

RX-EVOLV

Press Information

Mazda Motor Corporation

Distinctive Design

– Dynamic Four-door “Sports” Styling for the Next Millennium

Exterior - Mazda's "RX" Design Philosophy

"The most sports-car-like 4-door vehicle in the world and "An innovative leap into the new millennium" are apt descriptions of the exterior design theme of the RX-EVOLV.

The exterior design theme of the RX-EVOLV provides an innovative leap into the new millennium through the creation of the most sports car-like 4-door car in the world.

Four large wheels and tires, located at each corner of the body, result in ultra-short overhangs, accentuating the visual impact created by the unique sculpturing of the body contours. The shape of the body also expresses the ideal front/rear weight distribution made possible by the use of the compact rotary engine. In addition, the Double Clamshell Hood covering the engine compartment visually focuses attention on the centre midship layout of the rotary engine, which is positioned behind the front axle.

Designed as a canopy, the cabin, is visually separated from the body by the shoulder line, creating cockpit-like styling. A twin-bubble Aerowave Roof, reminiscent of the current RX-7, improves airflow over and around the body. The rear quarter pillar and wrap-around rear window increase roof rigidity, highlighting the strength of the wide rear track and low-profile tires. The rear section conveys a sense of the front-engine/rear-drive configuration of this unique sports car, complemented by the wide rear tires, which hint at the car's outstanding traction even when at a standstill.

Up front, extremely-thin Micro-HID (High-Illumination Discharge) lamps are mounted under the aerodynamic wing, providing a bright beam inside the front opening. The rear combination lights include two round lamps (a traditional design element of Mazda sports cars) inside oval lens covers on each side. When illuminated, the small protrusions around the round lamps emit a red light like the afterburners of a jet.

Interior - Sporty and Comfortable

The interior design theme is "Snug-Fit," aimed at creating a pleasant sense of being held comfortably but securely in the cabin and evoking an exciting, sporty feeling the moment any door is opened.

The RX-EVOLV's driver-oriented cockpit is designed so that the driver feels as if he or she is "at one" with the car. Controls, switches and pedals are designed and arranged for quick operation during spirited driving, while large dials are logically located for easy recognition. The most frequently used instruments, such as tachometer, speedometer and shift indicator, are set in the center of the dial cluster. Auxiliary gauges are displayed in the multi-mode display in the center of the instrument panel.

The individual "Lightweight Sports Mesh Seats," provide excellent support and breathability, for the RX-EVOLV's four occupants. Together with the spacious cabin, these seats provide both privacy and relaxation. During spirited driving, they support the occupants firmly but comfortably, something the RX-EVOLV's designers describe as "comfortable tension," which unites the driver with the car and enhances the pleasure of enthusiastic driving. In addition, the passenger-side rear seat incorporates a built-in, fold-down "Integrated Child Seat" and a detachable "Baby Pad."

Exceptional Functionality

--Superb Dynamic Performance and Excellent Packaging for Four Adults

Four-Door "Sports" Packaging Innovation

By inheriting a strong dose of a Mazda brand DNA, "Spirited" to the RX-EVOLV next generation Mazda sports car required the inclusion of classic enthusiast attributes such as a front-engine/rear-drive layout, a 50/50 front/rear weight distribution, a lightweight body with agile handling and a low yaw (polar) inertia moment. But these vital features were still insufficient . . . for the designers also included a comfortable spacious interior as a development goal.

To achieve this objective without compromise, Mazda turned to the newly-developed "RENESIS" rotary engine. The RENESIS plays the same role here as the 13B-REW does in the RX-7 but to an even greater degree. The RENESIS is more compact than the 13B-REW and is mounted center midship, low behind the front axle - as opposed to the RX-7's more forward front mid-engine layout.

By widening the front end of the floor tunnel and locating the engine in this area, the front bulkhead can be moved forward. Together with short front and rear overhangs and tires located at the corners of the body, this design results in a roomy cabin with a volume that exceeds that of existing compact sports sedans.

In addition, heavy components, such as the fuel tank, are carefully positioned within the wheelbase, contributing to the 50/50 front/rear weight distribution.

Balancing the stability provided by the long wheelbase with the agility produced by the low yaw moment of inertia, endows the RX-EVOLV with excellent control and never-before-experienced handling stability.

Freestyle Door System for Enhanced Rear Seat Access

The RX-EVOLV employs an innovative "Freestyle Door System" without central pillars, which provides easier access to the rear seats than that offered by conventional sedans.

The large front door features a double-action hinge: first the door extends out and forward, then it rotates to open. The rear doors are rear-hinged and open 90 degrees, creating a wide opening area. This greatly improves entry to and exit from the rear seats, making it much easier to get a child belted in, and to load or unload luggage. An electronic safety lock system prevents a rear door from opening from inside unless the same-side front door is opened.

Advanced Cockpit Technologies and Comfort Features

The RX-EVOLV employs advanced cockpit technologies and comfort features as follows:

- ID Access Card: The ID Access Card is used for locking/unlocking the doors and for starting the engine. Based on personal information stored on the IC chip, this card also controls engine output and actuation of the Active Cornering Brake system as a function of driver skill level. It also allows Internet access and transmission of medical information in case of an emergency.

- Shift Mode Selector: A joystick control mounted on the center console enables the driver to select the shift mode for operating the 6-speed auto-shift manual transmission. There is a choice of two shift modes: clutchless automatic shifting by electronically control actuator; or manual shifting using the wing shift controls in the back of the steering wheel.

- Wing Shift: Wing-shaped selectors set in the back of the steering wheel allow quick shifting during enthusiastic driving without moving the hands from the steering wheel.

- Active Cornering Brake Switch: The steering wheel is equipped with pad switches to actuate the active cornering brake function, which provides advanced cornering capabilities.

- One-Touch Parking Brake: One-touch button operation engages and releases the parking brake by an electrically-activated wire.

- Telemax / Multimedia: The multimedia display set into the center of the instrument panel displays air conditioning, audio system and tele-communication information, together with engine and chassis control information regulated by the ID Card.

- Rear-Seat Slide Mechanism: The rear seats can be slid fore and aft. Sliding the seats to their fully forward position enables the driver or front passenger to more easily reach children or luggage.

- Multi-Zone Super Sound System: 10 ultra-thin speakers integrated into the door trim, pillars and roof trim achieve excellent space efficiency and weight reduction, yet create the sound environment of a concert hall.

Responsive Handling and Performance

-- The Ultimate Driver-Machine Interface

RENESIS - Super Responsive Rotary Engine for the New Millennium

The RX-EVOLV is equipped with the newly-developed, naturally-aspirated "RENESIS" rotary engine, which revs eagerly to extremely high engine speeds while producing racecar-like power and performance. "RENESIS" stands for "The RE (Rotary Engine)'s GENESIS", or the rotary engine for the new millennium.

The RENESIS engine is improved from the 13B rotary engine used in the RX-7. Refinements include positioning the exhaust and intake ports on the side housing, separate from the rotor housing. This reduces overlap between the opening of the intake and exhaust ports, stabilizing combustion. At the same time, it enables the intake port to be enlarged, increasing engine rotational speeds and power output to levels never-before achieved with a naturally aspirated production rotary engine. Other refinements, including thinner, lightweight rotors, thicker eccentric shaft, and a 3-port, 3-stage variable intake system, contribute to the engine's maximum power output of 280 PS at 9,000 rpm, maximum torque of 23.0 kg-m at 8,000 rpm and a 10,000 rpm redline.

A new, compact wet-sump oil lubrication system, making use of the unique layout of the output shaft, and a thin oil pan contribute to the engine's lightweight compact design, which allows the engine to be located lower and further to the rear than ever before.

The engine and transmission are unified with a final drive unit connected by a carbon-fiber Power Plant Frame (P.P.F). This increases rigidity and provides direct, positive shift feel plus linear response to movements of the accelerator pedal.

Lightweight, Highly Rigid Body

The RX-EVOLV's rigid structure suppresses bending and twisting of the body and enhances the performance of the engine and suspension by inhibiting vibration and minimizing noise to provide a supremely quiet driving environment.

The RX-EVOLV's construction without center-pillars features wide door openings. However, a strong and highly rigid cabin structure is achieved through the use of hydroforming. This is a forming method in which super-high-tensile-strength steel is placed into a form and shaped using hydraulic pressure. In this instance the process begins with steel tubes which are formed into the closed-section structures forming each pillar and in the areas around the roof panel, quarter panels, and the cross members in the roof and floor. Hydroformed tubes are also built into the edges of the doors, which meet in the center of the car. To further reinforce this area of the body, foam material is inserted into the door tubes. When the body is heated during the paint curing process, the foam material expands and hardens further, increasing structural rigidity. Each door is

equipped with upper and lower latches for precise, secure location. When closed, the doors overlap the roof reinforcements and side sills for added stiffness and side impact protection.

As a result of its structural reinforcements, the RX-EVOLV's body is as rigid as that of a conventional sedan with a centre B pillar.

Never-before-experienced Chassis Dynamics

The suspension employs double wishbones with aluminum arms and knuckles front and rear. Setting the engine behind the front axle and the fuel tank in front of the rear axle, creates far more usable space for the long suspension arms, enabling optimized geometry and long wheel travel. Electronically-controlled, quick-ratio motor-assisted rack-and-pinion power steering, together with a low polar moment of inertia, provide agile and precise vehicle dynamics, despite the long wheelbase.

Ultra-light, highly-rigid, 5-spoke, 20-inch magnesium wheels are matched with low-profile tires featuring an unidirectional asymmetrical pattern based on the wet-weather tires used in Formula 1 racing.

The 19-inch, front and rear ventilated disc brake rotors are made from highly heat-resistant, aluminum-composite materials. Each front brake has a 6-piston caliper, while 4-piston calipers are used at the rear. The braking system also incorporates a 4-wheel Anti-lock Braking System (ABS) and Dynamic Stability Control (DSC).

Active Cornering Brake System for Active Control of the Yawing Moment

An Active Cornering Brake (ACB) system is used to further improve the excellent cornering ability of the vehicle. ACB controls the brake force at each wheel individually, allowing the driver, by pressing a pad switch on the steering wheel spokes, to vary the brake force (and thus the yawing moment) on the inner tires during cornering. This enables the driver to alter the handling characteristics of the vehicle from understeer to neutral to oversteer.

ID Access System to Control Vehicle Performance as a Function of the Driver's Skill

Based on personal information stored on the IC chip, the ID Access System controls engine output and actuation of the Active Cornering Brake system as a function of driver skill level. By regulating the engine management system and the electronic throttle, maximum output and torque are limited to 240 PS at 8,000 rpm and to 21.0 kg-m at 7,000 rpm, respectively. In addition, the transmission's shift schedule in the automatic-shifting mode is controlled to match the engine's power and torque characteristics, resulting in smoother shifting and improved fuel economy. On slippery surfaces the system also modulates the 4W-ABS and the DSC for added stability and security. It even cuts off the ACB when required.

Advanced Safety and Environmental Considerations

Safety Technologies to Support the RX-EVOLV's Fun-to-Drive Characteristics

The RX-EVOLV incorporates the highest levels of active and passive safety measures to provide all passengers with a feeling of security even when the car is engaged in spirited driving. Active safety includes technical features such as the RX-EVOLV's 4W-ABS and DSC brake systems plus excellent stability and accident-avoidance performance achieved through handling that faithfully reflects the driver's intentions.

The wheels are equipped with sensors to detect the loss of tire pressure - a warning lamp on the instrument panel informing the driver when the pressure falls below a specified level. And the tires are a run-flat design, allowing the driver to continue until the tire can be safely changed. This means that a spare tire is unnecessary, which not only reduces the weight of the car but also provides extra luggage space.

Advanced passive safety measures, including the highly rigid body, Mazda's Advanced Impact-energy Absorption and Distribution System, and the Smart airbags, are designed to minimize the impact of accidents on occupants.

The new, compact RENESIS rotary engine is mounted behind the front axle, creating a large crush zone at the front of the car. Also, setting the engine low reduces pedestrian head injuries in the event of a collision.

RENESIS, an LEV Rotary Engine for the New Millennium

Although it is a high-performance engine, the RENESIS also meets Japanese Low Emission Vehicle (LEV) standards. This is a necessity for any new-millennium power plant. The RENESIS rotary also features improved fuel economy at all speeds, from idling to high-speed operation.

RX-EVOLV, an Environmentally-Friendly Vehicle for the New Millennium

Environment-friendly recyclable plastic parts are used extensively throughout the vehicle.

Major Dimensions

- Overall length		4,285 mm
- Overall width		1,760 mm
- Overall height		1,350 mm
- Wheelbase		2,720 mm
- Track	front:	1,490 mm
	rear:	1,500 mm
- Curb Weight		1,250 kg
- Passenger capacity		4
- Engine type		Water-cooled, serial, 2-rotor
- Displacement		654 cm ³ (654 cc) x 2
- Maximum output (target)	Expert:	206 kW/9,000 rpm (280 PS/9,000 rpm)
	Non-expert:	177 kW/8,000 rpm (240 PS/8,000 rpm)
- Maximum torque (target)	Expert:	226 Nm/ 8,000 rpm (23.0 kg-m/8,000 rpm)
	Non-expert:	206 Nm/ 7,000 rpm (21.0 kg-m/7,000 rpm)
- Transmission		6-speed with auto/manual shift
- Steering		Electronically controlled, rack-and-pinion, motor- assisted power steering
- Suspension (front/rear)		Double wishbone
- Brakes	front:	19-inch Ventilated disc, 6-piston caliper;
	rear:	19-inch Ventilated disc, 4-piston caliper
- Tires	front:	225/40ZR20 run flat
	rear:	245/35ZR20 run flat

RX-EVOLV Technology Lexicon

Distinctive Design

- Double Clamshell Hood

The front-hinged hood opens to allow inspection of regularly serviced under-hood items. The rear-hinged aft panel flips open, providing a technician with easy access for engine maintenance.

- Central Midship Layout

This layout positions the engine behind the front axle, even closer to the centre of the car than is possible with Mazda's typical Front Midship rotary engine layout. This gives the RX-EVOLV a 50/50 (front/rear) weight distribution, ideal for a sports car.

- Ultra-Short Overhangs

Radically shortened front and rear bumper sections in the RX-EVOLV result in a lower polar moment of inertia for more responsive handling.

- Micro-HID Headlights

Thin 25 x 300 mm High-Intensity Discharge lights.

- Cooling Air Outlet

A duct for engine and brake cooling located in the front fender.

- Air Diffuser

An aerodynamic device below the rear bumper which improves airflow.

- Lightweight Sports Mesh Seat

A lightweight frame covered with a mesh cushion, creating a seat providing excellent support and "breatheability." Each seat is about 30-percent lighter than a conventional seat.

- Integrated Child Seat

A child seat built into the rear seat.

- Rear Trunk Through

The rear bulkhead "rolls up," providing access to the cabin from the trunk.

Exceptional Functionality

- Freestyle Door System

Front doors are front-hinged; rear doors are rear-hinged. This design, combined with pillarless construction, results in easy entry and exit. In addition, when opened, each front door first moves forward, then opens very wide.

- RX-EVOLV ID Access Card

A card which locks the doors, controls security systems and stores information

on driver skill. The card must be inserted before the engine can be started.

- Starter Button

Engine starting button.

- Shift Mode Selector

Transmission shift mode - auto-shift mode or manual mode - is selected by joystick operation.

- Wing Shift

The wing-shaped manual shift selector attached to the back of the steering wheel.

- DVD Digital Video System

Information and entertainment centre, which uses the display in the centre console.

- Multi-Zone Super Sound System

Sound system using 10 super-thin speakers mounted in the roof and door trim.

Responsive Handling and Performance

- RENESIS

Rotary engine with the intake and exhaust ports in the side housings. Naturally aspirated engine produces maximum power of 280 PS/9,000 rpm; maximum torque of 23.0 kg-m/8,000 rpm; and a 10,000 rpm rev limit.

- Power Plant Frame (PPF)

A frame to which the centre mid-ship mounted engine, transmission and final drive unit are mounted in an integrated fashion. As a result, the drivetrain responds instantly to throttle movements. Also used in the RX-7 and MX-5 Miata.

- Hydroform

A forming method in which super-high-tensile-strength steel is placed into a form and shaped using hydraulic pressure. It combines a high degree of strength with light weight. Used to form the RX-EVOLV's pillars and structural members in the roof and floor.

- High Mount Backbone Frame

The backbone frame is mounted in a high position, with a step-over for the engine. This provides excellent strength, while dispersing collision energy in front and rear collisions, and reduces deformation of the cabin.

- Active Cornering Brake System(ACB)

Dynamic Stability Control is used to actively monitor driver functions and increase cornering performance.

- Hidden Rollover Bar

A super-high-strength steel member, shaped by hydroforming, is integrated into the area from the quarter panel to the roof to create a strong, effective roll bar.

- Programmable Power Control

Uses driver skill information stored on the ID Access Card to vary maximum output and torque relative to the driver's skill, monitors 4W-ABS and DSC to provide stable control, and controls the ACB cut-off function.