

2008 Lexus IS F Sport Sedan

In addition to the exclusive V8, the 2008 IS F's performance credentials include racetrack-developed suspension and braking, and a specially calibrated version of the advanced Vehicle Dynamics Integrated Management (VDIM) system. Much of the IS F development took place at racetracks around the world including Germany's legendary Nurburgring Nordschleife, Circuit Paul Ricard in France, Japan's Fuji Speedway and the Higashi-Fuji Technical Center in Japan. In fact, Fuji Speedway is the IS F's home circuit, and the shape of turn one was the inspiration for the F-logo design.

The 2008 Lexus IS F will make an unmistakable design statement as it launches the brand's F performance marque. The IS F applies a distinctive new high-performance layer on the brand's L-finesse design language, with themes and design features that set the F model noticeably apart from standard Lexus models. Likewise, the interior will feature exclusive performance-influenced luxury appointments befitting the brand.

The "F" originates from the "Circle-F" internal code for what became the Lexus Division nearly 20 years ago. Since then, the "F" code has signified special Lexus vehicle programs that fall outside the normal engineering and development process.

"With Lexus solidly established as a luxury leader, it was time to expand the brand's scope by offering unique high-performance models, and the IS F is the first," said Dave Nordstrom, Lexus vice president of marketing. "Lexus did not design the IS F as a direct competitor to any specific models, but as a true performance sedan in a distinctly Lexus way. The IS F is totally authentic with a unique interpretation of driving excitement at all speeds and provides a new definition of 'usable power.'"

The Look of Performance Based on the IS luxury sport sedan, the IS F is clearly differentiated when viewed from the front, rear or in profile. A trapezoid-shaped front bumper fascia, a theme that is repeated at the rear, sets off the V-shape grille. The hood has a raised center section to make room for the V8 powerplant, and the front fenders were widened to envelop the 19-inch low-profile tires.

Both upper and lower grilles use a special wire-mesh pattern, and total grille area is increased to ensure adequate cooling for the 5.0-liter V8. The lower grille is flanked by large brake cooling ducts adjacent to standard fog lamps. Standard bi-xenon HID headlights include the Lexus Adaptive Front lighting System (AFS), which helps to illuminate curves at night.

The IS F's wedge-like profile is accentuated by functional front fender air outlets with lower edges that transition into larger rocker panels and continue as a character line into the rear bumper. The front fenders wear a discrete silver, black and blue "F" marque.

The rear view conveys a strong parting signature for the IS F, with a dramatic trapezoid shape and easily recognizable design elements. Four exhaust diffusers, two per side in a vertical arrangement, are integrated into the rear bumper. Above them, light-emitting diode (LED) stop and tail lamps behind clear lenses give the IS F a unique nighttime appearance. Attention to design detail extends down to the white LED license plate lamps. The subtle rear spoiler is one of many aerodynamic enhancements, which also include special underbody panels to optimize airflow.

Contributing to both design and performance, 19-inch forged-alloy wheels produced by BBS® feature a distinct dark-gray finish and an asymmetrical 10-spoke design.

IS F Engine, from the Bottom Up the 2008 Lexus IS F is exclusively powered by a performance-tuned 5.0-liter V8 engine producing 416 horsepower at 6,600 rpm and 371 lb.-ft. of peak torque at 5,200 rpm. Although based on the 4.6-liter V8 used in the Lexus LS and GS, the V8 in the IS F was specially engineered for higher power output, high-performance driving and durability. This new engine's high specific output (83.2 hp/liter) and high operating range (6,800 RPM redline) reflect the thorough attention to detail underlying the core engineering.

The IS F V8 introduces new technology and features that are exclusive to this version of the engine. Some of these include a dual air intake system, engine-oil and transmission-fluid coolers for high-speed performance and a cylinder-head scavenge oil pump. The scavenge pump forces oil from the cylinder heads back to the oil pan, ensuring a reliable oil supply even during cornering that exceeds one g.

The IS F 5.0-liter V8 is based on a die cast aluminum cylinder block with steel liners. Ribs positioned on the block's outer wall provide high rigidity. The crankshaft is forged, with high-frequency hardening to the fillet area, and uses a double torsional damper. Crankshaft journals are polished to a mirror finish to minimize the friction generated between the connecting rods and the crankshaft, and forged sintered iron alloy connecting rods ensure high-rpm durability.

Pistons use two-piece oil rings for low friction, and the skirt area is resin-coated to reduce noise and vibration. The timing-sensor rotor is attached at the rear of the crankshaft, which experiences less vibration than the front.

Innovative Breathing High-flow cylinder heads designed by Yamaha have a lightweight valvetrain, contributing to the IS F V8's high-rpm capability. The horsepower peak arrives at 6,600 rpm (just 200 rpm

before redline), and the torque peak at 5,200 rpm. The resulting performance character, while quite responsive in low-speed situations, provides a rush of power at higher engine speeds. Carefully chosen ratios for the 8-Speed Sport Direct Shift transmission help ensure responsiveness at all vehicle speeds.

The IS F V8 engine employs innovative new technologies to maximize efficiency and reduce emissions, including the SFI D-4 (direct-to-cylinder injection system with secondary port injectors) fuel injection and the Electronic Throttle Control System with intelligence (ETCS-i). Essentially, SFI D-4 integrates two types of fuel injection: A direct-type high-pressure fuel injection system, which provides a cooling effect in the cylinders and enables the high compression ratio (11.8:1) employed to extract maximum energy from the fuel; and a set of low-pressure port fuel injectors that help produce a precise burn to optimize power and efficiency under light- and medium-load conditions.

A dual air-intake system uses a primary intake passage for low and medium engine speeds. In the higher engine speed range (above 3,600 rpm), both the primary and secondary passages are opened, helping boost high-rpm power. Both intake passages share a common high-efficiency, low-restriction air filter.

Lexus optimized the intake system down to the smallest details. For example, the throttle valve shaft has been tapered down from 10 mm to 7 mm diameter in the center to expand the intake air passage. The intake manifold uses a simple plenum design with equal-length runners.

High-Precision, High-RPM Valve Control With a strong bottom end to help ensure durability, the top end of the IS F V8 could be engineered for high-rpm capability. The aluminum cylinder heads made for the IS

F by Yamaha feature integrated cam journals. The four composite camshafts use net-sinter forged cam lobes on hollow shafts, with the inside of the shafts serving as oil passages.

Titanium intake valves operated by roller rocker arms with needle bearings and fixed fulcrums contribute to a low-inertia [valve train](#). High-flow intake ports were specially designed for the IS F engine, with a cross-section area optimized to improve intake-pulsation efficiency and increase air-intake volume.

With the IS F 5.0-liter V8, Lexus has made a leap in valve-control technology with the new Variable Valve Timing with intelligence and Electrically controlled intake cam (VVT-iE). The exhaust camshaft uses hydraulically controlled variable valve timing.

Variable valve timing systems typically use engine oil pressure to operate cam-phasing mechanisms. In the IS F, using an electric drive motor to alter the intake camshaft phasing made it possible to expand VVT operational range to lower engine speeds, where engine oil pressure is usually not high enough to operate conventional VVT. An electric motor, with electronic control unit and a reducer, is mounted to the front of each intake camshaft.

Dual single-row independent primary timing chains drive the intake camshafts, which drive the exhaust camshafts via smaller secondary chains. Reinforcement ribs inside the timing-chain cover reduce timing chain noise, and integrating the water pump, oil pump and scavenge oil pump into the timing chain cover reduces weight.

The IS F V8's compact pent-roof combustion chamber positions the long-reach sparkplug nearly in the center. The plugs use an iridium-tipped center electrode and a platinum-tipped side electrode. A water jacket between the exhaust port and plug thread ensures optimal

cooling around the plugs. Four knock sensors in the engine's valley reduce the possibility of detonation.

Supporting Systems A true high-performance engine relies on outstanding support systems and thoughtful engineering that touches every detail. The Lexus IS F's unique stacked quad diffusers, for example, make more than a visual statement. They play an important role in a high-performance exhaust system by reducing backpressure. The stainless steel exhaust system starts with tubular exhaust manifolds and integrated catalyts. Next come dual 2.4-inch diameter front pipes that are joined before a pre-muffler and 2.7-inch single center pipe, after which the system splits into two 2.1-inch pipes and enters dual 16.8-liter mufflers.

A number of additional engineering details were integrated into the IS F to improve performance and efficiency. A cooling-fan motor was installed that is 30 percent lighter than conventional fan motors, and the fan shape was modified to enhance cooling and control noise. Front engine mounts have liquid-filled insulators, and the rear mounts are covered by rubber heat insulators. Inside the fuel tank, an offset high-output fuel pump and a sub-tank help prevent fuel starvation during cornering maneuvers. The alternator uses a larger front bearing, a cooling fan and die-cast aluminum cooling fins for the rectifier. The planetary-gear starter uses the crank-hold feature.

8-Speed Sport Direct Shift Transmission The IS F 5.0-liter V8 engine is mated to the world's first eight-Speed Sport Direct-Shift automatic transmission. This new transmission blends the performance characteristics of an automated manual-type transmission with the smoothness and refinement of a planetary-type automatic transmission. As a result, the driver can choose between ultra-quick manual shifts for performance driving, and smooth automatic shifts when convenience is the top priority. The driver can shift manually

using either the console shift or steering-wheel-mounted paddle shifters.

The eight-speed transmission is approximately the same length and width as the six-speed transmission used in other rear-wheel drive Lexus models. The transmission has a die-cast aluminum case and some aluminum internal parts, which contributes to weight reduction. Using eight speeds allows gear ratios that maximize torque up to the tire-grip limitations in the lower ranges while optimizing efficiency.

Driving enthusiasts will appreciate the transmission's Manual mode (M), which will hold each gear to the 6,800-RPM redline. A pair of unique paddles located within a fingertip's reach behind the steering wheel enables the driver to make ultra-fast up-shift gear changes. Paddle-shifting operation is allowed in either D or M modes, but shifts are quicker and more direct in M mode. At higher engine speeds, downshifts are accompanied by automated and precise throttle blips to match engine rpm to vehicle speed.

In addition, a Sport mode switch on the dashboard allows the driver to select from among Normal, Sport and Snow driving modes. In Sport mode, the VDIM system allows higher dynamic thresholds before intervening, alters steering assist to increase steering weight, and throttle response is sharpened. With the transmission in D mode, gears are held longer in response to throttle input.

Versatile Drive Mode When the driver selects Drive mode (D) using the console shifter, the eight-speed transmission provides quick shifts that are smooth and befitting a Lexus. At the same time, D mode offers plenty of versatility with full torque-converter lockup in 6th through 8th gears to optimize fuel efficiency. A flex-lockup clutch operates in 4th and 5th gears, continuously controlling lockup-clutch slippage to enhance fuel efficiency.

Until the engine reaches operating temperature, and when the VDIM system detects slippery road conditions, the transmission will automatically select 2nd gear start. Once the engine reaches operating temperature, or VDIM detects better road conditions, the transmission allows 1st gear start.

From D mode, the driver can select M mode by moving the console shifter into the M slot, or can gain temporary sequential operation by keeping the console shifter in D and operating the steering wheel paddle shifters. The latter is useful for situations where engine braking is desired, such as driving through a hilly area.

Paddle shifting while in D mode, however, is not the same as in M mode. If the vehicle is stopped, or if the vehicle is at a constant speed for a certain period of time, the transmission will change back to normal D operation. In addition, the driver can switch immediately into normal D operation by holding the upshift paddle (+) for one second.

The transmission uses flex-lockup control and deceleration control when decelerating while in D mode, using as many gears as possible and extending the fuel cutout for maximum efficiency. AI-SHIFT (Artificial Intelligence-SHIFT) complements the driver's Sport switch selection by automatically adapting the shifting based on road conditions and driver input. The new transmission is also highly responsive to uphill/downhill driving, always selecting the best gear for power or engine braking. Because the IS F is a Lexus, the intuitive powertrain control optimally smoothes out off-the-line response.

Sporty Manual Mode Manual mode (M) goes beyond simply allowing manual gear selection by changing the transmission's operational behavior to facilitate performance driving. In M mode, the driver will experience the feel of a manual transmission. Specifically, one will feel immediate g-force during acceleration and deceleration. In addition,

the transmission uses downshift blipping control to match engine speed for high-rpm downshifts.

The driver selects M mode using the console shifter, which then allows upshifts by pushing forward (+) and downshifts by pulling rearward (-). With the console shifter in M, the driver can also use the paddle shifters mounted behind the steering wheel.

In 1st gear, the torque converter operates to provide torque multiplication for consistent launches from a standing start. The torque converter is locked continuously in 2nd through 8th gears to provide a direct connection between engine and transmission for the fastest shifts and most direct driving experience.

In M mode, gears will be held until the driver up- or down-shifts. Two exceptions are if vehicle speed falls too low for the selected gear, then the transmission will downshift automatically; and if the transmission fluid or engine coolants exceed limits, then the transmission will revert to automatic operation to prevent damage.

Shifts in 0.1 Second and Downshift Throttle Blipping New hydraulic-control technology allows the IS F 8-Speed Sport Direct Shift transmission to perform on par with manual transmissions without sacrificing the smoothness of a torque-converter automatic. In M mode, upshifts are executed in just one-tenth of a second, six times faster than manual shifts in the V6-powered IS models.

The transmission-control system uses high-flow linear control valves for engaging and disengaging the clutches. The resulting simultaneous release and engagement of the shifting clutches provides fast shifts while diminishing gearshift shock. The solenoids allow direct control of the hydraulic pressure applied to the shifting clutches, along with centrifugal fluid pressure canceling mechanisms,

enabling finer control than conventional clutch-control systems. In addition to a conventional input-shaft speed sensor, the intermediate members of the gear train use a speed sensor to allow finer control of gear changes.

Driving enthusiasts pride themselves on the ability to execute a perfect manual-transmission downshift, which requires "blipping" the throttle while the clutch is disengaged to match the engine speed for the lower gear. The IS F transmission executes perfect downshifts in a similar way but with the consistency most drivers cannot match with a manual transmission.

When a downshift instruction is received, the transmission control system quickly opens the electronic throttle, instantaneously increasing engine speed (blipping) to match the engine speed after the gear change. Simultaneously, the system completes the gear change by smoothly and quickly engaging the shift clutch. The downshift, with throttle blipping, occurs in just 0.2-second.

To enhance performance and durability, a breather system separates air bubbles from the transmission fluid during performance driving. The transmission is also equipped with an air-to-liquid automatic transmission fluid (ATF) cooler to help ensure optimal transmission performance even during track driving. There is a transmission fluid temperature warning-light in the instrument panel.

Sports Car Dynamics The 2008 IS F is based on the robust IS platform, which was engineered from the start to allow a high dynamic envelope. The stiff body structure and the rear subframe are connected through several reinforcements.

Although using the basic double-wishbone front suspension and multi-link rear suspension configurations of the IS platform, the IS F benefits

from a multitude of track-proven modifications. The IS F sits an inch lower on its suspension than the standard IS models, helping to lower the center of gravity for quicker handling response. Like other IS models, the IS F employs high-strength steel suspension components for the optimal combination of rigidity and weight.

Spring and damper rates are increased, and larger-diameter stabilizer bars are used. The rear-suspension control arms are specific to the IS F to optimize geometry for the 19-inch wheels. In addition, the monotube shock absorbers use a larger-diameter piston rod. As on other IS models, the sophisticated shock-absorber design utilizes multi-leaf linear control valves to help improve damping force, and rebound springs offer improved body control without degrading ride comfort.

Suspension bushings have been specially tuned for better feel, and the subframe suspension mounts are stiffer than on other IS models to help reduce sway and ensure control under acceleration and braking. The engine mounts are also stiffer for a more direct feel. Special jounce stoppers added to both the front and rear suspension come into play early in the compression stroke to help reduce the roll angle when cornering and to reduce dive when braking. High-rigidity hub unit bearings are engineered for rigorous, high g-force track driving.

The Electric Power Steering (EPS) system has been remapped for improved steering response and feel while providing precise control and excellent straight-line control. The vehicle-speed-sensitive system eliminates parasitic loss from a hydraulic pump and reduces weight and complexity.

The front wheels measure 19 x 8J, with 225/40R19 tires and 19 x 9J in the rear, with 255/35R19 tires. Michelin Pilot Sport PS2 and Bridgestone Potenza models were each developed specifically for the

170-mph capabilities of the Lexus IS F. Design parameters called for handling grip befitting a premium sports car but with the control and ride quality expected for a Lexus in this class.

The direct-type tire pressure monitoring system allows two sets of tires to be registered, giving the customer the benefit of a system with a set of track tires or winter tires. The multi-information display indicates the tire selector switch.

Performance-Tuned Stability Control The IS F is equipped with a specially calibrated version of Lexus' innovative Vehicle Dynamics Integrated Management (VDIM) system to help provide superior handling dynamics and traction control. Combining input from a variety of sensors, VDIM is designed to anticipate the onset of a vehicle skid or slide and help correct the situation with a combination of braking, steering and throttle control in a way that is essentially transparent to the driver. VDIM integration provides precise management for Electric Power Steering (EPS), Vehicle Stability Control (VSC), traction control (TRAC), the Anti-lock Braking System (ABS), Brake Assist (BA), Electronic Brake force Distribution (EBD), and engine torque (via the electronically controlled throttle).

VDIM also provides an electronically controlled brake-based limited-slip differential effect on the rear wheels. During cornering, VDIM suppresses any tendency for the inside wheel to spin, transmitting more power to the outside wheel to maintain traction and momentum. Overall, VDIM enhances handling performance by helping to control front and rear wheel slip. When braking on a mixed-friction surface, VDIM will direct steering assist in the direction that will help provide the greatest control.

In the IS F, a Sport mode switch on the dashboard allows the driver to select from among Normal, Sport and Snow driving modes. In Sport mode, VDIM allows higher dynamic thresholds before intervening and alters steering assist to increase steering feel. Sport mode enables optimal vehicle control on a track in areas where the skills of even top-level drivers are challenged.

The experienced driver can disengage VSC/TRAC by press-and-holding the TRAC-off button for more than three seconds. Even with VSC/TRAC disengaged, however, the system still provides the brake-based limited-slip differential effect and ABS.

High-Performance Brakes The IS F is equipped with heavy-duty Brembo® brakes designed to the specifications of the Lexus engineering team. The 14.2-inch ventilated, drilled front rotors are gripped by rigid, powerful six-piston aluminum calipers, while the 13.6-inch ventilated, drilled rear rotors use two-piston calipers. High-friction brake pads are fitted on both. The brake system gives the driver confidence in extreme usage.

A single 10-inch brake booster with a tie-rod structure was utilized and tuned to improve feeling, effectiveness and firmness. Front bumper ducts adjacent to the fog lamps stream cooling air to the brakes. The brakes are finished with the Lexus name displayed on the calipers, a first for a Lexus production vehicle.

The Security of a Lexus Passive-safety technology in the IS F begins with a reinforced passenger compartment that helps protect the occupants with front-and-rear crush structures. Seatbelt pretensioners and force limiters are used for all seating positions.

In addition to the driver and front-passenger front [airbags](#) and front seat-mounted side airbags, the Lexus Supplemental Restraint System (SRS) includes side-curtain airbags that extend from A-pillar to C-pillar and a knee [airbag](#) for both the driver and the front passenger.

Advanced dual-stage front airbags are designed to deploy based on impact force. The driver's front airbag also includes an extra low stage designed to deploy based, in part, on the seat's position on its track. The front passenger's airbag features twin chambers, creating an indentation in the center impact area that helps provide overall occupant protection.

The available Pre-Collision System (PCS) can help reduce collision damage. The package includes Dynamic Radar Cruise Control, which uses millimeter-wave radar to measure and maintain a set distance from a vehicle traveling ahead. PCS relies on the radar sensor to detect obstacles in front of the car. The PCS computer, taking sensor inputs from vehicle speed, steering angle and yaw rate, is designed to determine whether a collision is unavoidable. In such a situation, PCS preemptively retracts front seat belts and pre-initializes Brake Assist so that increased braking will be applied the instant the driver depresses the pedal.

The rear back-up camera, included with the available navigation system, automatically projects an image of what its lens can detect behind the car onto the navigation screen when the transmission is in reverse gear. The available Intuitive Park Assist (IPA) system uses ultrasonic sensors to detect objects close to the car's front and rear bumpers, alerting the driver and showing distance to objects in the multi-information display within the speedometer. When the IS F is equipped with the navigation system, information on detected objects is shown in greater detail on the seven-inch touch screen display.

Uncompromised Lexus Luxury Like the exterior, the interior of the IS F features an exclusive design treatment highlighted by aluminized composite trim, aluminum-rimmed main gauges, unique steering-wheel treatment and other special surface treatments. The instrument panel integrates a new oil-temperature gauge, voltmeter and shift-indicator lights, and the "F" logo is discretely showcased on the steering wheel, rear-center console and outer seat cushions. For comfort, UV-reducing, heat-absorbing glass is used throughout the car.

In addition to the usual Lexus standards of comfort and convenience, the IS F interior features specially shaped and trimmed seats that hold the driver comfortably and securely in place. The special leather-trimmed sport seats are available in Black with blue stitching or a unique high-contrast Alpine and Black trim. The standard SmartAccess keyless entry and push-button start allows the driver to keep the access fob in a pocket or purse.

Standard amenities include 10-way power front seats; dual-zone automatic climate control, a pollen filter and smog detector; power moonroof with one-touch open/close and seven open-position settings; power tilt-and-telescoping steering wheel; three-position memory function for front seats, steering wheel and mirrors; all power windows with automatic up/down operation with jam protection; an auto-dimming rear-view mirror with HomeLink® programmable garage door opener, automated rain-sensing wipers and heated auto-dimming outside mirrors with integrated puddle lamps.

The air conditioning system's electrically controlled variable compressor adjusts output to demand rather than simply cycling on and off. The system can independently adjust upper and lower temperatures in response to ambient conditions or sunlight.

A multi-information display located in the speedometer integrates a trip computer that provides outside temperature, driving range, average fuel consumption, average fuel consumption since refueling (per tank), current fuel consumption, average speed and the F logo. The display also includes an oil-maintenance reminder and system warnings.

High-Power, High-Performance Audio The standard Lexus Premium [Audio System](#) features a six-disc, in-dash CD changer, and 13 speakers. Automatic Sound Levelizer (ASL) maintains consistent sound levels at varying extraneous noise levels. A convenient mini-jack in the center console enables connection of an iPod® or other portable music players.

Like all Lexus models, the IS F offers its own version of the Mark Levinson® Premium Surround Sound Audio System, which is specially tuned for IS F. This 14-speaker audio system features discrete 5.1 multi-channel playback with 7.1-channel speaker architecture. Its 10 amplifier channels provide 300 watts total output at less than 0.1 percent total harmonic distortion from 20 to 20,000 Hz (THD all channels driven). The Mark Levinson system plays conventional CDs and DVDs, plus MP3/WMA-formatted CDs. DVD movies can be viewed on the navigation system's color seven-inch touch screen when the parking brake is engaged.