

MICHELIN INNOVATION AT EUROSATORY

X-FORCE & TWEEL TYRES... ALL-TERRAIN EXCELLENCE

Michelin is significantly reinforcing its dedicated truck and off-road tyre range at the 2016 edition of Eurosatory, the international defence and security exhibition, which will be held from 13 to 17 June at Paris Nord Villepinte – France. How? By providing its customers in the rough terrain transport sector complete mastery of the conditions, whatever obstacles are encountered. Combining performance, service and user comfort, this renewed product range allows the customer to benefit from the best solution whatever the difficulty encountered.

Innovation is at the heart of Michelin's strategy. Knowing customers' needs, anticipating them, providing them with ever more suitable responses... So many requirements forming part of the Group's raison d'être: to offer everyone a better way forward.

Mobility is an essential requirement of the armed forces, it constitutes a strategic tool that often dictates the tactics adopted. Troops and their equipment are called on to move over very difficult terrain, including a great variety of obstacles, and this requires great adaptability from equipment at all times. Among the latter the tyre is in the front line: it provides vehicles with their direct contact with the ground.

To better support the armed forces in moving towards their future, Michelin has thus devoted its whole innovative power to improving its range of truck and off-road tyres. As a result the range that the Group presents to the armed forces is 100% versatile:

- Ruggedness and traction on rough terrain with the new version of the **MICHELIN X[®] FORCE[™]** tyre, available in four specific versions
- Zero pressure and puncture problem, minimum servicing and maximum comfort with the advances of the **MICHELIN X[®] TWEEL[®]** range

The MICHELIN truck range in three facts and figures

- 0** The risk of punctures or rapid deflations to which the MICHELIN X[®] TWEEL[®] is exposed.
- 4** The special versions of the tyres in the MICHELIN X[®] FORCE[™] range: sand, mud, high-speed and long-life.
- 100** The number of kilometres run by a MICHELIN X[®] FORCE[™], tyre after being hit by five bullets.

High-speed, long-life, sand and mud, the four special versions in the MICHELIN X[®] FORCE[™] range

The MICHELIN X[®] FORCE[™] range covers all the uses and expectations of customers whose activity takes place on difficult or rough ground. Backed by its experience in civil engineering, in the military and in the activities of fire brigades or emergency response vehicles, Michelin combines the best technology into this range.

1. Synthesis between the need to last and the diversity of terrain

The new MICHELIN X FORCE ZL tyre is ultra versatile, shows ruggedness in any test, and benefits from maximum longevity. The favourite for cross-country rally teams (60% of teams choose Michelin), it has a load ratio 30% greater than that of the previous version. Studdable and chainable with perfect road holding, it particularly benefits from pressure adapted to different situations. However, this extreme versatility does not impact on safety, which remains a priority. In addition to excellent all-terrain adhesion, resistance to tearing and impact damage are key characteristics due to the reinforced shoulder zone.

2. The synthesis between diversity of terrain and the need for speed

The MICHELIN X FORCE 2 tyre is suitable for all road and off-road conditions up to 110km/h. With especially high performance on sand it also presents significant gains in fuel consumption. A new rubber mixture offers increased wear resistance at high temperatures, increasing the tyre's life.

3. In the desert and sandy terrain

The MICHELIN X FORCE S allows exceptional flotation on sand. As well as its double carcass providing ruggedness and flexibility, it has a wide, flat tread with reduced depth, allowing equally high flotation performance whatever the air pressure.

4. In muddy terrain

The MICHELIN X FORCE ML allows exceptional flotation in mud. Capable of running at very low pressure it possesses a double carcass, a rugged element to resist damage, and a flexible element to enable use at very low pressure.

The MICHELIN X[®] TWEEL[®], a wheel-tyre assembly that protects against pressure and puncture problems

The MICHELIN X[®] TWEEL[®] maintains all the functional characteristics of a tyre, without incurring the risks associated with possible pressure loss. A true synthesis of the advantages of tyre and wheel, it offers an advanced mobility solution through its ability to deform on contact with rough terrain or obstacles encountered. As a result Tweel confers provides traction and stability characteristics, which combine efficiently with technology that eliminates servicing needs.

Michelin Research & Development in 8 facts and figures

1.5 (million) Michelin laboratories make more than 1.5 million measurements annually on materials and semi-finished products.

12 The time in minutes needed to travel the equivalent of once around the world using endurance and lifetime testing undertaken by Michelin on machines or vehicles (that is, 1.8 billion kilometres each year).

400 Four hundred simulation systems are used to reproduce the levels of performance expected by clients.

700 There are seven hundred qualified test and measurement methods. Michelin undertakes analyses both at the nanometre scale and on 4-metre high tyres weighing over 5 tonnes.

40,000 Over forty-thousand rolling tests carried out each year.

80 The test conditions used by Michelin machines cover a range of eighty degrees Celsius. They may carry out analyses at ambient temperatures which range from - 30° C to + 50° C, and at speeds of up to 450 km/hr.

200 Two hundred different components are used in the manufacture of a tyre.

4 There are four groups of tests used on tyres: laboratory tests, tests on machines (static and dynamic), tests on vehicles (objective and sensory), customer testing.

Michelin Group facts & figures

Founded	1889
Industrial locations	68 production sites in 17 countries
Number of employees	111,700 worldwide.
Research and development	Over 6,000 research staff on 25 sites spread over three continents in North America, Europe and Asia
2015 Research & Development Budget	700 million Euros
Annual production	178 million tyres produced, over 13 million maps and guides sold in 170 countries and 970 billion itineraries calculated by ViaMichelin.
2015 net sales	21.2 billion Euros

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