Powertech

POWERTECH LABS INC.
12388 - 88th Avenue • Surrey • British Columbia • Canada • V3W 7R7
Phone 604.590.7500 • Fax 888.590.6501 • www.powertechlabs.com

Chemical Analysis Services – Effective January 1, 2023

For over 40 years, Powertech Labs has been performing chemical analyses for electrical utilities and related industries around the globe. Our laboratories are equipped with state-of-the-art instrumentation for chemical, material and polymer testing on insulating oils and gases, lubricants, fuels and coolants, environmental samples, and materials evaluation. We have significant expertise in the analysis and data interpretation of insulating fluids, including traditional mineral oils, environmentally friendly vegetable oils and sulfur hexafluoride. Our asset management section is considered world-class and focuses on life extension, on-line monitoring and on-line oil purification of electrical equipment. We also have extensive experience in all aspects relating to electrical utilities PCB contamination, including analysis, on-line removal, and destruction with oil reclamation. Other services include analytical services for environmental testing, fuels, lubricants and coolants analysis and extensive capabilities in polymer and material testing including failure analysis.

Routine Testing: On the subsequent pages, you will find information and pricing on our most frequently requested tests and test packages. Volume discounts are also available; please contact us for a custom quotation.

Non-Routine Testing: We also pride ourselves on being able to develop and perform many of the more uncommon tests. For more information, please visit https://www.powertechlabs.com/applied-chemistry

Initiation: If you have never done business with us before, we require that your first transaction be paid for by credit card. After that, you are welcome to apply for credit. Please contact us for the required forms.

Containers: Disposable sampling containers are provided upon request, on a cost-recovery basis. Reusable sampling containers are supplied on loan to customers for up to 60 days. The customer may be invoiced the replacement cost for any items that are damaged or not returned within the period.

Sample Handling: An environmental handling fee of $8.00 will be applied on a per sample basis. Our minimum invoice charge is $100.

Sample Documentation: All samples submitted to Powertech Labs must be properly labeled and be accompanied with a completed Chain of Custody (CoC) or `requisition form. Some samples require additional information such as oil type (e.g., mineral or ester based) to perform the correct test. Potentially hazardous samples must also be identified in writing. Failure to comply will result in testing refusal, reporting delays or additional surcharges.

Reporting: All routine/unit test results will be reported on standard test report templates. Unless otherwise agreed upon, test reports will be emailed to the designated recipient(s). Invoices will typically be emailed separately.

Accreditation: Powertech labs is accredited to IEC/ISO 17025:2017 by the Standards Council of Canada (SCC) for specific tests. For our current Scope of Accreditation, visit https://www.scc.ca/en/search/laboratories/powertech

Terms and Conditions: Please refer to https://powertechlabs.com/wp-content/uploads/TPL-1291-Powertech-Terms-and-Conditions-General-R.3.pdf

Key Contacts

Test Type	Contact / Role	Phone	Email
Routine	Elwin Ko, Team Lead	604-598-5147	Elwin.Ko@powertechlabs.com
	Weili Kang, Senior Scientist	604-590-7402	Weili.Kang@powertechlabs.com
	Jeff Lang, AScT Senior Chemical Technologist	604-590-7458	Jeff.Lang@powertechlabs.com
	Stephen Varisco, B.Sc. P.Chem. Project Manager	604-590-7462	Stephen.Varisco@powertechlabs.com
Non-Routine	Stuart Chambers, Ph.D.	604-590-6614	Stuart.Chambers@powertechlabs.com

Turnaround Times

Group	Regular TAT [1]	Surcharges [2]			
		Same Day	Next Day	2 Days	3-4 Days
Insulating Fluids	5-10 Days	200%	150%	100%	50%
Tribology (Coolants, Fuels, and Lubricants)	5-7 Days	200%	150%	100%	50%
Site Assessment	5-7 Days	200%	150%	100%	50%

[1] For samples received after 3:00 PM, the TAT begins on the next business day
[2] Please contact us before submitting samples to ensure we can meet your requirements

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Insulating Fluids

Pkg ID	Test Package Name	Amount	Acid Number (1)	Colour (3)	Dielectric Breakdown (7)	Interfacial Tension (11)	Dissolved Gas Analysis (9)	Dissolved Water (22)	Furanic Compounds (16)	Power Factor (100°C) (20)	Oxidation Inhibitor (5)	Dissolved Metals (14)	Total PCBs (19)	Total Organic Halides	GC/MS Oil Scan
TP #1	Routine Oil Quality	600 mL	X	X	X	X									
TP #2	Routine Dissolved Gas	50 mL					X	X							
TP #3	Dissolved Gas + Furans	50 mL					X	X	X						
TP #4	Oil Quality + Power Factor	700 mL	X	X	X	X				X					
TP #5	Oil Quality Acceptance	750 mL	X	X	X	X				X	X				
TP #10	Utility TX, RX, SS	600 mL			X	X					X				
TP #11	Utility CB, CR, Hydraulic	600 mL			X			X							
TP #12	Utility VR and LTC	600 mL			X	X									
TP #13	Cable Oil	600 mL			X					X					
TP #14	Cable Oil + Metals	700 mL			X					X		X			
TP #26	Incoming Oil	100 mL										X	X	X	X

Test #	Test Name (Technique)	Ref Method	Amount
1	Acid Number	ASTM D664	30 mL
3	Colour	ASTM D1500	30 mL
4, 4a	Viscosity at 40°C or 100°C	ASTM D7042	30 mL
5	Oxidation Inhibitor (DBPC) in Insulating Oil	ASTM D4768	20 mL
6	Density (Digital Meter)	ASTM D4052	80 mL
7	Dielectric Breakdown Voltage, 2 mm gap	ASTM D1816	500 mL
9	Dissolved Gas in Insulating Oil Analysis	ASTM D3612	50 mL
11	Interfacial Tension	ASTM D971	30 mL
12	Oxidation Stability (RPVOT)	ASTM D2112*	50 mL
14	Metals in Insulating Oil (ICP)	ASTM D7151	20 mL
16	Furanic & Phenolic compounds in Insulating Oil Analysis (HPLC)	ASTM D5837	20 mL
18	Particle Count in Insulating Oil	ASTM D6786	200 mL
19a 19c	PCBs in Insulating Oils (1 ppm reporting limit) PCBs in Cable PILC	ASTM D4059	20 mL
20	Power Factor at 100°C	ASTM D924	100 mL
22/23	Water in Insulating Oil	ASTM D1533	20 mL
24	Sulphur Hexafluoride Gas/Blends and Decomposition Products	ASTM D2685*	150 mL
25	Degree of Polymerization	ASTM D4243	0.5 g
26	Flash Point (Cleveland Open Cup)	ASTM D92	30 mL
28	Corrosive Sulphur	ASTM D1275 B	300 mL
30	Moisture Content in Sulphur Hexafluoride Gas	In-House	150 mL
32	Total Sulphur in Insulating oil	ASTM D5185	20 mL
34 a/b	DC Res at 25/100°C	ASTM D1169	100 mL

* Modified method

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Coolants, Fuels and Lubricants (Tribology)

Test Package Name	Amount	Acid Number	Colour	Dissolved Metals	Particle Count	Viscosity at 40°C	Conductivity	Ethylene Glycol	Freezing Point (est)	Nitrite	Oil (Visual)	pH	Base Number	Soot	Viscosity at 100°C	Water (KFT)	Total PCBs	Total Organic Halides	API Gravity	Distillation + Cetane Index	Cloud and Pour Point	Particulate Contamination
Compressor Oil [1]	120 mL	X	X	X	X	X										X						
Coolant [2]	120 mL			X			X	X	X	X	X	X										
Engine Oil [1]	120 mL	X		X				X					X	X	X							
Diesel Fuel	1000 mL																		X	X	X	X
Industrial Oil [1]	120 mL	X	X	X	X	X																
Hydraulic + Water [1]	120 mL	X	X	X	X	X										X						
Refrigeration Oil [1]	120 mL	X	X	X	X	X										X						
Waste Oil [3]	120 mL			X													X	X				

Test Name (Technique)	Matrix	Ref. Method
API Gravity (Digital Meter)	Fuel, Oil	ASTM D4052
Ash	Fuel, Oil	ASTM D482
Base Number	Oil	ASTM D4739 *
Cloud and Pour Point (subcontracted)	Fuel	ASTM D2500 / D97
Distillation (includes calculated Cetane Index)	Fuel	ASTM D86 / D4737
Ethylene Glycol	Oil	ASTM D2982
Ethylene Glycol (Refractometer)	Coolant	ASTM D3321
Fire Point (includes Flash Point)	Petroleum	ASTM D92
Flash Point (Pensky Martens)	Fuel, Oil	ASTM D93
Flash Point (Seta closed cup)	Petroleum	ASTM D3828
Heat Content (Gross, Parr bomb)	Fuel	ASTM D240
Metals – 21 elements (ICP) [1]	Oil	ASTM D5185
Oxidation Stability (RPVOT)	Oil	ASTM D2272
Particle Count	Oil	ASTM D7596
Particulate Contamination	Fuel	ASTM D6217
Polychlorinated Biphenyls (PCB), Total	Oil	ASTM D6160
Pentane Insolubles	Oil	ASTM D893
Sediment and Water (BS&W)	Fuel	ASTM D2709
Sediment and Water (BS&W)	Oil	ASTM D1796
Soot	Oil	ASTM D7844
Total Organic Halides (TOX)	Oil	EPA 9076 *
Viscosity (40°C or 100°C)	Oil	ASTM D7042
Viscosity Index (inc. viscosity at 40°C & 100°C)	Oil	ASTM D2270
Water (High Level, Distillation)	Oil	ASTM D95
Water (Low Level, Coulometric Karl Fischer)	Fuel, Oil	ASTM D6304B

[1] Includes the following elements: Al, Ag, B, Ba, Ca, Cd, Cr, Cu, Fe, Pb, Mg, Mn, Mo, Na, Ni, P, Si, Sn, Ti, V, Zn
[2] Includes the following elements: Al, B, Cu, Fe, Mo, P, Pb, and Si
[3] Includes the following elements: As, Cd, Cr, Pb
* Modified Method

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Site Assessment

Test / Package	Ref. Method (Yr.)
General Parameters	
pH in Water	SM 4500-H (2011)
pH in Soil	BC ENV (2005)
Moisture	ASTM D2216 (2010)
Metals	
Strong Acid Leachable Metals (SALM) – BC CSR Package	BC ENV (2017)
Total Metals in Water	BC ENV (2017) / EPA 6010C / 200.7
Dissolved Metals in Water [2]	BC ENV (2019) / EPA 6010C / 200.7
Toxicity Characteristic Leachable Metals (TCLP)	EPA 1311 / 6010C
Lead in Paint	EPA 3050B / 6010B
Extractable Metals in Swabs / Solids	EPA 3050B / 6010B
Organics	
Extractable Petroleum Hydrocarbons in Soil/Water (EPH)	BC ENV (2016)
EPH – Silica Gel (add-on)	BC ENV (2018)
Polychlorinated Biphenyls in Soil/Water (PCB)	BC ENV (2002) / EPA 8082A
Polychlorinated Biphenyls in Swabs/Tar (PCB)	EPA 3540C / 8082A
Other	
Compositing (per sample)	N/A
Swabs – for Metals and Organics (PCB, etc.) [1]	N/A

[1] Sampling media is non-returnable
[2] Samples must be field filtered using a 0.45 µm membrane; a $15 charge will be applied for lab filtration