

Lexus IS F Dynamics: The Brake System

One company that has built an impressive reputation as a leader in the brake industry is Brembo. Their amazing brakes are used on race cars around the world including Formula 1, Le Mans endurance racers and pretty much anything else you can imagine, including MotoGP motorcycles. When Lexus went shopping for a supplier of brake parts for their new IS F, Brembo was, well, their first stop.



Only Excellence Will Do

The IS F engineering team specified a most impressive set of brakes for its progeny and Brembo has delivered. The system is designed to work extremely well in either street or track conditions. This is a lot harder than you might think as the two environments often have conflicting needs.

On the street, brakes need to work well hot or cold. On the race track there is typically ample time to warm them up. Some tracks are extremely hard on brakes, causing them to generate huge amounts of heat with little time to cool between brake zones.

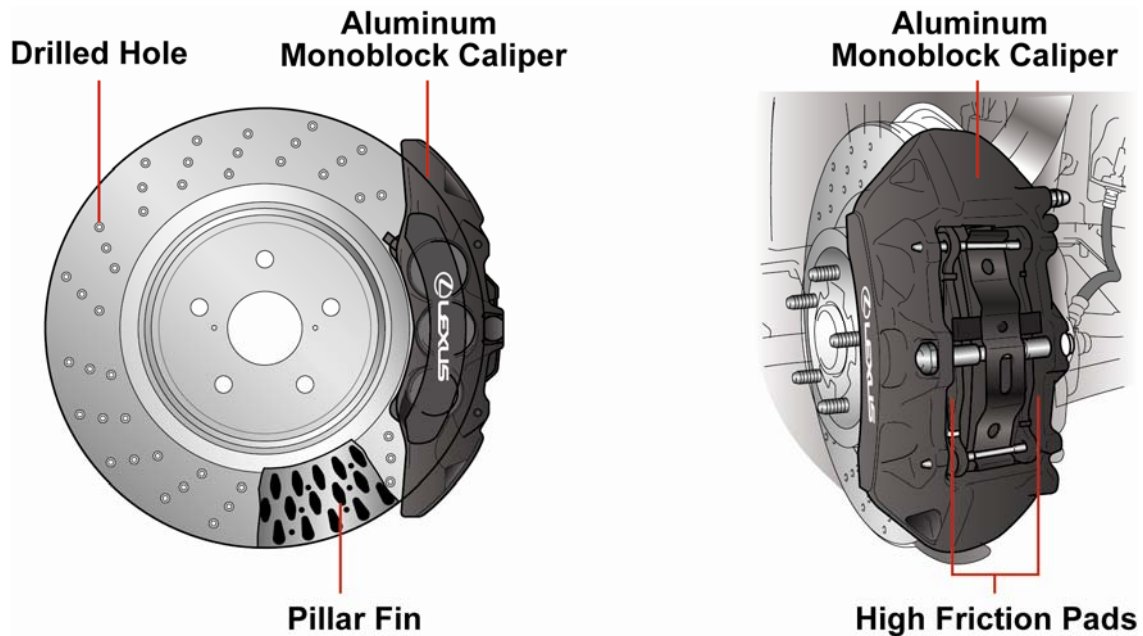
To deal with this, brake designers must build in substantial heat capacity along with ample cooling airflow for fade resistance. Heat capacity is created mainly through the size of the brake rotors and calipers. The larger they are, the more heat they can absorb. And the better the airflow to and through the rotors and calipers, the faster the brakes will cool down.

The seemingly endless march toward ever larger wheel diameters has also allowed brake designers to increase brake rotor diameters which allows the brakes to build greater stopping power through increased mechanical advantage and greater surface area.

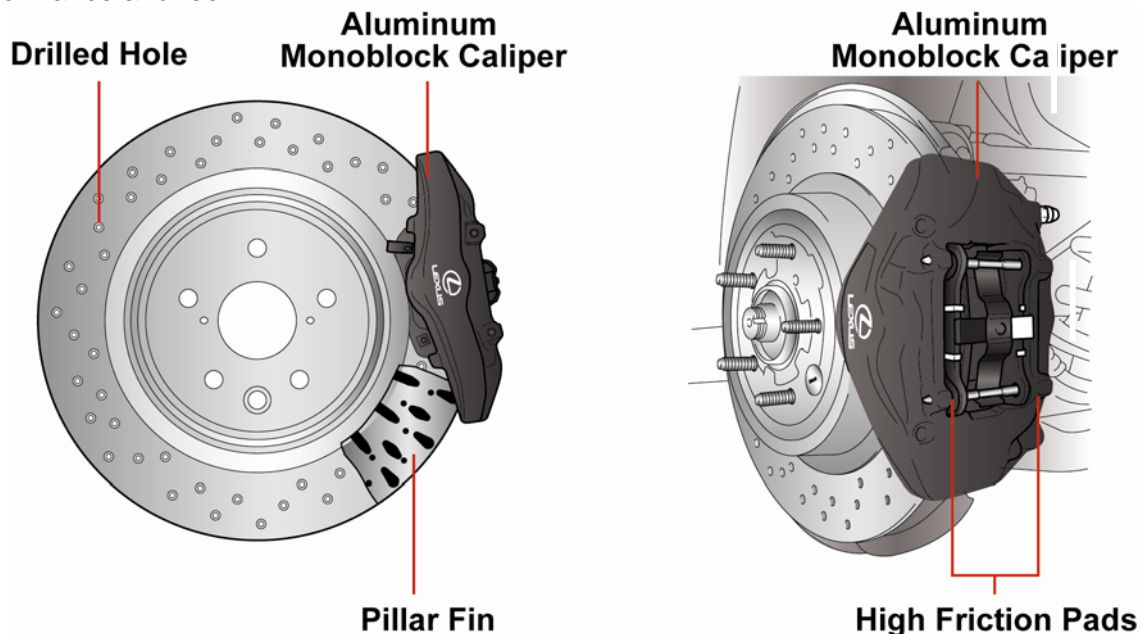
Show Me the Hardware

The IS F's 19-inch forged aluminum wheels provide the space for huge 14.2-inch diameter brake rotors. The rotors are cross-drilled and use special pillar-type internal fins to promote airflow and cooling.

Massive, yet light weight 6-piston aluminum calipers with high-friction brake pads are used up front. The "monoblock" caliper design increases rigidity, helping the brakes work consistently in extreme conditions while improving brake pedal feel.



A similar setup is used in the rear and like the front, large diameter rotors are paired with aluminum monoblock calipers and high-friction brake pads. But with much less work to do (due to vehicle weight transfer during braking), the rear calipers can be substantially smaller for reduced weight. The rear brakes nicely balance the fronts to provide excellent overall brake performance and feel.



Importantly, the brake cooling ducts in the front fascia and the brake backing plates have been shaped to promote effective cooling air flow. The wheels also play a part here as they allow plenty of air to pass through their multi-spoke design. Very cool.

Front Brake Specifications

Brake Caliper	Type	M6.30/34/38
	Manufacturer	Brembo S.p.A.
	Caliper piston diameter	mm (30 + 34 + 38) x 2
Rotor	Diameter x thickness	mm 360 x 30
	Number of pillars	141
Brake pad	Area x thickness	cm ² x mm 93.7 x 9.8

Rear Brake Specifications

Brake Caliper	Type	M36
	Manufacturer	Brembo S.p.A.
	Caliper piston diameter	mm (36) x 2
Rotor	Diameter x thickness	mm 345 x 28
	Number of pillars	93
Brake pad	Area x thickness	cm ² x mm 49.6 x 11.5

The sum of these wonderful parts is a brake system that is extremely powerful and fade resistant, with great feel and controllability. It will haul you to a stop in a very short distance from silly speeds—over and over again. And the beauty of all this confidence is that you don't have to pay for it with excess sensitivity at low speeds, so they're always easy to use.

