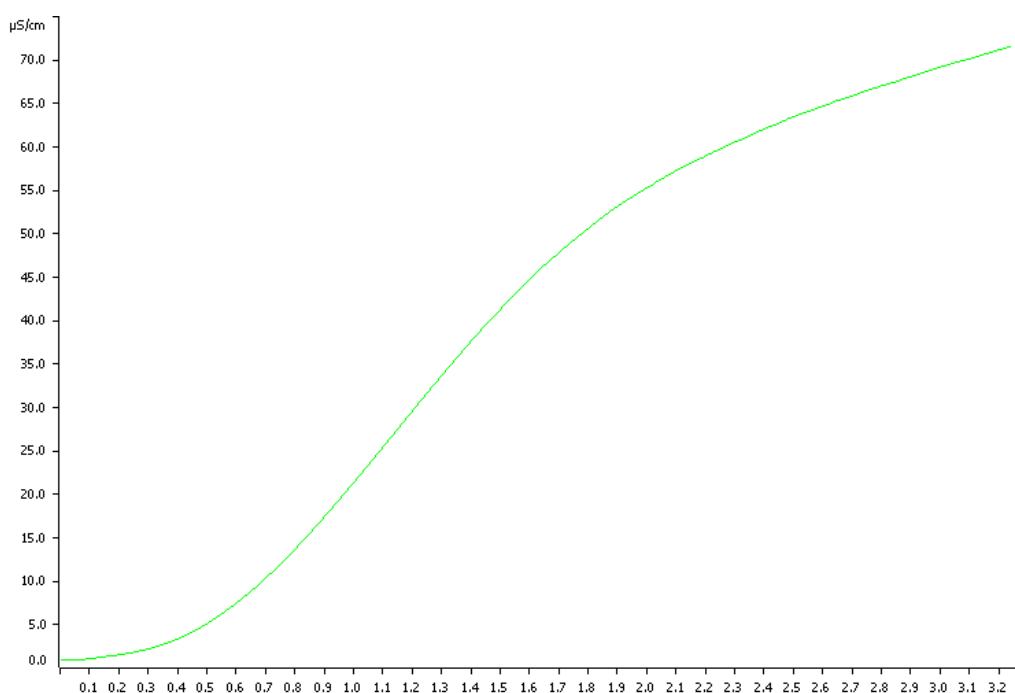


# Determination of the oxidation stability of motor oil



Motor oils are exposed to high shear forces and temperatures while the motor is running. Mechanical abrasions set iron and copper free, which act as catalysts for oxidation. All of this decreases the durability of motor oils. The oxidation stability with iron and copper catalysts can give an approximate indication for the shelf life.

A reproducible and accurate determination of the oxidation stability using the 892 Professional Rancimat can be realized.

# Method description

## Samples

Motor oil, SAE 5W/40, full-synthetic

Motor oil, SAE 15W/40, semi-synthetic

Motor oil, SAE 30, mineral oil, non-synthetic

## Sample preparation

No sample preparation is required.

## Configuration

892 Professional Rancimat	2.892.0010
Equipment for the determination of the temperature correction	6.5616.100
Reaction vessel long for stability measurements	6.1429.050
Air tube long for biodiesel measurements	6.2418.130
Iso-Versinic tubing 0.22 m, 4x	6.1839.000
Clamp for temperature sensor, 4x	6.2042.040
Wash glass, 4x	6.2405.030
Thread for wash glass, 4x	4.647.0471
Sealing ring, 4x	A.254.0103
FEP tubing M6, 18 cm, 4x	6.1805.050
FEP tubing M6, 25 cm, 4x	6.1805.080
FEP tube 14.5 cm, 4x	6.1819.090
Measuring vessel cover with built-in conductometric measuring cell	6.0913.130

## Reagents

Copper granular 0.4 mm – 2.0 mm, ≥ 99.90%
Iron powder (fine), ≥ 99%

## Analysis

Before the analysis is started, a temperature correction for each used block of the 892 Rancimat is performed.

Particles are removed from inside and outside the reaction vessel by being blown out with a sharp stream of pressurized nitrogen. Then, 60 mL deionized water is added in each measuring vessel and placed together with the measuring vessel cover on the 892 Rancimat. The displayed conductivity must not exceed 10 µS/cm.

3 g ± 0.02 g motor oil and, if necessary, 150 mg ± 5.0 mg granular copper and iron powder are weighted into the reaction vessel. Afterwards the oil trap is inserted between the Rancimat and the reaction vessel and the analysis is started.

## Parameters

Sample size	3 ± 0.02 g
Measuring solution	60 mL
Temperature	180 °C
Temperature correction	auto
Gas flow (air)	10.0 L/h
Evaluate stability time	yes
Conductivity change	40 µS/cm
Conductivity	50 µS/cm
Endpoint(s)	yes
Stop once all the criteria have been fulfilled	yes

## Results

Sample (n = 4)	Mean value of the stability time / h	s(abs) / h	s(rel) / %
Motor oil, SAE 30	0.94	0.07	7.7
Motor oil, SAE 15W/40	3.84	0.13	3.3
Motor oil, SAE 5W/40	2.54	0.11	4.4

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