



## **BALLISTICS RESISTANCE OF RUNFLAT INTERNATIONAL'S PROPRIETARY MATERIAL (WESTLON T1500)**

### **MATERIAL: WESTLON T1500**

Westlon T1500 is the polymer that RunFlat International has developed for its run-flat systems. It is produced in-house in a humidity and temperature controlled environment from customised raw materials with very low-water content resulting in a long, complex and homogeneous polymer. This unique material offers all the key properties to fulfill its run-flat functions:

- Stable structure at all operating temperatures from -40C to over 150C,
- Low friction coefficient on rubber to reduce heat inside the tyre in deflated mode,
- Homogeneous density (cavity-free),
- Complex structure ((star-shaped with multiple "arms", not mono-chain) which makes it both light and very robust.

### **BALLISTICS RESISTANCE**

Its homogeneously intertwined polymeric structure provides optimal ballistic resistance. Instead of trying to stop a bullet penetrating its structure, the material lets it through without cracking as cracks are prone to propagate in run-flat mode (which would result in the system opening up, thus immobilizing the vehicle).

## STATIC RESISTANCE



The photos above show the entry (left) and exit (right) holes of three 7.62 NATO bullets shot from 50m (as per FINABEL) within a 25cm<sup>2</sup> surface: no visible cracks at either end which would otherwise propagate rapidly in run flat mode.

In contrast, other run-flat manufacturers use standard nylon or other unsuitable material which are much less resilient (yet cheaper to manufacture). The below photos show the outcome of a material shot by three 7.62 NATO bullets from 50m (as per FINABEL) within a 25cm<sup>2</sup> surface. Cracks are apparent at all exit holes and one entry hole. The run-flat system is cracked before the vehicle is even in motion.



RunFlat International carried out similar shooting tests at -20°C, +20°C and +50°C, with the same outcome: no macro cracks at either end and an exit hole which is hardly apparent as the material tends to heal following the passage of the bullet.

## DYNAMIC RESISTANCE

Full FINABEL trials are endurance tests on tyres deflated as a result of 7 bullets shot at the tyre (7.62 NATO bullets shot from 50m). Due to the impracticality of shooting at tyres, many FINABEL trials are conducted on naturally deflated tyres (e.g. valve stem removed). Due to the superior ballistic resistance of the material shown in “Static Resistance” before and the experience gained from the wide-ranging trials carried out by RunFlat International, it is not evident that the shooting significantly influences the outcome of the trial when trialing RunFlat International’s systems and military tyres. RunFlat International have carried out multiple successful FINABEL trials with shooting with clients including the Ministry of Defence in Germany, France, Italy, Israel, Pakistan, India, etc...

Below are photographs of a tyre which was shot 7 times and covered 101km in run flat mode under 4T load. The tread and the outer sidewall (left) are in good condition. The inner side wall (right) shows 3 holes/tears. It was unclear whether these holes/tears were initiated by bullet holes but it can be considered that the holes generated by the bullets were not detrimental to the trial.



The RunFlat system itself can be shot either on the fixings or on one of the segments. The arrows below show where the bullets were shot (2 on the fixings and 2 on the segment). These pictures were taken on a RunFlat which covered 50km in run flat mode. The (patented) fixings feature 2 bolts connecting the segments which offer double safety in case one bolt were to fail. In any case, the fixing assembly are resistant to ballistic attack. The material itself sometimes develops small, superficial cracks during run-flat trials but these cracks do not tend to propagate far away from the bullet hole and remain contained during the trial, as shown on the below left photo.



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