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# Newsletter – November 2018

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**T**ribology is all about friction. This definition of friction from TRIBONET gives a detailed look at this subject.

**Friction** is a force acting opposite to the direction of relative motion. Friction rises on the interface between bodies but may also develop within the body. Examples of the latter include air and hydrodynamic friction, where the friction rises between the fluid layers. Friction is not a **fundamental** force, but rather a manifestation of electro-magnetic and gravity forces. There are many sources of friction: deformation of the surfaces, adhesion, capillary forces, van der Waals forces, chemical bonding, etc. Friction is a non-conservative force and the energy spent to overcome friction is lost. Friction losses reduce the energy efficiency of many mechanical devices. A recent **report** on the energy consumption due to frictional losses in passenger cars estimates that only 21.5% of the potential fuel energy is used to move the car, whereas direct frictional losses account for 33% (28% if braking is excluded). Within these losses, 35% is used to overcome tyre-road friction, 35% to overcome engine friction, 15% – transmission and 15% brake contact friction. So one of the major challenges of the modern **tribology** is to find new technologies to reduce friction and increase energy efficiency.

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## ETT – Essential Tribology Terminology

More simple definitions for four of tribology's essential terms

- ✓ **ISO** International Standards Organisation
- ✓ **JASO** Japanese Automotive Standards Organisation
- ✓ **Load-Carrying Capacity** A term used to describe the ability of a lubricant to resist film rupture and protect against wear and surface destruction under high load conditions.
- ✓ **Lubricity** The ability of an oil or a grease to lubricate. It is related to film strength and can be enhanced by additive treatment.

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### SAIT CLS OVERVIEW

On 21-22 November 2018



The SAIT will host the

**STLE: CLS, OMA, CMFS EXAMS**

On 23 November 2018

Venue: SAIT - Science Park - Johannesburg

## **SAIT Training**

**Follow the path from data to information and into knowledge:**

<b>LE 119:</b>	18 - 22 February 2019, Johannesburg
<b>LE 120:</b>	6 - 10 May 2019, Johannesburg
<b>LE 121:</b>	27 - 31 May 2019, Durban
<b>LE 122:</b>	22 - 26 July 2019, Johannesburg
<b>LE 123:</b>	26 - 30 August 2019, Cape Town
<b>LE 124:</b>	7 - 11 October 2019, Johannesburg

**Costs to be advised.**

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## **Graphene – a ‘miracle material’ for auto parts and weight reduction**

Graphene – a two-dimensional nanomaterial - has recently generated enthusiasm and excitement in the automotive industry for paint, polymer and battery applications, with Ford now announcing that it will be using the so called “miracle material” in its vehicle parts.

The material is 200 times stronger than steel and one of the most conductive materials in the world, while also providing a great sound barrier and extreme flexibility. Graphene is not economically viable for all applications, but Ford, in collaboration with Eagle Industries and XG Sciences, says that it has found a way to use small amounts in fuel rail covers, pump-covers and front engine covers to maximise its benefits.

“The breakthrough here is not in the material, but in how we are using it,” said Debbie Mielewski, Ford senior technical leader, sustainability and emerging materials. “We are able to use a very small amount, less than a half percent, to help us achieve significant enhancements in durability, sound resistance and weight reduction – applications that others have not focused on.”

Gravity, weight and mass are all part of the friction equation. Never mind auto parts, when it comes to exploration of space and our planetary system, strength and weight are critical issues.

The Centre for Advanced Two-Dimensional Materials (CA2DM) at the National University of Singapore (NUS) has teamed up with US-based aerospace company Boreal Space to test the properties of graphene after it has been launched into the stratosphere. The results could provide insights into how graphene could be used for space and satellite technologies.

Read more at: <https://phys.org/news/2018-08-graphene-stratosphere.html#jCp>

Ref <http://www.autoforum.co.za/View-News-Article.aspx?News=11347>

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## **INTERNATIONAL EVENTS**

**2 April 2019 – UNITI Mineral Oil Technology Congress – Stuttgart, Germany:**

[www.umtf.de](http://www.umtf.de)

## DID YOU KNOW?

### 'A tribological tip-trip'

#### Tribology contributes to Euro clean air standards

Here's some good news from Lubrizol's Johannesburg conference in October: *30 years ago, one heavy on-highway truck produced the same level of particulate matter as 100 heavy goods vehicles produced in 2017.* To make this possible, E6 lubricants are required to protect diesel particulate filters (DPF).

What is an E6 lubricant? ACEA (European Automobile Manufacturers' Association) E6-16 oils are low SAPS<sup>1</sup> Ultra High-Performance Diesel (UHPD) lubricants designed for use in severe duty, long drain applications. ACEA E6-16 is usually coupled with Daimler MB-Approval 228.51 and MAN 3677, MTU oil category 3.1 and Deutz DQC IV-10 LA.

Typically, Daimler, MAN, MTU and Deutz performance specifications build on top of an ACEA E6-16 with additional performance requirements in areas such as wear protection. **Low SAPS**. If you have a modern turbodiesel car that has a diesel particulate filter (DPF) in the exhaust, then you must use **low SAPS** oil.

**SAPS** – 'Sulphated Ash, Phosphorous, Sulphur' and it's often referred to as simply **low ash** oil.

Ref: Lubrizol

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## PARTING SHOT

#### SA urgently needs enforceable and local lubrication oil standards

According to Lubrizol's sampling of the local market, '**30% of the oils sampled** were off standard'. Furthermore, 'aging vehicle hardware still requires the **correct lubricant performance** profiles.'

It's far worse in Nigeria. Lubrizol's view is that '84% of oils sampled were off spec – lubricants with incorrect viscometrics or performance have the potential to damage engine components. Base oil is often sold as an incorrect lubricant solution.'

And finally – 'Products marketed at legacy API performance levels still need quality assurance to preserve brand reputation. Formulations with legacy API performance marketed correctly provide a real-world cost-effective solution meeting developing market needs.'