

GOODYEAR EAGLE F1 PICKED AS BEST OVERALL PERFORMANCE TIRE

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GOODYEAR TAKES PERFORMANCE TO NEW HEIGHTS.

"... the best performer ..."

"... you can't beat this Goodyear."

—Car and Driver, *DECEMBER 2005*

GOODYEAR 

GOODYEAR EAGLE F1 GS-D3 PICKED AS BEST OVERALL PERFORMANCE TIRE



TIRE TEST THE QUICK AND THE TREAD

We test 11 of the big names in street tires.

BY LARRY WEBSTER

PHOTOGRAPHY BY RICH CHENET

Finding the right tire for your ride is like trying to pick the right mattress for a good night's sleep. You know that buying the wrong one can have dire consequences, but you can get dizzy just wading through the jungle of choices. And unlike mattresses, you can't take new tires for a test run. That's where we come in.

First off, we decided against evaluating the popular all-season tires in favor of an examination of 11 high-performance ones, what are labeled in the industry as "maximum performance" tires. If you're like us, you want to know which tires will best contribute to the performance of your vehicle, accepting the inevitability of having to switch to snow tires when the white flakes appear. Even if your home turf is snow-free, you still have to deal with driving in the rain. Hence, all the tires here were put through three wet tests and three dry tests.

Testing tires is a difficult job (and probably the reason we haven't conducted such a test since 1989). But tires are a most critical part of your car, your only connection to the road. There are many difficult-to-control variables that affect tire

performance and make accurate testing a challenge. For one, the temperature of the track surface, which can have a significant effect on how a tire performs, can vary widely over the course of a day.

To minimize these variables, we enlisted the help of the Tire Rack, a tire and automotive-accessory business that was created in 1979 by a couple of autocrossers—Pete Veldman and his son-in-law, Mike Joines—who found it tough to locate high-performance tires for their hobby. The business took off, and in 2001, the Tire Rack built a 530,000-square-foot warehouse and a small test track in South Bend, Indiana. The company keeps a fleet of three BMW 325i's that it uses to perform its own tire tests to educate its sales force and regularly posts the data on the Web at www.tirerack.com (888-541-1777).

The Tire Rack generously offered us the use of its BMW's for our test. The 325i is a wonderfully balanced car, and its handling is so consistently predictable that we felt sure we'd get a clear idea of what the tires were doing as we put them through the tests. The required tire size—225/45R-17—is made by the 11 brands we wanted to evaluate. We used



What Makes a Tire Work?

Tires are much more sophisticated than they look. Although the basic construction of every tire here is the same—there's a carcass of polyester or rayon fabric with steel cords baked inside the rubber—there are countless detail differences that affect how a tire performs. The most obvious is the tread design. Tires with large grooves generally expel water from roadways more effectively. The larger and deeper the grooves, the better the tire is able to resist hydroplaning.

But those large grooves don't help on dry surfaces, where the more rubber a tire puts on the road, the better it grips. Think of a slick racing tire that has no grooves. Then take, for example, the BFGoodrich tire in this test. It has large tread blocks, not many grooves; as a result, it's great in the dry but not so hot in the wet.

We're oversimplifying here, because the chemical makeup of the rubber—known as compound—also has a profound effect on grip in both wet and dry conditions. Usually, a compound that's effective when the road is wet can overheat and get greasy when the road is dry. That's why we experienced a few tires that excelled in the wet but not in the dry—and vice versa.

A tire, like most parts of a car, is a compromise. Make it great in the wet, and it more than likely sacrifices dry performance, and that's why we didn't come across one tire that was able to ace all the tests.

Still, there are countless other variables for tire engineers to consider. For example, the construction of that inner carcass can be made stiff for precise feel or compliant for a good, comfy ride. And the construction can have a marked effect on performance.

Don't forget noise, durability, and appearance considerations, too. It's enough to make us glad we're not tire engineers.

—LW



BMW's recommended tire-pressure settings of 29-psi front and 35-psi rear for all our testing.

Although the track we used is small—its longest straight portion is only 456 feet—it's lined with sprinklers that can soak the asphalt and simulate driving in rain. The 0.3-mile autocross course has five timing beacons that provided a total time for each lap and segment times along the way. One of those segments was a long, constant-radius turn that allowed us to calculate maximum lateral grip during each lap.

It took three days to perform all the tests. On day one, we did wet and dry brake tests. We accelerated to 50 mph and then braked to a standstill. (We were unable to drive to our traditional 70-mph mark because there simply wasn't enough track.) There was a benefit to that lower speed: It ensured that we were measuring the braking performance of the tires and not just brake fade.

Over the next two days, when we performed the wet and dry autocross tests, we were joined by Spencer Geswein of Full-Lock Industries. Geswein and Brian Smith formed Full-Lock in 2001 and offer a variety of driving-related services that include instruction, testing, and racing (www.full-lock.com). Both men spent at least 10 years testing tires for Michelin, so we figured that kind of experience would uncover some subtle tire traits that we might miss. And in case you're thinking Geswein might play favorites, he asked that we not tell him which tires he was driving on, so his testing of the 11 brands was done blind.

Geswein drove three laps through the autocross course, and then we drove three laps—in dry and wet conditions. We averaged the six dry and six wet laps to come up with a time for each tire's performance on wet and dry surfaces. In the end, we had performance results for six tests: braking, autocross, and lateral grip—each in wet and dry conditions.

We gave the top-performing tire in each

test a score of 100 and scored the rest on their relative performance. For example, the tire that had the highest dry lateral grip of 0.95 g scored 100 points, and the tire placing last with 0.88 g received 92.6 points (0.88 is 92.6 percent of 0.95). We then added the scores from all the dry tests to arrive at a dry-performance rating and did the same for the wet-test results.

Things were more complicated when it came to determining the finishing order of the 11 tires. In addition to factoring in the wet and dry scores, we gave points based on a tire's price (we used the typical selling price in our calculations) and tread-wear grade, which is a rough estimate of how long a tire will have usable tread. For the price and tread-wear ratings we used the same proportional method.

But the categories were not all weighted equally. Our test focused on measuring performance, so we decided that results in the dry—lateral grip, for example—would carry the most weight. Wet performance is important, but less so for the purposes of this test. The price and the tread-wear scores had nothing to do with performance, but who doesn't consider what something will cost before buying?

After a lot of debate, our scheme worked like this: The proportional weighting for tread-wear and price scores was cut in half, the wet scores were not changed, and we doubled the dry-performance scores. And that's how a tire's overall ranking was calculated for this test.

Should you disagree with our rating method, we've presented all the data in graphical form so you can decide what's important to you.

Before you jump to the results, a few more things: The BMWs are rear-wheel drive, and our subjective comments might not be completely applicable to front-drive cars, which typically have handling characteristics different from the BMWs'. We didn't test the tires for ride or noise characteristics, two traits tiremakers may consider as important as performance. We



■ Kumho Ecsta MX



■ BFGoodrich g-Force T/A KD



■ Bridgestone Potenza RE050A



figure those two traits would be secondary for drivers interested in speed.

When the three days ended, we had a mountain of data—and sore backs from changing tires 33 times. We hope you find the information useful.

Eleventh Place Kumho Ecsta MX

Compared with tire companies that have been in business for more than 100 years (Michelin and Goodyear, for example), Kumho began selling tires in Korea 45 years ago. The company has been selling its rubber in the U.S. since 1966, and its racing tires are well established and competitive in amateur circles. Its highest-performing street tire, though, couldn't keep up here. In every test except dry braking, the MX finished well down the scale.

In the dry tests, the Kumhos felt stable and easy to drive and gave plenty of warning of the approaching traction limit. The tires recovered well once that limit was crossed. They didn't offer much grip (0.92 g versus the best at 0.95), and the time of 30.28 seconds in the dry autocross was 0.62 second slower than the fastest tire. That may not seem like much, but our test course was only 0.3 mile long, and on a longer track, the gap would be commensurately greater.

It was tricky driving the Kumho in the wet, however, because once the tire started sliding, it took seemingly forever to recover and regain traction. Geswein determined it was simply "slippery." That

behavior would have been excused if the Kumho had posted fast numbers in the dry, but it didn't. And although the MX—at \$136 per—was the third-least-expensive tire in our test, the high score in the price category wasn't enough to regain ground lost in the performance tests. As a side note, Kumho recently introduced a new tire called the Ecsta SPT that offers slightly less performance than the MX but may be quite tempting with a price of \$90.

Tenth Place BFGoodrich g-Force T/A KD

Here's a tire that trades off its weaknesses on wet surfaces for outstanding performance on dry ones. The BFGoodrich g-Force gripped so ferociously in the dry that it felt almost like a race tire. It posted the highest lateral acceleration (0.95 g) on the dry skidpad, and it never placed lower than third best in the other dry tests. The g-Force rewarded aggressive driving because its grip level didn't fall off precipitously

once it started sliding, as some tires do.

On a wet road, the g-Force is not so forgiving. Once you venture past the limits of adhesion and the tire begins to slide, you get a spooky feeling that resembles driving on ice, that is, you slide for a while before the tire regains grip. Geswein called the g-Force's wet-weather performance "not good" and "easy to overdrive in the wet." It finished last in two out of three wet-track tests.

This result was not a surprise because printed on the side of this tire are the letters "KD," which company employees told us stand for "killer dry." Although this tire was designed to give up some wet performance in return for dry grip, we did find a few other tires that are just as capable in the dry and a lot better in the wet.

Ninth Place Bridgestone Potenza RE050A

The Bridgestone performed a lot better in the wet than the BFGoodrich. In two wet tests, the autocross and the skidpad, it placed third. Those were its highest finishes, and for the most part, this tire didn't shine in any one area.

In performance terms, the Bridgestone was midpack. It fell to ninth in the overall ranking because its 140 tread-wear grade was the lowest of the group, and compounding that, at \$178 it was the second-most-expensive tire.

Our subjective comments seemed to back up the midpack performance. Geswein said it felt "dull and disconnected" and that it was "somewhat soft and





■ Toyo Proxes T1R



imprecise when driven hard." Although we didn't test the ride characteristics of this tire, we wondered if its lazy feel was a result of being designed for a compliant ride. If performance is your goal, there are better choices.

Eighth Place Toyo Proxes T1R

Toyo says its new T1R has "high-modulus bead apex rubber." You probably don't know what that means, and neither do we. This wasn't much more clear: "Spiral-wound, jointless edge and capplies." If this test were based on *no compredo* engineer-speak, Toyo would win.

In fact, the Proxes never placed higher than eighth in any test, and in two dry tests, the autocross and the skidpad, the Toyo finished last, trailing the top finishers by significant margins. In some tests it felt better than it actually was performing, but overall, Geswein noted it was "soft and imprecise" and didn't "feel like a sport tire."

In the end, the Toyo has its high wear grade (280) and attractive price (\$135) to thank for its eighth-place finish. In per-



■ Pirelli P Zero Rosso Asimmetrico



formance terms, there are lots of tires that do better. Perhaps a new set of "capplies" would help.

Seventh Place Pirelli P Zero Rosso Asimmetrico

With this Pirelli's seventh-place finish, we come now to the first of the midpack tires, which never excelled, but neither did they fall on their faces.

The Pirelli did flub two tests, which is why it lands farthest down in this group. In the dry-lateral-grip test, the Pirelli tied for second to last, and it finished seventh in the dry-braking test. Otherwise, it staked out the middle ground: not offending our enthusiast sensibilities but not knocking our socks off, either.

The Pirelli didn't move us to fill our notebooks with comments. Geswein noted there was "nothing particularly strong or weak" in its performance. We did notice it was easy to drive in the wet because it smoothly straddled the transition zone between sliding and gripping. When some tires—the Kumhos come to mind—begin to slide on wet surfaces, they *really* slide,



■ Dunlop SP Sport Maxx



but that wasn't the case with the Pirellis.

A week after our testing, Pirelli called to say there's a different version of the Asimmetrico that would have performed better. This version is noted by a hard-to-see "MO" that's embossed on the sidewall (it stands for "Mercedes spec," identifying the line of cars it was designed for), and it uses a different compound than the one we tested.

Sixth Place Dunlop SP Sport Maxx

The Dunlop surpassed the Pirelli's overall score by just 0.1 point, an amazingly close finish of 1100 possible points.

The Dunlop performed better in most test categories than the Pirelli. We thought it was a fairly satisfying tire to drive in that it provided good road feedback and scored higher in the wet tests than in the dry. In the water, the Dunlop had a "proper combination of direct feel and firmness," Geswein noted. But in the dry, the tire seemed to lose its confidence and lost some of the crispness we appreciated in the wet.



■ One thing to keep in mind about the imprints we carefully obtained is that a tire's contact patch changes dramatically as it is loaded, so these prints are not accurate representations of the amount of rubber that each tire puts on the road while cornering or braking.

So it's a slightly better wet tire but isn't stellar anywhere. The Dunlop was the only tire here that had its company name imprinted on the tread, which might score style points with some.

Fifth Place **Hankook Ventus R-S2 Z212**

The Hankook has one feature the other tires can't match—a \$99 price. And to its credit, the Hankook didn't behave like the cheapest tire, particularly when the track was dry. It tied the \$175 Yokohama and \$145 Goodyear for second place in lateral grip, scoring 0.94 g. And although its dry-braking results landed it in last place, that shortcoming did not greatly affect the Hankook's dry-autocross showing—a 29.86-second average, a third-place result that was only 0.20 second away from the winning effort.

It became apparent that the Hankook was clearly tuned for dry running as its wet-track results were below average. Like the other poor runners in water, the Hankook felt greasy and was slow to recover once it broke traction. But in the dry, the Korean tire felt just as responsive and sticky as its more-expensive competition.

The thing is, though, the harder you drive, the more tread you'll burn off a tire. So if you're a track-day addict who doesn't mind sacrificing some wet-weather capabilities, the Hankook is a choice that will save you money without losing much performance.

Fourth Place **Michelin Pilot Sport PS2**

Ever since we first experienced the PS2 in 2004, we suspected it was a better-than-average performer. We were right.



It placed in the top half of every test and finished second in both wet and dry braking, an impressive display of this tire's all-around competence.

Perhaps the most interesting revelation was how similar the tire felt in water and on dry pavement. Regardless of the level, the PS2 provided crisp turn-in response and a gradual loss of grip as the driver exceeded the tire's cornering capabilities.

Michelin says the PS2's tread is composed of two different compounds. The outer two-thirds of the tread has a rubber compound that's biased to provide good dry traction; the inner third has a different compound that's skewed toward

wet traction.

That performance will cost you. At \$179, the PS2 is the most expensive tire in the test. A set of these Michelins would run \$716, or almost double what four Hankooks go for. Is it worth it? How important is all-around performance to you?

Third Place **Yokohama Advan Neova AD07**

On dry pavement, the Yokohama tires put the BMW cars in a position to go fastest through our tests. Check the results. With the Yokos at all corners, the BMW was fastest on the dry autocross, and they provided the shortest stopping distance by



■ **Hankook Ventus R-S2 Z212**

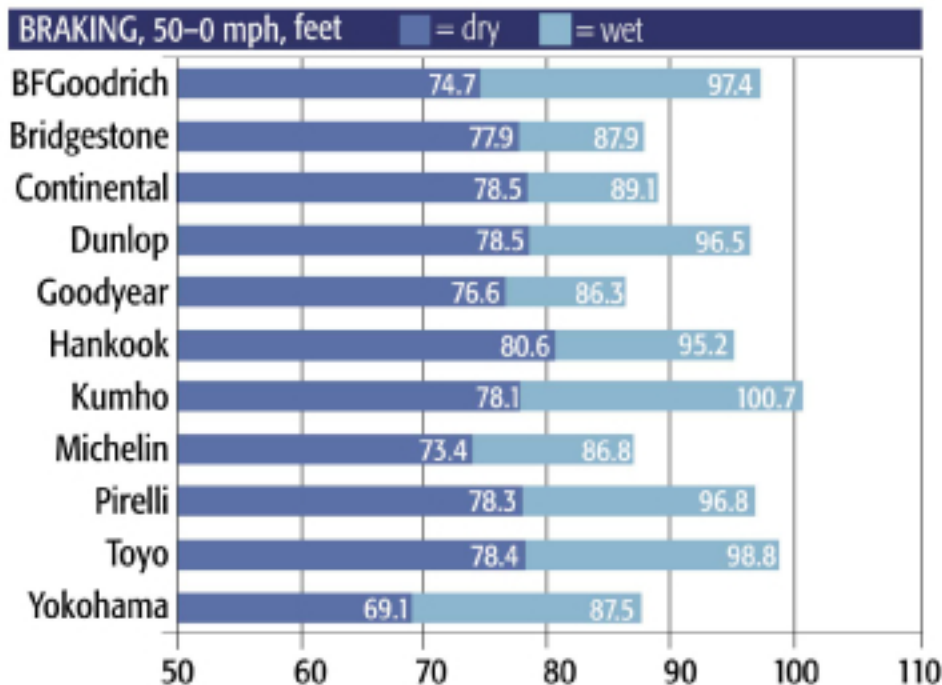


■ **Michelin Pilot Sport PS2**



■ **Yokohama Advan Neova AD07**





a significant margin.

Geswein knew the Yoko was a grippy tire before its results were posted. "Grip is way up," he commented after a run. He also noted that grip level stayed consistent even when the tire was sliding. In the dry, it performed a lot like the BFGoodrich, but the Yokohama is also pretty good in the wet.

Of all the tires, Geswein thought the Yokohama and the BFG g-Force rewarded aggressive driving because the two had a wide plateau of grip versus slip angle. That means if you enter a corner a little too fast and begin sliding, the Yokohama recovers quickly and in some sense covers up your mistakes.

The behavior in the wet was a little more toward the slippery end of the scale, but we could push the Yokohama hard and not feel as if we were on the verge of a sudden spinout. This combination of outstanding dry performance and more-than-

Vital Stats

	typical selling price	service designation*	UTQG tread-wear grade	weight, lb	dimensions		
					section width, in†	tread depth, 32/in	diameter, in
BFGoodrich g-Force T/A KD	\$169	90Y	200	24.0	8.9	9	25.0
Bridgestone Potenza RE050A	\$178	90Y	140	24.0	9.2	10	25.0
Continental ContiSportContact 2	\$146	91W	280	22.0	8.9	10	25.0
Dunlop SP Sport Maxx	\$165	94Y	240	25.0	8.9	10	25.0
Goodyear Eagle F1 GS-D3	\$145	90Y	280	24.0	8.9	11	24.9
Hankook Ventus R-S2 Z212	\$99	94Y	200	23.6	8.9	9	25.0
Kumho Ecsta MX	\$136	90Y	220	23.0	8.9	9	25.1
Michelin Pilot Sport PS2	\$179	90Y	220	23.0	8.9	10	25.0
Pirelli P Zero Rosso Asimmetrico	\$152	90Y	220	24.0	8.9	11	25.0
Toyo Proxes T1R	\$135	94Y	280	23.0	8.7	10	24.9
Yokohama Advan Neova AD07	\$175	91W	180	24.9	8.9	10	24.9

*The number, which in the case of these tires ranges from 90 to 94, is the load rating of the tire. The higher the number, the more weight the tire can carry. The letter is the speed rating: "W" for up to 168 mph and "Y" for 186 mph.

†Measured on a 7.5-inch-wide wheel.



Continental ContiSportContact 2



passable wet performance makes the Yokohama a very alluring product. If you're looking to cut the quickest lap times while using a street tire, this is the one to have. Bring money: They're \$175 apiece.

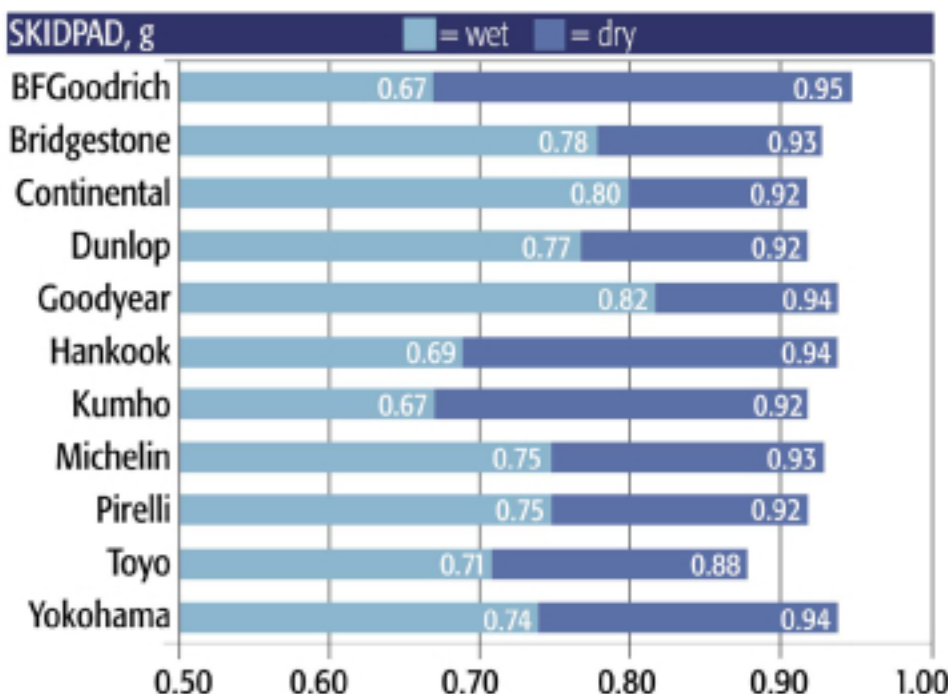
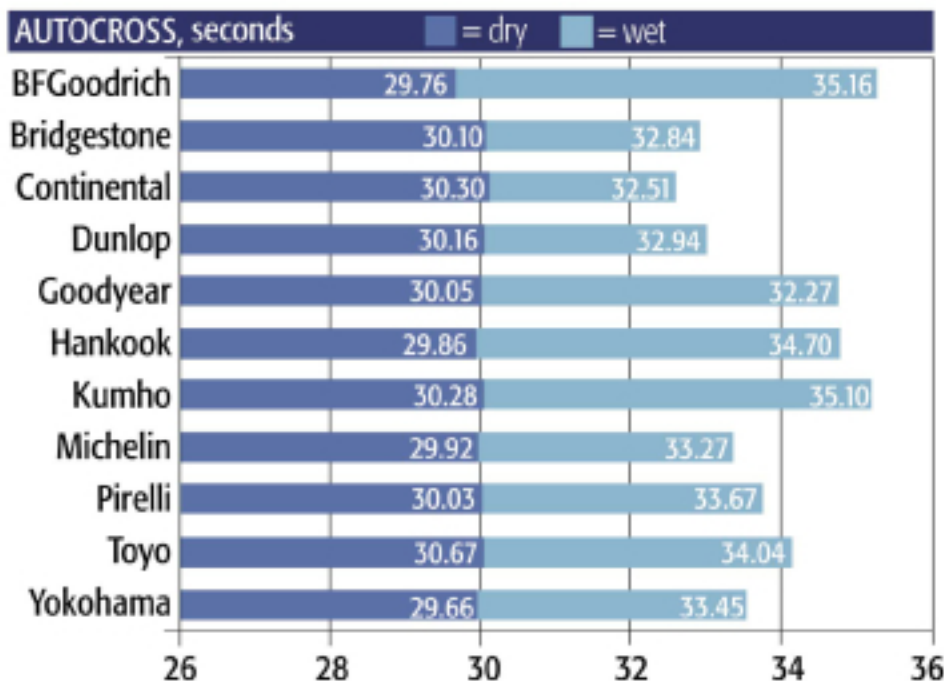
Second Place Continental ContiSportContact 2

When we tabulated the results and found the Continental in second place, we went back and checked our math. During three days of testing, our subjective impressions didn't lead us to believe that the Continental was a second-place tire, but when we added the scores, that's where it landed.

It simply didn't feel as sporty as some of the other performers—the Yokohama and the Michelin, for two—but thanks in part to the wide channels in its treads that shed water well, this tire was very good in the wet, placing second in the wet autocross test and skidpad measurements.

On dry surfaces, the Conti never rose above third from last among 11 tires. It felt soft and imprecise, two qualities not in the vocabularies of performance tires. Geswein grouped it with the other “dull and disconnected” tires.

So how, then, did it land in second place? There simply weren't huge gaps in the percentage differences among all the tires in dry situations. For example, the last-place tire was within 10 percent of the best tire. But in the wet, the spread from best to worst was 15 percent, which made





Goodyear Eagle F1 GS-D3



for a larger point spread. Plus, the Continental had a 280 tread-wear grade that was the highest for this test, and its \$146 price was a few dollars below the average cost.

First Place Goodyear Eagle F1 GS-D3

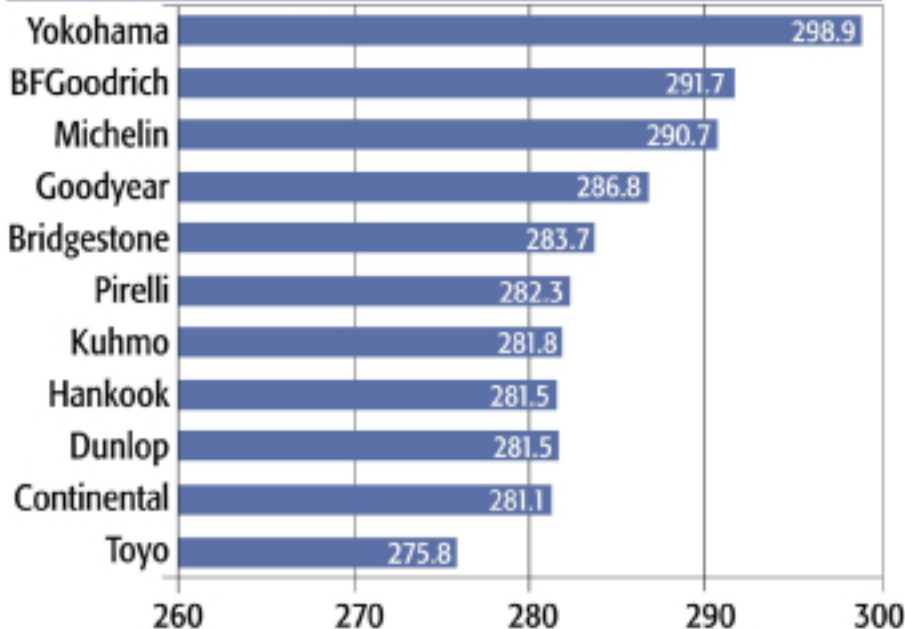
As an all-around high-performance tire, you can't beat this Goodyear. It was the best performer in all three wet-track tests and was very competent in the dry. It generated 0.94 g on the dry skidpad, only 0.01 g off the first-place BFGoodrich and tied with the Yokohama and Hankook.

The Goodyear gripped so well that you might not have been certain the road was wet, and it lost traction in a gentle, predictable manner. It held onto the wet track with 0.82 g of stick, an impressive figure considering the worst tire in that test made only 0.67 g.

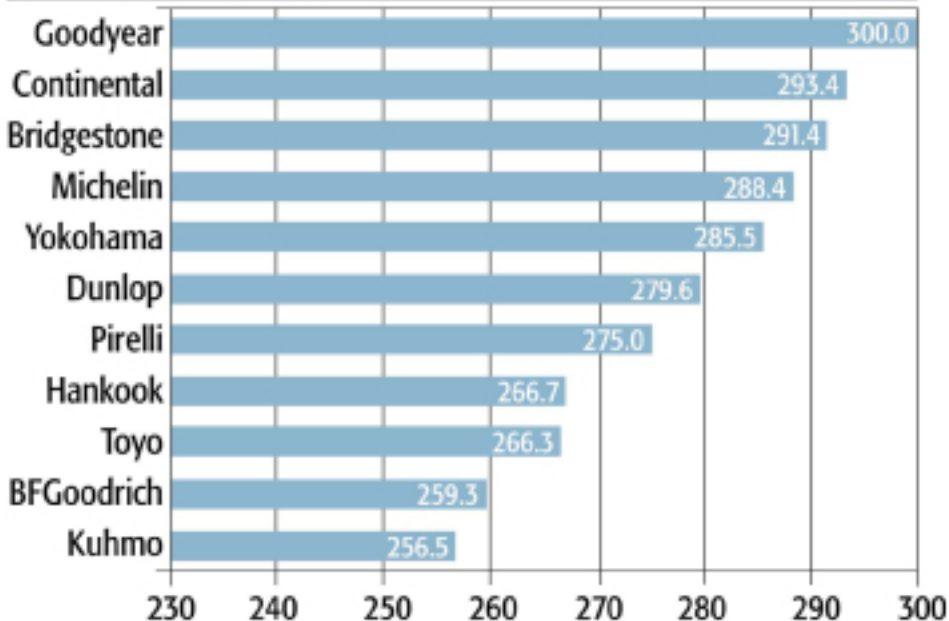
The Eagle F1 got a lot of favorable comments. In the wet, Geswein called it "direct"—a way of saying the tire provided clear signals about its contact with the pavement.

There were tires that performed better in the dry, but the Eagle wasn't far off. It was a little less precise than the BFG and Yokohama on a dry track, but not by much. And like the Continental, the Goodyear had a high 280 tread-wear grade. At \$145 each, it's \$34 cheaper than the most expensive tire here.

DRY-PERFORMANCE SCORE



WET-PERFORMANCE SCORE



OVERALL SCORE

Goodyear	1050.4
Continental	1031.9
Yokohama	1027.0
Michelin	1018.7
Hankook	1015.4
Dunlop	1002.2
Pirelli	1002.1
Toyo	999.7
Bridgestone	993.9
BFGoodrich	993.0
Kumho	990.7
min. points	
dry performance (x2)	600
wet performance	300
price	100
tread wear	100
total possible	1100