



*The toughest F1 GP on brakes ever! Let's find out why...*

## **Canada 2016 Formula 1 GP according to Brembo**

### ***The use of Formula 1 brakes on the Gilles Villeneuve Circuit under the spotlight***

The Racing Circuit of Gilles Villeneuve will host the 7th edition of the Formula 1 2016 World Championship from 10 to 12 June.

Located on the island of Notre-Dame in Montreal (French Canada), it hosted the first GP in 1978. The circuit has undergone numerous changes throughout the years until reaching its current layout in 2002. The Gilles Villeneuve Circuit is without a doubt the toughest test bench for single-seater braking systems. It is a "stop and go" type circuit characterised by sharp braking and accelerations.

The extremely sharp and frequent braking sections lead to extremely high work temperatures of the discs and pads, leaving no time for sufficient cooling along the short straights. Brembo solved this problem by increasing the number of cooling holes, which exceed one thousand for each disc. These features, combined with a significant percentage of time spent braking, determine a rough mix for the braking systems, also due to the fact that the aerodynamic load (and hence rolling resistance) is not among the highest. The scenario gets even worse when a tail wind blows along the two main straights, which can significantly increase the speed on the straight. This puts the brakes under even greater strain.

According to Brembo engineers, who classified the 21 circuits of the World Championship on a scale from 1 to 10, the Gilles Villeneuve Circuit is classified as highly demanding on brakes. The track in Montreal has earned a difficulty index of 10, the same as that obtained by only one other track, that of Abu Dhabi.

#### **Brake use during the GP**

A total of 7 braking points during every lap translates into a use of brakes for 19% of the total racing time. However, a majority of the braking requires a great deal of effort from the single-seater and its driver, as evidenced by the average deceleration of 4.3 g, which is second only to the Austria GP. The energy dissipated by each car when braking during the entire GP is 149 kWh, which is equivalent to the electricity required to run a washing machine in 9 Canadian homes for 24 hours continuously. From the starting line to the checkered flag, each driver exerts a total load of 61 tons and a half on the pedal, which is the total weight of more than 110 Canadian moose.

#### **The toughest braking points**

Of the 7 braking points of the Montreal circuit, Brembo engineers classify 4 as demanding on the brakes, 2 are of medium difficulty and 1 is light.

The most critical is the last one, namely the chicane that precedes the famous "Wall of Champions" where the car must be under total control when entering the curve to avoid leaping onto the bend. Excellent feeling with the brakes in this curve can make the difference between achieving good track time or crashing and ending the race. In this point, drivers abruptly pass from 335 km/h to 122 km/h in just 122 meters, which is only two times the length of a hockey field: the deceleration is equal to 5.6 g, and takes only 1.28 seconds.

The load exerted on the brake pedal in curves 1 (155 kg), 8 (151 kg) and 10 (148 kg) is also exceptionally high. The latter, in particular, slashes speed from a remarkable 302 km/h to only 60 km/h. The shortest braking point is, instead, in curve 2 as the single-seater brakes for only 59 meters and with a load of only 57 kg.

#### **Brembo Victories**

Single-seaters mounting Brembo brakes have won a total of 18 of the 38 editions of the Montreal GP in which they participated, including the last 3. None of the current drivers have won more than one race in Montreal with Brembo brakes. A total of 7 victories go to Michael Schumacher and 10 to the Ferrari, though the most recent dates back to 2004.