SETA STANHOPE-SETA
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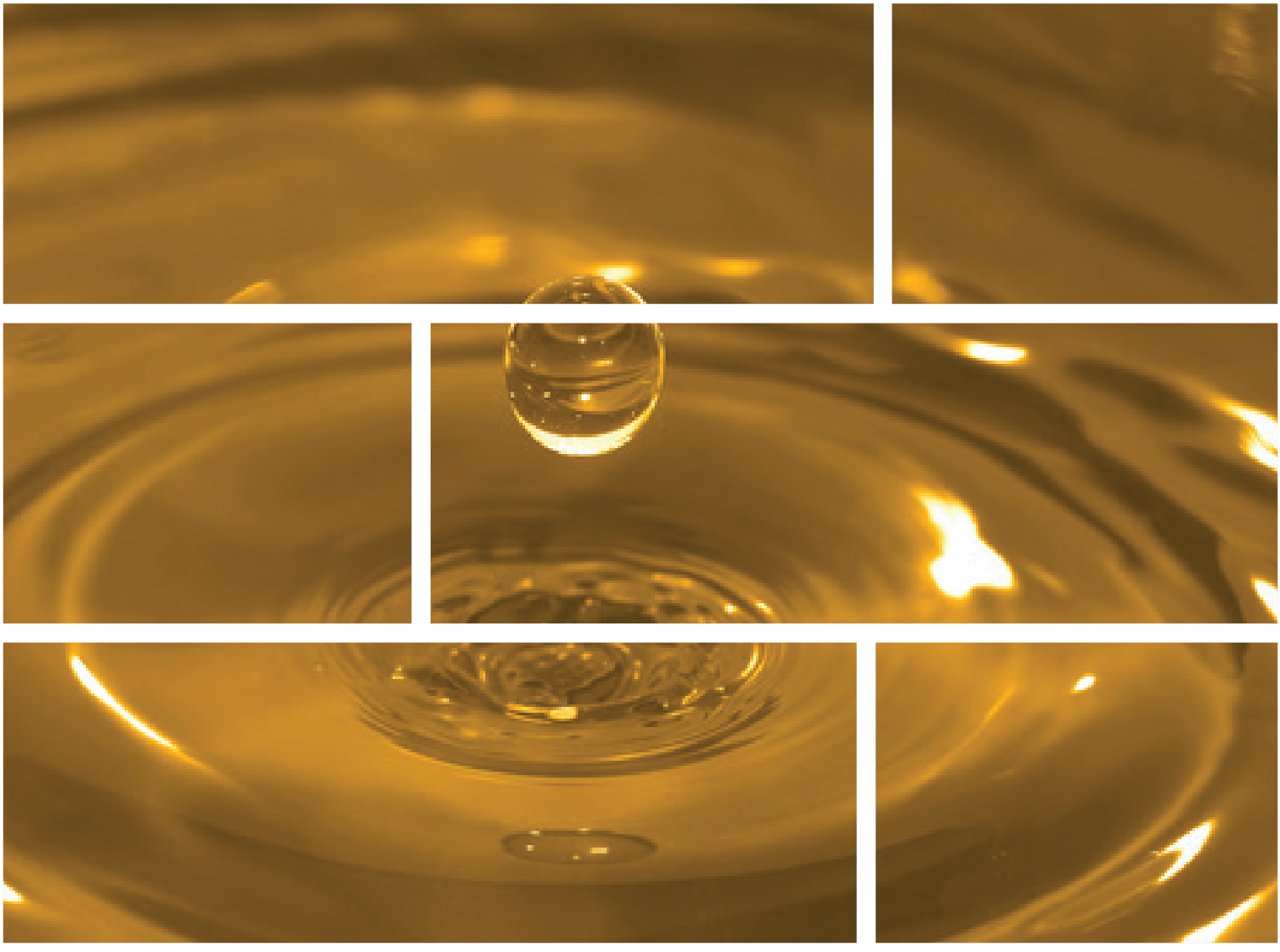
Lubricant Testing Solutions

Laboratory Instruments for quality control, analysis and calibration



Flash Point

Flash point is a key property for lubricating oils and is included in many specifications. All petroleum products will ignite if raised to a sufficiently high temperature. It is essential that lubricating oils have flash and fire points that are well above their expected operating temperatures. Flash point is also commonly used to determine whether lubricating oils have been contaminated with volatile materials and is a common test when assessing used lubricants.

PM-93 Pensky-Martens Flash Point (35000-0)

ASTM D93; IP 34; ISO 2719; FTM 791 1102; Flash Point by Pensky-Martens Closed Cup Tester

The Seta PM-93 is a fully automated Pensky-Martens Closed Cup Flash Point Tester which combines strict method conformance with state of the art control technology and safety systems to provide the next generation of automated precision flash point instruments.

- Fully conforms to test method ASTM D93 – Procedure A, B and C
- Ambient +5°C to 400°C
- 4 heating rates available
- Simple operation, touch screen menu
- Unique 'SafeFlash' extinguisher system and pre-dip safety mode
- Single action lifting arm operation
- Programmable, 30 test profiles, test methods & sample identities
- Test memory for 2000 results
- Gas or electronic ignition using long lasting Seta 'Ignite' technology

› Pensky-Martens Flash Point (35000-0)

Visit: www.stanhope-seta.co.uk/pm-93-flashpoint.html

View video online: www.stanhope-seta.co.uk/pm-93-flashpoint-video.html

Cleveland Multiflash (34300-2)

ASTM D92; IP 36; ISO 2592; FTM 791 1103; Flash and Fire Points by Cleveland Open Cup Tester

The Seta Multiflash Cleveland is a fully automatic open cup tester for both flash and fire point determination.

- Fully automatic heating control, flash and fire detection
- Ambient to 400°C
- Gas or electric ignition
- Automatic snuffer
- Centigrade or Fahrenheit temperature display

Shown opposite with the Multiflash Universal Base unit (p/n 34000-0).

Visit: www.stanhope-seta.co.uk/4340/Seta-Multiflash-Cleveland-Flash-Point-Module

› Cleveland Multiflash (34300-2 and 34000-0)

Lubricating Oil Multi-Test Verification Material (99853-2)

Manufactured and certified in strict accordance with ISO Guide 34, for full details see page 14.

Cleveland Standard (99882-0)

Designed specifically for use in determining flash points in petroleum products by the Cleveland Open Cup method.

- Fully traceable to National Standards
- Tested and certified in accordance with ASTM D92/IP 36
- 258°C nominal value
- Supplied in 80ml bottles
- Pack of 3,6 or 12 available

› Lubricating Oil MTVM (99853-2)

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Small Scale Flash Point in Oil condition monitoring

Flash point as part of an oil condition monitoring program can assist in reliably identifying degradation and contamination of the oils from fuel dilution. It can complement other tests such as viscosity measurement, and can be used to confirm whether a low viscosity result is due to improper blending, lubricant breakdown or fuel dilution. Fuel contamination of under 1% can be detected with the small scale instruments.

Many labs utilise the small scale flash point which typically provides a result in under two minutes as opposed to 30 minutes or longer with Cleveland or Pensky-Martens testers.

Setaflash Series 3 Small Scale Testers

ASTM D3278; ASTM D3828; ASTM D7236; IP 523; IP 524; IP 534; ISO 3679; ISO 3680; Flash Point by Small Scale Closed Cup Tester

The Setaflash Series 3 and Series 8 Small Scale Flash Point Testers are easy to use instruments that can complete a flash/no-flash test in less than two minutes and in many cases in 60 seconds.

- Ambient to 300°C depending upon model
- Fully automatic and manual models available
- Flash point test in less than 2 minutes
- Small sample size, 2 or 4ml
- Automatic flash detection
- Audible and on-screen prompts
- Portable operation and simple calibration

View video online: www.stanhope-seta.co.uk/setaflash.html

› Setaflash Series 3

Seta Part No:	30000-0	33000-0
Temperature Range:	Ambient to 300°C (572°F) (0 to 300°C with coolant module)	Ambient to 300°C (572°F) (0 to 300°C with coolant module)
Test Modes:	Rapid Equilibrium	Rapid Equilibrium and Ramp
Sample Size:	2 or 4ml according to method	2 or 4ml according to method
Test Duration: (Rapid Equilibrium Mode)	1 minute <100°C, 2 minutes >100°C FAME 1 minute or user defined 1 to 99 minutes	1 minute <100°C, 2 minutes >100°C FAME 1 minute or user defined 1 to 99 minutes
Ramp Rate:		2°C/min ramp
Cup material:	Aluminium	Aluminium
Size (HxWxD) / Weight:	19.5 x 29.5 x 14cm / 3kg	19.5 x 29.5 x 14cm / 3kg

Setaflash Series 8 Small Scale Testers

ASTM D3278; ASTM D3828; ASTM D7236; IP 523; IP 524; IP 534; ISO 3679; ISO 3680; Flash Point by Small Scale Closed Cup Tester

- Flash/no flash & ramp mode
- Ambient +5°C to 300°C
- Small sample size, 2 or 4ml
- Electric ignitor (gas option available)
- Automatic dipping and flash detection
- 64 Test memory & RS232 interface
- °C or °F temperature display
- Barometric pressure correction

View video online: www.stanhope-seta.co.uk/setaflash.html

› Setaflash Series 8

Seta Part No:	82000-0
Temperature Range:	Ambient +5 to 300°C (572°F)
Test Modes:	Rapid Equilibrium and Ramp
Sample Size:	2 or 4ml according to method
Test Duration, Rapid Equilibrium Mode:	1 minute <100°C, 2 minutes >100°C FAME 1 minute or user defined 1 to 99 minutes
Ramp Rate:	2°C/min ramp
Cup material:	Aluminium
Heating/Cooling Method:	Ceramic Pad, Forced Air (post-test cooldown)
Size (HxWxD) / Weight:	30 x 34 x 38 cm / 8kg

Viscosity

A key property which determines the ability of the lubricating oil to form a film that protects moving machinery components from wear during operation. Kinematic viscosity forms an integral part of lubricating oil specifications.

› Seta KV-6 Viscosity Bath (84200-2)

Seta KV-6 Ultra stable 6-place Viscosity Bath (84200-2)

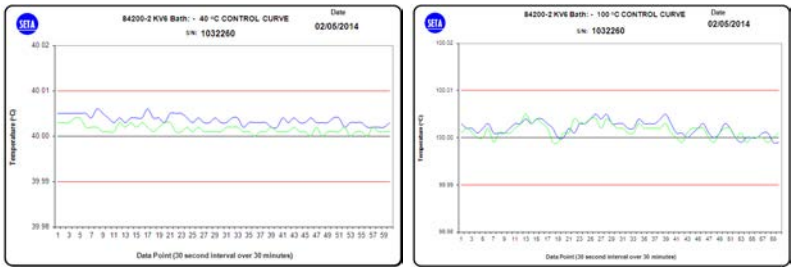
ASTM D445; IP 71; ISO 3104; FTM 791 305; Kinematic Viscosity of Transparent &Opaque Liquids

The Seta KV-6 gives the user a high quality, robust solution for kinematic viscosity determinations. Ultra precise temperature stability and uniformity is achieved with an integrated heating and stirring system. All internal components are made of stainless steel construction to ensure long term durability. The large 50 litre capacity ensures minimum temperature recovery time after loading of bath, improving sample throughput.

- Accommodates up to 6 viscometer tubes
- Temperature range ambient to 150°C, +/-0.01°C (cooling coil included)
- Oil, silicone fluid or water
- Temperature Stability: ±0.002° at 40°C; ±0.005° at 100°C; ±0.01° at 150°C
- Temperature Uniformity: ±0.003° at 40°C; ±0.006° at 100°C Integral safety features
- Low voltage halogen illumination
- Two positions for reference thermometers

Each bath is supplied with a full factory calibration and graphical temperature trace of stability.

Visit: www.stanhope-seta.co.uk/4472/KV6-Viscometer-Bath



› Typical example of stability at 40°C and 100 °C

Calibrated Cannon-Fenske Viscometers

ASTM D445; ASTM D446; IP 71; ISO 3104; ISO 3105

- Supplied with works certificate of calibration (calibration data at 40°C with the constant quoted at 40°C and 100°C). UKAS certificate of calibration available on request.
- Routine Viscometers (11634/**): For transparent liquids requiring approximately 7ml of sample.
- Opaque Viscometers (11641/**): For transparent and opaque liquids requiring approximately 12ml of sample.

Calibrated Cannon-Fenske Viscometers						
Viscosity Range (mm^2/s)	Nominal Constant	Size Code	Viscosity Std A	Viscosity Std B	Seta Part Number Routine:	Seta Part Number Opaque:
0.5 to 2	0.002	25	N0.8	N1	11634/01	11641/01
0.8 to 4	0.004	50	N1	N2	11634/02	11641/02
1.6 to 8	0.008	75	S3	S6	11634/03	11641/03
3 to 15	0.015	100	D5	D10	11634/04	11641/04
7 to 35	0.035	150	N10	S20	11634/05	11641/05
20 to 100	0.1	200	N35	S60	11634/06	11641/06
50 to 250	0.25	300	N100	S200	11634/07	11641/07
100 to 500	0.5	350	S200	N350	11634/08	11641/08
240 to 1200	1.2	400	N350	S600	11634/09	11641/09
500 to 2500	2.5	450	N1000	S2000	11634/10	11641/10
1600 to 8000	8	500	D5000	N4000	11634/11	11641/11
4000 to 20,000	20	600	N15,000	S30,000	11634/12	11641/12

Viscosity Reference Standards

A range of ISO 17025 (UKAS) quality standards are available, for full details see page 14.

- Full compliance with ASTM, IP and other method protocols
- Supplied in 500ml containers with 2 year shelf life

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4-Ball and Shear Stability

Shear stability is a measure of a lubricants resistance to viscosity loss when it is passed through narrow passageways such as bearings or gears. A common test for this property is the Taper Roller Bearing Rig (KRL) test CEC-L-45-99.

Seta-Shell 4-Ball Lubricant Testers

ASTM D2783; FTM 791 6503; Measurement of Extreme-Pressure Properties of Lubricating Fluids.
CEC-L-45-99 Viscosity Shear Stability of Transmission Lubricants (Taper Roller Bearing Rig).
ISO 26422 Determination of shear stability of lubricating oils containing polymers - Method using a tapered roller bearing

The 4-Ball Lubricant Test determines the friction properties of extreme pressure oils and greases. Used in tribology research laboratories and in the routine quality control of finished lubrication products.

- Applied loads range up to 800kgF
- Drive speed from 1200 to 1760rpm
- Timer range 0.1s to 9999hr
- Torque measurement and limiting
- Digital displays of Applied Load, Torque, Time
- Safety/splash guard
- Optional heating pad and controller

Manual Tester (19800-6): http://www.stanhope-seta.co.uk/3278/Seta-Shell-4-Ball-Lubricant-Tester

Autoload (19900-2): http://www.stanhope-seta.co.uk/3305/Seta-Shell-4-Ball-Lubricant-Tester-auto

› Seta-Shell 4-Ball Lubricant tester (19900-2)

SPECIFICATIONS - 4-Ball Lubricant Testers		
Seta Part No.	**19900-2**	**19800-6**
Speed Range:	1200 to 1760rev/min	1200 to 1760rev/min
Load Range:	40 to 800kgF	0 to 800kgF
Timing:	0.1s to 9999hr	0.1s to 9999hr
Voltage:	220/240V, 50/60Hz	220/240V, 50/60Hz
Power:	1.5kW	1.5kW
Size (HxWxD):	169 x 63 x 62cm	169 x 82 x 62cm
Weight:	150kg	161kg

Viscosity Shear Stability Head (19820-2)

CEC L-45-99; ISO 26422

The shear stability head fits into the test aperture of the four ball tester and comprises of a tapered roller bearing, jacket, drive lug, thermocouple spacer ring, bearing pad and plunger spacer disk.

An integral temperature probe connects to a external temperature control system.

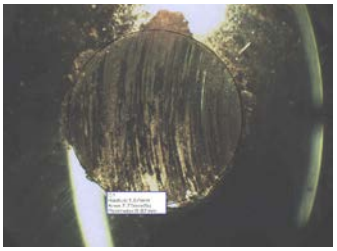
› Viscosity Shear Stability (19820-2)

Microscope with Digital Camera (19750-3)

The Microscope is used for x/y linear measurement and allows direct viewing of the ball scar with x30 magnification. The 1.3 Megapixel CCD camera fits any Seta microscope to allow image capture of the scars and on-screen measurement of the size.

Comprises Microscope, ball holder, lamp kit, grounding wire, leads. Camera supplied with software, calibration graticule slide and a 0.45X lens, 23.2mm/30.5mm/31.5mm c-mount adapters, and USB cable.

Existing users of the Microscope can purchase the camera separately (19755-0).



› Image capture of scar using Microscope with Digital Camera (19750-3)

Shear Strength Testing Apparatus for Mineral Oil (15700-0)

ASTM D6278, IP 294, DIN 51 382, CEC L-14

Apparatus to allow the evaluation of the shear stability of polymer-containing fluids. The test measures the percent viscosity loss at 100°C of polymer-containing fluids when evaluated by a diesel injector apparatus procedure that uses European diesel injector test equipment. The viscosity loss reflects polymer degradation due to shear at the nozzle.

Foaming Characteristics

The performance of a lubricant depends upon its ability to resist foaming and air entrapment. Foaming causes the protective film on the operating surfaces to be broken down and the effectiveness of the lubricant to reduce. This quickly leads to component wear. Foaming can also cause increased lubricant loss and premature oxidation.

Setafoam Dual Twin Foam Test Baths (14020-7)

ASTM D892; IP 146; FTM 791 3211; Foaming Characteristics of Lubricating Oils

Setafoam Dual Twin Foam Test Baths are a pair of highly transparent water baths for detecting foaming characteristics in lubricating oils. A known volume of air is passed through foam-stones and into the sample, the height of the foam is then recorded.

- High and low temperature baths with Integral flowmeters and regulators
- Temperature range ambient to 100°C
- Up to two simultaneous tests per bath
- Two integral normalising coils
- Local verification of the stones possible using the verification kit

› Setafoam Dual Twin Foam Test Baths (14020-7)

Visit: http://www.stanhope-seta.co.uk/4448/SetaFoam-Dual-Twin-Foam-Test-Baths

Setafoam 150 High Temperature Foaming Characteristics (14025-0)

ASTM D6082 High Temperature Foaming Characteristics of Lubricating Oils

The Setafoam 150 comprises of a fan assisted air bath with capacity for a removable 1000ml graduated cylinder. The temperature is digitally controlled and a separate thermal cut-out is built in for added safety. Viewing of the test progress and foam height is through a double glazed window with backlighting to enable easy determination of the foam height.

- Temperature range 50 to 150°C, +/-1°C
- 10 minutes bath warm-up time
- 40 minute sample warm-up

› Setafoam 150 High Temperature Foaming Characteristics (14025-0)

Tests for Maximum Pore Diameter & Permeability of Gas Diffusers

ASTM D892 Mandates the regular verification of foam stones prior to use to ensure that the pore diameter and permeability meets the requirements of the test method.

Seta Verification kit (14028-4)

ASTM D892 Annex A1
ASTM E128 Maximum Pore Diameter and Permeability of Rigid Porous Filters for Laboratory Use

The Seta Verification kit provides an accurate method of determining the pore diameter and permeability of gas diffusers in accordance with Annex A1 of D892. The equipment comprises of an air pump, a test selector valve, air control regulators, glassware, digital manometer and a flowmeter, all mounted on a chassis with the necessary manifolds and interconnecting tubes. The flowmeter and manometer are supplied with UKAS certification.

Visit: http://www.stanhope-seta.co.uk/3292/Foam-Verification-Kit

› Seta Verification kit (14028-4)

Automatic Diffuser washing

Appendix X1 in ASTM D892 provides guidance on a procedure for cleaning the diffusers. This includes a flush with toluene, heptane and dry air sequence which is repeated 5 times.

Seta Autowash (14024-0)

The Seta Autowash automates the washing sequence detailed in ASTM D892 and allows unattended washing of the diffusers.

- Automatic and unattended cleaning of diffusers
- Up to 10 factory washing programs available
- Up to 2 solvents can be used
- Low solvent use
- No operator exposure to solvents

› Seta Autowash (14024-0)

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www.lazarsci.com

Go-no-go Viscosity checks for in-service testing

Visgage (95000-0)

- Determines In-Service condition of lubricating oils
- Quick and easy viscosity check
- Viscosity range 40 to 800 Saybolt seconds at 100°F

Visit: http://www.stanhope-seta.co.uk/1925/Visgage-range-40-800-Ss---light-oils

› Visgage (95000-0)

Comparator (22950-2)

- Ideal for In-Service lubricant oil testing
- Rapid and easy Go / No-Go viscosity test
- 10ml sample and reference oil size
- Suitable for clear and opaque liquids

Visit: http://www.stanhope-seta.co.uk/1372/Seta-Tri-Gauge-Viscosity-Comparator

› Comparator (22950-2)

Density

Portable Density Measurement Kit (12600-0)

ASTM D1298; IP 160; ISO 3675 Density and Relative Density (Specific Gravity) of Liquids
ASTM D4052; ISO 12185 Density, Relative Density, and API Gravity of Liquids by Digital Density Meter

The oscillating U Tube type density meter draws sample into the measurement chamber via a spring loaded plunger action pump, providing a rapid density measurement.

- 0 to 3g/cm3 range
- Single hand operation
- Density and SG measurements
- Explosion-proof - Ex II 2 G EEx ib IIC T4
- Petrol and organic solvent resistant
- Automatic temperature compensation
- Density standards included in the kit

Visit: http://www.stanhope-seta.co.uk/3627/Portable-Density-Measurement-Kit

Note: Optional Hydrometers for ASTM D1298 are available from Seta on request.

› Portable Density Measurement Kit (12600-0)

Distillation

Provides information on volatility and residues. Typically this parameter is included in mineral oil specifications where a high degree of purity is required.

Setastill (11860-3)

ASTM D86; IP 123; ISO 3405; FTM 791 1001; Distillation of Petroleum Products at Atmospheric Pressure

The Setastill is a simple, manual, small footprint distillation unit comprising a flask support mechanism, heater elements, and the heater controller. The flask is supported by a drop-in ceramic-glass support board mounted to a platform that is adjustable for height.

- Ambient to 400°C distillation range
- Adjustable height heater/flask platform
- Toughened glass window
- Cooling fan

Visit: http://www.stanhope-seta.co.uk/3391/Setastill-Distillation

› Setastill (11860-3)

Oxidation Characteristics

Oxidation stability provides an indication of the service life of the oil. ASTM D943 covers the Oxidation Characteristics of Inhibited mineral oils. ASTM D4310 covers the sludging and corrosion tendencies of the oil in the presence of a metal catalyst.

Seta Oxidation Bath (16900-6)

ASTM D943; ISO 4263; Oxidation Characteristics of Inhibited Mineral Oils
ASTM D4310; Sludging and Corrosion Tendencies of Inhibited Mineral Oils

The Seta Oxidation Bath comprises of a 35 litre oil bath which can accept up to six sets of glassware. A Seta Oxflo control unit includes a gas inlet pressure regulator, pressure gauge and six precision flowmeters calibrated for oxygen at 3 litres/hour, 21°C and 0.4 bar pressure.

- Ambient +5°C to 100°C temperature range
- 6 position oil bath
- Digital thermostir unit
- Seta Oxflo Controller and 6 flowmeters included
- Low liquid protection and over temperature cut out

Visit: http://www.stanhope-seta.co.uk/4462/Oxidation-Bath-with-Oxflo-Controller

› Seta Oxidation Bath (16900-6)

Oxidation stability for steam turbine and automotive engine oils

The two test methods covered by the RõBot Bath are designed to provide a more rapid assessment of the oxidation characteristics of steam turbine and automotive oils.

Seta RõBot Bath (15200-5)

ASTM D2272 Oxidation Stability of Steam Turbine Oils by Rotating Pressure Vessel
ASTM D4742 Oxidation Stability of Gasoline Automotive Engine Oils by Thin-Film Oxygen Uptake (TFOUT)

The Seta RõBot Bath is a floor standing 72 litre oil bath digital temperature control. Two oxidation test vessels can be accommodated which are supported at an angle of 30° and rotated at 100 rev/min. The pressure within the test vessel is monitored and reported in real time using the Seta AutoRõBOT Pressure Monitoring System.

- Ambient to 160°C
- 2 test stations
- Fume extraction
- Gear drive
- Real time automatic pressure monitoring

Visit: http://www.stanhope-seta.co.uk/3467/Seta-RoBot-Bath

› Seta RõBot Bath (15200-5) with automatic pressure monitoring (15205-2)

Corrosiveness to Copper

Corrosion testing was introduced to automotive lubricating oil specifications in response to concerns over corrosion damage to engine components. The ASTM D130 test utilises Copper tokens that are exposed to the sample in the presence of heat and the resulting change in token colour is compared to an ASTM colour standard.

Copper Corrosion Baths

ASTM D130; IP 154; ISO 2160; FTM 791 5235; Corrosiveness to Copper from Petroleum Products by Copper Strip Test

A range of stainless steel water or oil baths which are digitally temperature controlled to ±0.1°C over a temperature range of ambient +5°C to 150°C.

The baths have two or nine test stations, each with a lid and hook for suspending either a copper corrosion test vessel or a test tube support. A test tube support can hold up to three test tubes.

9 Station Bath (11400-7): http://www.stanhope-seta.co.uk/4444/Silver-and-Copper-Corrosion-Bath

2 Station Bath (11300-2): http://www.stanhope-seta.co.uk/4440/Seta-Copper-Corrosion-Bath

› The Copper Corrosion Bath (11400-7)

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Cloud and Pour Point

Cloud and pour point tests are called up in most lubricating oil specifications. These parameters provide an indication of the expected physical condition of an oil when operated at low temperatures.

Seta Cloud and Pour Point Cryostat (93531-7)

ASTM D97; IP 15; ISO 3016; FTM 791 201; Pour Point of Petroleum Products
ASTM D2500; IP 219; ISO 3015; Cloud Point of Petroleum Products

The Seta Cloud and Pour Point Cryostat is a floor standing unit with four independently temperature controlled compartments each accommodating four Air Wells. The lid is electrically heated to prevent the formation of ice and condensation.

- Four Individually temperature controlled compartments
- Four air wells in each compartment
- Ambient to -51°C
- 'CFC free' refrigeration system
- Heated 'anti-condensation' lid

Visit: http://www.stanhope-seta.co.uk/3892/Seta-Cloud-and-Pour-Point-Cryostat

› Seta Cloud and Pour Point Cryostat (93531-7)

Insolubles and Trace Sediment

Lubricating oils should be clear of sediment and insoluble contamination. The presence of sediment can lead to wear and premature machinery failure, and insoluble material can be indicative of oil or additive breakdown.

Seta Oil Test Centrifuge

ASTM D893; FTM 791 3121; Insolubles in Used Lubricating Oils
ASTM D2273; FTM 791 3004; Trace Sediment in Lubricating Oils

Seta Oil Test Centrifuge is a microprocessor controlled, heated centrifuge. The instrument is fully programmable allowing automatic configuration to the specified oil test parameters.

- Conforms to safety requirements IEC 1010-1; 1010-2-D
- 4 or 6 place swing out rotor
- Static, near vertical bucket positioning
- 3000 rpm
- Heated chamber, ambient to 80°C
- Universal buckets for 12.5ml, 6 and 8 inch glassware
- Microprocessor control with 99 memories

4 Place (90000-3): http://www.stanhope-seta.co.uk/3943/Seta-Oil-Test-Centrifuge

6 Place (90100-0): http://www.stanhope-seta.co.uk/4807/Seta-6-Oil-Test-Centrifuge

› Seta Oil Test Centrifuge (90000-3)

Colour

Colour can be indicative of the condition of an oil. Within the pharmaceutical industry white mineral is typically required to be colourless and is measured using ASTM D156. Automotive products are generally measured using the ASTM D1500 test method.

Seta Multi-Colour Automatic Colorimeter (15260-4)

ASTM D156; FTM 791 101; Saybolt Color of Petroleum Products
ASTM D1500; IP 196; ISO 2049; FTM 791 102; ASTM Color of Petroleum Products

The Seta Multi-Colour Automatic Colorimeter is an automated spectrometric colorimeter designed for rapid colour analysis of petrochemical products, selectable for Saybolt, ASTM, Platinum-Cobalt/ Hazen/APHA, spectral data and CIE colour determinations.

- Automatic operation
- Multiple colour scales including ASTM and Saybolt
- Rapid measurement < 25 seconds

Visit: http://www.stanhope-seta.co.uk/4164/Seta-Multi-Colour-Automatic-Colorimeter

For visual determination in accordance with ASTM D1500 refer to Manual Colorimeter (15250-4).

Visit: http://www.stanhope-seta.co.uk/3993/Seta-Lovibond-Colour-Comparator

› Seta Multi-Colour Automatic Colorimeter (15260-4)

Rust Preventing Characteristics

A test that is included in most lubricating and hydraulic oil specifications and frequently used as part of an oil condition monitoring program. In use water can become entrained in the oil and the test provides a guide on how well the oil will protect metal surfaces from rusting due to the water content, it also indicates whether rust inhibitors are required.

Seta Rust Prevention Test Bath (11200-6)

ASTM D665; IP 135; FTM 791 4011; NACE TMO172-2001; Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water

The Seta Rust Prevention Test Bath is a 31 litre oil bath with a temperature range of ambient +5°C to 120°C. The top panel of the bath accepts up to 7 test beakers with stirrers.

- Ambient +5°C to 120°C temperature range
- 7 test stations
- Quick release stirrers
- Digital temperature controller
- Bath viewing window and door

Visit: http://www.stanhope-seta.co.uk/4470/Seta-Rust-Prevention-Test-Bath

› Seta Rust Prevention Test Bath (11200-6)

Water Separability

A test that is included in most lubricating and hydraulic oil specifications and used as part of an oil condition monitoring program. Water in oil can form emulsions and sludges. The water separability test assesses the effectiveness of the oil to separate from the water.

Herschel Emulsifier (96700-2)

ASTM D1401; IP 412; ISO 6614; Water Separability of Petroleum Oils and Synthetic Fluids

A three position Herschel Emulsifier with each position operating independently. Stirrers are raised and lowered automatically and audible prompts indicate when measurements need to be made.

- 3 position semi-automatic operation
- Integral backlighting
- 54/82 C operation
- Fully programmable test and measurement time

› Herschel Emulsifier (96700-2)

Water in Petroleum products

Typically measured in used lubricating oils as part of an oil condition monitoring program. This test provides an indication of the volume of water present using the Dean and Stark distillation procedure.

ASTM D95; IP 74; ISO 3733; FTM 791 3001 Water in Petroleum Products and Bituminous Materials by Distillation

Seta offer a range of flask heaters, stands and condensers for Dean and Stark Assembly, please visit our website for more information.

› Dean and Stark Assembly

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Carbon Residue

Typically called up in base oil specifications this test provides an indication of carbon deposits that may remain after an oils exposure to high temperatures. Two tests cover this property, ASTM D4530 – Micro carbon residue and ASTM D189 Conradson Carbon residue. The tests require different volume of sample, ASTM D4530 is accepted as the referee test. A third test, ASTM D524 Ramsbottom Carbon residue is also sometimes used and can be correlated to D4530 and D189.

Carbon Residue (97400-3)

ASTM D4530; IP 398; ISO 10370; Carbon Residue (Micro Method)

An automatic airtight furnace that is pre-programmed to run tests to determine Micro (Conradson) Carbon residue of petroleum products.

- Carbon residue range 0.1% to 30.0% (m/m)
- 12 sample capacity
- Automatic temperature ramp and gas control
- Digital display flowmeter
- Equivalent to ASTM D189; IP 13
- Temperature range ambient to 500°C

› Carbon Residue (97400-3)

Conradson Carbon Residue

ASTM D189; IP 13; ISO 6615; FTM 791 5001; Conradson Carbon Residue of Petroleum Products

Comprises of a cast iron tripod stand, Skidmore iron crucible with cover, spun sheet iron crucible with cover, spun steel circular hood with chimney, spun steel circular insulation block, and Nichrome wire support.

Available as a single test unit (10610-0) or 4-way test unit (10600-0).

Visit: http://www.stanhope-seta.co.uk/36/Seta-Conradson-Test-Unit

› 4-Way Unit (10600-0) and Single Unit (10610-0)

Ramsbottom Carbon Residue (10900-4)

ASTM D524; IP 14; ISO 4262; FTM 791 5002; Ramsbottom Carbon Residue of Petroleum Products

A compact instrument for determination of the Carbon Residue of petroleum products. The instrument comprises of a solid cast iron block with five test wells, allowing 4 simultaneous tests and a control bulb for temperature measurement. The enclosure is stainless steel and insulated to minimise surface temperatures. Temperature is displayed by clear LED indicators and independent temperature measurement is included.

- 5 test wells
- Temperature range ambient to 550°C
- Digital Temperature control
- Bath and control bulb temperature displays

› Ramsbottom Carbon Residue (10900-4)

Ash from Petroleum Products

Ash tests are recommended where the sample is known to contain inorganic ash. This will contribute to the quantity of carbon residue. ASTM D482 can be followed to determine the mass of the ash and this can be used to adjust the result from the carbon residue tests.

Seta Ash Furnace (99220-2)

ASTM D482; IP 4; ISO 6245; FTM 791 5421; Ash from Petroleum Products

The Seta Ash Furnace and accessories are suitable for D482. The furnace comes with pre-heated airflow system and extended chimney. Maximum temperature 1100°C with over-temperature cut-out and door safety power cut off switch.

Visit: http://www.stanhope-seta.co.uk/4038/Seta-Ash-Furnace

Air Release Properties

A test to quantify the ability of an oil to release entrained air. Typically found in turbine, hydraulic and gear oil specifications.

Seta Air Release Apparatus (15850-5) & Density Balance (15880-7)

ASTM D3427; IP 313; Air Release Properties of Petroleum Oils

The Seta Air Release apparatus comprises an air heater, fine control pressure regulator, pressure gauge, and mounting clip for the test vessel and digital temperature controller. A density balance can be supplied (15880-7) comprising an electronic balance, Seta-ARV software, sinker and platinum wire. Using the 15880-7 balance and software the density of the sample prior to and during the test, as well as the time taken for the sample to reach target density, is automatically calculated. End point values can be output to a printer or stored on disk.

- Ambient to 75°C temperature range
- 200kPa maximum air pressure
- 23l/min maximum flow rate
- Optional automated density monitoring using 15880-7 balance

Visit: http://www.stanhope-seta.co.uk/4371/Seta-Air-Release-Value-Apparatus

› Seta Air Release Apparatus (15850-5)

Aniline Point

The Aniline point of an oil provides a indication of the hydrocarbon mixture. The Aniline point is most often used to assess the aromatic content of oils. Lubricating oils with an aromatic content show a low Aniline point, whereas paraffinitic oils show a higher value.

Aniline Point (10000-2)

ASTM D611; IP 2; ISO 2977; FTM 791 3601; Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents – Method B

The Seta Thin Film Apparatus comprises of an archimedean type pump mounted within an aniline sample container with integral light-well, illuminated by a 6.5V lamp. The aniline sample container is immersed in a 600ml beaker, which incorporates a cooling coil and stirrer. A variable speed electric motor provides drive for the pump and bath stirrer.

Visit: http://www.stanhope-seta.co.uk/4824/Thin-Film-Apparatus

› Seta Aniline Point (10000-2)

Dielectric Breakdown Voltage

The dielectric breakdown voltage is a measure of the ability of an insulating liquid to withstand electrical stress. The presence of contaminants such as particles, dirt, and water can significantly reduce the breakdown voltage. A low result in this test method can be indicative of the presence of contaminants in the liquid tested. ASTM D877 is suitable for unfiltered new insulating oils, ASTM D1816 is suitable for filtered and de-gassed insulating liquids such as silicone fluids, mineral insulating oils, synthetic ester fluids and natural ester fluids.

Seta Dielectric Oil Tester (99620-3)

ASTM D877; IP 295; FTM 791 5702; Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes

ASTM D1816; Dielectric Breakdown Voltage of Insulating Liquids Using VDE Electrodes

The Seta Dielectric Oil Tester is the smallest and lightest portable oil test set of its rating available. The 2,8" colour display offers optimal readability and mobility. The instrument features an ultra fast switch-off time at flash over (<5µs) which is especially important for silicone oils.

- Automatic test sequence
- Pre-set and user defined programs
- Bluetooth connection & USB drive
- Fully interlocked

Visit: http://www.stanhope-seta.co.uk/4230/Automatic-Oil-Tester-100kv

› Seta Dielectric Oil Tester (99620-3)

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Infrared Spectroscopy

Infrared Spectroscopy is an important analytical technique for used oils and is typically used for trend analysis allowing the condition of the lubricant to be monitored. The most common technology is based on Fourier Transform Infrared (FTIR) which works on the principle that changes in spectral response of the oil provide an indication of the components of sample. The spectral responses can be converted into specific compounds such as additives or by-products of the oxidation process.

Seta-FTIR

ASTM D7214; D7418; E2412

Supports parameters such as Oxidation, Sulfation, Nitration, Soot, Water, Fuel Dilution.

- Small and lightweight
- No sample preparation
- Designed for field or laboratory use
- Internal 4 hour battery
- Available with general purpose and specific methods
- USB connection to any computer, if necessary

› Seta-FTIR

The Seta-FTIR package is a one-stop solution allowing quantitative analysis of key parameters of used and in-service oils. No specialist knowledge is required and the intuitive software package allows easy and quick interpretation of the results. The hardware comprises of a rugged spectrometer specifically designed for analysis both inside and outside of laboratory environments. The instrument can perform spectroscopic analyses on a range of liquids, powders, pastes and gels and requires no sample preparation. Results are typically available in 2 minutes and the wipe-clean sample area ensures no carry over and easy maintenance.

Custom models can be built, please contact Seta for further information.

Particle Counting

The understanding of particle contamination in lubricating and hydraulic oils is the single most important parameter when evaluating the cleanliness of new and used lubricating and hydraulic oils. Laser particle counting offers a quick and quantitative way of evaluating the particulate contamination or cleanliness of oil, allowing an operator to determine whether the oil is suitable for operation. Particle counting methods are written into many specifications and the instruments report particle count and size distribution in industry standard formats such as ISO 4406 and NAS 1638.

Seta AvCount2 (SA1000-2)

ASTM D6786 Particle Count in Mineral Insulating Oil Using Automatic Optical Particle Counters
ASTM D7647 Automatic Particle Counting of Lubricating and Hydraulic Fluids

- NAS 1638; ISO 4402, GOST 17216-71: 2µm to >200µm
- Cumulative & distributive particle numbers
- Uses "Straight from the Bottle" samples
- Integrated printer
- Easy to use large touch screen display
- Rugged, stainless steel case suitable for portable use
- Integral Data storage for up to 2000 measurements across 60 memories
- Optional in-line high pressure testing up to 310 Bar

› Seta AvCount2 (SA1000-2)

The Seta AvCount2 is a laser based particle analyser used for determining the particle concentration in Liquid fuels and oils. It can be used throughout distribution networks and in the laboratory. Whether checking the quality of fuel, filter systems or in service lubricants, AvCount2 provides fast and precise results.

Visit: http://www.seta-analytics.com/avcount2-particle-counter.htm

Aromatics and Saturates in Base Oils

Analysis of the aromatic and saturates content in oils is a key parameter needed to determine compatibility between base oils prior to the blend process.

Evochrom Base Oil HPLC System (SA2500-0)

ASTM D7419 Determination of Total Aromatics and Total Saturates in Lube Basestocks by High Performance Liquid Chromatography

The Evochrom Base Oil HPLC instrument is a complete plug and go system, fully specified for Aromatic and Saturates. The system is ready for use out of the box with minimal configuration required.

› HPLC (SA2500-0)

Reference Standards

Viscosity Standards

A range of ISO 17025 (UKAS) quality standards are available

- Full compliance with ASTM, IP and other method protocols
- Manufactured in accordance with ISO 17025 and UKAS certified
- Supplied in 500ml containers with 2 year shelf life

Kinematic Viscosity mm²/s (cSt)

Product Code	Seta Reference	20.00°C 68.00°F	25.00°C 77.00°F	37.78°C 100.00°F	40.00°C 104.00°F	50.00°C 122.00°F	60.00°C 140.00°F	80.00°C 176.00°F	98.89°C 210.00°F	100.00°C 212.00°F
S3	99784-0	4.626	4.081	3.065	2.929	2.423	2.044	1.524	1.207	1.192
S6	99785-0	10.46	8.833	6.045	5.697	4.454	3.583	2.479	1.864	1.836
S20	99786-0	42.83	33.76	19.79	18.21	12.91	9.554	5.791	3.962	3.884
N35	99832-0	84.99	64.77	35.19	31.99	21.59	15.31	8.675	5.656	5.530
S60	99787-0	158.2	117.4	59.96	53.97	34.97	23.92	12.77	7.970	7.774
N100	99833-0	320.4	232.1	111.8	99.71	61.95	40.83	22.69	12.17	11.85
S2000	99788-0	7946	5232	1988	1705	892.9	502.4	190.0	90.83	87.34
N350	99835-0	1194	825.4	355.8	311.9	179.7	110.6	49.33	26.94	26.09
S600	99789-0	2053	1409	593.7	517.7	292.4	176.0	75.27	39.63	38.30
N1000	99837-0	4256	2866	1153	997.4	543.0	316.2	127.0	63.52	61.25

Density Standards

- Full compliance with ASTM, IP and other method protocols
- Manufactured in accordance with ISO 17025 and UKAS certified
- Supplied in 100ml containers with 2 year shelf life

Seta Part Number:	Density @ 20°C
12600-001	0.8720
12600-002	0.8540
12600-003	0.8200

Multi Test Verification Material (MTVM)

Seta Lubricating Oil (99853-2)

The Seta Lubricating Oil MTVM is a unique secondary reference material that provides traceable validation of different test parameters from one sample. Multi Test Verification Materials (MTVM) allow routine monitoring of instrument performance and are particularly useful in training. The MTVM Lube oil is manufactured and certified in strict accordance with ISO Guide 34.

Test Parameter	Test Method Employed/ ASTM	Nominal Ranges	Amount/test
Flash Point	D93 Procedure A	196 to 225°C	80ml
Pour Point	D97 –IP 15	-49.1 to -33°C	50ml
Kinematic Viscosity 40°C	D445	53 to 165 mm²/s	30ml
Kinematic Viscosity 100°C	D445	9 to 22 mm²/s	30ml
Viscosity Index	D2270	139 to 180	60ml
Density	D4052	0.85 to 0.88 g/mL	10ml
Zinc	D5185	800 to 1000 mg/kg	5ml
Calcium	D5185	3000 to 5000 mg/kg	5ml
Phosphorus	D5185	800 to 1600 mg/kg	5ml
Acid Number	D664	1 to 5 KOH/g	2ml
Base Number	D2896	5 to 15 KOH/g	3ml

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Lubricating Oils Test Method Table

Test Method				Test Description	Instrument	Seta Reference
ASTM D86	IP 123	ISO 3405	FTM 791 1001	Distillation of Petroleum Products at Atmospheric Pressure	Manual Distillation	11860-3
ASTM D93	IP 34	ISO 2719	FTM 791 1102	Flash Point by Pensky-Martens Closed Cup Tester	Automatic Multiflash Automatic Manual	35000-0 34000-0 13661-4
ASTM D92	IP 36	ISO 2592	FTM 791 1103	Flash and Fire Points by Cleveland Open Cup Tester	Multiflash Automatic Manual	34300-2 13811-3
ASTM D95	IP 74	ISO 3733	FTM 791 3001	Water in Petroleum Products and Bituminous Materials by Distillation	Dean and Stark Apparatus	24410-4
ASTM D97	IP 15	ISO 3016	FTM 791 201	Pour Point of Petroleum Products	Amb to -51°C Four Compartment Amb to -35°C Three Compartment	93531-7 94100-3
ASTM D130	IP 154	ISO 2160	FTM 791 5325	Corrosiveness to Copper from Petroleum Products by Copper Strip Test	9 position bath – Liquid 2 position bath – Liquid 4 position bath – Solid Block	11400-7 11300-2 11308-0
ASTM D156			FTM 791 101	Saybolt Color of Petroleum Products	Automatic Colorimeter	15260-4
ASTM D189	IP 13	ISO 6615	FTM 791 5001	Conradson Carbon Residue of Petroleum Products	Conradson Carbon Residue unit	10610-0
ASTM D445	IP 71	ISO 3104	FTM 791 305	Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)	KV6 Viscometer Bath, 6 position bath	84200-2
ASTM D482	IP 4	ISO 6245	FTM 791 5421	Ash from Petroleum Products	Ash Furnace	99220-2
ASTM D524	IP 14	ISO 4262	FTM 791 5002	Ramsbottom Carbon Residue of Petroleum Products	Ramsbottom Carbon Residue bath	10900-4
ASTM D611	IP 2	ISO 2977	FTM 791 3601	Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents – Method B	Thin Film Apparatus	10000-2
ASTM D665	IP 135		FTM 791 4011	Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water	Rust Prevention Test Bath	11200-6
ASTM D877	IP 295		FTM 791 5702	Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes	Automatic Dielectric Tester	99620-3
ASTM D892	IP 146		FTM 791 3211	Foaming Characteristics of Lubricating Oils	Dual-Twin Foam Baths	14020-7
ASTM D893			FTM 791 3121	Insolubles in Used Lubricating Oils	Oil Test Centrifuge	90000-3, 90100-0
ASTM D943		ISO 4263		Oxidation Characteristics of Inhibited Mineral Oils	Solid block bath 12 position Solid block bath 6 position Liquid bath 6 position Liquid bath 6 position with light tight viewing window	16640-0 16645-0 16900-6 16960-2
ASTM D1298	IP 160	ISO 3675		Density and Relative Density (Specific Gravity) of Liquids	Hydrometers	
ASTM D1401	IP 412	ISO 6614		Water Separability of Petroleum Oils and Synthetic Fluids	Herschel Emulsifier 3 place	96700-2
ASTM D1500	IP 196	ISO 2049	FTM 791 102	ASTM Color of Petroleum Products	Colour Comparator Automatic Colorimeter	15250-4 15260-4
ASTM D1816				Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using VDE Electrodes	Automatic Dielectric Tester	99620-3
ASTM D2272				Oxidation Stability of Steam Turbine Oils by Rotating Pressure Vessel	RŏBOT Bath	15200-5
ASTM D2500	IP 219	ISO 3015		Cloud Point of Petroleum Products	Amb to -51°C Four Compartment Amb to -35°C Four Compartment	93531-7 94100-3
ASTM D2273			FTM 791 3004	Trace Sediment in Lubricating Oils	Oil Test Centrifuge	90000-3, 90100-0
ASTM D2783			FTM 791 6503	Measurement of Extreme-Pressure Properties of Lubricating Fluids	Seta-Shell 4-Ball Lubricant Tester	19900-2, 19800-6
ASTM D3427	IP 313			Air Release Properties of Petroleum Oils	Air Release Apparatus	15850-5
ASTM D3278 ASTM D3828	IP 523 IP 524	ISO 3679 ISO 3680		Flash Point by Small Scale Closed Cup Tester	Series '3' Manual Series '8' Auto'	30000-0, 33000-0 82000-0
ASTM D4052	IP 559	ISO 12185		Density, Relative Density and API Gravity of Liquids by Digital Density Meter	Hand Held Density meter	12600-0
ASTM D4310				Determination of Sludging and Corrosion Tendencies of Inhibited Mineral Oils	Liquid bath 6 way	16900-6
ASTM D4530	IP 398	ISO 10370		Determination of Carbon Residue (Micro Method)	Micro Carbon Residue Tester	97400-3
ASTM D4172				Wear Preventive Characteristics of Lubricating Fluid (Four-Ball Method)	Seta-Shell 4-Ball Lubricant Tester	19900-2, 19800-6
ASTM D4742				Oxidation Stability of Gasoline Automotive Engine Oils by Thin-Film Oxygen Uptake (TFOUT)	RoBOT Bath	15200-5
ASTM D6082				High Temperature Foaming Characteristics of Lubricating Oils	High Temperature foam bath	14025-0
ASTM D6786				Standard Test Method for Particle Count in Mineral Insulating Oil Using Automatic Optical Particle Counters	Automatic Multi-Mode Particle counter Automatic Multi-Mode Particle counter Kalrez seals	SA1000-2 SA1250-2
ASTM D7214				Determination of the Oxidation of Used Lubricants by FT-IR Using Peak Area Increase Calculation	Seta-FTIR	Please contact Seta to discuss application
ASTM D7236	IP 534			Flash Point by Small Scale Closed Cup Tester (Ramp Method)	Series '3' Manual Series '8' Auto'	30000-0, 33000-0 82000-0
ASTM D7418				Set-Up and Operation of Fourier Transform Infrared (FT-IR) Spectrometers for In-Service Oil Condition Monitoring	Seta-FTIR	Please contact Seta to discuss application
ASTM D7419				Determination of Total Aromatics and Total Saturates in Lube Basestocks by High Performance Liquid Chromatography	Evochrom Base Oil HPLC System	SA2500-0
ASTM D7647				Standard Test Method for Automatic Particle Counting of Lubricating and Hydraulic Fluids	Automatic Multi-Mode Particle counter Automatic Multi-Mode Particle counter Kalrez seals	SA1000-2 SA1250-2
ASTM E2412				Standard Practice for Condition Monitoring of Used Lubricants by Trend Analysis Using Fourier Transform Infrared (FT-IR) Spectrometry	Seta-FTIR	Please contact Seta to discuss application
ASTM E128				Maximum Pore Diameter and Permeability of Rigid Porous Filters for Laboratory Use	Autowash	14024-0
CEC-L-45-99		ISO 26422		Viscosity Shear Stability of Transmission Lubricants (Taper Roller Bearing Rig)	Shear Stability (KRL) Head	19820-2
ASTM D6278	IP 294	CEC L-14		Shear Stability of Lubricating Oils Containing Polymers	Shear Strength Testing Apparatus for Mineral Oil	15700-0

SETA STANHOPE-SETA Lubricant Test Method & Specification Table

Lubricant Methods & Description			White Mineral Oils	Base oils	Lubricating Oils	Hydraulic Oils
ASTM D86	IP 123	Distillation of Petroleum Products at Atmospheric Pressure	▯			
ASTM D93	IP 34	Flash Point by Pensky-Martens Closed Cup Tester	▯	▯	▯	▯
ASTM D92	IP 36	Flash and Fire Points by Cleveland Open Cup Tester	▯	▯	▯	▯
ASTM D95	IP 74	Water in Petroleum Products and Bituminous Materials by Distillation			▯	
ASTM D97	ISO 3016	Pour Point of Petroleum Products	▯	▯	▯	
ASTM D130	IP 154	Corrosiveness to Copper from Petroleum Products by Copper Strip Test			▯	
ASTM D156		Saybolt Color of Petroleum Products	▯			
ASTM D189	IP 13, ISO 6615	Conradson Carbon Residue of Petroleum Products		▯		
ASTM D445	IP 71	Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)	▯	▯	▯	
ASTM D482	IP 4	Ash from Petroleum Products			▯	
ASTM D524	IP 14	Ramsbottom Carbon Residue of Petroleum Products		▯		
ASTM D611	IP 2	Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents – Method B	▯	▯		
ASTM D665	IP 135	Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water			▯	▯
ASTM D877	IP 295	Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes	▯			
ASTM D892	IP 146	Foaming Characteristics of Lubricating Oils		▯	▯	▯
ASTM D893		Insolubles in Used Lubricating Oils			▯	
ASTM D943		Oxidation Characteristics of Inhibited Mineral Oils		▯	▯	▯
ASTM D1298	IP 160	Density and Relative Density (Specific Gravity) of Liquids	▯	▯		
ASTM D1401	IP 412	Water Separability of Petroleum Oils and Synthetic Fluids				▯
ASTM D1500	IP 196	ASTM Color of Petroleum Products		▯	▯	
ASTM D1816		Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using VDE Electrodes	▯			
ASTM D2272		Oxidation Stability of Steam Turbine Oils by Rotating Pressure Vessel		▯		
ASTM D2500	IP 219	Cloud Point of Petroleum Products	▯	▯	▯	
ASTM D2273		Trace Sediment in Lubricating Oils			▯	
ASTM D2783		Measurement of Extreme-Pressure Properties of Lubricating Fluids			▯	
ASTM D3427	IP 313	Air Release Properties of Petroleum Oils			▯	▯
ASTM D3278 ASTM D3828	IP 523, IP 524	Flash Point by Small Scale Closed Cup Tester	▯	▯	▯	▯
ASTM D4052	IP 559	Density, Relative Density and API Gravity of Liquids by Digital Density Meter	▯	▯		
ASTM D4172		Wear Preventive Characteristics of Lubricating Fluid (Four-Ball Method)			▯	
ASTM D4310		Determination of Sludging and Corrosion Tendencies of Inhibited Mineral Oils			▯	
ASTM D4530	IP 398	Determination of Carbon Residue (Micro Method)			▯	
ASTM D4742		Oxidation Stability of Gasoline Automotive Engine Oils by Thin-Film Oxygen Uptake (TFOUT)		▯		
ASTM D6082		High Temperature Foaming Characteristics of Lubricating Oils			▯	
ASTM D6786		Standard Test Method for Particle Count in Mineral Insulating Oil Using Automatic Optical Particle Counters	▯	▯		▯
ASTM D7214		Determination of the Oxidation of Used Lubricants by FT-IR Using Peak Area Increase Calculation		▯	▯	
ASTM D7236	IP 534	Flash Point by Small Scale Closed Cup Tester (Ramp Method)	▯	▯	▯	▯
ASTM D7418		Set-Up and Operation of Fourier Transform Infrared (FT-IR) Spectrometers for In-Service Oil Condition Monitoring		▯	▯	▯
ASTM D7419		Determination of Total Aromatics and Total Saturates in Lube Basestocks by High Performance Liquid Chromatography		▯		
ASTM D7647		Standard Test Method for Automatic Particle Counting of Lubricating and Hydraulic Fluids	▯	▯	▯	▯
ASTM E2412		Standard Practice for Condition Monitoring of Used Lubricants by Trend Analysis Using Fourier Transform Infrared (FT-IR) Spectrometry		▯	▯	
ASTM E128		Maximum Pore Diameter and Permeability of Rigid Porous Filters for Laboratory Use			▯	
CEC-L-45-99		Viscosity Shear Stability of Transmission Lubricants (Taper Roller Bearing Rig)			▯	
ASTM D6278	IP 294	Shear Stability of Lubricating Oils Containing Polymers (Diesel Injector Apparatus)	▯			
CEC-L-14		Shear Stability of Lubricating Oils Containing Polymers (Fuel Injection Pump)	▯			

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