



# BREITLÄNDER

Eichproben + Labormaterial GmbH

Hans-Sachs-Str. 12, D-59077 HAMM, Germany  
Tel (0)2381/404000, Fax -/403189, e-mail:mail@breitlander.com

**KALIBRIERSTANDARDS FÜR PETRO-PRODUKTE  
UND SCHMIERSTOFFE**

**CALIBRATION STANDARDS FOR PETROLEUM PRODUCTS  
AND LUBRICANTS**

hergestellt durch/produced by ANALYTICAL SERVICES, INC., USA

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7/06

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## Vorwort zum „AC-Ölkatalog“ von ANALYTICAL SERVICES

ANALYTICAL SERVICES, Inc. produziert gebrauchsfertige Referenzproben und analysierte Reagenzien zur Fertigung von Kalibrierproben für die Petroleum- und Schmierölindustrie.

Es werden insbesondere komplette Kalibriersätze nach ASTM für die RFA, Chemolumineszenz und UV-Fluoreszenz angeboten, wie z. B.:

ASTM-Methoden für die Schwefelbestimmung in Petroleumprodukten: D2622, D4294, D5453, D6334

ASTM-Methode für die Bleibestimmung in Kraftstoffen: D5059

ASTM-Methoden für die Elementbestimmung von Additiven in Schmierölen: D4927, D6481, D6443

ASTM-Methoden für die N + S Bestimmung: D4629, D5762, D5453, D3120, D3246, D3961

Ferner werden geeignete Formulierungen von Kalibrierlösungen für andere Methoden zur Schwefel- und Chlorbestimmung in Ölen und Altölen, z. B. nach CAN/GS oder zur Bestimmung von Schwefel, Eisen, Nickel und Vanadium in Rückstandsölen und Rohölen angeboten.

Kalibrierprobensätze, Kontrollproben, Driftkorrekturproben und Interne Standards für bestimmte ISO- und DIN-Methoden sind in einer [separaten Aufstellung](#) als Anhang dieses Kataloges zusammengestellt:

ISO 20884LOW, 20884HIGH, 14596LOW, 14596HIGH

DIN 51363(P), 51391(Ca), 51391(Zn), 51431(Mg)

Ferner werden angeboten: schwefelfreie, stabilisierte organo-metallische Einzelelement- und Multielementstandards für die Analyse von Abriebmetallen, Additiven und Verunreinigungen in Schmierölen, Rückstandsölen, Turbinenkraftstoffen und Benzin mittels ICP, AE und AAS.

Die organo-metallischen Standards werden auch als Konzentrate angeboten. Sie sind schwefel- und phosphorfrei, stabilisiert mit eigenen Chelatierungs- und Stabilisatorlösungen und dokumentiert in der Spurenanalyse. Sie können zur Formulierung von anwendungsspezifischen Kalibrierlösungen eingesetzt werden, z. B. für die Nickel- und Vanadiumbestimmung in Schmierölen und Rückstandsölen.

Bei den Schwefel- und Metallstandards (Fe, Ni und V) sind die Konzentrationen von Fe, Ni und V unabhängig von der Schwefelkonzentration.

Alle Referenzproben werden gravimetrisch mit zertifizierten Reagenzien präpariert, die mit NIST- SRMs, sofern vorhanden, überprüft werden.

In diesem Katalog sind zusätzlich zu den chemischen Standards auch eine Auswahl gängiger physikalischer Referenzproben gelistet; für eine Reihe dieser Prüfmethode stehen auch nationale oder EG-Standards zur Verfügung, bitte anfragen.

Wir haben die Originalunterlagen des Herstellers verwendet, auch um Übertragungsfehler zu vermeiden. Wir gehen davon aus, dass der englische Katalogteil verständlich ist. Sollten sprachliche Verständnisfragen auftauchen, so helfen wir gerne weiter.

Falls die von Ihnen gewünschte Referenzprobe nicht in diesem Katalog ist, sprechen Sie uns an; wir können Ihnen eine Vielzahl weiterer Referenzproben anbieten. Zudem fertigen wir regelmäßig für Kunden Referenzproben nach Vorgaben, auch in angeliefertem Basisöl, falls gewünscht. Lieferzeiten 2-3 Wochen, gravimetrisch präpariert und analysiert mit Rückführbarkeit auf NIST-SRMs.

Ferner haben wir ein umfangreiches Programm an unterschiedlichen Küvetten (Cups) von höchster Fertigungspräzision und alle gängigen RFA-Folien in unterschiedlichen Konfektionierungen am Lager. Bitte schauen Sie sich unser umfassendes Angebot für [RFA-Verbrauchsmaterial](#) an.

Wir möchten Sie auch auf unsere [RFA-Monitor-Glasproben](#) hinweisen: >180 erstellte Proben sind dokumentiert - oder fragen Sie nach einem klassisches Silikatglas entsprechend Ihrer Vorgaben – keine Boratschmelzlinge. Wir liefern für die Ölanalytik Glas-Monitorproben für die S-Bestimmung und auch für Abriebmetalle.

## Preface „AC Oil Catalogue“ - ANALYTICAL SERVICES

ANALYTICAL SERVICES, Inc. produces ready made reference materials and analysed reagents for the formulation of calibration samples used in the petroleum industry.

Specialities are complete calibration sets as per ASTM for XRF, Chemiluminescence, Microcoulometry and UV-Fluorescence, as e.g.:

ASTM methods for S determination in petroleum products: D2622, D4294, D5453, D6334

ASTM-method for Pb determination in fuels: D5059

ASTM-methods for element determination of additives in lube oils: D4927, D6481, D6443

ASTM-methods for N + S determination: D4629, D5762, D5453, D3120, D3246, D3961

Furthermore there are offered suitable formulations for calibration samples for other methods in sulfur and chlorine determination of fresh oils and waste oils, e.g. as per CAN/GS methods for analysis of sulfur, iron, nickel and vanadium in residual oils and crude oils.

Special sets of calibration samples, control samples, drift correction samples and internal standards for common ISO and DIN methods are compiled in a [separate amendment](#) to this catalogue comprising:

ISO 20884LOW, 20884HIGH, 14596LOW, 14596HIGH

DIN 51363(P), 51391(Ca), 51391(Zn), 51431(Mg)

Furthermore there are offered: sulfur free, stabilised organo-metallic single- and multielement standards for the analysis of wear metals, additives and traces in lube oils, residual oils, turbine fuels and gasolines by ICP, AE and AAS.

The organo-metallic standards are offered also as concentrates. They do not contain sulfur or phosphorus, unless otherwise noted and have been stabilised with special chelation and solubilizers. They can be used for formulation of application specific calibration solutions, e.g. for nickel- and vanadium determination in lube oils and residual oils.

Furthermore there are offered: sulfur free, stabilised organo-metallic single- and multielement standards for the analysis of wear metals, additives and traces in lube oils, residual oils, turbine fuels and gasolines by ICP, AE and AAS.

The organo-metallic standards are offered also as concentrates. They do not contain sulfur or phosphorus, unless otherwise noted and have been stabilised with special chelation and solubilizers. They can be used for formulation of application specific calibration solutions, e.g. for nickel- and vanadium determination in lube oils and residual oils.

For the sulfur and metals (Fe, Ni and V) standards, the concentration of Fe, Ni and V are independent of the sulfur concentration.

All standards are gravimetrically prepared with certified reagents which are checked against NIST SRMs, whenever available.

This catalogue contains besides the chemical standards a selection of common physical testing standards. For several testing methods there are national or EEC certified standards available, please request.

If you do not find the particular standard you are looking for please contact us; we can offer you a wide range of other reference standards. Furthermore we regularly produce custom made standards, even possible in your base oil. Delivery time for such standards is 2-3 weeks, they are gravimetrically prepared and analysed with traceability to NIST SRMs.

We like to point to our comprehensive program on various sample cups of highest precision and XRF thin films of different form and gauge. We carry in stock the complete program for prompt supply. Please check our program on [XRF-consumables](#).

Furthermore we like to mention our program on [XRF glass monitor standards](#) (drift control standards) with a range of >180 melt compositions. We can manufacture such classical silicate glasses (no borate beads) as per your specification. We supply some special monitor samples used in oil industry for S-determination and for wear metal analysis.

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# 1 SULFUR, CHLORINE, LEAD AND METALS IN FUELS AND OILS FORMULATED STANDARDS SETS

## 1.1 SULFUR STANDARDS

Product Code	Product	Method	Description
S(BS)I13	SULFUR IN ISOCTANE FOR GASOLINE AND REFORMULATED GASOLINE ANALYSIS <b>FLAMMABLE UN1262</b>	ASTM D6334 & D2622	Di-N-butyl sulfide in Isooctane. Conc. Range: 0-0.300 wt% S; 13 standards per set, 100ml each
S(BS)IT10	LOW LEVEL SULFUR STANDARDS <b>FLAMMABLE UN1993</b>	ASTM D6334 & D6445	Di-N-butyl sulfide in Isooctane-Toluene mixture. Conc. Range: 0-0.1000 wt% S; 10 standards per set, 100ml each
S(T)IT10	LOW LEVEL SULFUR STANDARDS <b>FLAMMABLE UN1993</b>	ASTM D6334 & D6445	Thiophene and Methyl Thiophene Isooctane-Toluene mixture. Conc. Range: 0-0.1000 wt% S; 10 standards per set, 100ml each
SCO10	SULFUR IN CRUDE OIL <b>FLAMMABLE UN1267</b>	ASTM D2622 & D4294-98	Di-N-butyl sulfide in crude oil. Conc. Range: 0.05-5.0 wt% S; 10 standards per set, 100ml each
SCO7	SULFUR IN CRUDE OIL <b>FLAMMABLE UN1267</b>	ASTM D2622 & 4294	Di-N-butyl sulfide in crude oil. Conc. Range: 0.05-2.0 wt% S; 7 standards per set, 100ml each
SDF10	SULFUR IN DIESEL FUEL	ASTM D2622 & D4294	Di-N-butyl sulfide in synthetic diesel fuel. Conc. Range: 0-5.0 wt% S; 10 standards per set, 100ml each
SDF7	SULFUR IN DIESEL FUEL	ASTM D4294	Di-N-butyl sulfide in synthetic diesel fuel. Conc. Range:0-0.100 wt% S; 7 standards per set, 100ml each

Product Code	Product	Method	Description
SG10C	SULFUR IN GASOLINE <b>FLAMMABLE UN1203</b>	ASTM D2622, D6334, D6445 & D4294	Di-N-butyl sulfide in unleaded gasoline. Due to the volatility of gasoline these standards are not stocked and are prepared as custom standards upon receipt of order. No table in catalogue. <b>Specify concentrations up to 250ppm S;</b> 10 standards per set, 100ml each
SG7C	SULFUR IN GASOLINE <b>FLAMMABLE UN1203</b>	ASTM D2622, D6334, D6445 & D4294	Di-N-butyl sulfide in unleaded gasoline. Due to the volatility of gasoline these standards are not stocked and are prepared as custom standards upon receipt of order. No table in catalogue. <b>Specify concentration up to 1000ppm S;</b> 10 standards per set; 100ml each
SIO11	SULFUR IN ISOCTANE COMPLETE RANGE <b>FLAMMABLE UN1262</b>	ASTM D5453	Di-N- butyl sulfide in Isooctane. Conc. Range: 0-1000.00 ng/μL; 11 standards per set, 100ml each
SIO3(H)	SULFUR IN ISOCTANE HIGH RANGE <b>FLAMMABLE UN1262</b>	ASTM D5453	Di-N-butyl sulfide in Isooctane. Conc. Range: 100.00-1000.00 ng/μL S; 3 standards per set, 100ml each
SIO4(M)	SULFUR IN ISOCTANE MEDIUM RANGE <b>FLAMMABLE UN1262</b>	ASTM D5453	Di-N-butyl sulfide in Isooctane. Conc. Range: 5.00-100.00 ng/μL; 4 standards per set, 100ml each
SIO6(L)	SULFUR IN ISOCTANE LOW RANGE <b>FLAMMABLE UN1262</b>	ASTM D5453	Di-N-butyl sulfide in Isooctane. Conc. Range : 0.0-10.00 ng/μL; 6 standards per set, 100ml each
SISOH7	SULFUR STANDARDS, HIGH RANGE, WITH 18% ZIRCONIUM INTERNAL STANDARD	ISO/CD 14596	Di-N-butyl sulfide and 16-18% zirconium internal standard in mineral oil. Conc. Range: 0.40-2.5 wt% S; 7 standards per set, 100ml each
SISOL8	SULFUR STANDARDS, LOW RANGE, WITH 1% ZIRCONIUM INTERNAL STANDARD	ISO/CD 14596	Di-N-butyl sulfide and 1% zirconium internal standard in mineral oil. Conc. Range: 0-1000ppm; 8 standards per set, 100ml each

Product Code	Product	Method	Description
SITCS5(H)	SULFUR STANDARDS FOR CANADIAN GENERAL STANDARDS BOARD HIGH RANGE <b>FLAMMABLE UN1993</b>	CAN/GS-3.0 NO. 16.1-98	Di-N-butyl sulfide in Isooctane-Toluene mixture. Conc. Range: 0.020-0.100 wt%; 5 standards per set, 100ml each
SITCS5(L)	SULFUR STANDARDS FOR CANADIAN GENERAL STANDARDS BOARD LOW RANGE <b>FLAMMABLE UN1993</b>	CAN/GS-3.0 NO. 16.1-98	Di-N-butyl sulfide in Isooctane-Toluene mixture. Conc. Range: 0-0.020 wt% S; 5 standards per set, 100ml each
SITCS9	SULFUR STANDARDS FOR CANADIAN GENERAL STANDARDS BOARD COMPLETE RANGE <b>FLAMMABLE UN1993</b>	CAN/GS-3.0 NO. 16.1-98	Di-N-butyl sulfide in Isooctane-Toluene mixture. Conc. Range: 0-0.1000 wt% S; 9 standards per set, 100ml each
SMO10	SULFUR IN MINERAL OIL	ASTM D2622 & D4294	Di-N-butyl sulfide in mineral oil. Conc. Range: 0-0.100 wt% S; 10 standards per set, 100ml each
SMO10(HL)	SULFUR IN MINERAL OIL	ASTM D2622 & D4294	Di-N-butyl sulfide in mineral oil. Conc. Range: 0-5.00 wt% S; 10 standards per set, 100ml each
SMO11	SULFUR IN MINERAL OIL COMPLETE RANGE	ASTM D4294-98	Di-N-butyl sulfide in mineral oil. Conc. Range: 0-5.00 wt% S; 11 standards per set, 100ml each
SMO6H	SULFUR IN MINERAL OIL HIGH RANGE	ASTM D4294-98	Di-N-butyl sulfide in mineral oil. Conc. Range: 0.100-5.000 wt% S; 6 standards per set, 100ml each
SMO7L	SULFUR IN MINERAL OIL LOW RANGE	ASTM D4294-98	Di-N-butyl sulfide in mineral oil. Conc. Range: 0-0.100 wt% S; 7 standards per set, 100ml each
SMOCS10	SULFUR STANDARDS FOR CANADIAN GENERAL STANDARDS BOARD COMPLETE RANGE	CAN/GS-3.0 NO. 16.0-95	Di-N-butyl sulfide in mineral oil. Conc. Range: 0-0.5000 wt%; 10 standards per set, 100ml each
SMOCS5(H)	SULFUR STANDARDS FOR CANADIAN GENERAL STANDARDS BOARD HIGH RANGE	CAN/GS-3.0 NO. 16.0-95	Di-N-butyl sulfide in mineral oil. Conc. Range: 0.100-0.500 wt% S; 5 standards per set, 100ml each

<b>Product Code</b>	<b>Product</b>	<b>Method</b>	<b>Description</b>
SMOCS6(L)	SULFUR STANDARDS FOR CANADIAN STANDARDS BOARD LOW RANGE	CAN/GS-3.0 NO. 16.0-95	Di-N-butyl sulfide in mineral oil. Conc. Range: 0-0.1000 wt% S; 6 standards per set, 100ml each
SRO10	SULFUR IN RESIDUAL OIL	ASTM D2622 & D4294-98	Di-N-butyl sulfide in residual oil. Conc. Range: 0.25-5.00 wt% S; 10 standards per set, 100ml each

<b>S(BS)I13</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.0010
3	0.0020
4	0.0030
5	0.0050
6	0.0100
7	0.0200
8	0.0300
9	0.0400
10	0.0600
11	0.1000
12	0.2000
13	0.3000

<b>S(BS)IT10</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.0005
3	0.0010
4	0.0030
5	0.0050
6	0.0075
7	0.0100
8	0.0300
9	0.0500
10	0.1000

<b>S(T)IT10</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.0005
3	0.0010
4	0.0030
5	0.0050
6	0.0075
7	0.0100
8	0.0300
9	0.0500
10	0.1000

<b>SCO10</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0800
2	0.1000
3	0.2500
4	0.5000
5	1.0000
6	1.5000
7	2.0000
8	3.0000
9	4.0000
10	5.0000

<b>SCO7</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0800
2	0.1000
3	0.2500
4	0.5000
5	1.0000
6	1.5000
7	2.0000

<b>SDF10</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.1000
3	0.2500
4	0.5000
5	1.0000
6	1.5000
7	2.0000
8	3.0000
9	4.0000
10	5.0000

<b>SDF7</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.0200
3	0.0400
4	0.0500
5	0.0600
6	0.0800
7	0.1000

<b>SIO11</b>	
<b>Standard No.</b>	<b>Sulfur (ng/μL)</b>
1	0.0000
2	0.5000
3	1.0000
4	2.5000
5	5.0000
6	10.000
7	25.000
8	50.000
9	100.00
10	500.00
11	1000.0

<b>SIO3(H)</b>	
<b>Standard No.</b>	<b>Sulfur (ng/μL)</b>
1	100.00
2	500.00
3	1000.0

<b>SIO4(M)</b>	
<b>Standard No.</b>	<b>Sulfur (ng/μL)</b>
1	5.0000
2	25.000
3	50.000
4	100.00

<b>SIO6(L)</b>	
<b>Standard No.</b>	<b>Sulfur (ng/μL)</b>
1	0.0000
2	0.5000
3	1.0000
4	2.5000
5	5.0000
6	10.000

<b>SISOH7</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.4000
3	0.7000
4	1.0000
5	1.5000
6	2.0000
7	2.5000

<b>SISOL8</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.0010
3	0.0050
4	0.0100
5	0.0250
6	0.0500
7	0.0750
8	0.1000

<b>SITCS5(H)</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0200
2	0.0350
3	0.0500
4	0.0750
5	0.1000

<b>SITCS5(L)</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.0010
3	0.0050
4	0.0100
5	0.0200

<b>SITCS9</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.0010
3	0.0050
4	0.0100
5	0.0200
6	0.0350
7	0.0500
8	0.0750
9	0.1000

<b>SMO10</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.0025
3	0.0050
4	0.0100
5	0.0200
6	0.0400
7	0.0500
8	0.0600
9	0.0800
10	0.1000

<b>SMO10(HL)</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.1000
3	0.2000
4	0.5000
5	0.7500
6	1.0000
7	2.0000
8	3.0000
9	4.0000
10	5.0000

<b>SMO11</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.0020
3	0.0050
4	0.0100
5	0.0300
6	0.0600
7	0.1000
8	0.5000
9	1.0000
10	2.5000
11	5.0000

<b>SMO6H</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.1000
3	0.5000
4	1.0000
5	2.5000
6	5.0000

<b>SMO7L</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.0020
3	0.0050
4	0.0100
5	0.0300
6	0.0600
7	0.1000

<b>SMOCS10</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.0100
3	0.0300
4	0.0500
5	0.0700
6	0.1000
7	0.2000
8	0.3000
9	0.4000
10	0.5000

<b>SMOCS5(H)</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.1000
2	0.2000
3	0.3000
4	0.4000
5	0.5000

<b>SMOCS6(L)</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.0000
2	0.0100
3	0.0300
4	0.0500
5	0.0700
6	0.1000

<b>SRO10</b>	
<b>Standard No.</b>	<b>Sulfur wt%</b>
1	0.2500
2	0.5000
3	1.0000
4	1.5000
5	2.0000
6	2.5000
7	3.0000
8	3.5000
9	4.0000
10	5.0000

## 1.2 SULFUR AND METALS IN OIL

Product Code	Product	Description
SFNVMO12	SULFUR AND METALS IN MINERAL OIL S, Fe, Ni, V	For the analysis of fuel and residual oils. Concentration of Fe, Ni and V are independent of the sulfur concentration. Each certified component added independently. Conc. Ranges: S:0.500-5.500 wt% V:25-500ppm Ni:5-100ppm Fe:50-500ppm 12 standards per set, 100ml each
SFNVRO12	SULFUR AND METALS IN RESIDUAL FUEL OIL S, Fe, Ni, V	Same as SFNVMO except that the matrix is residual fuel oil; 12 standards per set, 100ml each
SNVMO12	SULFUR AND METALS IN MINERAL OIL S, Ni, V	For the analysis of fuel and residual oils. Concentrations of Ni and V are independent of the sulfur concentration. Each certified component added independently. Conc. Ranges: S:0.50-5.500 wt% Ni:5-100ppm V:25-500ppm; 12 standards per set, 100ml each
SNVRO12	SULFUR AND METALS IN RESIDUAL FUEL OIL S, Ni, V	Same as SNVMO except that the matrix is residual fuel oil; 12 standards per set, 100ml each

SFNVMO12				
Standard No.	Sulfur wt%	Iron (ppm)	Nickel (ppm)	Vanadium (ppm)
1	0.0000	0	0	0
2	0.5000	300	10	500
3	1.0000	500	100	25
4	0.0000	100	80	250
5	2.0000	200	40	100
6	2.5000	400	5	400
7	3.0000	0	60	300
8	3.5000	500	0	200
9	0.0000	100	100	0
10	4.5000	300	50	250
11	5.0000	200	20	500
12	5.5000	50	100	50

<b>SFNVRO12</b>				
<b>Standard No.</b>	<b>Sulfur wt%</b>	<b>Iron(ppm)</b>	<b>Nickel (ppm)</b>	<b>Vanadium (ppm)</b>
1	0.1850	1	4	13
2	0.5000	300	10	500
3	1.0000	500	100	25
4	0.0000	100	80	250
5	2.0000	200	40	100
6	2.5000	400	5	400
7	3.0000	1	60	300
8	3.5000	500	4	200
9	0.0000	100	100	13
10	4.5000	300	50	250
11	5.0000	200	20	500
12	5.5000	50	100	50

<b>SNVMO12</b>			
<b>Standard No.</b>	<b>Sulfur wt%</b>	<b>Nickel (ppm)</b>	<b>Vanadium (ppm)</b>
1	0.0000	0	0
2	0.5000	10	500
3	1.0000	100	25
4	1.5000	80	250
5	2.0000	40	100
6	2.5000	5	400
7	3.0000	60	300
8	3.5000	0	200
9	4.0000	100	0
10	4.5000	50	250
11	5.0000	20	500
12	5.5000	100	50

<b>SNVRO12</b>			
<b>Standard No.</b>	<b>Sulfur wt%</b>	<b>Nickel (ppm)</b>	<b>Vanadium (ppm)</b>
1	0.1850	4	1
2	0.5000	10	500
3	1.0000	100	0
4	1.5000	80	250
5	2.0000	40	100
6	2.5000	5	400
7	3.0000	60	300
8	3.5000	0	200
9	4.0000	100	0
10	4.5000	50	250
11	5.0000	20	500
12	5.5000	100	50

### 1.3 CHLORINE STANDARDS

<b>Product Code</b>	<b>Product</b>	<b>Description</b>
CLW07	CHLORINE IN WASTE OIL	Chlorinated hydrocarbon in waste oil. Conc. Range: 0-1.00 wt% Cl; 7 standards per set, 100ml each

<b>CLW07</b>	
<b>Standard No.</b>	<b>Chlorine wt%</b>
1	0.0500
2	0.2000
3	0.4000
4	0.5000
5	0.6000
6	0.8000
7	1.0000

## 1.4 CHLORINE AND SULFUR STANDARDS

Product Code	Product	Description
CLSMO10	CHLORINE AND SULFUR IN MINERAL OIL.	Chlorinated hydrocarbon and Di-N-butyl sulfide in mineral oil. Conc. Range: Cl: 0-1.00 wt% S: 0-1.00 wt% 10 standards per set, 100ml each
CLSWO10	CHLORINE AND SULFUR IN WASTE OIL.	Chlorinated hydrocarbon and Di-N-butyl sulfide in waste oil. Conc. Range: Cl: 0-1.00 wt% S: 0-2.50 wt% 10 standards per set, 100ml each

### CLSMO10

Standard No.	Sulfur wt%	Chlorine wt%
1	0.0000	0.0000
2	0.1000	0.8000
3	0.6000	0.5000
4	0.2000	0.3000
5	0.7000	0.2000
6	0.3000	0.6000
7	0.4000	0.1000
8	0.5000	0.4000
9	0.8000	1.0000
10	1.0000	0.0000

### CLSWO10

Standard No.	Sulfur wt%	Chlorine wt%
1	0.5000	1.0000
2	2.5000	0.0200
3	0.5000	0.6500
4	1.0000	0.2000
5	1.5000	0.5000
6	1.7500	0.8000
7	1.2500	0.0500
8	2.0000	1.0000
9	2.2500	0.3800
10	0.7500	0.1000

## 1.5 LEAD STANDARDS

Product Code	Product	Method	Description
BIIS	BISMUTH INTERNAL STANDARD	ASTM 5059	Internal Standard Conc: 0.793g Bi/L
PBG7A	LEAD IN GASOLINE <b>FLAMMABLE UN1203</b>	ASTM D5059, PART A	7 standards per set, 100ml each
PBG7C	LEAD IN GASOLINE <b>FLAMMABLE UN1203</b>	ASTM D5059, PART C	7 standards per set, 100ml each
PBG12	LEAD IN GASOLINE <b>FLAMMABLE UN1203</b>	ASTM D5059, PARTS A & C	This set is made up of PBG7A and PBG7C 12 standards per set, 100ml each; one each of blank and 0.1%
PBI07A	LEAD IN ISOOCTANE <b>FLAMMABLE UN1262</b>	ASTM D5059, PART A	7 standards per set, 100ml each
PBI07C	LEAD IN ISOOCTANE <b>FLAMMABLE UN1262</b>	ASTM D5059, PART C	7 standards per set, 100ml each
PBI012	LEAD IN TOLUENE <b>FLAMMABLE UN1294</b>	ASTM D5059, PARTS A & C	This set is made up of PBI07A and PBI07C 12 standards per set, 100ml each; one each of blank and 0.1%
PBT7A	LEAD IN TOLUENE <b>FLAMMABLE UN1294</b>	ASTM D5059, PART A	7 standards per set, 100ml each
PBT7C	LEAD IN TOLUENE <b>FLAMMABLE UN1294</b>	ASTM D5059, PART C	7 standards per set, 100ml each
PBT12	LEAD IN ISOOCTANE <b>FLAMMABLE UN1262</b>	ASTM D5059, PARTS A & C	This set is made up of PBT7A and PBT7C 12 standards per set, 100ml each; one each of blank and 0.1%

<b>PBG7A</b>	
<b>Standard No.</b>	<b>Lead (g/Gal.)</b>
1	0.000
2	0.100
3	1.000
4	2.000
5	3.000
6	4.000
7	5.000

<b>PBG7C</b>	
<b>Standard No.</b>	<b>Lead (g/Gal.)</b>
1	0.000
2	0.001
3	0.005
4	0.010
5	0.050
6	0.100
7	0.300

<b>PBG12</b>	
<b>Standard No.</b>	<b>Lead (g/Gal.)</b>
1	0.000
2	0.001
3	0.005
4	0.010
5	0.050
6	0.100
7	0.300
8	1.000
9	2.000
10	3.000
11	4.000
12	5.000

<b>PBIO7A</b>	
<b>Standard No.</b>	<b>Lead (g/Gal.)</b>
1	0.000
2	0.100
3	1.000
4	2.000
5	3.000
6	4.000
7	5.000

<b>PBIO7C</b>	
<b>Standard No.</b>	<b>Lead (g/Gal.)</b>
1	0.000
2	0.001
3	0.005
4	0.010
5	0.050
6	0.100
7	0.300

<b>PBIO12</b>	
<b>Standard No.</b>	<b>Lead (g/Gal.)</b>
1	0.000
2	0.001
3	0.005
4	0.010
5	0.050
6	0.100
7	0.300
8	1.000
9	2.000
10	3.000
11	4.000
12	5.000

<b>PBT7A</b>	
<b>Standard No.</b>	<b>Lead (g/Gal.)</b>
1	0.000
2	0.100
3	1.000
4	2.000
5	3.000
6	4.000
7	5.000

<b>PBT7C</b>	
<b>Standard No.</b>	<b>Lead (g/Gal.)</b>
1	0.000
2	0.001
3	0.005
4	0.010
5	0.050
6	0.100
7	0.300

<b>PBT12</b>	
<b>Standard No.</b>	<b>Lead (g/Gal.)</b>
1	0.000
2	0.001
3	0.005
4	0.010
5	0.050
6	0.100
7	0.300
8	1.000
9	2.000
10	3.000
11	4.000
12	5.000

## 1.6 VANADIUM AND NICKEL STANDARDS WITH MANGANESE INTERNAL STANDARD FOR ISO/CD 14597

Product Code	Product	Method	Description
MNIS-0.05	MANGANESE INTERNAL STANDARD, 0.05%	ISO/CD 14596	500ml
NiISO7	NICKEL STANDARDS WITH 0.05% MANGANESE INTERNAL STANDARD <b>FLAMMABLE UN1307</b>	ISO/CD 14597	Nickel reagent and 0.05% Manganese internal standard in xylene-mineral oil. Conc. Range: 0-0.0100 wt% Mn; 7 standards per set, 100ml each
VISOH7	VANADIUM STANDARD, HIGH RANGE WITH 0.05% MANGANESE INTERNAL STANDARD <b>FLAMMABLE UN1307</b>	ISO/CD 14597	Vanadium reagent and 0.05% Manganese internal standard in xylene-mineral oil. Conc. Range: 0.03-0.100 wt% V; 7 standards per set, 100ml each
VISOL9	VANADIUM STANDARDS, LOW RANGE, WITH 0.05% MANGANESE INTERNAL STANDARD <b>FLAMMABLE UN1307</b>	ISO/CD 14597	Vanadium reagent and 0.05% Manganese internal standard in xylene-mineral oil. Conc. Range: 0.0005-0.0200 wt% V; 9 standards per set, 100ml each

<b>NiISO7</b>	
<b>Standard No.</b>	<b>Nickel wt%</b>
1	0.0000
2	0.0005
3	0.0010
4	0.0025
5	0.0050
6	0.0070
7	0.0100

<b>VISOH7</b>	
<b>Standard No.</b>	<b>Vanadium wt%</b>
1	0.0000
2	0.0300
3	0.0400
4	0.0500
5	0.0600
6	0.0800
7	0.1000

<b>VISOL9</b>	
<b>Standard No.</b>	<b>Vanadium wt%</b>
1	0.0005
2	0.0025
3	0.0050
4	0.0075
5	0.0100
6	0.0125
7	0.0150
8	0.0175
9	0.0200

## 1.7 LUBRICATING OIL STANDARDS

Product Code	Product	Method	Description
LOA11	LUBRICATING OIL ADDITIVES Ca,P,S,Zn	ASTM D6481, 6443, 4927	Similar to LOE17, but additive package concentration ranges; 11 standards per set, 100ml each
LOE10	LUBRICATING OIL ELEMENTS Ca,Cl,Cu,Mg,P,S,Zn	ASTM D6481, 6443, 4927	Abbreviated set for ASTM method; 10 standards per set, 100ml each
LOE17	LUBRICATING OIL ELEMENTS Ca,P,S,Zn	ASTM D6481, 6443, 4927	Engine oil. 17 standards per set, 100ml each
LOE17A	LUBRICATING OIL ELEMENTS Ca,Cl,P,S,Zn	ASTM D6481, 6443, 4927	Same as LOE17, but also contains Chlorine. 17 standards per set, 100ml each
LOE17A/B	LUBRICATING OIL ELEMENTS Ba,Ca,Cl,P,S, Zn	ASTM D6481, 6443, 4927	Same as LOE17, but also contains Barium and Chlorine. 17 standards per set, 100ml each
LOE17B	LUBRICATING OIL ELEMENTS Ba,Ca,P,S,Zn	ASTM D6481, 6443, 4927	Same as LOE17, but also contains Barium. 17 standards per set, 100ml each
LOE17B/C	LUBRICATING OIL ELEMENTS Ba,Ca,Mg,P,S, Zn	ASTM D6481, 6443, 4927	Same as LOE17, but also contains Barium and Magnesium. 17 standards per set, 100ml each
LOE17C	LUBRICATING OIL ELEMENTS Ca,Mg,P,S,Zn	ASTM D6481, 6443, 4927	Same as LOE17, but also contains Magnesium. 17 standards per set, 100ml each

Product Code	Product	Method	Description
LOE22	LUBRICATING OIL ELEMENTS Ca,Cl,Cu,Mg,P,S,Zn	ASTM D4927	Complete set for the ASTM method. 22 standards per set, 100ml each
LOE23	LUBRICATING OIL ELEMENTS Ba,Ca,Cl,Cu,Mg,P,S,Zn	ASTM D6481, 6443, 4927	Same as LOE22, but contains Barium. 23 standards per set, 100ml each
LOEASTM1	LUBRICATING OIL ELEMENTS Ca,P,S,Zn	ASTM D6481, 6443, 4927	Same as LOE17, but slightly different concentration ranges. 17 standards per set, 100ml each
LOEASTM2	LUBRICATING OIL ELEMENTS Ba,Ca,Cu,Cl,Mg,P,S,Zn	ASTM D6481, 6443, 4927	Same as LOE10, but also contains Barium. 10 standards per set, 100ml each
LOEASTM4	LUBRICATING OIL ELEMENTS Ca,Mg,P,S,Zn	ASTM D6481, 6443, 4927	Same as LOEASTM1, but also contains Magnesium. 17 standards per set, 100ml each

<b>LOA11</b>				
Standard No.	wt% Ca	wt% P	wt% S	wt% Zn
1	0.5000	1.0000	0.5000	0.5000
2	2.5000	1.0000	2.5000	2.0000
3	2.0000	1.2500	1.0000	1.5000
4	5.0000	0.0000	0.0000	0.0000
5	4.0000	0.5000	1.2500	0.5000
6	2.5120	0.7500	4.0000	1.0000
7	4.0000	0.0000	1.5000	1.0000
8	0.5080	2.0000	5.0000	1.0000
9	1.0000	0.7500	2.0000	1.5000
10	2.5000	1.2000	3.0000	0.5000
11	0.0000	0.0000	0.0000	0.0000

<b>LOE10</b>							
<b>Standard No.</b>	<b>wt% Ca</b>	<b>wt%Cl</b>	<b>wt%Cu</b>	<b>wt%Mg</b>	<b>wt%P</b>	<b>wt%S</b>	<b>wt%Zn</b>
1	0.0200	0.0300	0.0100	0.2000	0.2500	1.0000	0.0200
2	0.0200	0.0200	0.0500	0.2000	0.0200	0.0200	0.2500
3	0.0200	0.2000	0.0100	0.0400	0.2500	0.1500	0.2500
4	0.0200	0.2000	0.0500	0.0400	0.0200	1.0000	0.0200
5	0.4000	0.0200	0.0100	0.0400	0.0200	1.0000	0.2500
6	0.4000	0.0200	0.0500	0.0400	0.2500	0.0200	0.0200
7	0.4000	0.2000	0.0100	0.2000	0.0200	0.0200	0.0500
8	0.4000	0.2000	0.0500	0.2000	0.2500	1.0000	0.2500
9	0.2000	0.1000	0.0250	0.0800	0.1500	0.5000	0.1000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

<b>LOE17</b>				
<b>Standard No.</b>	<b>wt% Ca</b>	<b>wt% P</b>	<b>wt% S</b>	<b>wt% Zn</b>
1	0.6000	0.0050	0.1750	0.0600
2	0.5000	0.2000	0.0500	0.0800
3	0.4000	0.1500	0.3000	0.1800
4	0.2600	0.2500	0.1500	0.1200
5	0.0050	0.0050	0.4500	0.0700
6	0.4000	0.0250	0.3500	0.1000
7	0.3000	0.0600	0.2500	0.1200
8	0.2000	0.1000	0.4500	0.1000
9	0.0600	0.0800	0.3000	0.1300
10	0.0600	0.0500	0.2000	0.0500
11	0.0500	0.1200	0.1000	0.0750
12	0.0250	0.1500	0.2000	0.1300
13	0.0050	0.2000	0.4000	0.1500
14	0.1700	0.2500	0.5500	0.1100
15	0.1000	0.1000	0.2000	0.2000
16	0.0100	0.0100	0.6000	0.2500
17	0.0000	0.0000	0.0000	0.0000

<b>LOE17A</b>					
<b>Standard No.</b>	<b>wt% Ca</b>	<b>wt% Cl</b>	<b>wt% P</b>	<b>wt% S</b>	<b>wt% Zn</b>
1	0.6000	0.1000	0.0050	0.1750	0.0600
2	0.5000	0.0000	0.2000	0.0500	0.0800
3	0.4000	0.0100	0.1500	0.3000	0.1800
4	0.2600	0.5000	0.2500	0.1500	0.1200
5	0.0050	1.0000	0.0050	0.4500	0.0700
6	0.4000	0.4000	0.0250	0.3500	0.1000
7	0.3000	0.1000	0.0600	0.2500	0.1200
8	0.2000	0.0100	0.1000	0.4500	0.1000
9	0.0600	0.0500	0.0800	0.3000	0.1300
10	0.0600	0.2000	0.0500	0.2000	0.0500
11	0.0500	0.5000	0.1200	0.1000	0.0750
12	0.0250	0.8000	0.1500	0.2000	0.1300
13	0.0050	1.0000	0.2000	0.4000	0.1500
14	0.1700	0.6000	0.2500	0.5500	0.1100
15	0.1000	0.2000	0.1000	0.2000	0.2000
16	0.0100	0.4000	0.0100	0.6000	0.2500
17	0.0000	0.0000	0.0000	0.0000	0.0000

<b>LOE17A/B</b>						
<b>Standard No.</b>	<b>wt% Ba</b>	<b>wt% Ca</b>	<b>wt% Cl</b>	<b>wt% P</b>	<b>wt% S</b>	<b>wt% Zn</b>
1	0.1000	0.6000	0.1000	0.0050	0.1750	0.0600
2	0.1750	0.5000	0.0000	0.2000	0.0500	0.0800
3	0.0000	0.4000	0.0100	0.1500	0.3000	0.1800
4	0.0250	0.2600	0.5000	0.2500	0.1500	0.1200
5	0.1500	0.0050	1.0000	0.0050	0.4500	0.0700
6	0.0000	0.4000	0.4000	0.0250	0.3500	0.1000
7	0.2000	0.3000	0.1000	0.0600	0.2500	0.1200
8	0.0000	0.2000	0.0100	0.1000	0.4500	0.1000
9	0.1000	0.0600	0.0500	0.0800	0.3000	0.1300
10	0.0500	0.0600	0.2000	0.0500	0.2000	0.0500
11	0.0750	0.0500	0.5000	0.1200	0.1000	0.0750
12	0.0100	0.0250	0.8000	0.1500	0.2000	0.1300
13	0.0050	0.0050	1.0000	0.2000	0.4000	0.1500
14	0.0000	0.1700	0.6000	0.2500	0.5500	0.1100
15	0.0000	0.1000	0.2000	0.1000	0.2000	0.2000
16	0.0050	0.0100	0.4000	0.0100	0.6000	0.2500
17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

<b>LOE17B</b>					
<b>Standard No.</b>	<b>wt% Ba</b>	<b>wt% Ca</b>	<b>wt% P</b>	<b>wt% S</b>	<b>wt% Zn</b>
1	0.1000	0.6000	0.0050	0.1750	0.0600
2	0.1750	0.5000	0.2000	0.0500	0.0800
3	0.0000	0.4000	0.1500	0.3000	0.1800
4	0.0250	0.2600	0.2500	0.1500	0.1200
5	0.1500	0.0050	0.0050	0.4500	0.0700
6	0.0000	0.4000	0.0250	0.3500	0.1000
7	0.2000	0.3000	0.0600	0.2500	0.1200
8	0.0000	0.2000	0.1000	0.4500	0.1000
9	0.1000	0.0600	0.0800	0.3000	0.1300
10	0.0500	0.0600	0.0500	0.2000	0.0500
11	0.0750	0.0500	0.1200	0.1000	0.0750
12	0.0100	0.0250	0.1500	0.2000	0.1300
13	0.0050	0.0050	0.2000	0.4000	0.1500
14	0.0000	0.1700	0.2500	0.5500	0.1100
15	0.0000	0.1000	0.1000	0.2000	0.2000
16	0.0050	0.0100	0.0100	0.6000	0.2500
17	0.0000	0.0000	0.0000	0.0000	0.0000

<b>LOE17B/C</b>						
<b>Standard No.</b>	<b>wt% Ba</b>	<b>wt% Ca</b>	<b>wt% Mg</b>	<b>wt% P</b>	<b>wt% S</b>	<b>wt% Zn</b>
1	0.0250	0.6000	0.1000	0.0050	0.1750	0.0600
2	0.0000	0.5000	0.1500	0.2000	0.0500	0.0800
3	0.1000	0.4000	0.3500	0.1500	0.3000	0.1800
4	0.1750	0.2600	0.2250	0.2500	0.1500	0.1200
5	0.1500	0.0050	0.0000	0.0050	0.4500	0.0700
6	0.0000	0.4000	0.5000	0.0250	0.3500	0.1000
7	0.1000	0.3000	0.3250	0.0600	0.2500	0.1200
8	0.2000	0.2000	0.2500	0.1000	0.4500	0.1000
9	0.0500	0.0600	0.1000	0.0800	0.3000	0.1300
10	0.0750	0.0600	0.4000	0.0500	0.2000	0.0500
11	0.0100	0.0500	0.3000	0.1200	0.1000	0.0750
12	0.0000	0.0250	0.2000	0.1500	0.2000	0.1300
13	0.1750	0.0050	0.3750	0.2000	0.4000	0.1500
14	0.0050	0.1700	0.1750	0.2500	0.5500	0.1100
15	0.0000	0.1000	0.4250	0.1000	0.2000	0.2000
16	0.0050	0.0100	0.2750	0.0100	0.6000	0.2500
17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

<b>LOE17C</b>					
<b>Standard No.</b>	<b>wt% Ca</b>	<b>wt% Mg</b>	<b>wt% P</b>	<b>wt% S</b>	<b>wt% Zn</b>
1	0.6000	0.1000	0.0050	0.1750	0.0600
2	0.5000	0.1500	0.2000	0.0500	0.0800
3	0.4000	0.3500	0.1500	0.3000	0.1800
4	0.2600	0.2250	0.2500	0.1500	0.1200
5	0.0050	0.4500	0.0050	0.4500	0.0700
6	0.4000	0.5000	0.0250	0.3500	0.1000
7	0.3000	0.3250	0.0600	0.2500	0.1200
8	0.2000	0.2500	0.1000	0.4500	0.1000
9	0.0600	0.1000	0.0800	0.3000	0.1300
10	0.0600	0.4000	0.0500	0.2000	0.0500
11	0.0500	0.3000	0.1200	0.1000	0.0750
12	0.0250	0.2000	0.1500	0.2000	0.1300
13	0.0050	0.3750	0.2000	0.4000	0.1500
14	0.1700	0.1750	0.2500	0.5500	0.1100
15	0.1000	0.4250	0.1000	0.2000	0.2000
16	0.0100	0.2750	0.0100	0.6000	0.2500
17	0.0000	0.0000	0.0000	0.0000	0.0000

<b>LOE22</b>							
<b>Standard No.</b>	<b>wt% Ca</b>	<b>wt%Cl</b>	<b>wt%Cu</b>	<b>wt%Mg</b>	<b>wt%P</b>	<b>wt%S</b>	<b>wt%Zn</b>
1	0.3000	0.0800	0.0300	0.0600	0.0600	0.2750	0.0600
2	0.2500	0.1000	0.0000	0.0100	0.1500	0.0000	0.1500
3	0.5000	0.0000	0.0350	0.1600	0.1500	0.0000	0.0200
4	0.3500	0.0100	0.0000	0.1200	0.0800	0.2000	0.0000
5	0.1100	0.0000	0.0150	0.1000	0.1000	0.3000	0.0500
6	0.2000	0.1000	0.0000	0.2000	0.0500	0.2500	0.1500
7	0.0000	0.0500	0.0250	0.0000	0.0000	0.4500	0.0200
8	0.1500	0.0300	0.0000	0.1000	0.0300	0.4000	0.0400
9	0.2500	0.1500	0.0100	0.1600	0.0000	0.3500	0.0800
10	0.1100	0.1500	0.0400	0.0050	0.0300	0.7500	0.1500
11	0.2600	0.0500	0.0000	0.0000	0.0000	0.7500	0.0000
12	0.2000	0.0000	0.0050	0.1400	0.0800	0.5000	0.0800
13	0.0000	0.0000	0.0050	0.0200	0.0200	0.2000	0.0200
14	0.0700	0.1500	0.0200	0.0800	0.1400	0.6500	0.1500
15	0.0500	0.0000	0.0000	0.0000	0.1500	0.0000	0.0000
16	0.4000	0.0000	0.0010	0.0800	0.0000	0.5000	0.0200
17	0.1800	0.0200	0.0200	0.0000	0.0200	0.6000	0.0600
18	0.4000	0.0100	0.0010	0.0100	0.0200	0.2000	0.1000
19	0.0100	0.0200	0.0400	0.0100	0.0200	0.2000	0.1000
20	0.0500	0.0050	0.0500	0.0000	0.0080	0.0000	0.1200
21	0.2000	0.0500	0.0200	0.0800	0.0500	0.2750	0.0500
22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

LOE23								
Standard No.	wt%Ba	wt% Ca	wt%Cl	wt%Cu	wt%Mg	wt%P	wt%S	wt%Zn
1	0.1000	0.3000	0.0800	0.0300	0.0600	0.0600	0.2750	0.0600
2	0.1750	0.2500	0.1000	0.0000	0.0100	0.1500	0.0000	0.1500
3	0.0400	0.5000	0.0000	0.0350	0.1600	0.1500	0.0000	0.0200
4	0.0200	0.3500	0.0100	0.0000	0.1200	0.0800	0.2000	0.0000
5	0.1500	0.1100	0.0000	0.0150	0.1000	0.1000	0.3000	0.0500
6	0.0000	0.2000	0.1000	0.0000	0.2000	0.0500	0.2500	0.1500
7	0.2000	0.0000	0.0500	0.0250	0.0000	0.0000	0.4500	0.0200
8	0.0000	0.1500	0.0300	0.0000	0.1000	0.0300	0.4000	0.0400
9	0.0000	0.2500	0.1500	0.0100	0.1600	0.0000	0.3500	0.0800
10	0.0000	0.1100	0.1500	0.0400	0.0050	0.0300	0.7500	0.1500
11	0.1000	0.2600	0.0500	0.0000	0.0000	0.0000	0.7500	0.0000
12	0.0500	0.2000	0.0000	0.0050	0.1400	0.0800	0.5000	0.0800
13	0.0000	0.0000	0.0000	0.0050	0.0200	0.0200	0.2000	0.0200
14	0.0800	0.0700	0.1500	0.0200	0.0800	0.1400	0.6500	0.1500
15	0.0100	0.0500	0.0000	0.0000	0.0000	0.1500	0.0000	0.0000
16	0.0000	0.4000	0.0000	0.0010	0.0800	0.0000	0.5000	0.0200
17	0.0000	0.1800	0.0200	0.0200	0.0000	0.0200	0.6000	0.0600
18	0.0000	0.4000	0.0100	0.0010	0.0100	0.0200	0.0000	0.0000
19	0.1500	0.0100	0.0200	0.0400	0.0100	0.0200	0.2000	0.1000
20	0.0050	0.0500	0.0050	0.0500	0.0000	0.0080	0.0000	0.1200
21	0.1000	0.2000	0.0500	0.0200	0.0800	0.0500	0.2750	0.0500
22	0.1200	0.2000	0.0000	0.0000	0.0000	0.0000	0.7500	0.0000
23	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

<b>LOEASTM1</b>				
<b>Standard No.</b>	<b>wt% Ca</b>	<b>wt% P</b>	<b>wt% S</b>	<b>wt% Zn</b>
1	0.0050	0.0050	0.0500	0.0500
2	0.6000	0.0000	0.0000	0.0000
3	0.0000	0.3000	0.0000	0.0000
4	1.0000	0.0000	1.0000	0.0000
5	0.0000	0.0000	0.0000	0.3000
6	0.0050	0.2500	0.8000	0.3000
7	0.5000	0.1500	0.5000	0.1500
8	0.0100	0.2000	0.1000	0.2500
9	0.0500	0.0100	0.4000	0.0750
10	0.1000	0.1500	0.2000	0.2000
11	0.2000	0.2000	0.8000	0.1000
12	0.4000	0.0050	0.8000	0.3000
13	0.6000	0.1000	0.5000	0.0500
14	0.8000	0.0100	0.0500	0.1000
15	1.0000	0.3000	1.0000	0.1500
16	0.4000	0.0500	0.6000	0.2500
17	0.0000	0.0000	0.0000	0.0000

<b>LOEASTM2</b>								
<b>Standard No.</b>	<b>wt%Ba</b>	<b>wt%Ca</b>	<b>wt%Cl</b>	<b>wt%Cu</b>	<b>wt%Mg</b>	<b>wt%P</b>	<b>wt%S</b>	<b>wt%Zn</b>
1	0.0200	0.0200	0.0300	0.0100	0.2000	0.2500	1.0000	0.0200
2	0.2500	0.0200	0.0200	0.0500	0.2000	0.0200	0.0200	0.2500
3	0.0200	0.0200	0.2000	0.0100	0.0400	0.2500	0.1500	0.2500
4	0.2500	0.0200	0.2000	0.0500	0.0400	0.0200	1.0000	0.0200
5	0.0200	0.4000	0.0200	0.0100	0.0400	0.0200	1.0000	0.2500
6	0.2500	0.4000	0.0200	0.0500	0.0400	0.2500	0.0200	0.0200
7	0.0200	0.4000	0.2000	0.0100	0.2000	0.0200	0.0200	0.0500
8	0.2500	0.4000	0.2000	0.0500	0.2000	0.2500	1.0000	0.2500
9	0.1300	0.2000	0.1000	0.0250	0.0800	0.1500	0.5000	0.1000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

<b>LOEASTM4</b>					
<b>Standard No.</b>	<b>wt% Ca</b>	<b>wt%P</b>	<b>wt%S</b>	<b>wt%Zn</b>	<b>wt%Mg</b>
1	0.0050	0.0050	0.0500	0.0500	0.1000
2	0.6000	0.0000	0.0000	0.0000	0.1500
3	0.0000	0.3000	0.0000	0.0000	0.3500
4	1.0000	0.0000	1.0000	0.0000	0.2250
5	0.0000	0.0000	0.0000	0.3000	0.4500
6	0.0050	0.2500	0.8000	0.3000	0.5000
7	0.5000	0.1500	0.5000	0.1500	0.3250
8	0.0100	0.2000	0.1000	0.2500	0.2500
9	0.0500	0.0100	0.4000	0.0750	0.0500
10	0.1000	0.1500	0.2000	0.2000	0.4000
11	0.2000	0.2000	0.8000	0.1000	0.3000
12	0.4000	0.0050	0.8000	0.3000	0.2000
13	0.6000	0.1000	0.5000	0.0500	0.3750
14	0.8000	0.0100	0.0500	0.1000	0.1750
15	1.0000	0.3000	1.0000	0.1500	0.4250
16	0.4000	0.0500	0.6000	0.2500	0.2750
17	0.0000	0.0000	0.0000	0.0000	0.0000

## 1.8 METAL WORKING FLUIDS

Product Code	Product	Description
MWFL13	METAL WORKING FLUIDS LUBRICANT CI, P, S	For the analysis of lubricant base metal working fluids. 13 standards per set, 100ml each

<b>MWFL13</b>			
Standard No.	wt% CI	wt% P	wt% S
1	0.0000	0.0000	0.0000
2	0.7500	0.0250	0.5000
3	0.0500	0.1000	3.0000
4	1.0000	0.5000	2.5000
5	0.1000	0.0050	2.0000
6	1.5000	0.2000	1.0000
7	2.0000	0.0050	3.0000
8	1.0000	0.0500	0.1000
9	0.5000	0.4000	0.0000
10	2.0000	0.2000	1.5000
11	0.0000	0.5000	1.5000
12	1.2500	0.0100	0.0500
13	0.0500	0.3000	0.0500



## 2 STABILIZED ORGANO-METALLIC SOLUTIONS

### 2.1 LOMS: Concentrated Liquid Organo-Metallic Solutions

(Stabilized and Ready for Use)

These concentrated solutions are stabilized with Analytical Services, Inc. proprietary chelation and stabilization solution, and can be used to formulate sets of standards for the analysis of additive elements in lubricating oils; iron, nickel and vanadium in residual oil, and wear metals in oils for X-Ray Fluorescence Spectroscopy (XRF). These organo-metallic solutions can also be used to prepare single element or multi-element standards for plasma emission (ICP or DCP), rotating disk (rotrode), or atomic absorption spectroscopy (AA). The starting materials for the standards are ULTRAPURE REAGENTS and have been certified against NIST SRM'S whenever available. **THEY DO NOT CONTAIN PHOSPHORUS OR SULFUR, unless otherwise noted. TRACE IMPURITIES ARE DOCUMENTED ON THE CERTIFICATION OF ANALYSIS.**

Available in 25g, 50g and 100g

Element	Product Code	Conc. wt%
Aluminum	LOMSAI 3.0	3.0000
Antimony	LOMSSb 2.0	2.0000
Barium	LOMSBa 12.5	12.500
Cadmium	LOMSCd 10.0	10.000
Calcium	LOMSCa 5.0	5.0000
Cerium	LOMSCe 5.0	5.0000
Chromium	LOMSCr3.50	3.5000
Cobalt	LOMSCo 7.5	7.5000
Copper	LOMSCu 6.0	6.0000
Iron	LOMSFe 4.0	4.0000
Lead	LOMSPb 20.0	20.000
Lithium	LOMSLi 1.5	1.5000
Magnesium	LOMSMg 3.0	3.0000
Manganese	LOMSMn 6.0	6.0000
Molybdenum	LOMSMo 5.0	5.0000
Nickel	LOMSNi 5.0	5.0000
Phosphorus	LOMSP 5.0	5.0000
Potassium	LOMSK 7.5	7.5000
Praseodymium	LOMSPr 3.0	3.0000

<b>Element</b>	<b>Product Code</b>	<b>Conc. wt%</b>
Selenium	LOMSSe 3.5	3.5000
Silicon	LOMSSi 7.5	7.5000
Sodium	LOMSNa 2.5	2.5000
Strontium	LOMSSr 10.0	10.000
Thallium	LOMSTI 5.0	5.0000
Tin	LOMSSn 7.5	7.5000
Titanium	LOMSTi 5.0	5.0000
Vanadium	LOMSV 4.0	4.0000
Yttrium	LOMSY 2.5	2.5000
Zinc	LOMSZn 6.0	6.0000
Zirconium	LOMSZr 5.0	5.0000
<b>Custom</b>	<b>Price per g/Element</b>	<b>On request</b>

## 2.2 ORGM'S-DILUTE SINGLE-ELEMENT ORGANO-METALLIC OIL STANDARDS

These standards are sulfur free, unless otherwise noted, organo-metallic standards for X-ray Fluorescence (XRF), plasma emission (ICP or DCP), rotating disk (rotrode), or atomic absorption (AA). They are also stabilized with Analytical Services, Inc. proprietary chelation and solution and can be blended together to prepare multi-element standards.

Available in 50 ml and 100 ml

Element	Product Code	Conc. wt%
Aluminum	ORGM-AI0.1	0.1000
Aluminum	ORGM-AI0.5	0.5000
Antimony	ORGM-Sb0.1	0.1000
Antimony	ORGM-Sb0.5	0.5000
Arsenic	ORGM-As0.1	0.1000
Arsenic	ORGM-As0.5	0.5000
Barium	ORGM-Ba0.1	0.1000
Barium	ORGM-Ba0.5	0.5000
Beryllium	ORGM-Be0.1	0.1000
Beryllium	ORGM-Be0.5	0.5000
Cadmium	ORGM-Cd0.1	0.1000
Cadmium	ORGM-Cd0.5	0.5000
Calcium	ORGM-Ca0.1	0.1000
Calcium	ORGM-Ca0.5	0.5000
Cerium	ORGM-Ce0.1	0.1000
Cerium	ORGM-Ce0.5	0.5000
Chromium	ORGM-Cr0.1	0.1000
Chromium	ORGM-Cr0.5	0.5000
Cobalt	ORGM-Co0.1	0.1000
Cobalt	ORGM-Co0.5	0.5000
Copper	ORGM-Cu0.1	0.1000
Copper	ORGM-Cu0.5	0.5000
Gallium	ORGM-Ga0.1	0.1000
Gallium	ORGM-Ga0.5	0.5000
Gold	ORGM-Au0.1	0.1000
Iron	ORGM-Fe0.1	0.1000
Iron	ORGM-Fe0.5	0.5000
Lead	ORGM-Pb0.1	0.1000
Lead	ORGM-Pb0.5	0.5000
Lithium	ORGM-Li0.1	0.1000
Lithium	ORGM-Li0.5	0.5000

<b>Element</b>	<b>Product Code</b>	<b>Conc. wt%</b>
Magnesium	ORGM-Mg0.1	0.1000
Magnesium	ORGM-Mg0.5	0.5000
Manganese	ORGM-Mn0.1	0.1000
Manganese	ORGM-Mn0.5	0.5000
Mercury	ORGM-Hg0.1	0.1000
Mercury	ORGM-Hg0.5	0.5000
Molybdenum	ORGM-Mo0.1	0.1000
Molybdenum	ORGM-Mo0.5	0.5000
Nickel	ORGM-Ni0.1	0.1000
Nickel	ORGM-Ni0.5	0.5000
Phosphorous	ORGM-P0.1	0.1000
Phosphorous	ORGM-P0.5	0.5000
Potassium	ORGM-K0.1	0.1000
Potassium	ORGM-K0.5	0.5000
Scandium (contains S)	ORGM-Sc0.1	0.1000
Scandium (contains S)	ORGM-Sc0.5	0.5000
Selenium	ORGM-Se0.1	0.1000
Selenium	ORGM-Se0.5	0.5000
Silicon	ORGM-Si0.1	0.1000
Silicon	ORGM-Si0.5	0.5000
Silver	ORGM-Ag0.1	0.1000
Silver	ORGM-Ag0.5	0.5000
Sodium	ORGM-Na0.1	0.1000
Sodium	ORGM-Na0.5	0.5000
Strontium	ORGM-Sr0.1	0.1000
Strontium	ORGM-Sr0.5	0.5000
Thallium	ORGM-Tl0.1	0.1000
Thallium	ORGM-Tl0.5	0.5000
Tin	ORGM-Sn0.1	0.1000
Tin	ORGM-Sn0.5	0.5000
Titanium	ORGM-Ti0.1	0.1000
Titanium	ORGM-Ti0.5	0.5000
Vanadium	ORGM-V0.1	0.1000
Vanadium	ORGM-V0.5	0.5000
Yttrium	ORGM-Y0.1	0.1000
Yttrium	ORGM-Y0.5	0.5000
Zinc	ORGM-Zn0.1	0.1000
Zinc	ORGM-Zn0.5	0.5000
Zirconium	ORGM-Zr0.1	0.1000
Zirconium	ORGM-Zr0.5	0.5000

## 2.3 INTERNAL STANDARDS

<b>Product Code</b>	<b>Product</b>	<b>Method</b>	<b>Description</b>
BIIS	BISMUTH INTERNAL STANDARD	ASTM 5059	Pb analysis; Conc. 0.793g Bi/L, 1 per set
KIS	POTASSIUM IONIZATION SUPPRESSANT	ASTM D4628	1% Potassium in mineral oil, 1 per set
MNIS	MANGANESE INTERNAL STANDARD	ISO/CD 14596	Ni and V analysis; Conc. 0.05%, 1 per set
SNIS	TIN INTERNAL STANDARD		6.0% Tin, 1 per set
ZRIS-1	ZIRCONIUM INTERNAL STANDARD, LOW RANGE	ISO/CD14597	1% Zr; Low Range, sulfur analysis, 1 per set
ZRIS-18	ZIRCONIUM INTERNAL STANDARD, HIGH RANGE	ISO/CD14597	16% Zr; High Range, sulfur analysis, 1 per set



### 3 WEAR METAL STANDARDS

Sulfur free wear metals in 20 cSt lubricating oil for analysis by XRF, AA, ICP, or AE for applications for which sulfur interference is undesirable.

These standards are prepared with sulfur free ORGANO-METALLICS that do not contain metallic sulfonates.

Available in 4oz./100ml or 8oz./200ml

#### 3.1 WM-11 Standards

Al, Cr, Cu, Fe, Mg, Na, Ni, Pb, Si, Sn + Ti

Product Code	Concentration (ppm)
WM11-10	10.000
WM11-100	100.00
WM11-30	30.000
WM11-300	300.00
WM11-50	50.000
WM11-500	500.00
WM11-900	900.00

#### 3.2 WM-12 Standards

Ag, Al, Cr, Cu, Fe, Mg, Na, Ni, Pb, Si, Sn + Ti

Product Code	Concentration (ppm)
WM12-10	10.000
WM12-100	100.00
WM12-30	30.000
WM12-300	300.00
WM12-50	50.000
WM12-500	500.00
WM12-750	750.00
WM12-900	900.00

### 3.3 WM-20 Standards

Al, B, Ba, Ca, Cd, Cr, Cu, Fe, Mg, Mn, Mo, Na, Ni, P, Pb, Si, Sn, Ti, V + Zn

Product Code	Concentration (ppm)
WM20-10	10.000
WM20-100	100.00
WM20-30	30.000
WM20-300	300.00
WM20-50	50.000
WM20-500	500.00
WM20-900	900.00

### 3.4 WM-21 Standards

Ag, Al, B, Ba, Ca, Cd, Cr, Cu, Fe, Mg, Mn, Mo, Na, Ni, P, Pb, Si, Sn, Ti, V + Zn

Product Code	Concentration (ppm)
WM21-10	10.000
WM21-100	100.00
WM21-200	200.00
WM21-30	30.000
WM21-300	300.00
WM21-50	50.000
WM21-500	500.00
WM21-750	750.00
WM21-900	900.00

## 4 REAGENTS

**DB – Dibenzothiophene, 17.3 wt% S (solid)**

**DBS – DBS - Di-N-Butyl Sulfide 21.9 wt% S (liquid)**

**TNA – Benzothiophene 23.4 wt% S (solid)**

<b>4.1 Dibenzothiophene, (17.3% S)</b>		
<b>Product Code: DB</b>		
<b>25 g</b>	<b>50 g</b>	<b>100 g</b>

<b>4.2 Di-N-Butyl Sulfide Certified Reagent, (21.9 wt% S)</b>		
<b>Product Code: DBS</b>		
<b>100g/4oz.</b>	<b>200g/8oz.</b>	<b>400g/16oz.</b>

<b>4.3 Benzothiophene (Thianaphthene), (23.4 wt% S)</b>		
<b>Product Code: TNA</b>		
<b>25 g</b>	<b>50 g</b>	<b>100 g</b>

## 4.4 MATRIX OILS

Available in 1L and 1.9L

Product Code	Product	Description
GM	GASOLINE MATRIX	Gasoline with low level of sulfur, about 1ppm
HVMO75	HIGH VISCOSITY MINERAL OIL	Hydrotreated 350 N <1.0ppm sulfur
LVMO4.5	LOW VISCOSITY MINERAL OIL	Odorless and water white; flashpoint 200 °F; Viscosity at 100 °F: -2.68 cSt; <1ppm sulfur
MVMO25	LUBRICANT BASE STOCK	Hydrotreated 100 N; <1ppm sulfur; 25 cSt
RFO	RESIDUAL FUEL OIL	Asphaltic residual diluted with 100 N; Sulfur concentration about 0.25%
SDFM	SYNTHETIC DIESEL FUEL MATRIX	Mixture of aromatic solvent and low viscosity mineral oil; <1ppm sulfur
TLM	CERTIFIED TOLUENE MATRIX	Toluene that has been certified for nitrogen and sulfur. The values will appear on the Certificate of Analysis.

## 4.5 STABILIZATION SOLUTIONS

Available in 50ml and 100ml

<b>Product Code</b>	<b>Product</b>	<b>Description</b>
STAB SOLN A	STABILIZATION SOLUTION	For chelating and solubilizing organo-metallic solids and solutions for single element and multi-element standards
STAB SOLN B	STABILIZATION SOLUTION	Used in conjunction with STAB SOLN A
STAB SOLN C	STABILIZATION SOLUTION	For chelating and solubilizing organo-metallic solids and solutions for single element and multi-element standards

## 4.6 NITROGEN IN SOLID POLYMER

Finely divided synthetic polymer solid that contains a certified amount of nitrogen. Used for calibrating instruments for the analysis of nitrogen in all types of polymers and other solids that are completely combustible.

### 4.6.1 NITROGEN IN SOLID POLYMER

Concentration Range: 0 - 3.0 wt% N; please specify concentration in order

NITROGEN IN SOLID POLYMER		
Product Code: NP	10 g (each)	50 g (each)

### 4.6.2 NITROGEN AND SULFUR IN SOLID POLYMER

Concentration Range: 0 -1.0 wt% N and S; each please specify concentration in order

NITROGEN AND SULFUR IN SOLID POLYMER		
Product Code: NSSP	10 g (each)	50 g (each)

## 4.7 G.C. VOLATILITY - BLENDED MOTOR OIL

Blended Motor Oils for G.C. Volatility

Available in 25ml, 50ml and 100ml

Product Code	Method
GC 6417	ASTM D6417

## 5 PHYSICAL TESTING STANDARDS

### 5.1 ASTM D 97 Pour Point Standards

Pour points are determined by consensus analysis. Standards are packaged in 250ml bottles.

Pour Point, Approx. Value	Product Code
-05 °C	PP5
-10 °C	PP10
-15 °C	PP15
-20 °C	PP20
-40 °C	PP40
-50 °C	PP50

### 5.2 ASTM D2386 Freezing Point Standards

Standards are packaged in 250ml amber bottles and verified by consensus analysis.

Nominal Freezing Point	Product Code
-45 °C	FPZ 45
-50 °C	FPZ 50

### 5.3 ASTM D2500 Cloud Point Standards

Cloud points are determined by consensus analysis. Standards are packaged in 250ml bottles.

Cloud Point, Approx. Value	Product Code
+50 °C	CP5
-02 °C	CP2
-10 °C	CP10
-15 °C	CP15
-20 °C	CP20

#### 5.4 ASTM D445 Viscosity Standards

Oils are tested in accordance with ASTM D445 and are packaged in 500ml amber glass bottles.

Nominal Viscosity @ 40°C	Product Code
180 cSt	VIS180
19 cSt	VIS20
4 cSt	VIS4
520 cSt	VIS520
61 cSt	VIS60
7 cSt	VIS7

#### 5.5 ASTM D5188 Vapor-Liquid Ratio-Temperature

Performance check samples for ASTM D5188 are supplied in 20ml flame sealed ampoules for the daily monitoring of instrument performance.

Standard No.	V/L Temp	Product Code
1	36.1 °C (96.9 °F)	VL1
2	68.7 °C (155.7 °F)	VL2

#### 5.6 ASTM D5482/ D5191 Vapor Pressure Standards

Analytical Services, Inc. offers a range of vapor pressure quality control samples for ASTM D5482 and D5191 (mini-methods), consisting of pure solvents of known vapor pressure. The samples are packaged in 10ml flame sealed ampoules.

Standard No.	Vapor Pressure	Product Code
1	68.3 kPa (9.91 p.s.i.)	VP1
2	68.0 kPa (9.86 p.s.i.)	VP2
3	51.1 kPa (7.41 p.s.i.)	VP3
4	46.7 kPa (6.77 p.s.i.)	VP4
5	22.5 kPa (3.26 p.s.i.)	VP5
6	7.1 kPa (1.03 p.s.i.)	VP6
7	42.1 kPa (6.13 p.s.i.)	VP7

### 5.7 ASTM D56 Tag Closed Cup Flash Point

Standards are packaged in 250ml amber glass bottles and verified by consensus analysis.

Product Code	Nominal Flash Point
TCC40	42 °C
TCC68	67 °C

### 5.8 ASTM D6371/IP309 Cold Filter Plug Point Standards

A standard is available for the Cold Filter Plug Point Test that is verified by consensus analysis. One temperature is available packaged in a 250ml bottle.

Product Code	CFPP Temperature
CCPP1	- 18 °C

### 5.9 ASTM D86 Group 4 Distillation Standard

The group 4 standard is a diesel oil whose distillation range is from 379 °F to 700 °F, (193 °C to 371 °C) and was verified by consensus analysis.  
**DISTILLATION RANGE: IBP 379 °F, 10% 439 °F, 50% 525 °F, 90% 639 °F, EP 700 °F**

Product Code	Description
D86-4-1	Distillation Std. 0.25L
D86-4-2	Distillation Std. 0.50L

### 5.10 ASTM D86 Synthetic Distillation Standard

The automatic distillation apparatus duplicated the distillation conditions of the manual method. The increased reliance on electronic control requires an independent standard to verify that the apparatus is performing correctly. Analytical Services has introduced a synthetic blend of hydrocarbons that boil in the temperature range specified in ASTM D86 distillation groups 1 and 2. The group 1 and 2 standard covers the boiling range 129 °F to 368 °F, (54 °C to 187 °C) and was verified by consensus analysis with twelve refinery laboratories.

**DISTILLATION RANGE: IBP 129°F, 10% 180°F, 50% 228°F, 90% 319°F, EP 368°F**

Product Code	Description
D86-1	Synthetic Distillation Std. 0.5L
D86-2	Synthetic Distillation Std. 1.0L
D86-3	Synthetic Distillation Std. 4 x 1.0L

### 5.11 ASTM D92 Cleveland Open Cup Flash Point

Standards are packaged in 250ml amber glass bottles and verified by consensus analysis.

Product Code	Nominal Flash Point
FP200	200 °C
FP230	230 °C

### 5.12 ASTM D93 Pensky Martin Flash Point

Standards are packaged in 250ml amber glass bottles and verified by consensus analysis.

Product Code	Nominal Flash Point
FP60	60 °C
FP75	75 °C
FP93	93 °C

### 5.13 Certified Flash Point Standards

These reference materials are stable, pure hydrocarbon with a method specific flash point determined by an inter-laboratory study. Standards are packaged in 250ml bottles.

Method	Nominal Flash Point	Product Code
ASTM D92	116 °C	FD115TD
ASTM D92	140 °C	FP138HEX
ASTM D93	54 °C	FP53ND
ASTM D93	70 °C	FP65UD
ASTM D93	134 °C	FP134HEX
ASTM D56	50 °C	FP51ND
ASTM D56	67 °C	FP67UD

### 5.14 IP 33/ IP170 Abel Flash Point

Standards are packaged in 250ml amber glass bottles and verified by consensus analysis.

Product Code	Nominal Flash Point
AB40	41 °C



## 6 REFERENCE STANDARDS FOR ELEMENTAL ANALYSERS

Determination of N and S in petrochemical products as per ASTM and other methods via Chemiluminescence, Microcoulometry and UV-Fluorescence.

### 6.1 NITROGEN AND SULFUR IN PETROLEUM PRODUCTS

Product Code	Product	Method	Description
A-NS(H)	NITROGEN AND SULFUR IN PETROLEUM PRODUCTS. SULFUR BY ULTRAVIOLET FLUORESCENCE AND NITROGEN BY CHEMILUMINESCENCE. <b>FLAMMABLE UN1262</b>	N/D5762 & S/D5453	Dibenzothiophene (S) and Pyridine (N) in Isooctane package in 2ml amber pre-scored ampoules. <b>Concentrations are blank , 100, 500, 1000 ng/μL</b> 6 per set.
A-NS(L)	NITROGEN AND SULFUR IN PETROLEUM PRODUCTS. SULFUR BY ULTRAVIOLET FLUORESCENCE AND NITROGEN BY CHEMILUMINESCENCE. <b>FLAMMABLE UN1262</b>	N/D4629 & S/D5453	Dibenzothiophene (S) and Pyridine (N) in Isooctane packaged in 2ml amber pre-scored ampoules. <b>Concentrations are blank , 0.25, 0.5, 1.0, 2.5, 5.0 ng/μL</b> 6 per set.
A-NS(M)	NITROGEN AND SULFUR IN PETROLEUM PRODUCTS. SULFUR BY ULTRAVIOLET FLUORESCENCE AND NITROGEN BY CHEMILUMINESCENCE. <b>FLAMMABLE UN1262</b>	N/D4629 & S/D5453	Dibenzothiophene (S) and Pyridine (N) in Isooctane packaged in 2ml amber pre-scored ampoules. <b>Concentrations are blank , 5.0, 25, 50, 100 ng/μL</b> 6 per set.

## 6.2 NITROGEN IN PETROLEUM PRODUCTS

Product Code	Product	Method	Description
A4629(1)	NITROGEN IN PETROLEUM PRODUCTS BY SYRINGE-INLET CHEMILUMINESCENCE. <b>FLAMMABLE UN1262</b>	ASTM D4629	Pyridine in Isooctane packaged in 2ml amber pre-scored ampoules. <b>Concentrations are blank , 0.25, 0.5, 1.0, 2.5, 5.0 mg/kg</b> 6 per set.
A4629(2)	NITROGEN IN PETROLEUM PRODUCTS BY SYRINGE-INLET CHEMILUMINESCENCE. <b>FLAMMABLE UN1262</b>	ASTM D4629	Pyridine in Isooctane packaged in 2ml amber pre-scored ampoules. <b>Concentrations are blank , 5.0, 25, 50, 100 mg/kg</b> 6 per set.
A5762	NITROGEN IN PETROLEUM PRODUCTS BY BOAT-INLET CHEMILUMINESCENCE. <b>FLAMMABLE UN1307</b>	ASTM D5762	Acridine in Xylene packaged in 2ml amber pre-scored ampoules. <b>Concentrations are blank , 100, 500, 1000 mg/kg</b> 6 per set.

## 6.3 SULFUR IN PETROLEUM PRODUCTS

Product Code	Product	Method	Description
A3120-6	DETERMINATION OF SULFUR IN PETROLEUM HYDROCARBONS BY OXIDATIVE MICROCOULOMETRY <b>FLAMMABLE UN1262</b>	ASTM D3120	Di-N-butyl sulfide in Isooctane matrix packaged in 2ml amber pre-scored ampoules. <b>Concentrations are blank , 1, 10, 25, 50, 100 mg/kg.</b> 6 per set.
A3246-6	DETERMINATION OF SULFUR IN PETROLEUM HYDROCARBONS BY OXIDATIVE MICROCOULOMETRY <b>FLAMMABLE UN1262</b>	ASTM D3246	Di-N-butyl sulfide in Isooctane matrix packaged in 2ml amber pre-scored ampoules. <b>Concentrations are blank , 1, 10, 25, 50, 100 mg/kg.</b> 6 per set.
A3961-6	DETERMINATION OF SULFUR IN PETROLEUM HYDROCARBONS BY OXIDATIVE MICROCOULOMETRY <b>FLAMMABLE UN1294</b>	ASTM D3961	Di-N-butyl sulfide in Toluene matrix packaged in 2ml amber pre-scored ampoules. <b>Concentrations are blank , 1, 10, 25, 50, 100 mg/kg.</b> 6 per set.

Product Code	Product	Method	Description
A5453(H)	SULFUR IN LIQUID PETROLEUM HYDROCARBONS BY ULTRAVIOLET FLUORESCENCE. <b>FLAMMABLE UN1262 or UN1294</b>	ASTM D5453	Di-N-butyl sulfide in Toluene or Isooctane matrix packaged in 2ml amber pre-scored ampoules. <b>Concentrations are blank , 100, 250, 500, 750, 1000 ng/μL.</b> Please specify matrix. 6 per set.
A5453(L)	SULFUR IN LIQUID PETROLEUM HYDROCARBONS BY ULTRAVIOLET FLUORESCENCE. <b>FLAMMABLE UN1262 or UN1294</b>	ASTM D5453	Di-N-butyl sulfide in Toluene or Isooctane matrix packaged in 2ml amber pre-scored ampoules. <b>Concentrations are blank , 1, 2.5, 5, 7.5, 10 ng/μL.</b> Please specify matrix. 6 per set.
A5453(M)	SULFUR IN LIQUID PETROLEUM HYDROCARBONS BY ULTRAVIOLET FLUORESCENCE. <b>FLAMMABLE UN1262 or UN1294</b>	ASTM D5453	Di-N-butyl sulfide in Toluene or Isooctane matrix packaged in 2ml amber pre-scored ampoules. <b>Concentrations are blank , 5, 25, 50, 100, 200 ng/μL.</b> Please specify matrix. 6 per set.
A5453(T)	SULFUR IN LIQUID PETROLEUM HYDROCARBONS BY ULTRAVIOLET FLUORESCENCE. <b>FLAMMABLE UN1262 or UN1294</b>	ASTM D5453	Di-N-butyl sulfide in Toluene or Isooctane matrix packaged in 2ml amber pre-scored ampoules. <b>Concentrations are from the M, L, and H ranges.</b> Please specify matrix. 6 per set.
A5453CK	SULFUR IN LIQUID PETROLEUM HYDROCARBONS BY ULTRAVIOLET FLUORESCENCE. <b>FLAMMABLE UN1262 or UN1294</b>	ASTM D5453	Di-N-butyl sulfide in Toluene or Isooctane matrix packaged in 2ml amber pre-scored ampoules. <b>Daily Calibration Check Sample.</b> Specify concentration and matrix. 10 per set.
ASOM(CK)	DETERMINATION OF SULFUR IN PETROLEUM HYDROCARBONS BY OXIDATIVE MICROCOULOMETRY <b>FLAMMABLE UN1262 or UN1294</b>		Di-N-butyl sulfide in Toluene or Isooctane matrix packaged in 2ml amber pre-scored ampoules. <b>Daily Calibration Check Sample.</b> Please specify concentration and matrix. 10 per set.



## 7 HYDROGEN SULFIDE AND MERCAPTAN STANDARDS

### 7.1 AMPOULES FOR TITRATION ANALYSIS

20ppm H<sub>2</sub>S and 40ppm Mercaptan; 20ml

<b>Product Code</b>
H2SRSH-20

### 7.2 AMPOULES FOR GC ANALYSIS

20ppm H<sub>2</sub>S and 40ppm Mercaptan; 2ml

<b>Product Code</b>
H2SRSH-2



## 8 TITRATION STANDARDS

### 8.1 BROMINE INDEX FOR ASTM D2710

Product Code	Product	Description
BRI3	BROMINE INDEX STANDARD <b>FLAMMABLE UN1294</b>	Bromine Index in Toluene; 3 per set, 8oz (~200ml) each

#### BRI3

Standard No.	Bromine Index
1	10
2	100
3	1000

### 8.2 BROMINE NUMBER FOR ASTM D1159

Product Code	Product	Description
BRNO2	BROMINE NUMBER STANDARDS <b>FLAMMABLE UN1294</b>	Bromine Number in Toluene; 2 per set, 8oz (~200ml) each

#### BRNO2

Standard No.	Bromine Number
1	2
2	10

### 8.3 TOTAL ACID NUMBER FOR ASTM D664

Product Code	Product	Description
TAN2	TOTAL ACID NUMBER STANDARDS	TAN in mineral oil; 2 per set, 16oz (~450ml) each

#### TAN2

Standard No.	TAN (Acid Number)
1	2
2	5

### 8.4 BASE NUMBER FOR ASTM D2896 & D5984

Product Code	Product	Description
BNO3	TOTAL BASE NUMBER STANDARD	Total Base Number in mineral oil; 3 per set, 16oz (~450ml) each

#### BNO3

Standard No.	TBN (Base Number)
1	2
2	5
3	10

### 8.5 NITROGEN BASES IN HYDROCARBONS

Product Code	Product	Method	Description
N-UOP269	Organic Nitrogen in Petroleum Distillates	UOP269-90	Organic Nitrogen in Petroleum Distillates; Conc. 0.01, 0.05, 0.10, 1.0wt%; 4 per set, 200ml each

## Anhang / Supplement

### AC Ölproben nach DIN AC Oil samples as per DIN

Kalibrationsproben, zertifiziert - schwarz markiert  
Calibration samples, certified – marked black

zugehörige Kontrollproben (QC) - rot markiert  
fitting control samples (QC) – marked red

zugehörige Driftkorrekturproben (DC) - grün markiert  
fitting drift correction samples (DC) – marked green

Interne Standards, Prefix AC; mit Konzentrationsangabe, zertifiziert; werden punktgenau nachgestellt  
Internal standards, prefix AC; with concentration, certified; can be reformulated precisely

Interne Standards, Prefix BR, nicht zertifiziert, ca.-Konzentrationsangabe - Richtanalyse - blau markiert  
Internal standards, prefix BR, not certified, approx. concentration – batch depending – marked blue

#### Schwefel/sulfur - ISO 20884 LOW

Art.-Nr.	Material	Gebinde/unit
AC S20884L	0,5,10,25+50ppm S in Mineral Oil	5 x 50 ml
AC S20884L	0,5,10,25+50ppm S in Mineral Oil	5 x 100 ml
AC S20884L(QC)	10 ppm S in Mineral Oil	100 ml
AC S20884L(QC)	10 ppm S in Mineral Oil	200 ml
AC S20884L(QC)	10 ppm S in Mineral Oil	1000 ml
AC S20884L(QC)	10 ppm S in Mineral Oil	3.78 l
AC S20884(DC)	1000ppm S in Mineral Oil	100 ml
AC S20884(DC)	1000ppm S in Mineral Oil	200 ml
AC S20884(DC)	1000ppm S in Mineral Oil	1000 ml
AC S20884(DC)	1000ppm S in Mineral Oil	3.78 l

#### Schwefel/sulfur - ISO 20884 HIGH

Art.-Nr.	Material	Gebinde/unit
AC S20884H	0,50,100,200,350+500ppm S in M.-Oil	6 x 50 ml
AC S20884H	0,50,100,200,350+500ppm S in M.-Oil	6 x 100 ml
AC S20884H(QC)	200 ppm S in Mineral Oil	100 ml
AC S20884H(QC)	200 ppm S in Mineral Oil	200 ml
AC S20884H(QC)	200 ppm S in Mineral Oil	1000 ml
AC S20884H(QC)	200 ppm S in Mineral Oil	3.78 l
AC S20884(DC)	1000ppm S in Mineral Oil	100 ml
AC S20884(DC)	1000ppm S in Mineral Oil	200 ml
AC S20884(DC)	1000ppm S in Mineral Oil	1000 ml
AC S20884(DC)	1000ppm S in Mineral Oil	3.78 l

**Schwefel/sulfur - ISO14596 LOW**

Art.-Nr.	Material	Gebinde/unit
AC S14596L S in Min.Oil	0,10,50,100,250,500,750,1000 ppm S	8 x 50 ml
AC S14596L S in Min.Oil	0,10,50,100,250,500,750,1000 ppm S	8 x 100 ml
AC S14596L(QC)	200 ppm S in Mineral Oil	100 ml
AC S14596L(QC)	200 ppm S in Mineral Oil	200 ml
AC S14596L(QC)	200 ppm S in Mineral Oil	1000 ml
AC S14596L(QC)	200 ppm S in Mineral Oil	3.78 l
AC ZRIS-1	Zr-Internal Standard, 1%	200 ml
AC ZRIS-1	Zr-Internal Standard, 1%	500 ml
AC ZRIS-1	Zr-Internal Standard, 1%	1000 ml
AC ZRIS-1	Zr-Internal Standard, 1%	3.78 l

**Schwefel/sulfur - ISO14596 HIGH**

Art.-Nr.	Material	Gebinde/unit
AC S14596H S in Min.Oil	0, 0.4, 0.7, 1.0, 1.5, 2.0, 2.5% S	7 x 50 ml
AC S14596H S in Min.Oil	0, 0.4, 0.7, 1.0, 1.5, 2.0, 2.5% S	7 x 100 ml
AC S14596H(QC)	5000 ppm S in Mineral Oil	100 ml
AC S14596H(QC)	5000 ppm S in Mineral Oil	200 ml
AC S14596H(QC)	5000 ppm S in Mineral Oil	1000 ml
AC S14596H(QC)	5000 ppm S in Mineral Oil	3.78 l
AC ZRIS-18	Zr-Internal Standard, 18%	200 ml
AC ZRIS-18	Zr-Internal Standard, 18%	500 ml
AC ZRIS-18	Zr-Internal Standard, 18%	1000 ml
AC ZRIS-18	Zr-Internal Standard, 18%	3.78 l
BR ZR18	Zr-Internal Standard, ca. 18%	1000 ml
BR ZR18	Zr-Internal Standard, ca. 18%	2500 ml

**Phosphor/phosphorus - DIN51363 (P)**

Art.-Nr.	Material	Gebinde/unit
AC P51363	P in Lube Oil, 0 - 1%	10 x 50 ml
AC P51363	P in Lube Oil, 0 - 1%	10 x 100 ml
AC P51363(QC)	P in Lube Oil, 1000 ppm	100 ml
AC P51363(QC)	P in Lube Oil, 1000 ppm	200 ml
AC P51363(QC)	P in Lube Oil, 1000 ppm	1000 ml
AC P51363(QC)	P in Lube Oil, 1000 ppm	3.78 l
AC ZRIS-18	Zr-Internal Standard, 18%	200 ml
AC ZRIS-18	Zr-Internal Standard, 18%	500 ml
AC ZRIS-18	Zr-Internal Standard, 18%	1000 ml
AC ZRIS-18	Zr-Internal Standard, 18%	3.78 l
BR ZR18	Zr-Internal Standard, ca. 18%	1000 ml
BR ZR18	Zr-Internal Standard, ca. 18%	2500 ml

**Kalzium/calcium - DIN51391 (Ca)**

Art.-Nr.	Material	Gebinde/unit
AC CA51391 Ca in Min.Oil	0,500,1000,2500,5000,7500ppm+1% Ca	7 x 50 ml
AC CA51391 Ca in Min.Oil	0,500,1000,2500,5000,7500ppm+1% Ca	7 x 100 ml
AC CA51391(QC)	1250 ppm Ca in Mineral Oil	100 ml
AC CA51391(QC)	1250 ppm Ca in Mineral Oil	200 ml
AC CA51391(QC)	1250 ppm Ca in Mineral Oil	1000 ml
AC CA51391(QC)	1250 ppm Ca in Mineral Oil	3.78 l
AC SNIS-11.7	Sn-Internal Standard, 11.7%	200 ml
AC SNIS-11.7	Sn-Internal Standard, 11.7%	500 ml
AC SNIS-11.7	Sn-Internal Standard, 11.7%	1000 ml
AC SNIS-11.7	Sn-Internal Standard, 11.7%	3,78 l
BR SN28	Sn-Internal Standard ca. 28%	1000 ml
BR SN28	Sn-Internal Standard ca. 28%	2500 ml

**Zink/zinc - DIN51391 (Zn)**

Art.-Nr.	Material	Gebinde/unit
AC ZN51391 Zn in Min.Oil	0,500,1000,2500,5000,7500ppm+1% Zn	7 x 50 ml
AC ZN51391 Zn in Min.Oil	0,500,1000,2500,5000,7500ppm+1% Zn	7 x 100 ml
AC ZN51391(QC)	1250 ppm Zn in Mineral Oil	100 ml
AC ZN51391(QC)	1250 ppm Zn in Mineral Oil	200 ml
AC ZN51391(QC)	1250 ppm Zn in Mineral Oil	1000 ml
AC ZN51391(QC)	1250 ppm Zn in Mineral Oil	3.78 l
AC COIS-1	Co-Internal Standard, 1%	200 ml
AC COIS-1	Co-Internal Standard, 1%	500 ml
AC COIS-1	Co-Internal Standard, 1%	1000 ml
AC COIS-1	Co-Internal Standard, 1%	3.78 l
BR CO12	Co-Internal Standard ca. 12%	1000 ml
BR CO12	Co-Internal Standard ca. 12%	2500 ml

**Magnesium/magnesium - DIN51431(Mg)**

Art.-Nr.	Material	Gebinde/unit
AC MG51431 Mg in Min.Oil	0,100,250,500,1000,2500+5000 ppm Mg	7 x 50 ml
AC MG51431 Mg in Min.Oil	0,100,250,500,1000,2500+5000 ppm Mg	7 x 100 ml
AC MG51431(QC)	250 ppm Mg in Mineral Oil	100 ml
AC MG51431(QC)	250 ppm Mg in Mineral Oil	200 ml
AC MG51431(QC)	250 ppm Mg in Mineral Oil	1000 ml
AC MG51431(QC)	250 ppm Mg in Mineral Oil	3.78 l
AC BRIS-1	1% Br-Internal Standard	200 ml
AC BRIS-1	1% Br-Internal Standard	500 ml
AC BRIS-1	1% Br-Internal Standard	1000 ml
AC BRIS-1	1% Br-Internal Standard	3,78 l



## SULFUR STANDARDS FOR ASTM D7039

Product Code	Product	Method	Description
SIN-6C	SULFUR IN MINERAL OIL	ASTM D7039	Sulfur in Mineral Oil Conc. Range 0, 10, 50, 100, 200 and 500ppm. 100ml each
SMO6(H)-H	SULFUR IN MINERAL OIL	ASTM D7039	Sulfur in Mineral Oil Conc. Range 0, 100, 200, 400, 800 and 1000ppm. 100ml each
SMO6(L)-H	SULFUR IN MINERAL OIL	ASTM D7039	Sulfur in Mineral Oil Conc. Range 0, 2, 5, 10, 15 and 20ppm. 100ml each
SMO6(M)-H	SULFUR IN MINERAL OIL	ASTM D7039	Sulfur in Mineral Oil Conc. Range 0, 5, 10, 25, 50 and 100ppm

<b>SIN-6C</b>	
Standard No.	Sulfur ppm
1	0
2	10
3	50
4	100
5	200
6	500

<b>SMO6(H)-H</b>	
Standard No.	Sulfur ppm
1	0
2	100
3	200
4	400
5	800
6	1000

<b>SMO6(L)-H</b>	
<b>Standard No.</b>	<b>Sulfur ppm</b>
1	0
2	2
3	5
4	10
5	15
6	20

<b>SMO6(M)-H</b>	
<b>Standard No.</b>	<b>Sulfur ppm</b>
1	0
2	5
3	10
4	25
5	50
6	100

## Ultra Low Sulfur in Diesel Fuel

Product Code	Product	Method	Description
ULSD0-25	ULTRA LOW SULFUR IN DIESEL FUEL		ULTRA LOW SULFUR in DIESEL FUEL Conc. Range 0, 5, 10, 15, 20 and 25ppm 100ml each
ULSD20-100	ULTRA LOW SULFUR IN DIESEL FUEL		ULTRA LOW SULFUR in DIESEL FUEL Conc. Range 20, 40, 60, 80 and 100ppm 100ml each

ULSD0-25	
Standard No.	Sulfur ppm
1	0
2	5
3	10
4	15
5	20
6	25

ULSD20-100	
Standard No.	Sulfur ppm
1	20
2	40
3	60
4	80
5	100

## Sulfur Standards for EPA Methods 80.580 to 80.585

Product Code	Product	Method	Description
SEPA(G)H	SULFUR IN MINERAL OIL	EPA 80.580 to 80.585	Sulfur in Mineral Oil; Gravimetric standards for EPA; high level requirements. Set of two standards. Conc. Range 150 and 450ppm 200ml each
SEPA(G)L	SULFUR IN MINERAL OIL	EPA 80.580 to 80.585	Sulfur in Mineral Oil; Gravimetric standards for EPA; low level requirements. Set of two standards. Conc. Range 5 and 15ppm 200ml each
SEPA(P)H	SULFUR IN DIESEL FUEL	EPA 80.580 to 80.585	Sulfur in Diesel Fuel; Precision standard for EPA; high level requirements. 300ppm S 400ml
SEPA(P)L	SULFUR IN DIESEL FUEL	EPA 80.580 to 80.585	Sulfur in Diesel Fuel; Precision standard for EPA; low level requirements. 7ppm S 400ml
SEPA6C	Complete Set	EPA 80.580 to 80.585	This is the complete set of standards for the EPA requirements and includes all of the above products.

<b>SEPA(G)H</b>	
Standard No.	Sulfur ppm
1	150
2	450

<b>SEPA(G)L</b>	
Standard No.	Sulfur ppm
1	5
2	15

<b>SEPA(P)H</b>	
<b>Standard No.</b>	<b>Sulfur ppm</b>
1	300

<b>SEPA(P)L</b>	
<b>Standard No.</b>	<b>Sulfur ppm</b>
1	7

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