Sheet 1

The Formula One tyres 2011

In accordance with the regulations laid down by the FIA (Fédération Internationale de l'Automobile) Pirelli will supply two different types of tyre designed for two different types of use. The first type of tyre has been designed for dry surfaces, while the second is for wet surfaces. The dimensions of each tyre are 13 inches, the same as for the rim diameter. Dry tyres have a tread width of 660 millimetres, with a sidewall height of 245 millimetres for the front tyre and of 325 for the rear. For wet conditions a wet tyre and an intermediate tyre are available. Compared to the dry weather tyres, the wet versions have a wider tread width of 670 millimetres that raises the car up and helps avoid areas of standing surface water. The front tyre has a sidewall height of 245 millimetres while the rear tyre size is 325 millimetres.

Dry tyres

The tyres for dry weather, known as slicks, have a tread that is devoid of grooves or channels and come in four versions: supersoft, soft, medium and hard. The different compounds are designed to be well-suited to a wide range of circuits, depending on the type of asphalt, the number and severity of all the different corners and the speed of the straights. This allows the teams to choose between a number of different strategies.

Supersoft. This is the softest tyre in the range and it is designed to provide peak performance and roadholding on slow and twisty circuits such as Monte Carlo and the Hungaroring.

Paul Hembery says: "This tyre gives lots of grip, over just a few laps. It's a special compound, which is quite distinct to the rest of the range. The exceptional amount of grip available is surprising, even though it is at its peak for only a limited number of laps."

Soft. This tyre is used on circuits with comparatively low levels of tyre degradation. Soft tyres do not tend to last for as long as hard tyres, so they are frequently used in qualifying and for short stints during a race.

Paul Hembery says: "I like this tyre a lot. It gets up to temperature quickly and it's very driveable. It delivers everything you would expect a soft tyre to do and it's durable as well, with good balance and grip."

Medium. Along with the hard compound, this will be one of the most commonly used tyres during Pirelli's debut season. It is a versatile tyre designed to work well in a wide range of conditions and is well suited to circuits with varying characteristics.

Paul Hembery says: "Reliability is the watchword here. As you would expect, this tyre takes a little longer to get up to temperature but once it has warmed up properly you are sure of good consistency and durability."

Hard. This is also a frequent choice, as it is a tyre designed to provide the maximum endurance in the toughest conditions. A hard tyre takes longer to reach its peak operating temperature than a softer tyre, so is best suited to longer stints.

Paul Hembery says: "At the opposite end of the scale from the supersoft, this is a proper hard tyre. There are some quite significant differences between the steps now – which is what the teams and the governing body wanted. It's great news for the spectators."

Wet tyres

The wet tyres, which are characterised by grooves in the tread pattern, come in two types: full wet tyres, for rain, and intermediates. The wet tyres have deep grooves in them, with channels designed to expel water on full wet asphalt. Intermediates have more shallow grooves, for damp or slightly wet surfaces, as well as mixed conditions. The two tyres have in common the same compound.

Wet. These tyres have deep grooves in them, similar to a road car tyre, and are designed to expel more than 60 litres of water per second at 300kph. A road car tyre can only displace about 10 litres of water per second, at much lower speeds.

Intermediate. These tyres have light grooves to disperse water, but this reduces the contact patch and leads to less grip on a dry track. When the rain is heavy, drivers will switch to wet tyres.

Paul Hembery says: "The strongest area of our wet tyres is the amount of water that they are capable of dispersing. The other notable characteristic is the short time that the soft compound takes to get up to operating temperature."

Sheet 2

The Formula One tyre regulations 2011

The tyre regulations for the 2011 season are largely unaltered from those of 2010, in order to provide the teams with technical stability.

Unless it is a wet race, teams must use two of the four dry compounds (supersoft, soft, medium, hard) at every event. Pirelli will decide in advance which two of the compounds it will bring to each race – for example, hard and soft.

One of the two compounds will be theoretically better suited to the circuit and the likely conditions, and this is known as the prime tyre. The regulations state though that at some point the teams will all have to use the other tyre as well: this is known as the option tyre – even though the teams are obliged to use it. The tyres will be visibly different from each other with special branding so that people can see instantly which tyre is which.

The art of tyre strategy lies in working out when is the best time to use each tyre, bearing in mind the allocation that each team is given. In total, every car has 11 sets of dry tyres available over the weekend – but they are not all allowed to be used. After arriving at the circuit drivers will receive three sets of tyres (two prime, one option) for the two free practice sessions on Friday. They must return one set after each session. They are then given a further eight sets of tyres (four of each nominated compound) to use for the rest of the weekend but one set of each specification must be handed back after Saturday morning practice, leaving the drivers with three sets of each compound for qualifying and the race.

Tyre allocation and rules

Drivers need to get the best out of their tyres during five crucial periods: two free practice sessions on Friday, one free practice session on Saturday morning, qualifying on Saturday afternoon, and the race on Sunday.

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During the race, the driver must use at least one set of each compound. If he doesn't, he can be excluded. If the race is suspended for any reason before a driver has used both tyres, 30 seconds is added to his race total.

Wet races

Different rules apply if it is a wet race, as drivers are not obliged to use the dry tyres. In fact, if the race is started behind a safety car, it is compulsory for the drivers to use wet weather tyres until the safety car comes in.

Sheet 3

Production and logistics

Pirelli's motorsport tyres will all be produced at the Izmit plant, just outside Istanbul in Turkey, which has housed the Italian firm's motorsport tyre production line since 2007. Izmit will also be Pirelli's logistical hub, alongside a distribution facility in the United Kingdom: the centre of an operation involving around 50 technicians and 15 trucks at races.

Approximately 50,000 tyres will be produced for Formula One in 2011, along with 70,000 for the GP2 and GP3 Series. All the other racing and rally championships equipped by Pirelli will also use tyres made in Izmit, with a total output of 200,000 covers scheduled for the year.

The Izmit factory is a cutting-edge facility that has benefited from a 140 million Euro investment over the last 10 years. A further 30 million Euros will be invested this year as Pirelli returns to Formula One.

In total, Pirelli's automotive sports range now incorporates 200 types of racing tyre, including the six PZero covers that form the backbone of Pirelli's Formula One campaign as well as the championship-winning rally tyres. On top of that, Pirelli equips a number of prestigious one-make championships such as the Ferrari Challenge, Lamborghini Super Trofeo and Trofeo Maserati.

The Formula One production line in Turkey, which covers an area of 15,000 square metres and employs a total of 140 staff, will run some of the most advanced sports tyre production machinery in the world. The results can be seen on track this weekend in Abu Dhabi.

Sheet 4

A lap of Abu Dhabi with Pedro de la Rosa

The Yas Marina circuit is one of the newest arrivals onto the Grand Prix schedule, having made its debut as the finale to the 2009 season: a place it has occupied on the calendar ever since. Pedro de la Rosa talks us round a lap of the 5.55-kilometre track, where he will expect to average around 195kph as he tests the latest evolution of Pirelli tyres.

“Abu Dhabi is an interesting track, which is actually the flattest place we go to all year: there are no bumps or elevations at all and we use a medium to high downforce set-up. It’s a circuit that is quite tough on brakes and rear tyres, as there are a wide variety of corners where you put a lot of power down on the exit and have to get good traction.

From the start-finish straight you head into a 90-degree left hand corner and then into a very fast part of the circuit. There is a sweeping series of corners where we get up to about 300kph and then we have a hard braking area into a tight left corner, followed by a tight right corner that leads into the hairpin bend before the straight.

For this, you just keep the car in second gear and concentrate on keeping right so that you get the best possible drive onto the straight; in these situations you can feel the rear tyres really working hard.

We accelerate to top speed on the straight – the longest one of the season where we reach nearly 320kph – and then it’s another hard braking area for a second gear left corner, where you can’t be too greedy with the apex: you just have to let the car flow.

After that it’s another very fast section where we are back up to seventh gear before braking for a left corner that has quite similar characteristics to the corner at the end of the straight. The key to this is leaving the braking as late as you can.

We now enter the most technical and demanding part of the circuit, so you need your tyres to be very precise and consistent. You can use the kerb a bit, and in these situations you are very grateful for the ability of the tyres to cushion the impacts slightly.

You need your car to be very stable throughout this whole section, which is one turn after another. Then you go under the tunnel, and you have to be very careful for the following left corner as it is off-camber with not much run-off and can very easily fire you into the wall before you realise what’s happening.

Next we go right, come round past the pit lane entry, and it’s a reasonably straightforward right turn again onto the start-finish straight. Do that 55 times, and you will have driven an Abu Dhabi Grand Prix! But during our time testing here we’re going to do considerably more than that: the equivalent of about 3 Grands Prix.

The actual race starts in the afternoon and ends in twilight: we'll be beginning at 1800 when we start testing the rain tyres and keep going until midnight. I'm really looking forward to it, as we're creating a little bit of history. Abu Dhabi is a demanding circuit with a bit of everything, which makes it a great place to test tyres."