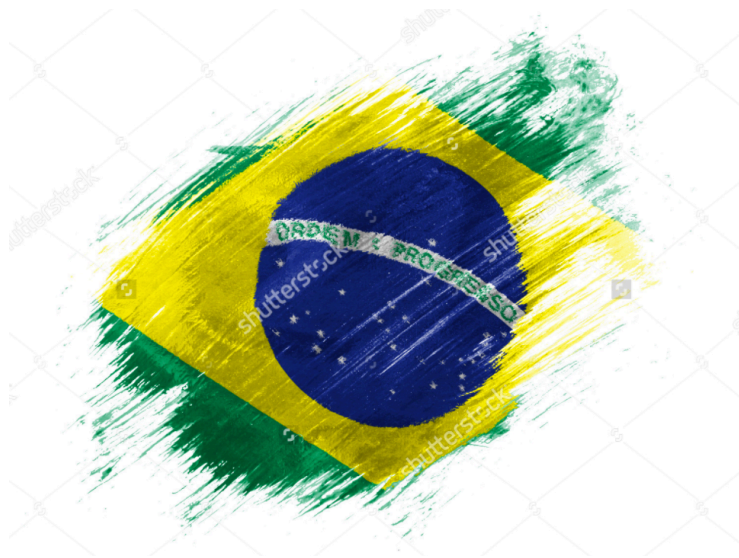


Brazil



November 13th, 2016

PRACTICE 1	FRI	7AM
PRACTICE 2	FRI	11AM
PRACTICE 3	SAT	8AM
QUALIFYING	SAT	11AM
RACE	SUN	11AM

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WAG of the Week

Quickly... who is the best Formula One driver to come from Brazil? No, it is not Felipe Massa. The answer you are looking for is Ayrton Senna. In fact, Senna may be the greatest F1 driver of all time. Senna was magical on track and lived and breathed the sport. The traits that made Senna such a brilliant driver were some of the same reasons that never able to settle down off track before his untimely death in 1994.

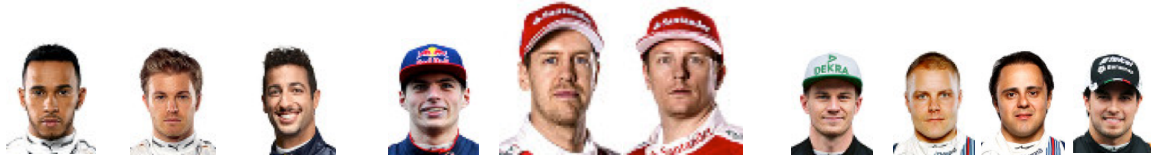
The story of Senna's love life begins with Lilian de Vasconcelos Souza. The two were friends since childhood and decided to marry in February 1981. The marriage lasted only a year, however, as Vasconcelos had a hard time adapting to Senna's racing life in England. Vasconcelos even admitted, "I was his second passion. His first passion was racing... There was nothing more important in the world for him, not family, not wife, nothing." Post-divorce, Senna went wild and dated numerous women.



First up was Adriane Yamin who only 15 years old when the 25-year-old Senna started courting her. Yikes. Sounds like President-Elect Trump at a beauty pageant. Luckily, Yamin was frequently chaperoned by her mother during dates, and the relationship was broken off in 1988. Next up was Xuxa. Maria da Graca Xuxa was a Brazilian television personality who Senna dated from 1988 until 1990. That is until he left Xuxa for Christine Ferracciu. Ferracciu and Senna lived in Monaco and Portugal on and off between 1990 and 1991. You can also add models Edilaine Barros, Carol Alt, Marjorie Andrade and Elle Macpherson to the list of women Senna dated. It seemed that Senna was finally settling down when he met TV personality Adriane Galisteu, but we all know how that tragically ended. Maybe it is best to remember Senna for his driving skills and philanthropic nature.



Rewind with Rob



Hamilton | Rosberg | Ricciardo | Verstappen | Vettel | Raikkonen | Hulkenberg | Bottas | Massa | Perez |

Turn 1: to skip it or not to skip it, that is the question.

That was indeed the question of the Mexican Grand Prix. Most drivers decided to stay on the tarmac, but on three separate occasions, drivers continued straight at the end of the long frontstretch, skipping the chicane altogether.

Both Lewis Hamilton and Nico Rosberg went off track on Turn 1 on the opening lap. Hamilton started in pole position and got off to a good start. Because of the long opening straight, he had quite a head of steam coming into the corner. When he applied the brakes, he locked up and his car slid straight through the chicane, bypassing both Turn 1 and Turn 2.

Meanwhile, right behind him in P2, Rosberg also got off to a good start. He was on the outside of the right Turn 1 and was going to be on the inside of the left Turn 2. Max Verstappen dove to the inside of Turn 1 and was immediately on Rosberg's right by the time the two cars got halfway through the turn. But Verstappen locked his brakes with the late dive and pushed Rosberg off the track to the left. Rather than continue with the contact, Rosberg steered left and rejoined the track after Turn 2. Hamilton had a substantial lead as a result of not even attempting to make the turn into Turn 1, but he lifted off the gas and had already started to come back to the pack by the time the Virtual Safety Car was deployed for a crash further down the order.

The race stewards decided that neither Hamilton nor Rosberg would be penalized for skipping Turn 1. Hamilton was given a free pass because they used race data to confirm that he voluntarily slowed down after skipping the chicane to give back his advantage (and he did so before the VSC was deployed). Rosberg was given the free pass because it was determined that he was forced off the track. For both decisions, it was critical that it happened on the opening lap, which is often chaotic. Apparently the stewards are more forgiving of infractions that happen that early because....

The end of the race was incredibly intense. You had Hamilton in a comfortable P1 and Rosberg cruising in P2, happy to get a little closer to the drivers' championship. But behind them Verstappen was in P3 on very old Medium tyres and Sebastian Vettel was hot on his tail with considerably fresher Mediums. Meanwhile, Ricciardo had gone for a second pit stop and he was wearing fresh Softs and quickly closing the gap to Vettel.

Coming into that same Turn 1, Verstappen was under pressure from Vettel and locked up his ancient tyres, skipping the chicane altogether, a la Hamilton. After the incident, Red Bull radioed to Verstappen, advising him that they thought he would have to give the position to Vettel. Then, in a radio message that was not shared with the viewing public, Red Bull told Verstappen to hold position pending a decision by the FIA. Vettel was going berserk when Verstappen didn't let him pass.

Verstappen was slowed down by his old tyres in the ensuing laps, which caused Vettel to be pushed back into Ricciardo. Vettel thought Verstappen was doing this on purpose and started swearing over race radio. Ricciardo crept closer and closer and finally made a move on the front stretch. He was coming in to Turn 1 on the left, which would have put him on the inside for Turn 2. Vettel moved to the left to block while he was under braking, in clear violation of the new "Verstappen Rule." As the cars were halfway through the chicane, they came together primarily because Ricciardo's line was invaded by the late-moving Vettel. The contact prevented Ricciardo from completing the pass.

Although Verstappen crossed the line in P3, he was given a 5 second penalty for missing the turn because of his lock-up. Although Vettel crossed the line in P4, and then was promoted to P3 (and participated in the podium celebration!), he received a 10 second penalty for moving under braking and finished in P5. Ricciardo was the big beneficiary of these penalties and he was ultimately promoted to P3.

Besides the penalties, the other big news was the low tyre degradation. Most drivers only made one stop over the 70+ laps. Passing was fairly difficult, so drivers that made more than one stop to be faster on track often got stuck behind slower cars and couldn't take advantage of their pace. Poor Perez never made it past the one-stopping Williams cars and finished a disappointing P10 in his home race. Hopefully Pirelli bring softer shoes to Mexico next year.



Track Talking

The Brazilian Grand Prix. Home of Senna, greatest racer of all time. If you do not know Senna, please do yourself a favor and watch the Netflix documentary of his same name.

This race is late in the season and often provides the back drop for the world champion. The big question this year, will Nico lock up the championship in Brazil, or will Hamilton keep the fight going? If I were a betting man, which I am not, it is illegal to gamble at this establishment, I would Lewis does not finish the race.

Lewis has been hanging around our American hero Ryan Lochte recently, so I see some shenanigans going down this weekend. Ryan and Lewis run it back at the gas station, rip some posters off the wall, and get tossed out of the country. Maybe a hot take, but that is what you get here at the newsletter. Heard it here first. Also, no real evidence that Lewis has been hanging out with Lochte, but it seems like a guy he would party with.



Charlie's Chatter

- Jolyon Palmer has been confirmed as Nico Hulkenberg's team-mate at Renault for 2017, leaving just seven seats still to be filled for next season.
- Esteban Ocon is the new favorite to fill Hulkenberg's vacancy at Force India.
- It appears that Formula One is the fourth most popular sport in South Africa behind football, rugby and cricket. The United States has some work to do.
- Williams driver Massa is hoping to put on a show for his home fans at the Brazilian Grand Prix as he targets reaching the podium at his final home race.
- Defending champion Lewis Hamilton has received advice from Kanye West about how to make it in the music industry. Something tells us, despite the advice, he won't make it.
- Nico Rosberg says he will not change his driving style to maintain his World Championship points lead.
- Rumor has it *The F1 Newsletter* staff is planning an offseason retreat in an undisclosed location. Some of the world's best writers will be in attendance.



Fantasy Focus



(P1) Schweizer F1 | (P2) Tonka BMW | (P3) O'Brien Red Bull Audi

A lot of ink has been spilled by the mainstream (F1) media about the tight race between Lewis Hamilton and Nico Rosberg for the World Drivers' Championship. Considerably less has been spent on the equally thrilling race in the F1 Newsletter's GP Predictor. The astonishing results from Mexico have proven that anything can happen in these last two races. We have some real battles on our hands. First, some Mexican pointers:

- Every squad correctly predicted that Hamilton would win
- Every squad still actively making picks correctly predicted that Rosberg would finish P2
- Ferrari and Red Bull evenly split the predictions for P3 (it was Red Bull in the end)
- The top two squads, Schweizer F1 and Tonka BMW, took the massive bonus point for 6 correct predictions
- Scuderia Drew narrowly missed the big bonus with 5 correct predictions
- The Big 3 Constructors of Mercedes, Red Bull and Ferrari held all of the top 5 predictions -- much of the in-race drama is winding down as the season comes to a close

Full Mexican Grand Prix Results

Schweizer F1 (175)
Tonka BMW (169)
O'Brien Red Bull Audi (105)
Scuderia Drew (79)
JBone (69)
Sauber Alfa Romeo F1 (59)
FO Racing (47) (shuttered)
PIT ROAD HOOLIGANS (30) (shuttered)

Overall Standings (Total Points; Points Behind Next Place Ahead, Points Ahead of Next Place Back)

O'Brien Red Bull Audi (993; --, +52)
Tonka BMW (941; -52, +71)
Schweizer F1 (870; -71, +90)
Sauber Alfa Romeo F1 (790; -90, +36)
Scuderia Drew (754; -36, +98)
FO Racing (656; -98, +1) (shuttered)
JBone (655; -1, +252)
PIT ROAD HOOLIGANS (403; -252, --) (shuttered)

O'Brien Red Bull Audi

has had a comfortable lead since its monster race at Hungary before the summer break. It has slowly fallen back to the pack since then. Will it be caught?

Tonka BMW

had its own huge race in Mexico and should be equally focused on attacking P1 and defending against Schweizer F1 in P3.

Schweizer F1

has the most comfortable lead over its pursuer, with a 90 point cushion. Two first place finishes in a row have catapulted it into P3. But just before those were two of the worst performances of the season. What will

we see from this mercurial squad and can it hold onto the podium?

Sauber Alfa Romeo

struggled badly in Mexico, losing a 40 point lead and falling into P4. This once proud squad needs some luck in Brazil because Scuderia Drew is nipping on its heels, only 36 points away.

Scuderia Drew

had a strong finish in Mexico with over 100 points and five correct guesses that put it within easy striking distance of P4. With a strong exit from the corner here, it can easily overtake Sauber Alfa Romeo with laps to spare.

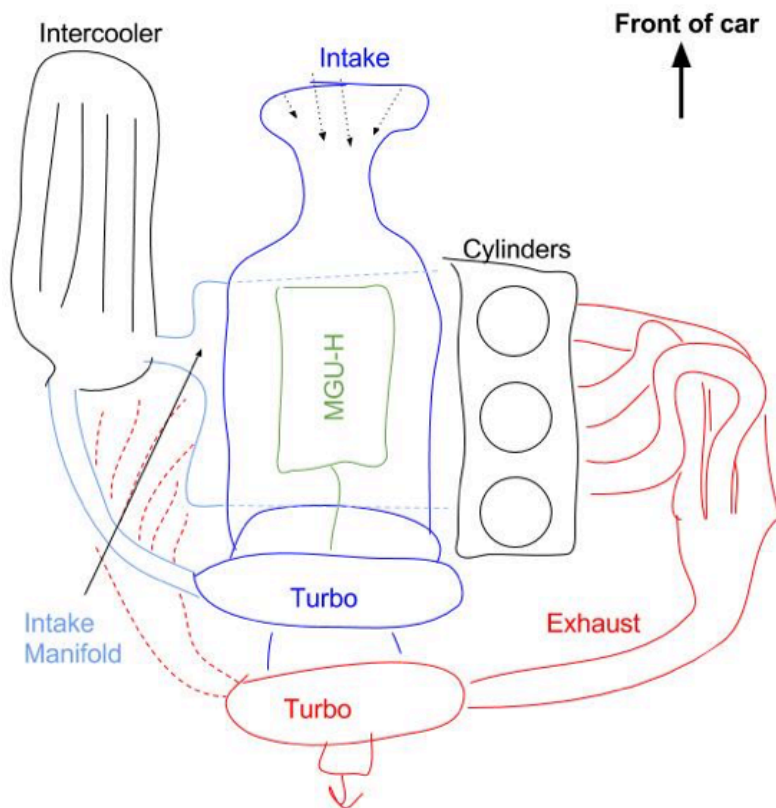
JBone

is in a fight that all the television cameras on are: it's a single point behind FO Racing for the coveted P6. FO Racing has closed shop for the season and is averaging only 33 points per race since the summer break. Facing relegation, JBone is in the fight of its life.

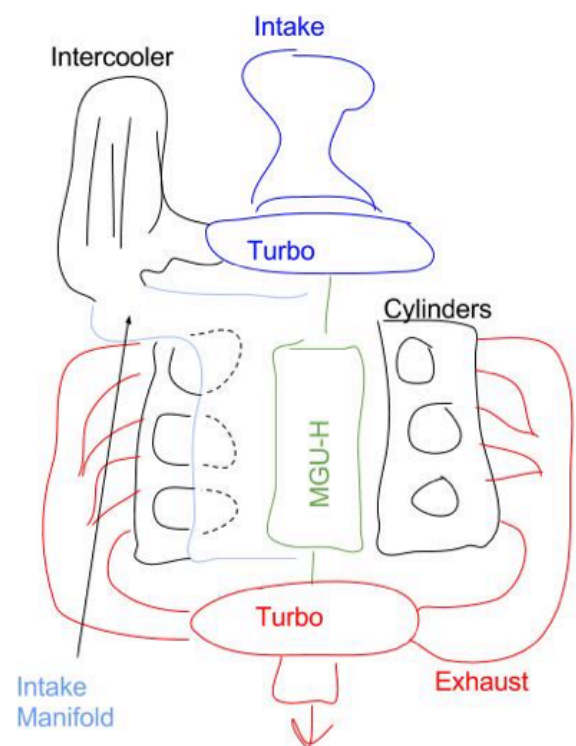
Start Your Engines!

Have you ever been passing someone on the highway in your POS Subaru, impotently screaming “go!” as you inch by a tan minivan brimming with a rec soccer team? If so, you know how it feels to drive an F1 car in 2016 without a Mercedes engine. Given the millions of dollars each of these corporate hegemon plough into research and development, how is it that the Mercedes-powered cars are just a little faster? Obviously there are many factors, which you can read about in another column in this venerated newsletter, but the constructors have made some meaningfully differing engineering choices when it comes to power units. So, let someone who draws and thinks like a child try to explain the differences between the Mercedes engines and the rest of the pack. Below are very rough illustrations of “standard” (i.e. Renault) and Mercedes engines.

Renault Engine (more or less...)



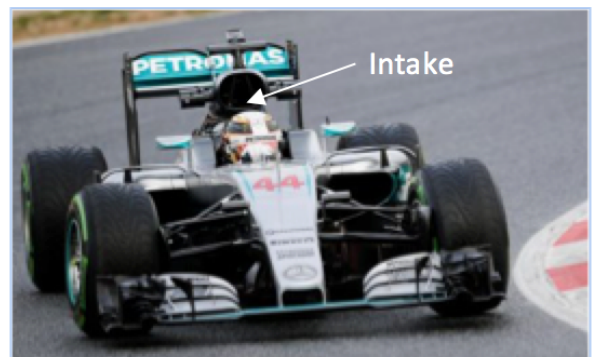
Mercedes Engine (more or less...)



Note: Turbochargers are basically fans that force air into the intake to increase pressure, which leads to increased power. Essentially the second (red) turbo forces the first (blue) turbo to spin faster, drawing in more air.

Note: The Motor Generator Unit (MGU-H) is the heat-portion of the Energy Recovery System (ERS). It recovers some energy through a shaft connecting it to the spinning turbos. That energy is stored in a batteries to be used for various purposes (e.g. accelerate the car, reduce turbo lag) later. For more on ERS: https://www.formula1.com/en/championship/inside-f1/understanding-f1-racing/Energy_Recovery_Systems.html

This is a top-down view of a portion of an F1 engine. The intake is the hole you see over a driver's head (pictured right). Let's follow the air to understand what's going on in the Renault engine. Air enters the intake and proceeds to the blue turbo towards the rear of the car.



The air spins the turbo and subsequently passes out of that turbo and into the intercooler. From the intercooler, the air passes into the intake manifold and then into the cylinders, where the air is combined with fuel and ignited in a process called combustion. After combustion, the air passes through the exhaust pipes into the red turbo fan, and finally out of the car through a single exhaust pipe.

The fundamental difference is that the turbos are separated in the Mercedes engine. One is near the intake while the other remains aft. An advantage of this setup is that less heat passes from the hot (red) turbo to the cool (blue) turbo. Cooler air in the first turbo means cooler air passes through the intercooler into the cylinders, which in turn allows more tightly packed air molecules to squeeze into the cylinders and combust with the fuel to produce a bigger bang and more power. Cooler air in the first turbo also allows for a smaller intercooler since the intercooler is doing less work, which in turn allows the car to be more aerodynamic. Splitting the turbos also allows the MGU-H (see note in graphic) to independently control the turbo fans because each has its own shaft. Because of this, the MGU-H can be used to spool only the first (blue) turbo to compensate for turbo lag, which is more efficient than spinning both because any energy *not* used compensating for lag can be transferred to another part of the ERS (i.e. the MGU-K) to power the wheels

You will also notice the Mercedes engine has shorter exhaust pipes. On the Renault engine, the longer pipes are designed to even out the exhaust impulses from the cylinders. This helps with scavenging, a process whereby air is pushed out of the cylinders so fresh air can be forced in. The Mercedes engine packaging is smaller, which therefore makes it lighter and more aerodynamic. Additionally, the exhaust in the shorter pipes retains more heat by the time it hits the red turbo fan, which is desirable because hotter gasses spin the red turbo fan faster. Remember, the faster the red turbo spins, the faster the blue turbo spins, forcing more air into the engine. Lastly, shorter piping throughout the engine produces less turbo lag since it takes less gas to pressurize the system.

While the Renault engines maximize the amount air and fuel entering the engine to increase power, the Silver Arrows rely on greater efficiency through reduced weight and energy loss, and increased aerodynamics. Mercedes' bet is that the benefits of these engineering choices outweigh the benefits of the other approach, and considering how the team has dominated the field these last couple of years, it seems their bet has paid off.

Paddock Pointers

Dear Pals,

First time, long time here. Love what you put out each race, but I am starting to get nervous about the off season. Where will I send my motor and life questions once the season is over? How can I get through a Friday at work?

*Sincerely,
Anxiously Revving*

Chello,

We appreciate the question and the nice feedback. Regarding your off season questions, maybe give your mother a call. I am sure she has been patiently waiting to hear from you. Yeah, you can send a question in, but just like the drivers, we here at The Newsletter need an off season too. Our turbo hybrid engines need to be re-charged. One more week left in the season, send those questions before it is too late.

Sincerely
Your Pals

Moment in History

As I am sure you know because you faithfully read “Charlie’s Chatter,” Felipe Massa is retiring at the end of the 2016 season. You may have expected to wait until the final race of the season to read a tribute to the Williams driver, but we are a bit different here at *The F1 Newsletter*. And seeing as Massa was born and raised in São Paulo, Brazil, we consider the Brazilian Grand Prix an appropriate race to tribute Felipe. This week’s moment in history takes you back to the 2008 Brazilian GP. It was the 18th and final race of the 2008 Formula One season.

Heading into the final race of the season, the Drivers’ Championship was extremely close. Lewis Hamilton, driving for McLaren, was in the lead with 94 points followed closely by Ferrari driver Felipe Massa with 87 points. A maximum of ten points were available for the final race, which meant that Massa could still win the title if Hamilton finished in sixth place or lower. Otherwise, Hamilton would be World Champion. Qualifying was relatively straight forward with Massa grabbing pole position and Hamilton qualifying fourth. The race was bit more dramatic.

Minutes before the race was set to begin, torrential rain hit the Autódromo José Carlos Pace. The race was delayed and the entire field was forced to switch to treaded rain tyres. Weather conditions improved quite rapidly, however, and after a few laps both Massa and Hamilton dove into the pits for slick tyres. Massa was quick swapping out tyres, but Hamilton did not fare as well, dropping from fourth into seventh. Hamilton quickly fought back to regain two spots and critical championship points. At that point all Hamilton had to do was hold on to win the World Championship.

Once again, the weather threw Hamilton and McLaren for a loop. With a five laps remaining and rain in the forecast, both Massa and Hamilton returned to the pits for wet weather tyres. No big deal. Two Toyotas gambled, however, and remained on slick tyres, so as Hamilton returned to the track he fell to sixth place. As Massa cruised to victory the rain came pouring down. The Toyotas were losing ground and losing ground fast. Entering the final corner in the final lap of the final race of the season, Hamilton passed one of the Toyotas and grabbed fifth place denying Massa the World Championship.

Just like Hillary Clinton in the 2016 election, Felipe Massa was gutted. He lost his World Championship and was never able to regain his form. Até a próxima vez, Felipe.



Tyre me out

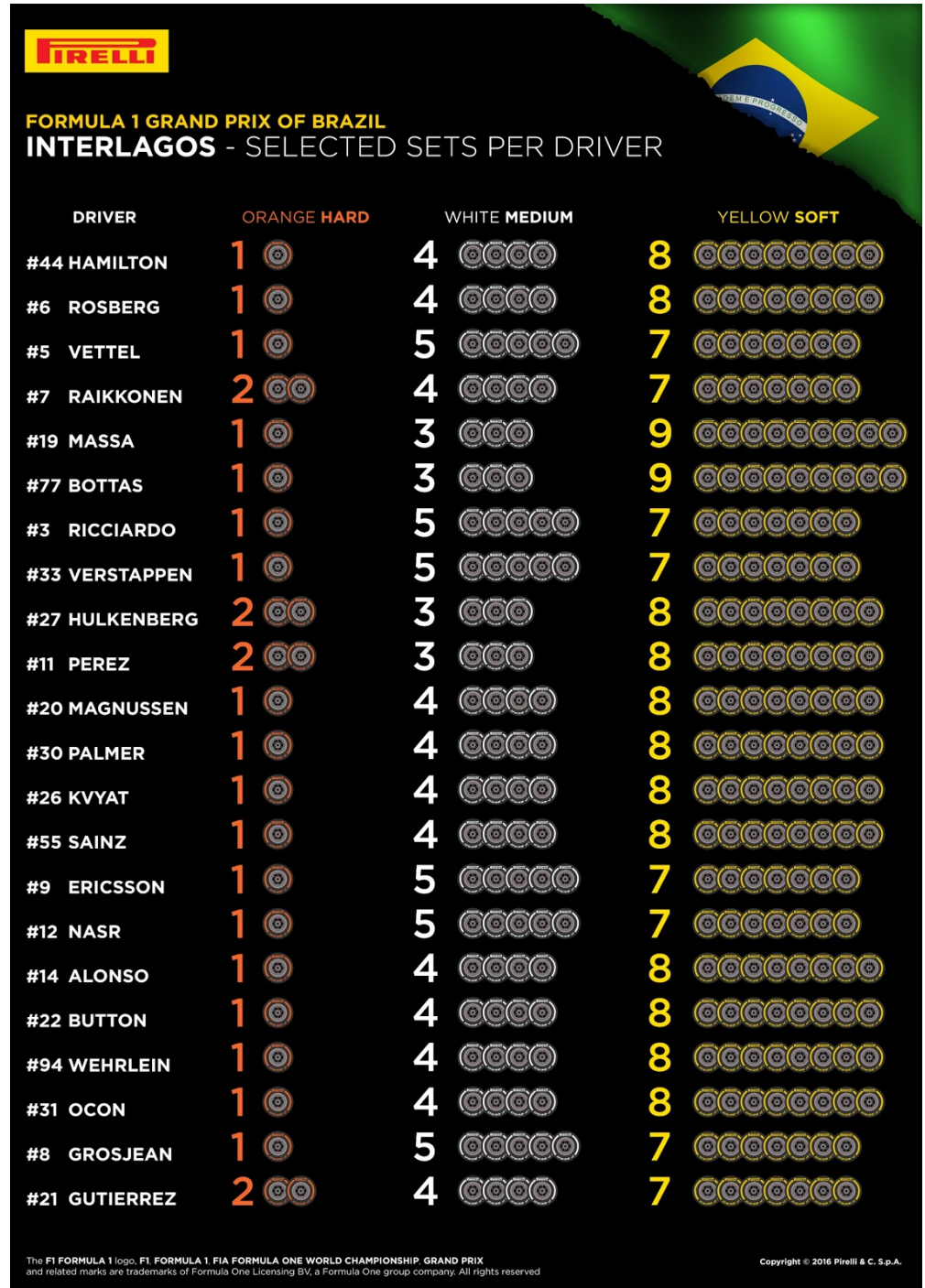
Last year at Interlagos, teams made either two or three pit stops. After starting on the yellow Softs, the white Mediums were the preferred race tyre. The Soft tyres were run for 10 to 15 laps and the Mediums for 20 to 30 laps each until the 71 total laps were complete.

This year, Pirelli has added the orange Hard tyre into the mix. This was unexpected as Pirelli has generally introduced the next softer compound to the 2015 options. It's possible that Pirelli went harder here because the Mediums were such a prohibitive race favourite last year and they wanted to add additional strategy options.

Although Interlagos is famous for being affected by the rain it was a dry race last year. In the dry, passing was difficult, which of course pushes teams to fewer pit stops. If it's dry again this year, look for a 2 stop strategy, especially with the Hards in the mix. But as your correspondent is late in submitting this column, he can report that rain is most definitely in the forecast for this weekend. That will throw the biggest of monkey wrenches into the works and it's almost impossible to predict what will happen.

As you can see in the tyre selection graphic, teams are very skeptical of Pirelli's prediction that the Hard compound will prove useful. Most teams have selected the bare minimum of 1 set of the Hards. There isn't much variation in the teams' strategies with the other tyres

either, as almost everyone has gone 2 to 1 for the Softs over the Mediums. The Medium is probably still the preferred race tyre, so expect teams to save a few sets so they are fresh on Sunday. We'll see what happens when the lights go out!



Circuit City

AUTÓDROMO JOSÉ CARLOS PACE

FIRST GRAND PRIX	NUMBER OF LAPS	CIRCUIT LENGTH	RACE DISTANCE	LAP RECORD
1973	71	4.309 KM	305.909 KM	1:11.473 JUAN PABLO MONTÓYA (2004)

