FORMULA E: ELECTRIFYING TECHNOLOGY

Formula E has attracted world-class drivers and celebrity owners, generating plenty of dramatic action in its first season, which will come to a climax in June this year. But beyond the glitz and glamour, the new futuristic racing series aims to drive change towards an electric future for transport. *International Innovation* looks at some of the cutting-edge technologies under the bodywork.

**BATTERY**

Williams Advanced Engineering (see p71) designed the lithium-ion battery for this season’s Formula E car. The main innovative aspect of the battery is Williams’ smart management system that constantly monitors and manages performance. Total usable energy is limited to 28 kWh, delivering maximum power of 200 kW, the equivalent of 270 bhp. Today’s battery technology is not sufficiently advanced to allow a one-hour race at full speed without recharging, and for reasons of safety it is not permitted for teams to swap the batteries of their cars during a race. Therefore, each driver has two cars and changes from one to another when the battery is depleted. In future seasons, it is expected that weight will go down, power density will rise and range will increase, as the opening up of regulations in season two encourages new manufacturers to develop and accelerate electric vehicle technology.

**FORMULA E CAR SPECIFICATIONS**

- Top speed: 220 km/h
- Acceleration: 0-100 in 3 s
- Power: 180 kW (race) / 200 kW (qualifying)
- Weight: 896 kg including driver
- Range: 25 minutes
- Charging time: 50 minutes
POWERTRAIN

Developed for the McLaren P1 hybrid supercar, McLaren Applied Technologies provides the electric motor, a motor control unit and the control electronics that manage the systems on the car. Lightweight and powerful, the electric motor delivers the greatest power density of any automotive electric motor in the world today.

AERODYNAMICS

In response to the need to maximise battery lifetime during the race, Italian racing car company Dallara’s monocoque chassis design has emphasised the importance of reducing drag. This has meant single-plane front and rear wings to generate downforce to keep the car on the road whilst reducing drag; front and rear fairings intended to smooth airflow over the exposed tyres; significantly smaller air intakes that also reduce drag; and carbon fibre and aluminium composition intended to make the car lightweight but strong enough to pass the same rigorous International Automobile Federation (FIA) crash testing as Formula 1 cars.

FANBOOST

Unique within motorsport, FanBoost allows fans to vote for their favourite drivers to receive a speed boost during races. Votes can be cast online at www.fiaformulae.com and the three drivers with the most votes receive a five-second power boost of approximately 40 bhp. The single boost – which is operated by a lever on the back of the steering wheel – can be used to aid overtaking at any time except on the first lap.