

setral®

Silicone Lubricants For Challenging Operating Conditions

We are your technology partner for lubricants
Lubricant Expo Europe 24, Düsseldorf (Germany)
Stefan Bossler, Dipl.-Ing. Chemie



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We are your technology partner for lubricants

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ECCO Group

WE MANAGE FRICTION.

Since 1969, the ECCO GROUP has been developing products and technologies for a wide range of industrial applications. We offer natural fibers under the Setralit[®] brand, solid lubricants of the MIPO[®] series and specialty lubricants under the setral[®], TECCEM[®] and Fluoronox[®] brands.



setral[®] TECCEM[®] & Fluoronox[®]

Specialty lubricants such as greases, pastes, oils, bonded coatings and chemical-technical products such as cleaners and corrosion inhibitors for industrial applications

MIPO[®]

Mixed powders used specifically as additives for friction linings, lubricants and self-lubricating plastics

Plurasafe[®]

Take over of the PAG special oil range under the Plurasafe[®] brand from BASF[®] for further development, production and worldwide distribution

Setralit[®]

Industrial fibers based on renewable raw materials, such as flax and hemp

Data & Facts

We are your technology partner for lubricants



> **50 years** of expertise in the development and production of specialty lubricants & chemical-technical maintenance products



Certified according to

ISO 9001:2005
ISO 14001:2015
ISO 21469:2006
Koscher and Halal
Environmental and Climate Pact of Bavaria
Ecovadis Gold Medal – top 5%!



> **800 products** in over
50 containers



Further highlights

- > 350 manufacturer approvals and recommendations
- OEM supplier for the automotive industry
- One of the leading manufacturers in Europe for PFPE-greases
- Licensing partnership with BASF®



> **100 products** for the food and pharmaceutical industry



export to > **90 countries**
with over **60 distributors** worldwide

Product portfolio

SPECIAL LUBRICANTS AND MAINTENANCE PRODUCTS
- THE RIGHT SOLUTION FOR EVERY APPLICATION!

Whether in maintenance, production or OEM applications, our quality lubricants always meet the requirements of our customers from almost all industries.

YOUR ADVANTAGES

- ✓ dramatically reduced friction & less wear
- ✓ significantly extended relubrication intervals
- ✓ extended service life for systems and machines
- ✓ reduced energy consumption
- ✓ environmentally friendly



solid lubricants



high temperature oils



pastes



special oils



greases



metal working fluids



bonded
coatings



cleaners



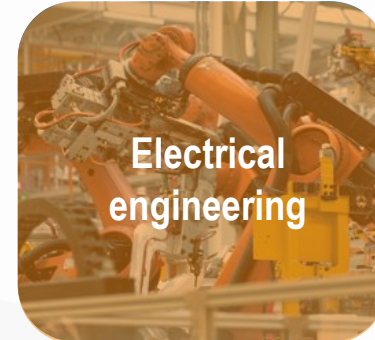
aerosols



additives

Industry mix

We are your technology partner for lubricants



- ✓ Aviation
- ✓ Cement
- ✓ Chemical industry
- ✓ Energy
- ✓ Glass
- ✓ Mechanical Engineering
- ✓ Metalworking
- ✓ Mining
- ✓ Paper
- ✓ Plant Engineering
- ✓ Printing
- ✓ Shipping
- ✓ Steel
- ✓ Toys
- ✓ Wind Power
- ✓ and much more

Introduction

High temperature base oils

PFPE

- Oils under pressure due to possible PFAS restrictions
- High price, only few manufacturers worldwide
- Not water soluble, not hazardous, NSF H1 certified
- No 1:1 alternative available now and in the near future



Silicone oils

- Low pricing compared to PFPE
- High production volume from several manufacturers
- Not water soluble, not hazardous, NSF H1 certified
- Possible supply shortage for some viscosities



Silicone oils - old prejudices

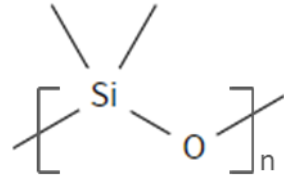
- Known as surface-disturbing substances
- Banned from automotive industry – „100% silicone free manufacturing plant“
- Bad reputation also because of breast implant scandal in early 2010's



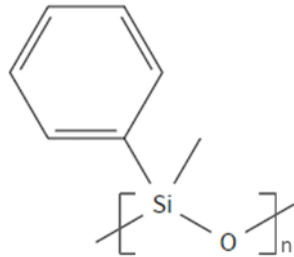
Different types of Silicone oils

- **DMPS – Dimethylpolysiloxane**

(most commonly used)

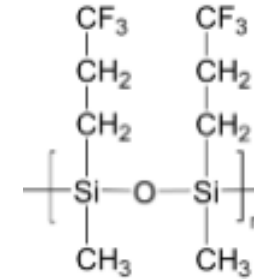


- **Phenyl Methyl Silicone**



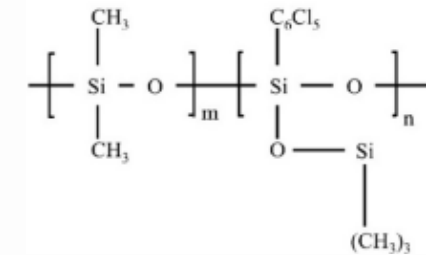
- **Fluorosilicone**

(various types)



- **Chlorophenylsiloxane**

(various types)



Typical properties

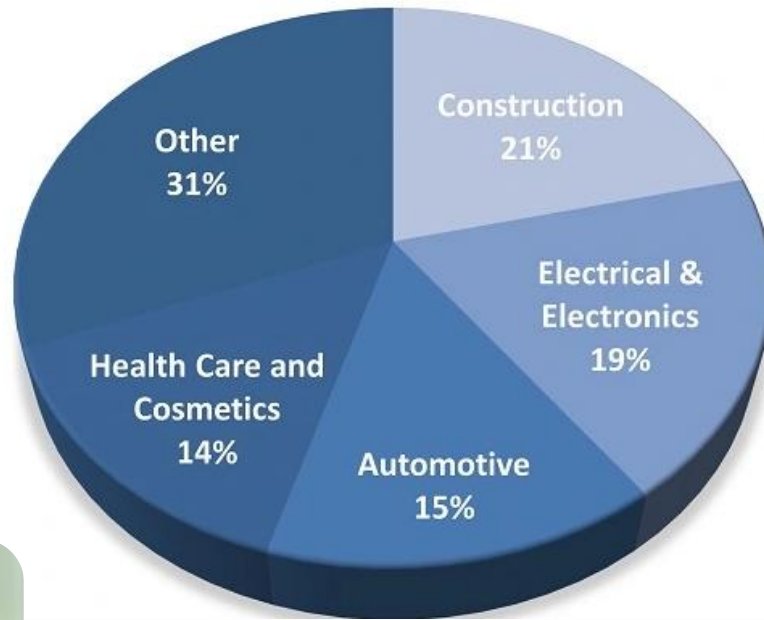
- Clear liquids, odorless
- Wide temperature range
- Thermal stability
- Flash point >300°C
- Very broad viscosities available – from water like up to 100.000 and more
- Very high viscosity index VI, up to 600
- H1 NSF food approval possible for nearly all viscosities >100mm²/s
- Water repellent
- Good material compatibility with polymers and elastomers, exception silicone rubber
- Not microplastic
- Does not contain MoSH/MoAH
- Very low surface energy
- Relatively low load-carrying capability
- Low lubricity
- High wetting character

Applications

- Base oil for lubrication
- Vacuum pump oil
- Thermal oil (heat transfer fluid)
- Release agent
- Ingredient for the cosmetic industry
- Ingredient for all kind of polish – shoe, car wax etc.
- Anti foam agent
- Damping fluid
- Textile finishing agent
- Hydrophobic agent



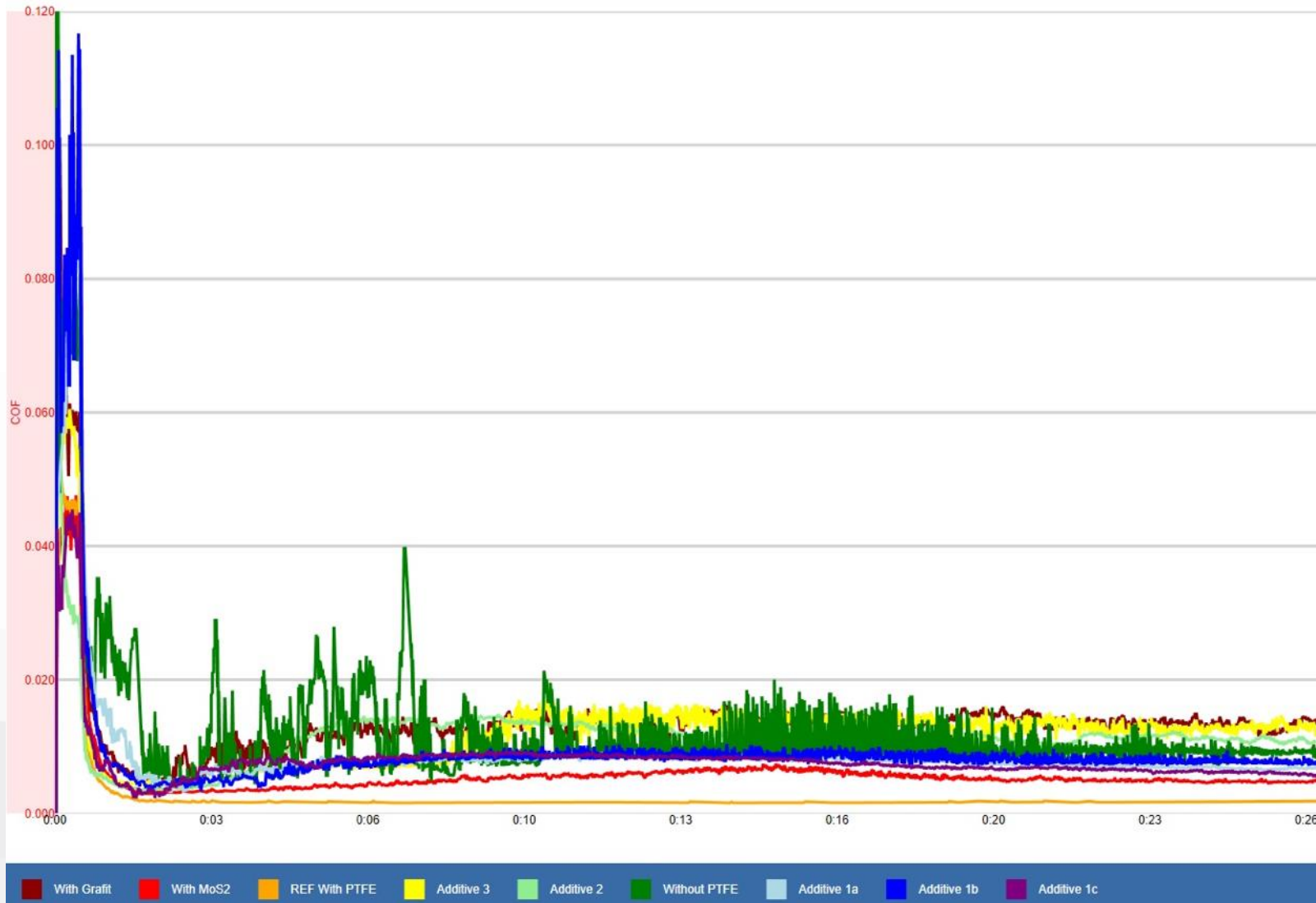
GLOBAL DEMAND OF SILICONES (2017)



Typical properties of common base oils

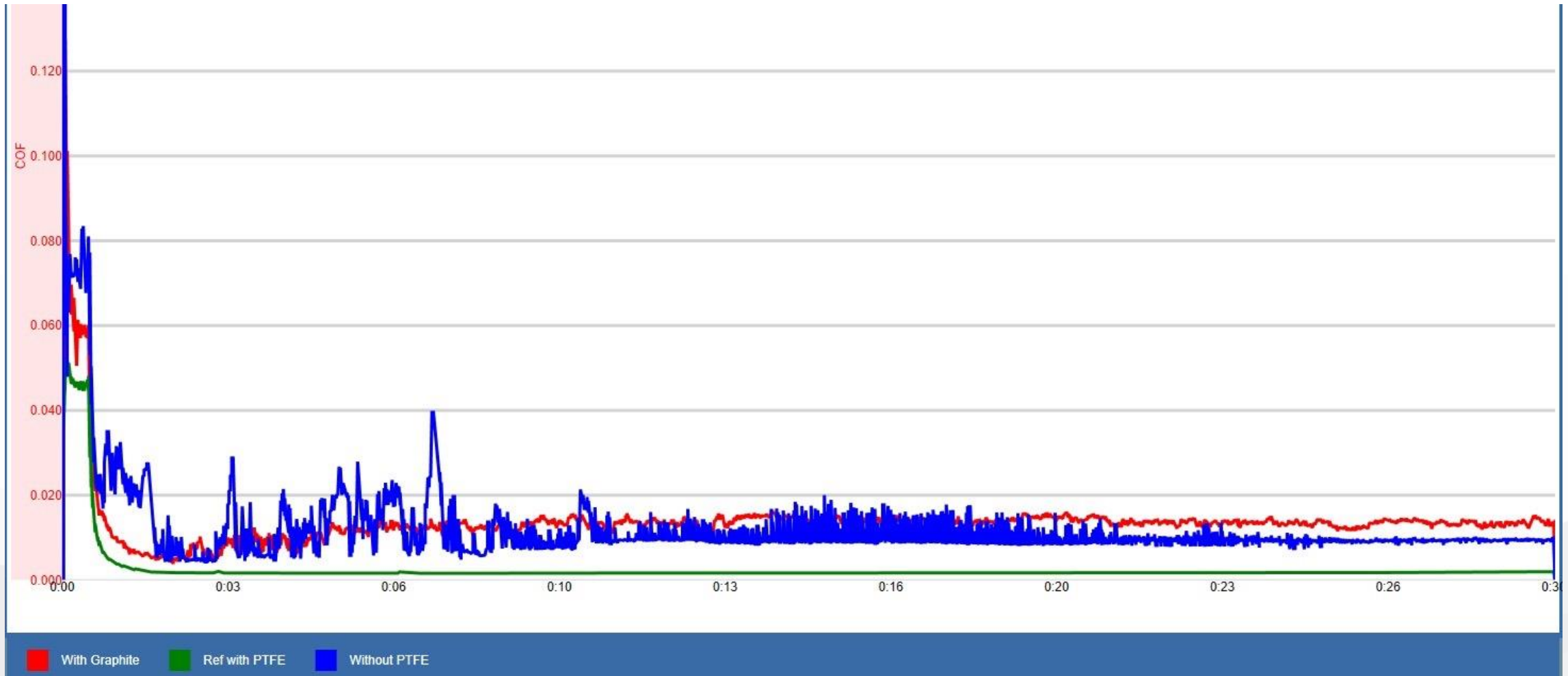
Property	Mineral oil	Ester	PAO	PG	Silicone	PFPE
Density 20°C [g/ml]	0,9	0,9	0,85	0,9 - 1,1	0,9 - 1,05	1,89 - 1,92
Viscosity index VI	80 - 100	140 - 175	130 - 150	150 - 270	190 - 600	50 - 350
Pour point [°C]	-40 to -10	-70 to -37	-50 to -30	-56 to -23	-80 to -30	-70 to -30
Flash point [°C]	<250	200 - 230	<200	150 - 300	150 - 300	not flammable
Oxidation stability	moderate	good	good	good	very good	very good
Thermal stability	moderate	good	good	good	very good	very good
Lubricity	good	good	good	very good	fair to poor	good
compatibility with elastomers coatings etc.	good	poor	good	good up to poor	good	good

SRV test DMPS with different solids and additives

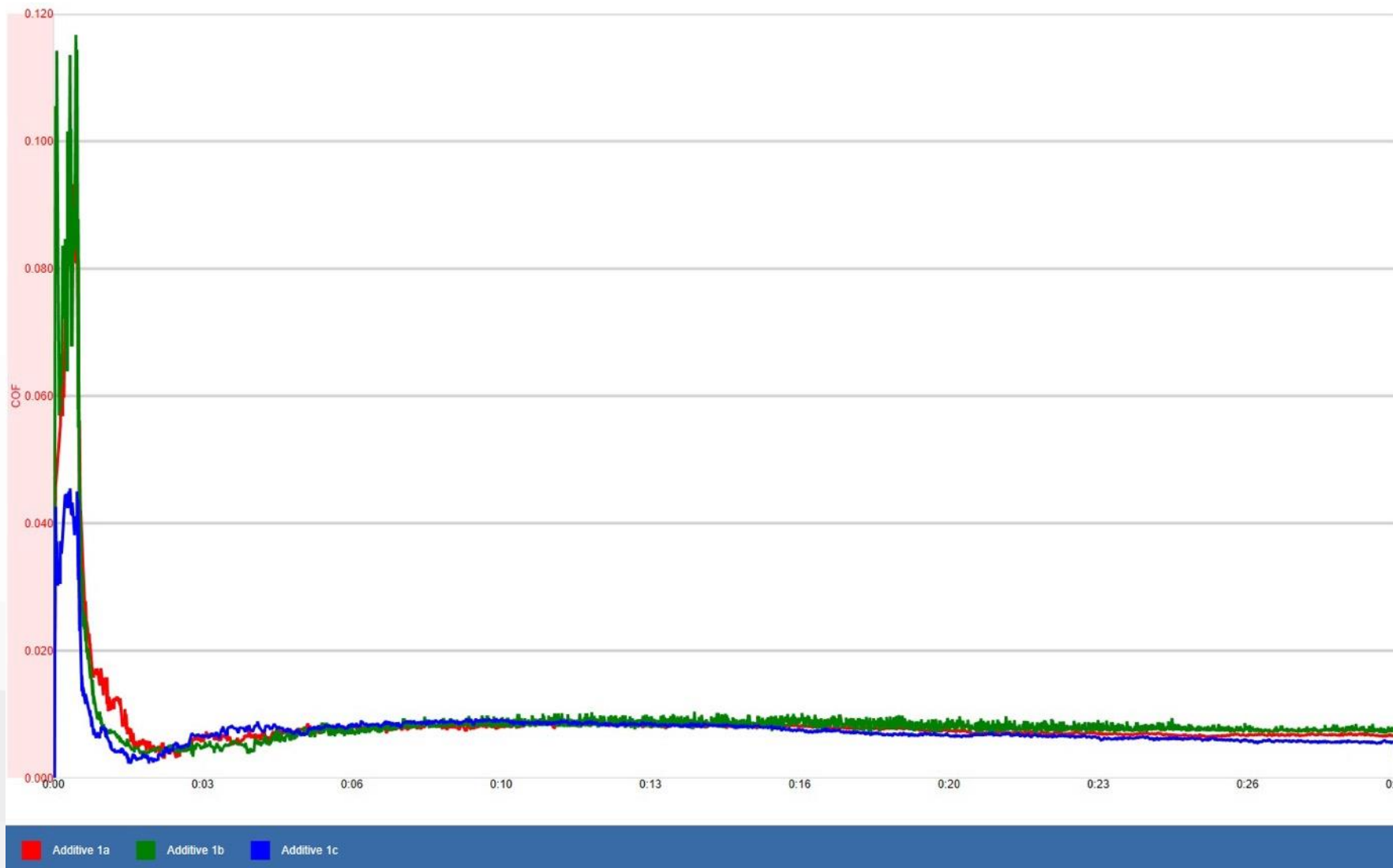


name of the graph	type
ref with PTFE	PTFE
without PTFE	without PTFE
MoS ₂	MoS ₂
Graphite	Graphite
Additive 1a	Friction improver with low additive content
Additive 1b	Friction improver with medium additive content
Additive 1c	Friction improver with high additive content
Additive 2	EP/AW additive type 1
Additive 3	EP/AW additive type 2

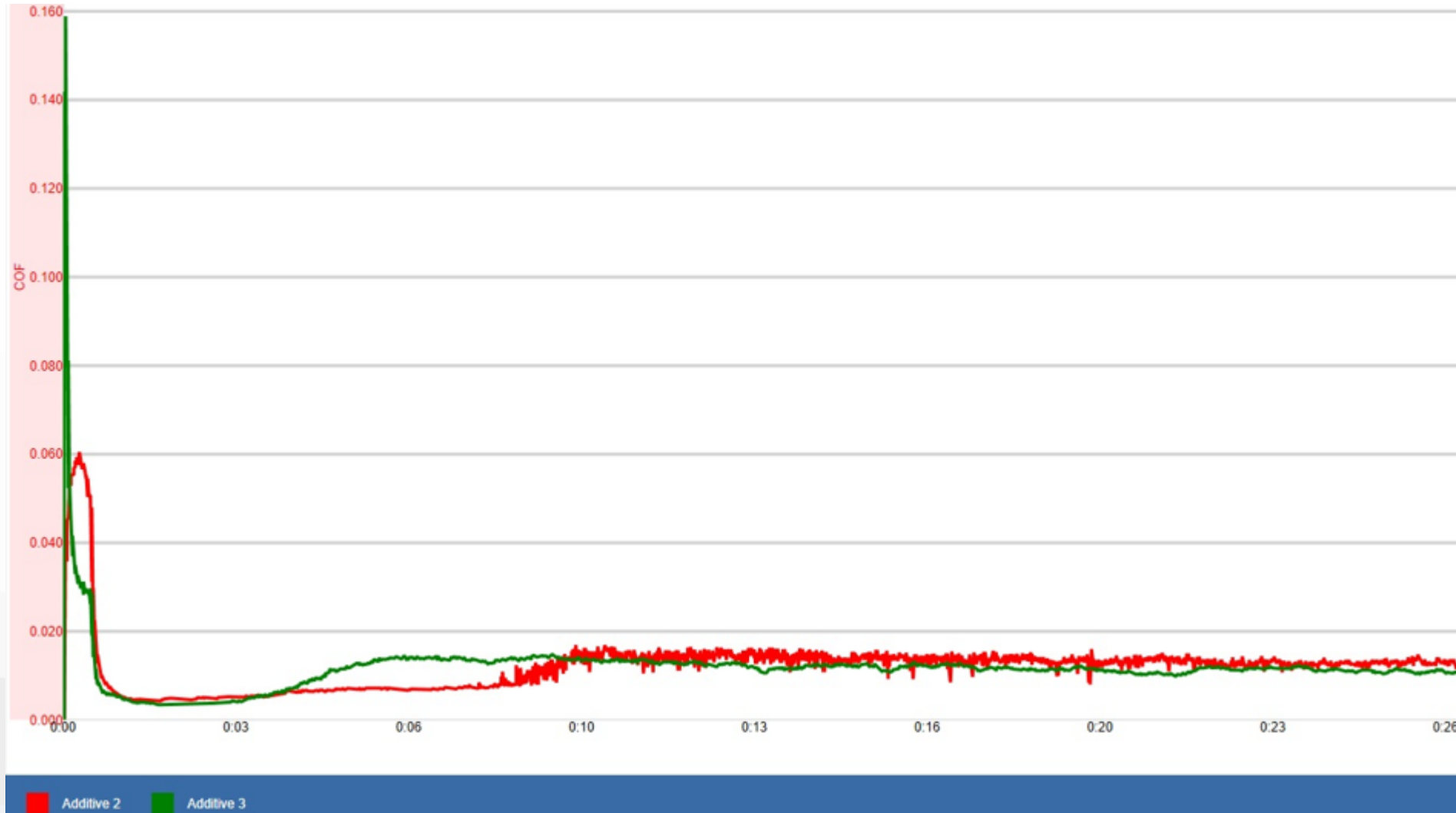
SRV test with different solids



SRV test with different additive content



SRV test EP/AW additive 2 and 3



Oxidation behavior of different oils

Oxidation stability tester (RapidOxy)

Parameter: in house test method

Oil type	Viscosity 40°C	Result
Silicone	200	Very good
Silicone	1000	Very good
PAO	40	Fair
MO	460	Fair
PFPE	500	Very good
POE	400	Fair



Automotive applications silicone oil-based greases



**Accelerator
pedal**



**HVAC
system**



**tank cap
closure**



**adblue
cap**

Conclusion silicone oils

- Variety of different molecular structure and big variety of viscosities available
- Widely used - also in the automotive sector
- Serious candidate in the high temperature range if it should be PFAS-free
- Very good formulations possible even without PTFE (PFAS and microplastics)

setral[®]

Visit us at our booth 431



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DISCLAIMER

The information should not be considered a warranty of product features and they do not guarantee the suitability of products in particular cases. They do not absolve the user from test selected products in the corresponding application.

All data are based on empirically determined values or on guideline values taken from technical literature.

Depending on the type of mechanical, dynamical chemical and thermal stress lubricants change their technical values. These values may affect the function of components.

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