



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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CHEMICAL

Valid To: November 30, 2019

Certificate Number: 1873.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following types of tests on tobacco, tobacco smoke, and electronic cigarettes:

Mainstream (MS) and Sidestream (SS) Smoke Analysis:

<u>Test Description</u>	<u>Method</u>	<u>Test Procedure(s)</u>
Ammonia (MS/SS) by HPLC	AM-011	HC T-101, HC T-201
Analytical Smoke Machines	SOP EQU-037	HC T-115, FR11178, FR45483 ISO 3308, ISO 3402, ISO 4387, CRM No.64
Benzo(a)pyrene (MS) by HPLC	AM-207	HC T-103
Benzo(a)pyrene (SS) by HPLC	AM-208	HC T-203
Carbon Monoxide (MS) by NDIR	AM-007	HC T-115, HC T-214, FR11178, FR46483, ISO 8454, CRM No. 68
Carbonyls (MS) by UPLC	AM-076	HC T-104
Carbonyls (MS/SS) by HPLC	AM-005	HC T-204
Coumarin By UHPLC-MS/MS	AM-179	
Ethyl Carbamate by GC/MS	AM-175	
Eugenol (MS/SS) by HPLC	AM-087	HC T-105
Filter Efficiency (MS) by GC	AM-026	CRM No. 9
Hydrogen Cyanide (MS/SS) by CFA	AM-111	HC T-107, HC T-205
Ignition Propensity	AM-050	ASTM 2187-04, ASTM 2187-09 ISO 12863:2010
Mercury (MS) by CVAA	AM-036	HC T-108
Mercury (SS) by CVAA	AM-041	HC T-206
Metals (MS) by ICP-MS	AM-021	HC T-109
Metals (SS) by ICP-MS	AM-043	HC T-207
Nicotine, Water, and Menthol (MS) by GC	AM-001	HC T-115, FR11178, FR46483 ISO 10315, ISO 10362-1, ISO 4387 CRM No. 65, No. 66, No. 67
Nicotine in Aqueous Media and Saliva by GC-MS	AM-228	
Nicotine in Salt Media by UPLC-MS/MS	AM-242	
Nitric Oxide (MS) by Chemiluminescence	AM-029	



Test Description	Method	Test Procedure(s)
Nitric Oxide (MS) by Chemiluminescence	AM-216	HC T-110
Nitric Oxide (SS) by Chemiluminescence	AM-217	HC T-208
N-Nitrososarcosine by GC-MS	AM-120	
pH (MS) by pH Meter	AM-016	
pH (MS) by pH Meter	AM-093	HC T-113
Phenolics (MS) by HPLC	AM-027	HC T-114, CRM No. 78
Phenolics (SS) by HPLC	AM-048	HC T-211
Primary Aromatic Amines (MS/SS) by GC-MS	AM-030	HC T-102, HC T-202
Primary Aromatic Amines (MS) by GC-MS	AM-199	
Polycyclic Aromatic Hydrocarbons (MS) by GC-MS	AM-190	
Polycyclic Aromatic Hydrocarbons (MS/SS) by GC-MS	AM-044	
Semi-Volatiles (MS/SS) by GC-MS	AM-006	HC T-112, HC T-210
Tar, Nicotine, and CO (SS) by GC and NDIR	AM-008	HC T-212
Tobacco Specific N-Nitrosamines (MS) by LC-MS/MS	AM-020	CRM No. 75, ISO 19290
Tobacco Specific N-Nitrosamines (MS) by GC	AM-210	HC T-111
Tobacco Specific N-Nitrosamines (SS) by GC	AM-211	HC T-209
Volatile Organics (MS/SS) by GC-MS	AM-015	HC T-116, HC T-213, CRM No. 70
Volatile Organics I (MS) by GC-MS	AM-180	
Volatile Organics II (MS) by GC-MS	AM-193	

Physical Properties:

Test Description	Method	Test Procedure(s)
Physical Properties	AM-009	ISO 2971, ISO 4387, ISO 6565, ISO 9512 CRM No. 65
Weight of Cigars/Cigarettes per Thousand	AM-186	Tax Purposes

Tobacco:

Test Description	Method	Test Procedure(s)
Acetamide and Acrylamide By GC-MS	AM-129	
Aflatoxin B1 In Tobacco By LC-MS/MS	AM-177	
Ammonia by HPLC	AM-115	HC T-302, CRM No. 79
Anions by HPLC	AM-110	
Benzo(a)pyrene by UPLC	AM-125	HC T-307
Caffeic Acid by UPLC-MS/MS	AM-069	
Carbonyls in Tobacco by UPLC-MS/MS	AM-240	CRM No. 86
CDC Nicotine by GC-FID	AM-072	FR Volume 74, No. 4
CDC Oven Volatiles and pH by pH Meter	AM-071	FR Volume 74, No. 4, AOAC 966.02 (OV)
Coumarin By UHPLC-MS/MS	AM-179	
Ethyl Carbamate (Urethane) By GC-MS	AM-174	
Methyl Salicylate (Wintergreen) and Ethyl Salicylate by GC-MS	AM-078	
Eugenol by HPLC	AM-088	HC T-314
Humectants by GC-FID	AM-090	HC T-304

Test Description	Method	Test Procedure(s)
Menthol by GC-FID	AM-070	
Mercury by CVAA	AM-095	HC T-306
Metals by ICP/MS	AM-052	HC T-306
Minor Alkaloids by GC/MS	AM-100	
N-Nitrosodiethanolamine by GC-TEA	AM-172	
N-Nitrososarcosine by GC-MS	AM-120	
Nicotine by GC-MS	AM-100	CRM No. 87
Nicotine by GC-NPD	AM-206	HC T-301
Nicotine in Salt Media by UPLC-MS/MS	AM-242	
Nitrate by CFA	AM-218	HC T-308
Nitrite by CFA	AM-182	
Organic Nitrogen by CFA	AM-183	
Oven Volatiles by Gravimetric	AM-058	
pH by pH Meter	AM-053	HC T-310
Polycyclic Aromatic Hydrocarbons by GC-MS	AM-187	
Polycyclic Aromatic Hydrocarbons in Tobacco and Tobacco Products by GC-MS	AM-248	
Quinoline by GC-MS	AM-243	
Reducing Sugars by CFA	AM-074	CRM No. 38
Sodium Propionate by GC-MS	AM-170	
Sodium Propionate by GC-FID	AM-089	HC T-312
Sorbic Acid by HPLC	AM-098	HC T-313
Tobacco Specific N-Nitrosamines by LC-MS/MS	AM-031	CRM No. 72
Tobacco Specific N-Nitrosamines by GC-TEA	AM-209	HC T-309
Total Alkaloids by CFA	AM-114	ISO 15152
Total Sugars by CFA	AM-073	CRM No. 38
Total Sugars (as Reducing Sugars) by CFA	AM-113	FR Notice No 66, Volume 71
Triacetin by GC-MS	AM-099	HC T-311
Volatile N-Nitrosamines by GC-MS	AM-085	
Water Activity in Smokeless Tobacco	AM-233	

Toxicology Services:

Test Description	Method	Test Procedure(s)
Ames Assay	AM TOX-001	HC T-501
Neutral Red Uptake Assay	AM TOX-002	HC T-502
Micronucleus Assay	AM TOX-003	HC T-503
Sister Chromatid Exchange	AM TOX-004	
Mycoplasma Test	AM TOX-010	
Total Bacteria, Yeast and Mold Enumeration	AM TOX-011	BAM, 8 th edition, Rev. A, 1998. Ch 18, AOAC 966.23
Mainstream Smoke for Bacterial Reverse Mutation Assay	AM-122	HC T-122 Appendix I, HC T-115
Mainstream Smoke for Neutral Red Uptake Assay	AM-123	HC T-123 Appendix I, HC T-115
Mainstream Smoke for InVitro Micronucleus Assay	AM-124	HC T-124 Appendix I, HC T-115

Electronic Cigarettes:

Test Description	Method	Test Procedure(s)
Ammonia in Aerosol and E-Liquid By HPLC with Non-Suppressed Conductivity Detection	AM-250	
Carbonyls in E-Cigarette Aerosol By HPLC-UV	AM-236	
Carbonyls in E-Liquid and Aerosol by LC-MS/MS	AM-244	
Carbonyls in E-Liquid by UPLC-UV	AM-239	
E-Vapor Condensate Collection and Characterization	AM-224	
Nicotine Degradants in E-Liquid and E-Cigarette Aerosol by LC-MS	AM-238	
Nicotine, Menthol and Humectants in E-liquid by GC-FID	AM-200	
Nicotine, Menthol, Humectants and Contaminants in E-Cigarette Aerosol by GC-FID	AM-201	CRM No. 84
Metals in ENDS Aerosol by ICP-MS	AM-249	
pH in Smoke and E-Cigarette Aerosol	AM-237	
pH of E-Liquid	AM-232	
Primary Aromatic Amines (PAAs) in E-Cigarette Vapor by GC-MS	AM-221	
Selected Diketones In E-Liquid By GC/MS	AM-230	
Selected Metals In E-Liquid and Trapped Aerosol By ICP/MS	AM-235	
Tobacco Specific N-Nitrosamines in E-liquid by LCMSMS	AM-225	
Tobacco-Specific N-Nitrosamines (TSNAs) in E-Cigarette Vapor by LCMSMS	AM-220	
Water in E-liquid by GC-TCD	AM-222	

Key:

CRM = CORESTA Recommended Method

FR = Federal Register

HC = Health Canada

ISO = International Standards Organization





Accredited Laboratory

A2LA has accredited

ENTHALPY ANALYTICAL, INC.

Richmond, VA

for technical competence in the field of

Chemical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).



Presented this 5th day of December 2017.

A handwritten signature in blue ink, appearing to read "L. A. ...", positioned above a horizontal line.

President & CEO
For the Accreditation Council
Certificate Number 1873.01
Valid to November 30, 2019
Revised January 25, 2019

For the tests to which this accreditation applies, please refer to the laboratory's «field» Scope of Accreditation.