entered at a speed of 2-3 mph in first gear. The rider will fully turn the handlebars and lean the motorcycle as necessary to complete the turn. This is done in both directions.

The 30 mph cone weave consists of seven sets of three cones each, alternately offset from a center line at 36 foot intervals. The rider will approach the pattern from a sufficient distance to establish and maintain a speed of 30 mph. Using counter steering, the rider will weave the motorcycle around the seven sets of cones maintaining 30 mph, plus or minus 2 mph. The 30 mph cone weave represents steering or negotiating around debris or other hazards on the roadway.

The Short Cone Weave pattern utilizes eight single cones placed in a straight line at various distances. The cones will be placed at 11, 10 ½, and 10 foot intervals measured from cone center to cone center. The rider will negotiate the cone weave at about 1-2 mph in first gear, utilizing the rear brake as needed. Lock-to-lock turns will be used to successfully ride the course. This exercise represents typical motorcycle maneuverability used in slow-speed enforcement riding.

BASIC MOTORCYCLE PATTERNS

2024 BMW R1250RT-P

PATTERN	20 FT.	19 FT.	18 FT.	17 FT.	16 FT.
Circle	Pass	Pass	Pass	N/A	N/A
U-Turn	Pass	Pass	Pass	N/A	N/A

PATTERN	11 FT.	10 ½ FT.	10 FT.	9 ½ FT.
Short Cone Weave	Pass	Pass	Pass	Pass

PATTERN	CONSIDERATION	RATING**
30 MPH Cone Weave	Counter steering effort / Bike Drag	Pass

2024 HARLEY-DAVIDSON ROAD GLIDE

PATTERN	20 FT.	19 FT.	18 FT.	17 FT.	16 FT.
Circle	Pass	Pass	Pass	N/A	N/A
U-Turn	Pass	Pass	Pass	N/A	N/A

PATTERN	11 FT.	10 ½ FT.	10 FT.	9 ½ FT.
Short Cone Weave	Pass	Pass	Pass	Pass

PATTERN	CONSIDERATION	RATING**
30 MPH Cone Weave	Counter steering effort / Bike Drag	Pass

** Rating Scale – Pass or Fail

BASIC MOTORCYCLE PATTERNS

2024 ZERO DSRP					
PATTERN	**20 FT.**	**19 FT.**	**18 FT.**	**17 FT.**	**16 FT.**
Circle	Pass	Pass	Pass	N/A	N/A
U-Turn	Pass	Pass	Pass	N/A	N/A
PATTERN	**11 FT.**	**10 ½ FT.**	**10 FT.**	**9 ½ FT.**	
Short Cone Weave	Pass	Pass	Pass	Pass	
PATTERN	**CONSIDERATION**			**RATING****	
30 MPH Cone Weave	Counter steering effort / Bike Drag			Pass	

2024 ZERO FXP					
PATTERN	**20 FT.**	**19 FT.**	**18 FT.**	**17 FT.**	**16 FT.**
Circle	Pass	Pass	Pass	N/A	N/A
U-Turn	Pass	Pass	Pass	N/A	N/A
PATTERN	**11 FT.**	**10 ½ FT.**	**10 FT.**	**9 ½ FT.**	
Short Cone Weave	Pass	Pass	Pass	N/A	
PATTERN	**CONSIDERATION**			**RATING****	
30 MPH Cone Weave	Counter steering effort / Bike Drag			Pass	

** Rating Scale – Pass or Fail

28 LAP HIGH-SPEED COURSE MOTORCYCLE DYNAMICS EVALUATION

*** Due to rider safety, speeds were limited to 80 mph. There will be no lap times posted.**

28 LAP HIGH-SPEED COURSE TEST RIDER'S SUBJECTIVE EVALUATION

This evaluation is conducted on a high-speed riding course. It is designed to evaluate, identify and eliminate the obvious unacceptable motorcycles (i.e., those motorcycles that are demonstrably unstable or otherwise exhibit unsafe characteristics).

For this evaluation, four riders are utilized for each motorcycle. Each rider completes seven laps around our 1.46 mile test track at the Pomona Fairplex in Pomona, for a total of 28 laps. The motorcycles are limited to 80 mph for rider safety.

Four Emergency Vehicle Operations Center motorcycle training instructors, two each from the Los Angeles County Sheriff's Department and Los Angeles Police Department, share the riding and evaluation of these motorcycles.

At the conclusion of the preliminary handling portion of the evaluation, each rider completes a "Rider's Subjective Evaluation" form. If the test motorcycle is judged unacceptable in this preliminary review, it is rejected and not subject to further testing and evaluation.

28 LAP HIGH-SPEED COURSE
MOTORCYCLE DYNAMICS EVALUATION

2024 BMW R1250 RT-P

RIDER	LAPS
Jeffery Houle - LASD	1 thru 7
Derek Vaughn- LAPD	8 thru 14
Hector Renteria - LASD	15 thru 21
James York - LAPD	22 thru 28

ITEM	RATING**
STEERING	10
LEAN ANGLE	10
SUSPENSION	10
BRAKE FADE	10
BRAKE PULL	10
ABS OPERATION	10

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

28 LAP HIGH-SPEED COURSE
MOTORCYCLE DYNAMICS EVALUATION

2024 HARLEY-DAVIDSON ROAD GLIDE

RIDER	LAPS
Jeff Houle- LASD	1 thru 7
Derek Vaughn - LAPD	8 thru 14
Hector Renteria - LASD	15 thru 21
James York - LASD	22 thru 28

ITEM	RATING**
STEERING	8.5
LEAN ANGLE	5.5
SUSPENSION	8
BRAKE FADE	10
BRAKE PULL	10
ABS OPERATION	10

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

28 LAP HIGH-SPEED COURSE
MOTORCYCLE DYNAMICS EVALUATION

2024 ZERO DSRP

RIDER	LAPS
Jeff Houle- LASD	1 thru 7
Derek Vaughn - LAPD	8 thru 14
Hector Renteria - LASD	15 thru 21
James York - LAPD	22 thru 28

ITEM	RATING**
STEERING	9.75
LEAN ANGLE	9.75
SUSPENSION	9.75
BRAKE FADE	9.75
BRAKE PULL	9.75
ABS OPERATION	9.25

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

28 LAP HIGH-SPEED COURSE
MOTORCYCLE DYNAMICS EVALUATION

2024 ZERO FXP

RIDER	LAPS
Jeff Houle - LAPD	1 thru 7
Derek Vaughn - LASD	8 thru 14
DNF	15 thru 21
DNF	22 thru 28

ITEM	RATING**
STEERING	9.5
LEAN ANGLE	9.5
SUSPENSION	9.5
BRAKE FADE	9
BRAKE PULL	9
ABS OPERATION	9.5

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

* Due to lack of charge voltage motorcycle could only complete 14 laps *

HEAT EVALUATION

The heat evaluation is a "PASS-FAIL" scenario and is based on manufacturer's allowable operating temperatures.

Heat from each engine component is measured by means of a digital thermometer with a bi- metallic probe and infrared heat gun at the conclusion of the 32 high-speed laps. This process is accomplished in the following manner:

1. Transmission Fluid	The probe is inserted into the transmission via the oil fill hole.
2. Engine Oil	The probe is inserted into the engine case via the oil fill hole, if accessible.
3. Radiator Coolant	Temperature is measured via the infrared heat gun aimed below the top radiator tank.

HEAT EVALUATION

IMMEDIATELY FOLLOWING 28 LAP COURSE

2024 BMW R1250RT-P		
ITEM	**MANUFACTURERS RECOMMENDATION**	**TEST RESULT**
Radiator Water	208° to 216° Max.	Pass
Engine Oil	176° to 248° Max.	Pass
Transmission Oil	Part of the engine case	N/A
RADIANT HEAT		
Oil Coolers	N/A	
Brake Rotors	Front - 208° F Rear - 191° F	
Engine	218° F	
Transmission	N/A	
Exhaust	193° F	

HEAT EVALUATION

IMMEDIATELY FOLLOWING 28 LAP COURSE

2024 HARLEY DAVIDSON ROAD GLIDE		
ITEM	**MANUFACTURERS RECOMMENDATION**	**TEST RESULT**
Radiator Water	Air cooled	N/A
Engine Oil	280° F to 410° F	Pass
Transmission Oil	Part of the engine case	N/A
RADIANT HEAT		
Oil Coolers		
Brake Rotors	Front - 147° F Rear - 195° F	
Engine	245° F	
Transmission	211° F	
Exhaust	200° F	

HEAT EVALUATION

IMMEDIATELY FOLLOWING 28 LAP COURSE

2024 ZERO DSRP		
ITEM	**MANUFACTURERS RECOMMENDATION**	**TEST RESULT**
Radiator Water	N/A	N/A
Engine Oil	N/A	N/A
Transmission Oil	N/A	N/A
RADIANT HEAT		
Oil Cooler	N/A	
Brake Rotors	Front - 108° F Rear - 101° F	
Engine	N/A	
Transmission	N/A	
Exhaust	N/A	

HEAT EVALUATION

IMMEDIATELY FOLLOWING 28 LAP COURSE

2024 ZERO FXP		
ITEM	**MANUFACTURERS RECOMMENDATION**	**TEST RESULT**
Radiator Water	N/A	N/A
Engine Oil	N/A	N/A
Transmission Oil	N/A	N/A
RADIANT HEAT		
Oil Cooler	N/A	
Brake Rotors	Front - 102° F Rear - 90° F	
Engine	N/A	
Transmission	N/A	
Exhaust	N/A	

CITY COURSE

MOTORCYCLE DYNAMICS

EVALUATION

This evaluation is for motorcycles identified by the manufacturer as intended for law enforcement use and is conducted on a closed 1.6 mile city street course . This course closely represents the environment most urban law enforcement agencies must contend with. The course has several straight-a-ways, multiple right and left turns and obstacles in the roadway.

This is the final track evaluation and the manufacturers, if they so choose, are allowed to rebuild the motorcycles brake system prior to this portion of the evaluation process.

For this evaluation, two riders are utilized for each motorcycle. Each rider completes two laps around the city course. Lap timing is via a GPS based "VBOX Datalogger" timing device, mounted on the motorcycle. The combined times of the two laps are recorded next to the rider's name.

If the test vehicle is determined to be unacceptable in this preliminary review by not completing the course in less than 5 minutes, it is rejected and not subject to further testing and evaluation.

CITY COURSE
MOTORCYCLE DYNAMICS
EVALUATION

2024 BMW R1250RT-P

RIDERS	TOTAL TIME	AIR /TRACK	SPEED
Jeff Houle- LASD	4:34.91	84º F / 118º F	42.04
James York– LAPD	4:44.09	84° F / 118° F	40.56
Average Time	4:39.50	Average Speed	41.30

ITEM	RATING**
STEERING	10
LEAN ANGLE	10
SUSPENSION	10
BRAKE FADE	10
BRAKE PULL	10
ABS OPERATION	10

**Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding

CITY COURSE
MOTORCYCLE DYNAMICS
EVALUATION

2024 HARLEY-DAVIDSON ROAD GLIDE

RIDERS	TOTAL TIME	AIR /TRACK	SPEED
James York - LAPD	4:40.30	84º F / 118º F	41.14
Jeff Houle - LASD	4:44.86	84º F / 118º F	40.56
Average Time	4:42.58	Average Speed	40.85

ITEM	RATING**
STEERING	9
LEAN ANGLE	5
SUSPENSION	7.5
BRAKE FADE	9.5
BRAKE PULL	9.5
ABS OPERATION	9.5

**Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding

CITY COURSE
MOTORCYCLE DYNAMICS
EVALUATION

2024 ZERO DSRP

RIDERS	TOTAL TIME	AIR /TRACK	SPEED
Hector Renteria - LASD	4:49.94	84º F / 118º F	39.72
Derek Vaughn - LAPD	4:51.68	84º F / 118º F	39.45
Average Time	4:50.81	Average Speed	39.59

ITEM	RATING**
STEERING	10
LEAN ANGLE	10
SUSPENSION	10
BRAKE FADE	10
BRAKE PULL	10
ABS OPERATION	10

**Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding

CITY COURSE
MOTORCYCLE DYNAMICS
EVALUATION

2024 ZERO FXP

RIDERS	TOTAL TIME	AIR /TRACK	SPEED
Hector Renteria - LASD	4:52.22	84º F / 118º F	39.45
Derek Vaughn - LAPD	4:59.83	84º F / 118º F	38.40
Average Time	4:56.03	Average Speed	38.93

ITEM	RATING**
STEERING	10
LEAN ANGLE	10
SUSPENSION	10
BRAKE FADE	10
BRAKE PULL	10
ABS OPERATION	10

**Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding

BRAKE EVALUATION

This evaluation procedure measures the braking response and efficiency of the motorcycle. There are three different brake evaluations: A hard braking evaluation, a transitional braking evaluation from a dry to a wet surface, and a transitional braking evaluation from a smooth surface to a sandy surface. Stopping distance is recorded electronically via a GPS based VBOX Datalogger.

The hard brake evaluation is conducted by first accelerating the motorcycle to 80 MPH, then decelerating to a stop, maintaining an average deceleration rate of 22 feet per second. This procedure is repeated three additional times. The motorcycle is then immediately accelerated to 40 mph and then stopped as quickly as possible, simulating a panic stop. That stopping distance is measured and recorded.

During the dry/wet braking evaluation, the motorcycle will be accelerated to 40 mph, and at a predetermined position, the brakes will be applied. The entire brake application will begin on a dry roadway surface, immediately transitioning onto a wet roadway surface while bringing the motorcycle to a full stop. Controllability of the motorcycle and its Anti-lock braking system (ABS) operation will be evaluated.

During the debris field braking evaluation, the motorcycle will be accelerated to 40 mph, and at a predetermined position, the brakes will be applied. The entire brake application will take place on a smooth roadway surface, immediately transitioning to a roadway strewn with sand and gravel while bringing the motorcycle to a full stop. Controllability of the motorcycle and its Anti-lock braking system (ABS) operation will be evaluated.

If a brake malfunction is experienced (i.e., severe brake fading), an effort is made to detect the cause of the brake failure. If it is decided that the failure is inherent in the engineering of the brake system of the motorcycle, the evaluation is discontinued and the motorcycle is disqualified from further evaluation. If the failure is associated with a correctable situation, it is corrected and the evaluation is run again. The defect and any remedial action taken are noted in the evaluation results.

HARD BRAKING

PANIC STOP

MOTORCYCLE	DRY STOPPING DISTANCE	SAND STOPPING DISTANCE	WET STOPPING DISTANCE
2024 BMW R1250 RT-P	137.1 ft..@ 60 MPH	76.7 ft.@ 40 MPH	64.0 ft.@ 40 MPH
2024 HD ROAD GLIDE	137.8 ft. @ 60 MPH	77.7 ft.@ 40 MPH	65.8 ft.@ 40 MPH
2024 ZERO DSRP	144.1 ft. @ 60 MPH	80.0 ft.@ 40 MPH	64.4 ft.@ 40 MPH
2024 ZERO FXP	156.8 ft. @ 60 MPH	92.7 ft.@ 40 MPH	67.9 ft.@ 40 MPH

ERGONOMICS EVALUATION

50 MILE RIDE

This portion evaluates the fuel efficiency and ergonomics of the motorcycle during extended field operations. It is designed to simulate the types of situations that an officer may encounter during an eight hour shift. Each motorcycle is driven two times through a 25 mile loop, one loop completed by each of the two EVOC riders. The loop covers 6.25 miles of city streets, 6.25 miles of California freeways, 6.25 miles of coastal highway, and 6.25 miles of mountain canyons. No attempt is made to coddle the motorcycle through the loop, and hard acceleration starts are avoided.

During the ride-ability evaluation, a minimum of ten simulated traffic stops will be performed while on city streets. The rider will be required to properly position the motorcycle in a safe traffic enforcement position, dismount the motorcycle, pause for a minimum of two minutes per stop, remount the motorcycle, and accelerate into traffic.

The numerical results of the evaluation are recorded and then averaged between the two riders. This average is then recorded as the final result of this portion of the evaluation. Each rider will also submit a subjective evaluation of each motorcycle at the end of the ride.

The fuel efficiency evaluation is an attempt to estimate MPG (miles per gallon) based on actual riding conditions. It is the average gas usage of all two riders, for all two loops.

This subjective evaluation is a rating of human factors done individually and independently by all two riders. The ratings are averaged to minimize personal prejudices that individuals may have for or against any given motorcycle. This evaluation rates each motorcycle comparatively for its general suitability and efficiency for patrol operations.

ERGONOMICS EVALUATION

SUBJECTIVE EVALUATION – 110 MILE RIDE

MOTORCYCLE	**2022 BMW R1250RT-P**

RIDING POSITION	CONSIDERATIONS	RATING
Seat Comfort	Padding, Springs, Width	9
Seat Position	Range of Adjustment	10
Riding Position	Lean Angle, Comfort	10
Floorboards / Pegs	Access to Foot Controls	10

INSTRUMENT PANEL	CONSIDERATIONS	
Controls	Position, Usability	10
Visibility	Instruments	10
Reflection / Glare	Windshield, Instruments	10
Instruments	Adequate, Legibility	10

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

*** Due to no noticeable changes from previous model no ergonomics were done this year. The ratings posted are from 2022 model***

MIRRORS	CONSIDERATIONS	RATING
Road Visibility	Distortion, Obstruction	10
Reflections	Instruments, Controls	10
Mirror Coverage	Adjustment, Rear Visibility, Flat or Convex	10
Mirror Location	Accessibility, Visibility, Obstruction	10

WIND SCREEN	CONSIDERATIONS	RATING
Height / Width	Wind / Debris Protection	10
Adjustability	Electric or Manual, Ease of Use	10
Top Edge	Clear View Over Top of Windshield, (Bifocal Effect)	10

CONTROLS	CONSIDERATIONS	RATING
Handlebars	Angle, Size, Position	10
Shift Levers	Usability, Shift Pad Position	10
Switches	Reach, Markings, Visibility, Accessibility	10
Rear Brake Pedal	Location, Feedback, Ease of Use	10
Front Brake Lever	Location, Feedback, Adjustability	10
Clutch Lever	Lever Resistance, Adjustability	10

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

MOUNT / DISMOUNT	CONSIDERATIONS	RATING
Trunk Height	Ample Leg Swing Room	10
Foot Peg / Floorboard	Interferes with Mounting / Dismounting	10
Lean Angle	Side Stand—of Adequate Length	10

SUSPENSION	CONSIDERATIONS	RATING
Quality of Ride	Dampening, Rebound	10
Rider Size	Adjustability	10

STORAGE	CONSIDERATIONS	RATING
Saddlebags	Angle, Size and Position of Opening	10
Compartment Dividers	Holds Gear Upright When Open	10
Locks	Same Key, Security, Sturdiness	10

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

ERGONOMICS EVALUATION

SUBJECTIVE EVALUATION – 50 MILE RIDE

MOTORCYCLE	**2024 HARLEY DAVIDSON ROAD GLIDE**

RIDING POSITION	CONSIDERATIONS	RATING
Seat Comfort	Padding, Springs, Width	6.5
Seat Position	Range of Adjustment	6
Riding Position	Lean Angle, Comfort	6
Floorboards / Pegs	Access to Foot Controls	6.5

INSTRUMENT PANEL	CONSIDERATIONS	RATING
Controls	Position, Usability	6.25
Visibility	Instruments	6.5
Reflection / Glare	Windshield, Instruments	6.5
Instruments	Adequate, Legibility	5.5

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

MIRRORS	CONSIDERATIONS	RATING
Road Visibility	Distortion, Obstruction	7
Reflections	Instruments, Controls	6.25
Mirror Coverage	Adjustment, Rear Visibility, Flat or Convex	4
Mirror Location	Accessibility, Visibility, Obstruction	5

WIND SCREEN	CONSIDERATIONS	RATING
Height / Width	Wind / Debris Protection	6
Adjustability	Electric or Manual, Ease of Use	N/A
Top Edge	Clear View Over Top of Windshield, (Bifocal Effect)	8

CONTROLS	CONSIDERATIONS	RATING
Handlebars	Angle, Size, Position	6.5
Shift Levers	Usability, Shift Pad Position	6
Switches	Reach, Markings, Visibility, Accessibility	5.5
Rear Brake Pedal	Location, Feedback, Ease of Use	7
Front Brake Lever	Location, Feedback, Adjustability	8
Clutch Lever	Lever Resistance, Adjustability	6

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

MOUNT / DISMOUNT	CONSIDERATIONS	RATING
Trunk Height	Ample Leg Swing Room	8
Foot Peg / Floorboard	Interferes With Mounting / Dismounting	8.5
Lean Angle	Side Stand of Adequate Length	7.5

SUSPENSION	CONSIDERATIONS	RATING
Quality of Ride	Dampening, Rebound	6
Rider Size	Adjustability	5

STORAGE	CONSIDERATIONS	RATING
Saddlebags	Angle, Size and Position of Opening	8.5
Compartment Dividers	Holds Gear Upright When Open	8.5
Locks	Same Key, Security, Sturdiness	7.5

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

ERGONOMICS EVALUATION

SUBJECTIVE EVALUATION – 50 MILE RIDE

MOTORCYCLE	**2024 ZERO DSRP**

RIDING POSITION	CONSIDERATIONS	RATING
Seat Comfort	Padding, Springs, Width	8
Seat Position	Range of Adjustment	6.5
Riding Position	Lean Angle, Comfort	7.5
Floorboards / Pegs	Access to Foot Controls	8.5

INSTRUMENT PANEL	CONSIDERATIONS	RATING
Controls	Position, Usability	8.5
Visibility	Instruments	8.5
Reflection / Glare	Windshield, Instruments	8.5
Instruments	Adequate, Legibility	8.5

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

MIRRORS	CONSIDERATIONS	RATING
Road Visibility	Distortion, Obstruction	8.5
Reflections	Instruments, Controls	8.5
Mirror Coverage	Adjustment, Rear Visibility, Flat or Convex	7.5
Mirror Location	Accessibility, Visibility, Obstruction	8.5

WIND SCREEN	CONSIDERATIONS	RATING
Height / Width	Wind / Debris Protection	6.5
Adjustability	Electric or Manual, Ease of Use	N/A
Top Edge	Clear View Over Top of Windshield, (Bifocal Effect)	8.5

CONTROLS	CONSIDERATIONS	RATING
Handlebars	Angle, Size, Position	8.5
Shift Levers	Usability, Shift Pad Position	9
Switches	Reach, Markings, Visibility, Accessibility	8.5
Rear Brake Pedal	Location, Feedback, Ease of Use	8.5
Front Brake Lever	Location, Feedback, Adjustability	8.5
Clutch Lever	Lever Resistance, Adjustability	9

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

MOUNT / DISMOUNT	CONSIDERATIONS	RATING
Trunk Height	Ample Leg Swing Room	3
Foot Peg / Floorboard	Interferes With Mounting / Dismounting	5.5
Lean Angle	Side Stand of Adequate Length	8.5

SUSPENSION	CONSIDERATIONS	RATING
Quality of Ride	Dampening, Rebound	8.5
Rider Size	Adjustability	8.5

STORAGE	CONSIDERATIONS	RATING
Saddlebags	Angle, Size and Position of Opening	4.5
Compartment Dividers	Holds Gear Upright When Open	4.5
Locks	Same Key, Security, Sturdiness	4.5

****Rating Scale 1 – 10 / 1 -Poor / 5 – Average / 10 - Outstanding**

ACCELERATION PERFORMANCE EVALUATION

This test is designed to measure vehicle performance in terms of acceleration, including speed and time at the quarter mile. Although the top speed is not recorded, a minimum of 100 MPH is generally obtained to satisfy the requirements for high speed law enforcement patrol.

To get the information on the 30 – 60 MPH and 60 – 100 MPH two separate runs were driven. In each run, the vehicle was accelerated to just under the target speed. The vehicle's speed was allowed to level off, and then the vehicle was accelerated through the target speed. This allowed for an actual time between the targeted speed.

All of the information gathered during the acceleration and subsequent brake test is gathered using a Race Logic "Drift Box 02". The data logger is a GPS based measuring device.

ACCELERATION EVALUATION

SPEED	BMW R1250RT-P	HD– ROAD GLIDE	ZERO DSRP
0-60 MPH	3.82 sec.	5.57 sec.	2.7 sec.
30-60 MPH	2.16 sec.	3.07 sec.	1.31 sec.
60-100 MPH	5.70 sec.	13.47 sec.	N/A
¼ MILE	12.38 @ 110.9 MPH	14.24 @ 94.4 MPH	N/A

SPEED	ZERO FXP		
0-60 MPH	2.79 sec.		
30-60 MPH	1.53 sec.		
60-100 MPH	N/A		
¼ MILE	N/A		

FUEL EFFICIENCY

EVALUATION

MOTORCYCLE	AVERAGE
2022 BMW R1250 RT-P	43.1 MPG
2024 HARLEY DAVIDSON ROAD GLIDE	39.4 MPG
2024 ZERO DSRP	N/A
2024 ZERO FXP	N/A

- Due to BMW having no noticeable changes previous year data was used*
- Also not having the means to accurately figure out MPG figures for electric bikes, no average MPG could be determined, although after 50 miles the ZERO DSRP batteries state of charge went from 100% to 37% upon completion of ergonomic testing.
-

COMMUNICATION EVALUATION

The communications evaluation of each vehicle is conducted by technicians assigned to the Los Angeles County Sheriff's Department's Communications and Fleet Management Bureau. This evaluation concerns itself with the radio installation, the effect of radio operation on motorcycle performance and the effect of the motorcycle on radio performance.

The Electromagnetic Interference Susceptibility test is intended for use in the presence of electromagnetic fields resulting from use of public safety two-way radios.

Motorcycle performance must not be affected in any way by transmissions from a radio and antenna installed on the motorcycle and operating in any of the frequency ranges of 450 to 512 MHz, and having a radio frequency output no more than 50 watts. Motorcycle performance shall not be affected by the presence of another motorcycle equipped with the above described radio and operated next to the subject motorcycle.

Radiated and conducted electromagnetic interference motorcycle systems and accessories shall be designed to reduce interference with the use of public safety radio receivers or electronic sirens or sound amplifiers. The effective sensitivity of a receiver installed on the motorcycle shall not be reduced by more than the amount tabulated below for each frequency band:

FREQUENCY BAND	ALLOWABLE DEGRADATION
450 to 512 MHz	3 dB

Degradation is the difference in effective receiver sensitivity measured with the vehicle engine and accessories turned off as compared to that measured with the engine and accessories turned on.

Sensitivity is measured in terms of the 12 dB Sinad signal as defined in EIA Standard RS-204. To determine effective sensitivity, the receiver is connected to the antenna through an isolating tee connector which allows introduction of the signal generator through the isolated port. Comparative signal strength readings are then taken with and without the interference present.

**** Due to no changes to the BMW R 1250 RT-P from previous test there was no communication evaluation performed, year 2021 results are provided.**

COMMUNICATION NOISE EVALUATION

2021 BMW R1250RT-P

RADIO MAKE	MODEL NO.	ANTENNA TYPE	LOCATION
Motorola XTL-5000	MWU40025	2dB Gain Whip	Top of Tail box

** Rating Scale: 1-10 (1-Poor / 5 –Average / 10-Outstanding)

FREQUENCY: 483.1625 MHz

WITH ANTENNA	12 dB SINAD	20 dB QUIETING	DESENS dB
Engine Off	-85dB	-80dB	+5dB
Engine Idle (No Acc)	-85dB	-80dB	+5dB
Engine High RPM (No Acc)	-85dB	-80dB	+5dB
Engine Idle W/Air	N/A	N/A	N/A
Engine Idle W/ Lights	-85dB	-80dB	+5dB
Engine Idle W/Heater	N/A	N/A	N/A
Engine Idle W/All Acc	-85dB	-80dB	+5dB
Engine High RPM W/All Acc	-85dB	-80dB	+5dB

Glove Compartment Accessibility	Rating **
Control Head	N/A
Microphone	N/A
Electronic Siren	N/A
Dashboard (Handlebar) Accessibility	
Radio Control Head	10
Siren Console	10
Mobile Digital Terminal/Computer	9
Speakers	10
Microphones	7
Equipment Box Accessibility	
Factory Power Terminal in Trunk	10
One Radio Installation	10
Two Radio Installation	N/A
Antenna Installation	6
Computer Installation	8
Engine Compartment Accessibility	
Battery Terminal Connection	10
Accommodation for Cables	7
Hidden Siren Installation	N/A
Ignition Fuse Terminal Block	
Clip – on Connections for Accessories	9

COMMUNICATION NOISE EVALUATION
2024 HARLEY DAVIDSON ROAD GLIDE

RADIO MAKE	MODEL NO.	ANTENNA TYPE	LOCATION
Motorola XTL-5000	MWU40025	2dB Gain Whip	Top of Tail box

** Rating Scale: 1-10 (1-Poor / 5 –Average / 10-Outstanding)

FREQUENCY: 482.8120 MHz

WITH ANTENNA	12 dB SINAD	20 dB QUIETING	DESENS dB
Engine Off	-93dB	-90dB	-3dB
Engine Idle (No Acc)	-93dB	-90dB	-3dB
Engine High RPM (No Acc)	-93dB	-90 dB	-3dB
Engine Idle W/Air	N/A	N/A	N/A
Engine Idle W/ Lights	-93dB	-90dB	-3dB
Engine Idle W/Heater	N/A	N/A	N/A
Engine Idle W/All Acc	-93dB	-90dB	-3dB
Engine High RPM W/All Acc	-93dB	-90dB	-3

Also tested: XTS5000 Portable - No spurious interference detected

Glove Compartment Accessibility	Rating **
Control Head	N/A
Microphone	N/A
Electronic Siren	N/A
Dashboard (Handlebar) Accessibility	
Radio Control Head	5
Siren Console	6
Mobile Digital Terminal/Computer	4
Speakers	5
Equipment Box Accessibility	
Factory Power Terminal in Trunk	8
One Radio Installation	10
Two Radio Installation	0
Antenna Installation	2
Computer Installation	2
Engine Compartment Accessibility	
Battery Terminal Connection	7
Accommodation for Cables	6
Hidden Siren Installation	N/A
Ignition Fuse Terminal Block	
Clip – on Connections for Accessories	9

COMMUNICATION NOISE EVALUATION
2024 ZERO DSRP

RADIO MAKE	MODEL NO.	ANTENNA TYPE	LOCATION
Motorola XTL-5000	MWU40025	2dB Gain Whip	Top of Tail box

** Rating Scale: 1-10 (1-Poor / 5 –Average / 10-Outstanding)

FREQUENCY: 482.8120 MHz

WITH ANTENNA	12 dB SINAD	20 dB QUIETING	DESENS dB
Engine Off	-94dB	-88dB	-6dB
Engine Idle (No Acc)	-94dB	-88dB	-6dB
Engine High RPM (No Acc)	-94dB	-88dB	-6dB
Engine Idle W/Air	N/A	N/A	N/A
Engine Idle W/ Lights	-94dB	-88dB	-6dB
Engine Idle W/Heater	N/A	N/A	N/A
Engine Idle W/All Acc	-94dB	-88dB	-6dB
Engine High RPM W/All Acc	-94dB	-88dB	-6dB

Glove Compartment Accessibility	Rating **
Control Head	N/A
Microphone	N/A
Electronic Siren	N/A
Dashboard (Handlebar) Accessibility	
Radio Control Head	5
Siren Console	6
Mobile Digital Terminal/Computer	4
Speakers	5
Equipment Box) Accessibility	
Factory Power Terminal in Trunk	2
One Radio Installation	10
Two Radio Installation	0
Antenna Installation	0
Computer Installation	2
Engine Compartment Accessibility	
Battery Terminal Connection	7
Accommodation for Cables	0
Hidden Siren Installation	N/A
Ignition Fuse Terminal Block	
Clip – on Connections for Accessories	3



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