

## TESTING AND CALIBRATION LABORATORY ACCREDITATION PROGRAM (LAP)

### Scope of Accreditation

*La présente portée d'accréditation existe également en français et est publiée séparément.*

**Legal Name of Accredited Laboratory:** **AGAT Laboratories LTD.**

Location Name or Operating as (if applicable): Petroleum and Lubricating Testing Services, Oil Sands, Air, Forensic and Test Method Development Services

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**To ensure compliance with the *Official Languages Act*, the Standards Council of Canada (SCC) translated proprietary content from English to French when it was not available in French. In case of discrepancies between the English and French versions, the original version prevails.**

<b>SCC File Number:</b>	15827
<b>Accreditation Standard(s):</b>	ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories
<b>Fields of Testing:</b>	Chemical/Physical
<b>Program Specialty Area:</b>	Environmental Testing (ET) Forensic Test Method Development and Evaluation and Non-routine Testing (TMDNRT)
<b>Initial Accreditation:</b>	2010-04-27
<b>Most Recent Accreditation:</b>	2024-11-07
<b>Accreditation Valid to:</b>	2026-04-27

*Remarque: La présente portée d'accréditation existe également en français, sous la forme d'un document distinct. Note: This scope of accreditation is also available in French as a document issued separately.*

**TEST METHOD DEVELOPMENT & NON-ROUTINE TESTING**

Note: The laboratory accredited under this PSA have demonstrated that it meets ISO/IEC 17025 requirements for non-routine testing under the following product classification.

**Description of activities:**

1. Developing, modifying and validating new, published or existing test methods for screening and determining chemical residues and contamination in environmental and forensic samples.
2. Developing and validating mass spectral techniques for confirming the identity of chemical residues and contaminants in environmental and forensic samples.
3. Screening, determining and confirming the identity of chemical residues and contaminants in environmental and forensic samples for non-routine purposes.

**Description of techniques:**

1. Gas Chromatography (GC) with Mass Spectrometry (MS) Detection
2. Two-Dimensional Gas Chromatography

**FORENSICS**

**Description of activities:**

1. Examination and analysis of trace evidence.

**Description of techniques:**

1. Gas Chromatography (GC) with Mass Spectrometry (MS) Detection

**Forensic Chemistry / Trace Analysis**

**(Testing conducted at 2420-42 Avenue NE, Calgary AB T2E 7T6)**

IHF-60-25001	Determination of Ignitable Liquid Residues in Fire Debris by Gas Chromatography-Mass Spectrometry (ASTM E1618, ASTM E1412, ASTM E2451)
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**ENVIRONMENTAL AND OCCUPATIONAL HEALTH AND SAFETY**

**Environmental:**

**Air - (Testing conducted at 3700 – 21st Street NE, Calgary AB T2E 6V6)**

AQM-43-16000	Determination of Anions by Ion Chromatography (Modified APHA Method 4110B; EPA 6, EPA 8, ASSC Method 8, EPA 26, MMCAAP Method 47071, NIOSH 7906, NIOSH 7907, NIOSH 7908, NIOSH 6004, OSHA ID-200, OSHA ID-182, OSHA ID-214)
	Fluoride (F <sup>-</sup> )
	Chloride (Cl <sup>-</sup> )
	Bromide (Br <sup>-</sup> )
	Phosphate (PO <sub>4</sub> <sup>3-</sup> )
	Nitrite (NO <sub>2</sub> <sup>-</sup> )
	Nitrate (NO <sub>3</sub> <sup>-</sup> )
	Sulphate (SO <sub>4</sub> <sup>2-</sup> )
	Sulfite (SO <sub>3</sub> <sup>2-</sup> )
	Sulfur Dioxide (SO <sub>2</sub> )
	Sulfuric Acid mist (H <sub>2</sub> SO <sub>4</sub> )

AQM-43-16002	Gravimetric Determination of Particulate Matter from Stationary and Other Sources (Modified Alberta Stacks Sampling Code Method 5, AENV, US EPA Method 5, US EPA Method 201A and US EPA 17)
AQM-43-16004	Determination of Nitrogen Dioxide (NO <sub>2</sub> ) in the Air by Ion Chromatography (in-house)
AQM-43-16005	Determination of Nitrogen Oxide (NO <sub>x</sub> ), from Stationary Sources (Alberta Stack Sampling Code, Method 7A, and Method 7D AENV; US EPA Method 7A; US EPA Method 7D)
AQM-43-16006	Determination of Hydrogen Sulfide (H <sub>2</sub> S) in Air by Spectrofluorophotometry (in-house)
AQM-43-16007	Determination of Sulfur Dioxide (SO <sub>2</sub> ) in Air by Ion Chromatography (in-house)
AQM-43-16008	Determination of Ozone (O <sub>3</sub> ) in Air by Ion Chromatography (in-house)
AQM-43-16009	Determination of Dustfall (Total, Fixed, Soluble, Insoluble and Total Suspended Solids) by Gravimetric Analysis (Modified ASTM D1739, "Methods Manual for Chemical Analysis of Atmospheric Pollutants", Method No. 32020, EPHA 2540B, 2540E, 2540D)
AQM-43-16010	Determination of Total Particulate and Dew Point in Air and Other Sources (Modified ASTM D1142, NIOSH 0500, Colorimetry)
AQM-43-16011	Determination of Ammonia (as N) and Hydrogen Sulfide in Aqueous Samples by Colorimetry (Modified Methods Manual for Chemical Analysis of Atmospheric Pollutants Method #41515, Method #43535)
AQM-43-16012	Determination of Ammonia (NH <sub>3</sub> ) in Air by Spectrofluorophotometry (in-house)

**Air - (Testing conducted at 2420-42<sup>nd</sup> Avenue NE, Calgary AB T2E 6V6)**

IHF-60-25002	<p>Determination of Gas Phase Sample Composition by Gas Chromatography, Gravimetric Analysis and Stain Tube Colorimetry (Modified ASTM D1946, ASTM D4888, EPA TO-14A, TO-15, NIOSH 6602, EPA 10B, ASSC Method 18, EPA 18, ASSC Method 3C, EPA 3C, NIOSH 0500)</p> <p>Oxygen Methane Carbon Monoxide Non Methane Volatile Hydrocarbons Nitrous Oxide C3-C12 1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethene 1,2,4-Trimethylbenzene 1,2-Dichlorobenzene 1,2-Dichloropropane 1,3-Dichlorobenzene Benzene Carbon tetrachloride Chloroethane Chloromethane cis-1,3-Dichloropropene Dichlorotetrafluoroethane (R114) Hexachlorobutadiene m-Xylene p-Xylene Tetrachloroethene trans-1,3-Dichloropropene Trichlorofluoromethane Vinyl chloride Propylene Total Oil Mist &amp; Particulate Pressure Dew Point Odour</p> <p>Nitrogen Ethane Carbon Dioxide Volatile Halogenated Hydrocarbons Sulfur Hexafluoride Dimethyl Ether 1,1,2,2-Tetrachloroethane 1,1-Dichloroethane 1,2,4-Trichlorobenzene 1,2-Dibromoethane (EDB) 1,2-Dichloroethane 1,3,5-Trimethylbenzene 1,4-Dichlorobenzene Bromomethane Chlorobenzene Chloroform cis-1,2-Dichloroethene Dichlorodifluoromethane Ethylbenzene Methylene chloride o-Xylene Styrene Toluene Trichloroethene Trichlorotrifluoroethane (R113) Ethylene Pentene Atmospheric Dew Point Water Content</p>
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IHF-60-25003	<p>Determination of Volatile Organic Compounds in Air by Gas Chromatography (Modified NIOSH 1500, NIOSH 1501, NIOSH 1003 )</p> <p>1,1,1,2-Tetrachloroethane</p> <p>1,1,2,2-Tetrachloroethane</p> <p>1,1-Dichloroethane</p> <p>1,2,3-Trichlorobenzene</p> <p>1,2,4-Trichlorobenzene</p> <p>1,2-Dibromo-3-chloropropane (DBCP)</p> <p>1,2-Dichlorobenzene</p> <p>1,2-Dichloropropane</p> <p>1,3-Dichlorobenzene</p> <p>2-Butanone (MEK)</p> <p>2-Hexanone</p> <p>Acetone</p> <p>Acrolein</p> <p>Benzene</p> <p>Bromodichloromethane</p> <p>Bromomethane</p> <p>Chlorobenzene</p> <p>Chloroform</p> <p>cis-1,2-Dichloroethene</p> <p>Dibromochloromethane</p> <p>Dichlorodifluoromethane</p> <p>Hexachlorobutadiene</p> <p>m,p-Xylene</p> <p>Methylene chloride</p> <p>o-Xylene</p> <p>Tetrachloroethene</p> <p>trans-1,2-Dichloroethene</p> <p>Trichloroethene</p> <p>Vinyl acetate</p> <p>Total VOC as Hexane</p> <p>1,1,1-Trichloroethane</p> <p>1,1,2-Trichloroethane</p> <p>1,1-Dichloroethene</p> <p>1,2,3-Trichloropropane</p> <p>1,2,4-Trimethylbenzene</p> <p>1,2-Dibromoethane (EDB)</p> <p>1,2-Dichloroethane</p> <p>1,3,5-Trimethylbenzene</p> <p>1,4-Dichlorobenzene</p> <p>2-Chloroethylvinylether</p> <p>4-Methyl-2-pentanone (MIBK)</p> <p>Acetonitrile</p> <p>Acrylonitrile</p> <p>Bromobenzene</p> <p>Bromoform</p> <p>Carbon tetrachloride</p> <p>Chloroethane</p> <p>Chloromethane</p> <p>cis-1,3-Dichloropropene</p> <p>Dibromomethane</p> <p>Ethylbenzene</p> <p>Isopropylbenzene (Cumene)</p> <p>Methyl tert-butyl ether (MTBE)</p> <p>Naphthalene</p> <p>Styrene</p> <p>Toluene</p> <p>trans-1,3-Dichloropropene</p> <p>Trichlorofluoromethane</p> <p>Vinyl chloride</p>
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IHF-60-25006	<p>Determination of Hydrocarbon Based Biological Markers by Gas Chromatography Mass Spectrometry in Oil and Soil Samples and TEL in Oil, Soil, and Water Samples; TEL in Water and Soil by GCMSMS (in-house)</p> <table border="0"> <tr> <td>S21</td> <td>S22</td> </tr> <tr> <td>DIA27S</td> <td>DIA27R</td> </tr> <tr> <td>DIA28Sab</td> <td>DIA28Rab</td> </tr> <tr> <td>DIA29S</td> <td>DIA29R</td> </tr> <tr> <td>5aaa C27S</td> <td>C27abbR</td> </tr> <tr> <td>C27abbR(218)</td> <td>C27abbS</td> </tr> <tr> <td>C27abbS(218)</td> <td>5aaa C27R</td> </tr> <tr> <td>5aaa C28S</td> <td>C28abbR</td> </tr> <tr> <td>C28abbR(218)</td> <td>C28abbS</td> </tr> <tr> <td>C28abbS(218)</td> <td>5aaa C28R</td> </tr> <tr> <td>5aaa C29S</td> <td>C29abbR</td> </tr> <tr> <td>C29abbR(218)</td> <td>C29abbS</td> </tr> <tr> <td>C29abbS(218)</td> <td>5aaa C29R</td> </tr> <tr> <td>Tr23</td> <td>Tr24</td> </tr> <tr> <td>Tr25</td> <td>Tr26A</td> </tr> <tr> <td>Tr26B</td> <td>TET24</td> </tr> <tr> <td>Tr27a</td> <td>Tr27b</td> </tr> <tr> <td>Tr28A</td> <td>Tr28B</td> </tr> <tr> <td>Tr29A</td> <td>Tr29B</td> </tr> <tr> <td>Tr30A</td> <td>Tr30B</td> </tr> <tr> <td>Tr31A</td> <td>Tr31B</td> </tr> <tr> <td>Ts</td> <td>Tm</td> </tr> <tr> <td>H28</td> <td>NOR25H</td> </tr> <tr> <td>H29</td> <td>C29Ts</td> </tr> <tr> <td>30d</td> <td>M29</td> </tr> <tr> <td>30O</td> <td>H30</td> </tr> <tr> <td>M30</td> <td>H31S</td> </tr> <tr> <td>H31R</td> <td>30G</td> </tr> <tr> <td>H32S</td> <td>H32R</td> </tr> <tr> <td>H33S</td> <td>H33R</td> </tr> <tr> <td>H34S</td> <td>H34R</td> </tr> <tr> <td>H35S</td> <td>H35R</td> </tr> <tr> <td>H36S (TR35)</td> <td>H36R (TR35)</td> </tr> <tr> <td>D30 (177)</td> <td>H30 (177)</td> </tr> <tr> <td>H30b</td> <td>C20TA</td> </tr> <tr> <td>C21TA</td> <td>C22TA</td> </tr> <tr> <td>SC26TA</td> <td>RC26TA (SC27TA)</td> </tr> <tr> <td>SC28TA</td> <td>RC27TA</td> </tr> <tr> <td>RC28TA</td> <td>C21MA 1</td> </tr> <tr> <td>C22MA 2</td> <td>C23MA 3</td> </tr> </table>	S21	S22	DIA27S	DIA27R	DIA28Sab	DIA28Rab	DIA29S	DIA29R	5aaa C27S	C27abbR	C27abbR(218)	C27abbS	C27abbS(218)	5aaa C27R	5aaa C28S	C28abbR	C28abbR(218)	C28abbS	C28abbS(218)	5aaa C28R	5aaa C29S	C29abbR	C29abbR(218)	C29abbS	C29abbS(218)	5aaa C29R	Tr23	Tr24	Tr25	Tr26A	Tr26B	TET24	Tr27a	Tr27b	Tr28A	Tr28B	Tr29A	Tr29B	Tr30A	Tr30B	Tr31A	Tr31B	Ts	Tm	H28	NOR25H	H29	C29Ts	30d	M29	30O	H30	M30	H31S	H31R	30G	H32S	H32R	H33S	H33R	H34S	H34R	H35S	H35R	H36S (TR35)	H36R (TR35)	D30 (177)	H30 (177)	H30b	C20TA	C21TA	C22TA	SC26TA	RC26TA (SC27TA)	SC28TA	RC27TA	RC28TA	C21MA 1	C22MA 2	C23MA 3
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C28MA 8	C28MA-U
C27MA 9	C28MA 10_11
C29MA 12	C29MA-U
C29MA 13	C28MA 14_15
C29MA 16	C30MA 17
C30MA 18	C4B
C5B	C6B
DEC (cis)	DEC(trans)
1-DEC	2-DEC
3-DEC	4-DEC
Naphthalene	2-Methylnaphthalene
1-Methylnaphthalene	N2
N3	N4
N5	Biphenyl
Bp1	Bp2
Acenaphthylene	Acenaphthene
AC1	AC2
Fluorene	FL1
FL2	FL3
Phenanthrene	Anthracene
PA1	PA2
PA3	PA4
PA5	Retene
Fluoranthene	Pyrene
Benzo[a,b,c]fluorenes	FP1
FP2	FP3
FP4	Benzo(c)phenanthrene
Benzo(a)anthracene	Cyclopenta[cd]pyrene
Triphenylene	Chrysene
BC1	BC2
BC3	BC4
Benzo[b+j]fluoranthene	Benzo[k]fluoranthene
Benzo[j]fluoranthene	Benzo[a]fluoranthene
Benzo[e]pyrene	Benzo[a]pyrene
Perylene	BAP1
BAP2	Indeno[1,2,3-c,d]fluoranthene
Indeno[1,2,3-c,d]pyrene	Dibenzo[a,c]anthracene
Dibenzo[a,h]anthracene	Benzo[g,h,i]perylene
Benzothiophene	BT1
BT2	Dibenzothiophene
DB1	DB2
DB3	DB4

	DB5 Benzo[b]naphtho[1,2-d]thiophene NBT1 NBT3 nC10 nC11 nC12 nC13 nC14 nC15 nor-Pristane Pristane (FID) nC17 (FID) Phytane (FID) nC18 (FID) nC20 nC22 nC24 nC26 nC28 nC30 nC32 nC34 nC36 nC38 nC40 nC42 nC44	Benzo[b]naphtho[2,1-d]thiophene Benzo[b]naphtho[2,3-d]thiophene NBT2 NBT4 isoC11 isoC12 isoC13 isoC14 Farnesane nC16 Pristane nC17 Phytane nC18 nC19 nC21 nC23 nC25 nC27 nC29 nC31 nC33 nC35 nC37 nC39 nC41 nC43 Tetraethyl Lead (TEL)
IHF-60-25007	Determination of Extractable Petroleum Hydrocarbons by Two-Dimensional Gas Chromatography (in-house) F2    F3    F4 2-Methylnaphthalene    Acenaphthene    Acenaphthylene Anthracene    Benzo (a) anthracene    Benzo (a) pyrene Chrysene    Fluoranthene    Fluorene Naphthalene    Phenanthrene    Pyrene A10-A12    A12-A16    A16-A21 A21-A34    C8-C10    C10-C12 C12-C16    C16-C21    C21-C34 C34-C50    A8-A10 Benzo (b+j) fluoranthene/Benzo (k) fluoranthene Indeno (1,2,3-c,d) pyrene/Dibenzo (a,h) anthracene	



**Water and Brine - (Testing conducted at 2420-42<sup>nd</sup> Avenue NE, Calgary AB T2E 7T6)**

IHF-60-25010	Determination of Metals in Water Using Triple-Quad Inductively Coupled Plasma – Mass Spectrometry (Modified SM 3125B, EPA 1669) Aluminum                      Antimony                      Arsenic Barium                          Beryllium                      Bismuth Boron                            Cadmium                        Calcium* Cesium                          Chromium                        Cobalt Copper                          Gallium                          Iron Lead                              Lithium                          Magnesium* Manganese                      Molybdenum                    Nickel Phosphorus                      Potassium*                      Rubidium Selenium                        Silicon*                          Silver Sodium*                        Strontium                        Sulfur* Tellurium                        Thallium                        Thorium Tin                                Titanium                         Tungsten Uranium                         Vanadium                        Yttrium Zinc                                Zirconium                        Cerium* Germanium*                      Gold*                            Indium* Iridium*                         Niobium*                        Palladium* Platinum*                        Rhodium*                        Ruthenium* Scandium*                        Tantalum*		
IHF-60-25012	Determination of Selenium Speciation in Water Samples by IC-ICP-QQQ (in-house) Se (IV)                          Se (VI)                          SeCN SeSO <sub>3</sub> MeSe(4)                        SeMet		
IHF-60-25013	Determination of Arsenic Speciation in Waters by Multidimensional IC-ICP-QQQ (in-house) Arsenic (III)                      Arsenic (V)                      AsC AsB                                DMA                                MMA		

IHF-60-25015	<p>Determination of Dioxin and Furans in Soil, Water and Air by GC-MS and GC-MS/MS (Modified US EPA Method 1613, ATP Method 16130, US EPA Method 23, EPS 1/RM,/19, US EPA Method TO-9A)</p> <p>2378-Tetrachlorodibenzo-p-dioxin (2378-TCDD)  12378-Pentachlorodibenzo-p-dioxin (12378-PeCDD)  123478-Hexachlorodibenzo-p-dioxin (123478-HxCDD)  123678-Hexachlorodibenzo-p-dioxin (123678-HxCDD)  123789-Hexachlorodibenzo-p-dioxin (123789-HxCDD)  1234678-Heptachlorodibenzo-p-dioxin (1234678-HpCDD)  Octachlorodibenzo-p-dioxin (OCDD, 12346789-Octachlorodibenzo-p-dioxin)</p> <p>2378-Tetrachlorodibenzofuran (2378-TCDF)  12378-Pentachlorodibenzofuran (12378-PeCDF)  23478-Pentachlorodibenzofuran (23478-PeCDF)  123478-Hexachlorodibenzofuran (123478-HxCDF)  123678-Hexachlorodibenzofuran (123678-HxCDF)  123789-Hexachlorodibenzofuran (123789-HxCDF)  234678-Hexachlorodibenzofuran (234678-HxCDF)  1234678-Heptachlorodibenzofuran (1234678-HpCDF)  1234789-Heptachlorodibenzofuran (1234789-HpCDF)  Octachlorodibenzofuran (OCDF, 12346789-Octachlorodibenzofuran)</p>
IHF-60-25016	<p>Determination of Fatty Acid Methyl Esters (FAME), in Aviation Turbine Fuel by GC-MS (Modified Method IP 585)</p> <p>Methyl Hexadecanoate (C16:0)  Methyl Heptadecanoate (C17:0)  Methyl Octadecanoate (C18:0)  Methyl Octadecenoate(C18:1)  Methyl Octadecadienoate (C18:2)  Methyl Octadecatrienoate (C18:3)</p>

IHF-60-25017	<p>Determination of Perfluorinated Substances (PFAS) in Water and Soil by SPE-LC-MS/MS (US-EPA 1633)</p> <p>Perfluorobutanoic acid (PFBA)</p> <p>Perfluoropentanoic acid (PFPeA)</p> <p>Perfluorohexanoic acid (PFHxA)</p> <p>Perfluoroheptanoic acid (PFHpA)</p> <p>Perfluorooctanoic acid (PFOA)</p> <p>Perfluorononanoic acid (PFNA)</p> <p>Perfluorodecanoic acid (PFDA)</p> <p>Perfluoroundecanoic acid (PFUnA)</p> <p>Perfluorododecanoic acid (PFDoA)</p> <p>Perfluorotridecanoic acid (PFTTrDA)</p> <p>Perfluorotetradecanoic acid (PFTTeDA)</p> <p>Perfluorobutanesulfonic acid (PFBS)</p> <p>Perfluoropentanesulfonic acid (PFPeS)</p> <p>Perfluorohexanesulfonic acid (PFHxS)</p> <p>Perfluoroheptanesulfonic acid (PFHpS)</p> <p>Perfluorooctanesulfonic acid (PFOS)</p> <p>Perfluorononanesulfonic acid (PFNS)</p> <p>Perfluorodecanesulfonic acid (PFDS)</p> <p>Perfluorododecanesulfonic acid (PFDoS)</p> <p>1H, 1H, 2H, 2H-Perfluorohexane sulfonic acid (4:2-FTS)</p> <p>1H, 1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2-FTS)</p> <p>1H, 1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2-FTS)</p> <p>Perfluorooctanesulfonamide (PFOSA)</p> <p>N-methyl perfluorooctanesulfonamide (NMeFOSA)</p> <p>N-ethyl perfluorooctanesulfonamide (NEtFOSA)</p> <p>N-methyl perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)</p> <p>N-ethyl perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)</p> <p>N-methyl perfluorooctanesulfonamidoethanol (NMeFOSE)</p> <p>N-ethyl perfluorooctanesulfonamidoethanol (NEtFOSE)</p> <p>Hexafluoropropylene oxide dimer acid (HFPO-DA)</p> <p>4,8-Dioxa-3H-perfluorononanoic acid (ADONA)</p> <p>Perfluoro-3-methoxypropanoic acid (PFMPA)</p> <p>Perfluoro-4-methoxybutanoic acid (PFMBA)</p> <p>Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)</p> <p>9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)</p> <p>11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)</p> <p>Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)</p> <p>3-Perfluoropropyl propanoic acid (3:3FTCA)</p> <p>2H, 2H, 3H, 3H-Perfluorooctanoic acid (5:3FTCA)</p> <p>3-Perfluoroheptyl propanoic acid (7:3FTCA)</p>
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IHF-60-25018	<p>Determination of Perfluorinated Substances (PFAS) in Drinking Water by SPE-LC-MSMS ( US-EPA 533, EPA 537.1)</p> <p>Perfluorobutanoic acid(PFBA)</p> <p>Perfluoropentanoic acid(PFPeA)</p> <p>Perfluorohexanoic acid(PFHxA)</p> <p>Perfluoroheptanoic acid(PFHpA)</p> <p>Perfluorooctanoic acid(PFOA)</p> <p>Perfluorononanoic acid(PFNA)</p> <p>Perfluorodecanoic acid(PFDA)</p> <p>Perfluoroundecanoic acid(PFUnA)</p> <p>Perfluorododecanoic acid(PFDoA)</p> <p>Perfluorotridecanoic acid(PFTrDA)</p> <p>Perfluorotetradecanoic acid(PFTA)</p> <p>Perfluorobutanesulfonic acid(PFBS)</p> <p>Perfluoropentanesulfonic acid(PFPeS)</p> <p>Perfluorohexanesulfonic acid(PFHxS)</p> <p>Perfluoroheptanesulfonic acid(PFHpS)</p> <p>Perfluorooctanesulfonic acid(PFOS)</p> <p>1H,1H, 2H, 2H-Perfluorohexane sulfonic acid(4:2FTS)</p> <p>1H,1H, 2H, 2H-Perfluorooctane sulfonic acid(6:2FTS)</p> <p>1H,1H, 2H, 2H-Perfluorodecane sulfonic acid(8:2FTS)</p> <p>N-methyl perfluorooctanesulfonamidoacetic acid(NMeFOSAA)</p> <p>N-ethyl perfluorooctanesulfonamidoacetic acid(NEtFOSAA)</p> <p>Hexafluoropropylene oxide dimer acid(HFPO-DA)</p> <p>4,8-Dioxa-3H-perfluorononanoic acid(ADONA)</p> <p>Perfluoro-3-methoxypropanoic acid(PFMPPA)</p> <p>Perfluoro-4-methoxybutanoic acid(PFMBA)</p> <p>Nonafluoro-3,6-dioxaheptanoic acid(NFDHA)</p> <p>9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid(9Cl-PF3ONS)</p> <p>11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid(11Cl-PF3OUdS)</p> <p>Perfluoro(2-ethoxyethane)sulfonic acid(PFEESA)</p>
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**Water (Inorganic) - (Testing conducted at 3650 – 21st Street NE, Calgary AB T2E 6V6)**

WAT-0300	Determination of pH, Alkalinity and Acidity in Water Using Benchtop pH meter for Conducting Subsequent Manual Acid Base Titration (Modified APHA 2310B and APHA 2320B)
WAT-0301	Determination of Conductivity, pH and Alkalinity of Water using PC-Titrate (Modified ASTM D1067) Autotitrator
WAT-0600	Determination of Total Suspended Solids Dried at 103°C-105°C (APHA 2540D)
WAT-0601	Determination of Total Dissolved Solids Dried at 180°C (APHA 2540 C)

WAT-2100	Determination of Inorganic Anions in Water using Ion Chromatography (APHA 4110B) Chloride Nitrate Bromide Nitrite Sulfate
WAT-2301	Determination of Relative Density of Water using Portable Digital Density Meter (Modified ASTM D7777)
WAT-2302	Determination of Conductivity and Resistivity of Water using Conductivity Meter of Analytical Water Samples (APHA 2510 B)
WAT-2303	Determination of Selected Elements in Water Using Inductively Coupled Plasma Optical Emission Spectrometer (Modified EPA 200.7) Barium Calcium Iron Magnesium Manganese Potassium Sodium Strontium
WAT-2311	Determination of Sulfides in water using Ion Selective Electrode (ASTM D4658)

**Water (Microbiology) - (Testing conducted at 3650 – 21st Street NE, Calgary AB T2E 6V6)**

WAT-2304	Estimating Biological Activity of Acid Producing Bacteria in Water by APB-BART™ Test Kits (Acid producing bacteria- Biological Activity Reaction Test BART User Manual 2004 edition)
WAT-2305	Estimating Biological Activity of Sulphate reducing bacteria in Water by SRB-BART™ Test Kits (Sulphate reducing bacteria- Biological Activity Reaction Test BART User Manual 2004 edition)
WAT-2307	Estimating Biological Activity of Iron Related Bacteria in Water by IRB-BART™ Test Kits (Iron related bacteria Biological Activity Reaction Test BART User Manual 2004 edition)

**NON-METALLIC MINERALS AND PRODUCTS**

**Oil Shale and Tar Sands:**

**(Testing conducted at 3801-21 Street NE, Calgary AB T2E 6T5)**

ROCK-04-26000	Determination of Water, Minerals and Bitumen in Oil Sands by Dean Stark Analysis Performed by Direct Determination (Modified ACOSA method)
ROCK-04-26001	Determination of Water, Minerals and Bitumen in Oil Sands by Dean Stark Analysis Performed by Weight Difference (Modified ACOSA method)
ROCK-31-001	Determination of Methylene Blue Index of Oil Sands (Modified ASTM C837)
ROCK-31-002	Evaluation of Particle Size Distribution (PSD) of Oil Sands Wet and Dry Sieve Combined (Modified API40 Recommended Practices)
ROCK-31-004	Determination of Particle Size Distribution (PSD) of Oil Sands Samples by Laser Diffraction (in-house)

**Petroleum Crudes and Natural Gas:**

**(Testing conducted at 3650-21st Street NE, Calgary AB T2E 6V6)**

HC-0100	Determination of Density, Relative Density and API Gravity of Liquids by Digital Density Meter (ASTM D4052; ASTM D5002)		
HC-0120	Determination of Hydrogen Sulfide by Tutweiler Titration and Stain Tubes (GPA C1; GPA 2377)		
HC-0160	Determination of Hydrocarbon from Methane (C1) to Decane (C10) and inert gases in Gas Phase Mixtures by GC/TCD and GC/FID (Modified GPA 2261, GPA 2286)		
	Helium	Hydrogen	Nitrogen
	Carbon	Dioxide	Methanol
	Methane	Ethane	Propane
	Isobutane	n-Butane	Isopentane
	n-Pentane	Hexane	Heptanes+
	Oxygen	C1-C15+	Benzene
	Ethylbenzene	m/p-Xylene	o- Xylene
	Toluene		
HC-0200	Determination of Water and Sediment in Crude Oil by the Centrifuge Method (Modified ASTM D4007)		
	Solids Fraction	Water Fraction	
HC-0300	Determination of Cloud Point of Petroleum Products and Liquid Fuels (ASTM D2500; ASTM D5771)		
HC-0310	Determination of Hydrocarbon C1 to C30+ by Flame Ionization Detection (Atmospheric and Pressurized Samples after Flashing (Modified GPA 2186)		
	Methane	Ethane	Propane
	Iso-butane	n-Butane	Iso-pentane
	n-Pentane	Cyclopentane	Hexane
	Methylcyclopentane	Benzene	Cyclohexane
	Heptanes	Methylcyclohexane	Toluene
	Octane	Ethylbenzene	o-Xylene
	m,p-Xylene	Nonane	Trimethylbenzene
	Decanes	Undecanes	Dodecanes
	Tridecanes	Tetradecanes	Pentadecanes
	Hexadecanes	Heptadecanes	Octadecanes
	Nonadecanes	Eicosanes	Heneicosanes
	Docosanes	Tricosanes	Tetracosanes
	Pentacosanes	Hexacosanes	Heptacosanes
	Octacosanes	Nonacosanes	Tricontanes+
HC-0355	Flashing a Pressurized Hydrocarbon Liquid Sample to Atmospheric Pressure by the Single Stage Flash Method and Obtaining a Gas/Oil Ratio (in-house)		
HC-0420	Determination of Flash Point by Pensky-Martens Closed Cup Tester (ASTM D93)		
HC-0500	Determination of Pour Point in Petroleum Products (ASTM D97)		

HC-0500	Determination of no flow point and pour Point of Petroleum Products and Liquid Fuels (ASTM D7346)												
HC-0500	Determination of Pour Point of Crude Oils (ASTM D5853)												
HC-0600	Determination of Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity) (ASTM D445)												
HC-0610	Determination of Dynamic Viscosity (cP or mPas) and Density of Liquids by Stabinger Viscometer (and the Calculation of Kinematic Viscosity) (ASTM D7042)												
HC-0700	Determination of Vapor Pressure of Petroleum Products by Reid Method (ASTM D323)												
HC-0801	Determination of Organosulfur Compounds in Liquid and Gaseous Sample using GC/TCD/SCD (Modified UOP 791 ASTM D5504, ASTM D5623)												
HC-0900	Determination of Natural Gas Liquid and Liquefied Petroleum Gas Mixtures Containing the following Components by Gas Chromatography GC/TCD (GPA 2177) <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Nitrogen</td> <td style="width: 33%;">Carbon Dioxide</td> <td style="width: 33%;">Methane</td> </tr> <tr> <td>Ethane</td> <td>Propane</td> <td>Isobutane</td> </tr> <tr> <td>n-Butane</td> <td>Isopentane</td> <td>n-Pentane</td> </tr> <tr> <td>Hexane</td> <td>Heptane</td> <td></td> </tr> </table>	Nitrogen	Carbon Dioxide	Methane	Ethane	Propane	Isobutane	n-Butane	Isopentane	n-Pentane	Hexane	Heptane	
Nitrogen	Carbon Dioxide	Methane											
Ethane	Propane	Isobutane											
n-Butane	Isopentane	n-Pentane											
Hexane	Heptane												
HC-0904	Determination of PIONAOX(U) in Atmospheric and Pressurized Liquid Hydrocarbon Samples by GC-FID (ASTM D6730) <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">P- n-paraffins</td> <td style="width: 33%;">I- iso-paraffins</td> <td style="width: 33%;">O- Olefins</td> </tr> <tr> <td>N-Naphthenes</td> <td>A- Aromatics</td> <td>OX-Oxygenates</td> </tr> <tr> <td colspan="3">U-Unknown Hydrocarbons</td> </tr> </table>	P- n-paraffins	I- iso-paraffins	O- Olefins	N-Naphthenes	A- Aromatics	OX-Oxygenates	U-Unknown Hydrocarbons					
P- n-paraffins	I- iso-paraffins	O- Olefins											
N-Naphthenes	A- Aromatics	OX-Oxygenates											
U-Unknown Hydrocarbons													
HC-1200	Determination of Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents (ASTM D 611 Method A) Aniline Point, °C Mixed Aniline Point, °C												
HC-1300	Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure (ASTM D86) Initial Boiling Point, °C 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, and 90% Recovery, °C Final Boiling Point, °C Recovered, Volume % Residue, Volume % Loss, Volume %												
HC-2100	Determination of Heptane Insoluble Asphaltene Content in Oil %wt (Modified ASTM D6560)												
HC-3100	Determination of Sulfur Content Mass% or ppm in Crude Oils and its Products by Energy Dispersive X-Ray Fluorescence Spectrometry (ASTM D4294)												
HC-3120	Determination of Wax Content %wt of Petroleum Oils and Asphalts (Modified UOP 46-64)												

HC-3180	Determination of Pentane Insolubles by Membrane Filtration (Modified ASTM D4055)
HC-3181	Determination of Boiling Point of Samples with Residues Such as Crude Oils and Atmospheric and Vacuum Residues by High Temperature Gas Chromatography (ASTM D7169)
HC-3188	Determination of Light Hydrocarbons (C1-C9) in Stabilized Crude Oils by Gas Chromatography (ASTM D7900)
HC-3192	Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuels, and Engine Oil by Ultraviolet Fluorescence (ASTM D5453)

**Petroleum Refinery Products (including asphalt materials, petrochemicals, fuels and lubricants):**

**Fuels and Lubricants - (Testing conducted at 3650-21st Street NE, Calgary AB T2E 6V6)**

LTS-30-8001	Determination of Kinematic Viscosity of Transparent and Opaque Liquids cSt at 40 and 100 degrees Celsius Using an Automatic Viscometer and Calculation of Dynamic Viscosity) (ASTM D445)
LTS-30-8007	Determination of Oil Contamination by Automatic Particle Count and Particle Shape Classification Using a Direct Imaging Integrated Tester (ASTM D 7596)
LTS-30-8008	Determination Of Water in Petroleum Products, Lubricating Oils and Additives By Karl Fischer Titration Water % (ASTM D6304)
LTS-30-8014	Determination of Copper Corrosion from Petroleum Products by Copper Strip Tarnish Test (ASTM D130)
LTS-30-8015	Determination of Additive Elements, Wear Metals, and Contaminants in Used and Unused Lubricating Oils and by Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) (ASTM D5185) Aluminium                      Silver                      Arsenic Boron                              Barium                      Calcium Cadmium                          Chromium                      Copper Iron                                  Potassium                      Magnesium Manganese                      Molybdenum                      Sodium Nickel                              Phosphorus                      Lead Antimony                          Silicon                          Strontium Titanium                          Vanadium                          Zinc Zirconium
LTS-30-8028	Determination of Water Separation Characteristics of Aviation Turbine Fuels by Portable Separometer as per MSEP Rating (ASTM D3948)
LTS-30-8029	Determination of Electrical Conductivity of Aviation and Distillate Fuels in pS/m (ASTM D2624)
LTS-30-8032	Determination of Flash point in degree Celsius by Tag Closed Cup Tester (ASTM D56)





**Notes:**

\* Marked analytes are tested only in water.

**DOCUMENT / ACRONYM**

**ISO/IEC 17025:2017:** General requirements for the competence of testing and calibration laboratories

**RG-FORENSIC:** SCC Requirements and Guidance for the Accreditation for Forensic Testing Laboratories

**RG-TMDNRT:** SCC Requirements and Guidance for the Accreditation of Laboratories Engaged in Test Method Development and Non-Routine Testing

**NIOSH:** National Institute for Occupational Safety and Health (USA)

**OSHA:** Occupational Safety and Health Administration (USA)

**EPA:** Environmental Protection Agency (USA)

**APHA:** American Public Health Association

**ASSC:** Alberta Stack Sampling Code

**ACOSA:** Alberta Committee for Oils Sands Analysis

**GPA:** Gas Processor's Association

**UOP:** Universal Oil Products

**ASTM:** ASTM International, formerly American Society of Testing and Materials

**AENV:** Alberta Environment and Natural Resources

This document forms part of the Certificate of Accreditation issued by the Standards Council of Canada (SCC). The original version is available in the Directory of Accredited Laboratories on the SCC website at [scc-ccn.ca](http://scc-ccn.ca)

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