
SAIT Newsletter, April 2019

Tribology and hydraulics are enmeshed co-travellers in every aspect of our daily lives.

The world's airlines are totally dependent on hydraulic efficiency where hydraulic motor efficiency does not depend upon viscosity alone. Just consider temperatures ranging from a baking-hot runway to minus 51°C at over 11,000m altitude where operational efficiency is an absolute demand – that's tribology efficiency at work!

You can investigate this further, here: [An Investigation of Hydraulic Motor Efficiency and Tribological Surface Properties](#)

ETT – Essential Tribology Terminology

Three more simple definitions for of tribology's essential terms

- **Penetration** A measure of the hardness and consistency of bitumen and lubricating greases expressed in terms of the depth (in tenths of a millimetre) by which a weighted special needle or cone will penetrate the sample in 5 seconds at the specified temperature.
 - **Pensky–Martens Closed Cup (PMCC)** A test for determining the flash point of fuel oils, lubricating oils and other petroleum products.
 - **Pour Point** The lowest temperature at which a liquid petroleum product will flow when it is cooled under the conditions prescribed by the ASTM standard test method.
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SAIT Events:

1. SAIT AGM –

18:00 on Tuesday 14 May 2019

Venue: Science Park, 1 Northway, Kelvin, Sandton.

Technical Meeting: after the AGM – details to follow.

2. SAIT Annual Awards Dinner –

19:00 for 19:30 on Friday 17 May 2019

Venue: Cedar Woods Conference Centre, 120 Woodmead Drive, Woodmead, Sandton.

Speaker and Full Details: to follow.



International Events:

15 – 17 May 2019 – SERBIATRIB '19 – 16th International Conference on Tribology - will be held in Kragujevac (Serbia), at the Faculty of Engineering, University of Kragujevac - www.serbiatrib.fink.rs

25 to 27 June 2019 – 12th International Colloquium Fuels – Conventional and Future Energy for Automobiles. *Colloquium Office:* Werner Schollenberger, email werner.schollenberger@tae.de; *Registration and Accommodation Service:* online - www.tae.de/go/fuels, email: Alexandra.fisch@tae.de; *Venue:* Technische Akademie Esslingen e.V., an der Akademie 5, 3760 Ostfildern.

In January 2020 the 22nd International Colloquium Tribology will take place at the Technische Akademie Esslingen. The conference provides an international exchange forum for the industry and the academia. Leading university researchers present their latest findings, and representatives of the industry inspire scientists to develop new solutions. Discussions and co-operations enable attendees to meet current tribological challenges.

One of the main topics is the forthcoming e-mobility technology, its various aspects and its consequences for the lubrication and tribology community. Abstracts can be submitted via this website www.tae.de/go/tribology. The closing date for the submission is **31 May 2019**.

Other South African Events:

The Corrosion Institute Southern Africa is holding a conference.



Click here for [further details](#).

Click here for the [registration form](#)

SAIT Training

Follow the path from data to information and into knowledge:

The SAIT Training schedule for the remainder of 2019 is:

LE 120: 6 - 10 May 2019, Johannesburg

LE 123: 26 - 30 August 2019, Cape Town

LE 121: 27 - 31 May 2019, Durban

LE 124: 7 - 11 October 2019, Johannesburg

LE 122: 22 - 26 July 2019, Johannesburg

Costs: SAIT Members: R16 031 Non-Members: R17 894 Students: R4 922

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STLE examinations at SAIT

The South African Institute of Tribology will host three examinations of the Society for Tribologists & Lubrication Engineers (STLE) on **22 November 2019**. The venue is Science Park, Kelvin, and time is from 09:00 to 12:00. *The exams are open to SAIT members in good standing.*

- **Certified Lubrication Specialist (CLS):** Although not compulsory, it is highly recommended that you first attend the SAIT five-day 'Lubrication Engineering' course. A distinction of 75% is a good indication of success in the CLS exam, where the standard is high and the pass mark is 70%. The recommended books for the CLS exam are the STLE Alberta Section 'Basic Handbook of Lubrication' Third Edition, and/or the AIST 'The Lubrication Engineers Manual' Fourth Edition.
- **Oil Monitoring Analyst (OMA I and OMA II)**
- **Certified Metalworking Fluids Specialist (CMFS)**

Recommended reading for all modules is on the STLE website www.stle.org under "Professional Development".

For further information, costs and to register, please contact Gill, Isabel or Berice at the SAIT offices: Tel. (+27) (0)11 804 3710 or email secretary@sait.org.za or admin@sait.org.za.

Materials do matter every day of your life – especially when you apply brakes in a car!

Organic **brake pads** (also known as NAO, or "non-asbestos organic") were developed as an alternative to asbestos **pads**, composed of various fibres mixed with binding resins to hold them together. Some common **materials** used in organic **brake pads** include glass, fibre, rubber, carbon and Kevlar.

Development of disc-type brakes began in England in the 1890s. In 1902, the [Lanchester Motor Company](#) designed brakes that looked and operated in a similar way to a modern disc-brake system even though the disc was thin and a cable activated the brake pad. Other designs were not practical or widely available in cars for another 60 years. Successful application began in airplanes before World War II, and even the [German Tiger](#) tank was fitted with discs in 1942.....for more fascinating insight please visit the Wikipedia site dealing with [Disc Brakes](#).

Note: Asbestos SDS indicate there is no safety level of exposure to asbestos.

The Breakpoint for Hydraulic Efficiency is 60°C.

Winter is not far away now. We may not be too worried about rising oil temperatures, but the fact is, any industrial hydraulic system running higher than 60°C (**140° Fahrenheit**) is too hot.

Consider that for every 10-degree increase in temperature above 60 degrees, the life of the oil is cut in half. Systems that operate at high temperatures can produce sludge and varnish, which result in the sticking of valve spools.

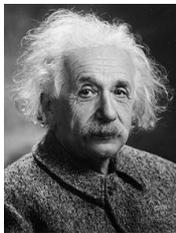
“Pumps and hydraulic motors bypass more oil at high temperatures, causing the machine to operate at a slower speed. In some cases, high oil temperatures can waste electrical energy by making the pump drive motor pull more current to operate the system. O-rings also harden at higher temperatures, leading to more leaks in the system,” Says Al Smiley of GPM Hydraulic Consulting.

For a detailed article on hydraulic oil temperature. Please click here for Al Smiley’s full article, [Controlling Hydraulic Temperatures](#).

Smiley’s concluding remarks are most significant – “The next time a heat problem occurs in one of your (hydraulic) systems, look for oil that is flowing from a higher pressure to a lower pressure in the system. That’s where you’ll likely find your problem.”

DID YOU KNOW?

‘A tribological tip-trip’



Einstein used viscosity to estimate the size of molecules. In July 1905, Einstein submitted his doctoral dissertation to the University of Zurich. In it he derived a neat estimate of the size of molecules. Molecules are made by joining together atoms. For example, each molecule of water is made by joining two atoms of hydrogen with an atom of oxygen. Einstein devised mathematical equations to model the viscosity – the stickiness – of a sugar-water solution. Then, using data on sugar-water viscosity obtained experimentally, he solved his equations, finding that a volume of 47.3 pints (22,4 litres) at 68°F (20°C) and standard atmospheric pressure contains 2.1×10^{23} molecules – a huge number equal to 21 followed by 22 zeroes. Today, the accepted value of this number (known as ‘**Avogadro’s constant**’) is 6.022×10^{23} . *From this Einstein was able to deduce the size of each individual molecule.*

Extracted from “3 Minute Einstein” by Paul Parsons, page 66 – ‘Structure of Matter’

PARTING SHOT

Standards, are they necessary?

Standard: something established for use as rule or basis of comparison in measuring or judging capacity, quantity, content, extent, value, quality, etc.

Standards are necessary in any industry and need to be followed to ensure optimum performance, efficiency and ultimately reduce total cost of ownership. Without these standards in place and enforced, consumers and businesses may suffer the consequences of substandard products being put forward and there will be no way of confirming the performance.

In South Africa we rely on the South African Bureau of Standards (SABS), as well as international standards. The SABS has recently issued a lubricant standard for public review, namely:

- SANS 1843ED3 -High performance engine lubricating oil for diesel engines (for API Service Category CJ-4)

Support for these and other voluntary standards would help with uplifting the standards in the industry in general.

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