

Methods Used by ACZ Laboratories, Inc for NEON Project

Analysis	Method	Method Reference Full Citation	ACZ Comments
Total carbon	ASA No.9 29-2.2.4	D.W. Nelson & L.E. Sommers, (1982). Total carbon, organic carbon, and organic matter. In A.L. Page (Ed.), <i>Methods of soil analysis part 2 chemical and microbiological properties, 2nd Edition</i> (pp. 542-560). Madison, WI: American Society of Agronomy, Inc.	<p>Total carbon A 0.19g- 0.21g sample is weighed into a combustion boat and analyzed in a pure oxygen environment typically regulated at 1450°C. The combination of furnace temperature and analyze flow causes the sample to combust. All sample materials contained in the combustion boat go through an oxidative-reduction process that causes carbon bearing compounds to break down and free the carbon and sulfur. The carbon then oxidizes to form CO₂.</p>
Total organic carbon			<p>Total organic carbon Analyzed after a separate 0.19g- 0.21g sample is weighed into a 50mL centrifuge tube and leached with 2 N Hydrochloric Acid (HCl). The sample is heated to drive off any Inorganic Carbon, leaving Total Organic Carbon, to be analyzed as described above.</p> <p>ACZ is currently operating a LECO SC632 in accordance with the manufacturer's instructions (LECO Corporation. 2010. SC632 carbon/sulfur determinator instruction manual, Version 1.5X. St. Joseph MI: LECO Corporation)</p>

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PAHs	M3540/8270C	<p>Method 3540C, Revision 3, December 1996, Final Update III to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.</p> <p>Method 8270C, Revision 3, December 1996, Final Update III to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.</p> <p>Method 8270D, Revision 5, July 2014, Final Update V to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.</p>	ACZ's reported reference method will change from 8270C to 8270D in the near future. Currently, where discrepancies exist between these versions, ACZ observes the most stringent requirements.
PCBs	M3540/8082	<p>Method 3540C, Revision 3, December 1996, Final Update III to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.</p> <p>Method 8082, Revision 0, December 1996, Final Update III to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.</p> <p>Method 8082A, Revision 1, February 2007, Final Update IV to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.</p>	ACZ's reported reference method recently changed from 8082 to 8082A.

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Aluminum, total Antimony, total Barium, total Beryllium, total Cadmium, total Calcium, total Chromium, total Copper, total Iron, total Lead, total Magnesium, total Manganese, total Molybdenum, total Nickel, total Phosphorus, total Potassium, total Sodium, total Tin, total Titanium, total Zinc, total	M3050/6010b or 6020	<p>Method 3050B, Revision 2, December 1996, Final Update III to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.</p> <p>Method 6010B, Revision 2, December 1996, Final Update III to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.</p> <p>Method 6010D, Revision 4, July 2014, Final Update V to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.</p> <p>Method 6020, Revision 0, September 1994, Final Update II to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.</p> <p>Method 6020B, Revision 2, July 2014, Final Update V to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.</p>	<p>ACZ's reported reference method will change from 6020 to 6020B in the near future. Currently, where discrepancies exist between these versions, ACZ observes the most stringent requirements.</p>
Mercury by Direct Combustion AA	M7473	<p>Method 7473, Revision 0, February 2007, Final Update IV to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846.</p>	

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Conductivity, Saturated Paste	SM2510B	APHA (2011). <i>Standard methods for the examination of water and wastewater: Method 2510 B</i> . Standard Methods Online.	
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2	U.S. EPA (March, 1978). <i>Field and laboratory methods applicable to overburden and minesoils</i> (pp. 45-47). United States Environmental Protection Agency. EPA 600/2-78-054.	
Total Alkalinity Bicarbonate as CaCO ₃ Carbonate as CaCO ₃ Hydroxide as CaCO ₃	SM2320B	APHA (2011). <i>Standard methods for the examination of water and wastewater: Method 2320 B</i> . American Public Health Association. Standard Methods Online.	
Total Nitrogen	M351.2	U.S. EPA (August, 1993). <i>Methods for the determination of inorganic substances in environmental samples: Method 351.2</i> . United States Environmental Protection Agency. EPA/600/R-93/100.	
Nitrate as N, soluble (water)	Calculate (NO ₃ NO ₂) – NO ₂	U.S. EPA (August, 1993). <i>Methods for the determination of inorganic substances in environmental samples: Method 353.2</i> . United States Environmental Protection Agency. EPA/600/R-93/100.	

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Nitrate/Nitrite as N, soluble (water) Nitrite as N, soluble (water)	M353.2	U.S. EPA (August, 1993). <i>Methods for the determination of inorganic substances in environmental samples: Method 353.2</i> . United States Environmental Protection Agency. EPA/600/R-93/100.	
Nitrogen, ammonia (water)	M350.1	U.S. EPA (August, 1993). <i>Methods for the determination of inorganic substances in environmental samples: Method 350.1</i> . United States Environmental Protection Agency. EPA/600/R-93/100.	
Grain size	ASA no.9 15-4.2.2	G.W. Gee & J.W. Bauder, (1986). Particle size analysis. In Arnold Klute (Ed.), <i>Methods of soil analysis part 1 physical and mineralogical methods, 2nd Edition</i> (p. 401). Madison, WI: American Society of Agronomy, Inc.	Summary: When sieving for analytical purposes, wet or dry, a total weight of the dried, “as received” sample is recorded in a particle size template. The sample is shaken through the required sieves and the sample fractions retained on the screens are individually gathered, dried, and weights are recorded. The percent passing through each screen is calculated on the particle size template.
Soil texture analysis	ASA No. 9 Pt. 1 Section 15-5	G.W. Gee & J.W. Bauder, (1986). Particle size analysis. In Arnold Klute (Ed.), <i>Methods of soil analysis part 1 physical and mineralogical methods, 2nd Edition</i> (pp. 404-408). Madison, WI: American Society of Agronomy, Inc.	Summary: A 40-g portion of air-dried and screened (< 2000um) sample is weighed into a 250mL wide mouthed bottle with a cap. 100mL of Sodium Metaphosphate dispersing agent is added and the sample is shaken overnight. The dispersed sample is transferred to a 1000mL-graduated cylinder.

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			<p>Room temperature Type I H₂O is added, the sample is agitated with a plunger to get the sample into suspension, and the hydrometer is inserted in the suspension. The hydrometer reading is recorded at 40 seconds and 7.25 hours. The percentage of sand, silt and clay will be calculated by the computer when the data is entered. The soil texture is then classified using the USDA Textural Triangle. Some clients require multiple time increment readings of the hydrometer in which case a separate Excel bench sheet is used instead of entering data into LIMS.</p>