

Certificate of Analysis

1RLC Certified Reference Large Cigar

Data Sheet Number: 2023-1RLC-CTRP

Reference values generated on: 10/31/2023

Reference values are valid until: 10/31/2028

Superseded data sheet code: NA

Description of Material	Large cigar with homogenized tobacco leaf wrapper
Lot/Batch Number	1RLC
Matrix	Tobacco blend
Major starting materials	Dark air cured, sun cured, and stems with no humectants or flavors in the body filler and glycerin and water in the head filler

1RLC Reference Large Cigar Values and Uncertainties

Mainstream Smoke Using CRM 64 Smoking Regime [†]					
Parameter	Reference Value	Certified Uncertainty	Constant Coverage Factor	Unit	Number of accepted data points
Total Particulate Matter (TPM)	118.22	12.21	2.01	mg/cigar	207
Tar (Nicotine-free dry particulate Matter (NFDPM))	99.29	8.02	2.00	mg/cigar	207
CO (Carbon Monoxide)	184.8	14.8	2.08	mg/cigar	207
Nicotine	6.969	1.410	2.02	mg/cigar	207
Puff Count	50.1	5.4	2.04	Puffs/cigar	207
Water	11.97	6.53	2.00	mg/cigar	207
Ammonia	127.9	33.4	2.00	µg/cigar	207
Acetaldehyde	3734	949	3.03	µg/cigar	207
Acrolein	52	28	2.62	µg/cigar	207
Crotonaldehyde	65	69	2.00	µg/cigar	207
Formaldehyde	24	11	1.99	µg/cigar	207
NNK (4(methylnitrosamino)-1-(3-pyridyl)-1-butanone)	2004	767	2.14	ng/cigar	207
NNN (N-nitrosornicotine)	5476	1712	2.00	ng/cigar	207
Benzo[α]pyrene	115	32	2.01	ng/cigar	207
1-Aminonaphthalene	233	88	2.49	ng/cigar	207
2-Aminonaphthalene	140	105	3.02	ng/cigar	207
4-Aminobiphenyl	27.7	13.0	2.68	ng/cigar	207
1,3-Butadiene	628	154	2.24	µg/cigar	207
Acrylonitrile	168	49	2.79	µg/cigar	207
Benzene	697	199	3.09	µg/cigar	207
Isoprene	4360	683	2.27	µg/cigar	207
Toluene	1281	898	3.75	µg/cigar	207

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Homogenized Cigar (composite sample including the wrapper, binder, and filler)					
Parameter	Reference Value	Certified Uncertainty	Constant Coverage Factor	Unit	Number of accepted data points
Ammonia	4440	292	2.01	µg/g	207
Arsenic	697	116	1.99	ng/g	207
Cadmium	1009	188	2.50	ng/g	207
Nicotine	15510	2019	2.58	µg/g	207
NNK (4(methylnitrosamino)-1-(3-pyridyl)-1-butanone)	2317	1026	2.00	ng/g	207
NNN (N-nitrosornicotine)	14347	2617	2.04	ng/g	207
Moisture Content	14.31	1.10	2.00	%	207
pH	6.22	0.17	2.00	pH unit	207
Nitrate	18328	3508	2.05	µg/g	207
Nitrite*	33	-	-	µg/g	75
Water Activity	0.67	0.05	2.06	a _w	207
Physical Properties					
Parameter	Reference Value	Certified Uncertainty	Constant Coverage Factor	Unit	Number of accepted data points
Pressure Drop	33.22	6.26	2.01	mmWg	3093
Circumference	49.0	1.1	2.02	mm	3093
Length	140.8	0.8	1.99	mm	3093
Nominal Diameter†	15.59	0.33	2.01	mm	3093
Total weight	7736.70	216.49	2.00	mg/cigar	3093
Filler weight	6804.6	116.5	1.99	mg/cigar	276

*Nitrite results for the majority of the data provided by contract laboratories were below level of quantification, therefore, the reference value is for information purposes only and calculation of certified uncertainty was not performed.

†Cigars were cut at 5 mm from the mouth end before smoking.

*Diameter was measured at 33 mm from the head of the cigar.

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CERTIFIED VALUES AND UNCERTAINTIES: The "Certified Values" listed above are unweighted means of results submitted by three ISO 17025 – accredited laboratories using a combination of methods and instruments that emulate actual methods and instrumentation techniques currently utilized in the analysis of each parameter in the analytical community. No assumptions were made regarding the accuracy or precision of each laboratory therefore no weighting was done on the results of each lab.

The "Certified Uncertainty", UCRM, listed above are expanded uncertainties intended to provide approximately 95% confidence interval around the respective reference values obtained by multiplying the combined standard uncertainty with a coverage factor k, equal to the t-value based on the approximated degrees of freedom using the Welch-Satterthwaite equation. Each "Certified Uncertainty" includes an uncertainty component that accounts for systematic error among the methods used by different laboratories.

The data for the mainstream smoke parameters contained herein are reflective only of data obtained from a Linear Smoking machine.

STATEMENT OF TRACEABILITY: The traceability of the reference values and uncertainties certified herein are maintained through an unbroken chain of comparisons to appropriate standards with suitable procedures and measurement uncertainties by virtue of the ISO 17025 – accreditations possessed by the three participating laboratories. The accredited methods used by the laboratories are listed below.

METHODS USED BY CONTRACT LABORATORIES are listed in the "Laboratory Test Code" column. The CORESTA Recommended Methods for Mainstream Smoke, Homogenized Cigar, and Physical Parameters are provided for informational purposes only, and should not be assumed to be the method used by the contract laboratories.

Parameter Measured	Laboratory Test Code	Reference Methods
Total Particulate Matter (TPM), Puff Count	AM-001/LP-706/TMS-00115a	CRM-65
Tar (Nicotine-free dry Particulate Matter)	AM-001/LP-706/TMS-00115a	CRM-65
Nicotine Mainstream Smoke	AM-001/LP-706/TMS-00115a	CRM-66
Carbon Monoxide in Mainstream Smoke	AM-001/LP-706/TMS-00115a	CRM-68
Water in TPM	AM-001/LP-706/TMS-00115a	CRM-67
Ammonia in Mainstream Smoke	AM-011/LP715/TMS-00101	
Carbonyls in Mainstream Smoke	AM-076/LP-712/TMS-00104	
Tobacco Specific Nitrosamines (TSNAs) in Mainstream Smoke	AM-020/LP-754/TMS-00135	CRM-75

Benzo[α]pyrene in Mainstream Smoke	AM-044/LP711/TMS-00120	
Aromatic Amines in Mainstream Smoke	AM-199/LP716/TMS-00128	
Volatile Organic Compounds in Mainstream Smoke	AM-015/LP714/TMS-00124	
Pressure Drop	AM-009/EQU-024/TMG-00606	
Physical Parameters	AM-009/LP725,LP783/CRM64	
Moisture Content	AM-071/LP-801/TWT-00300	CRM-76
pH	AM-071/LP031	CRM-69
Water Activity	AM-233/LP440/TWT-00378	CRM-88
Aerobic Microbial Counts	AM TOX-011/LP905/TBA-00526B	
Nicotine in Tobacco	AM-072/LP445/TWT-00324	CRM-62 or CRM -87
Tobacco Specific Nitrosamines (TSNAs) in Tobacco	AM-031/LP412/TWT-00333	CRM-72
Ammonia in Tobacco	AM-115/LP509/TWT-00302	CRM-79
Nitrate in Tobacco	AM-110/LP505, LP507/TWT-00338	CRM-103
Metals in Tobacco	AM-052/LP416/TWT-00306	CRM-93

INTENDED USE: This product may be used for analytical method development, assigning values to materials (when applicable), and equipment calibration to any applicable extent.

INSTRUCTIONS FOR CORRECT USE: This reference material may be stored in sealed containers or bags at -20°C until testing. Prior to analysis, the reference material should be unopened and transferred to a refrigerator for a minimum of 24 hours or until they are completely thawed, and then moved to equilibration chamber for at least 3 days, but no more than 10 days, until it reaches weight equilibrium. Any reference materials found to have damaged package should be discarded.

HAZARD INFORMATION: N/A

HOMOGENEITY: Homogeneity of this material is reflected in the "Certified Uncertainties" disclosed herein.

Parameter	Reported Value	Reported Uncertainty	Unit	Number of accepted data	Constant Coverage Factor
Total Aerobic Microbial Counts (TAMC)	6.64	0.77	Log (CFUs)	176	2.16
Total Yeast and Mold Counts (TYMC)	3.67	-	Log (CFUs)	24	-

TAMC and TYMC were measured by ISO 17025 laboratories using the following methods: AM TOX-011/LP904/TBA-00526B. Most of the TYMC results were below the level of quantification. Due to the inherent variability of microbial populations in processed tobacco products and the broad range of values reported by the labs, these values are indicative of the microbial load within the product and are not certified reference values. Additional information about the microbial population and diversity can be found on the product page at ctrp.uky.edu.

Cut width data was provided by the manufacturer of the 1RLC and was not measured by ISO 17025 laboratories. The filler for the 1RLC is composed of a threshed filler with a cut width range of 1/16 inch – 1/2 inch (0.159 cm – 1.27 cm). The average percentage of filler within a certain size range is listed in the table below.

Filler Material Sizes					
% >	1/2 inch (1.270 cm)	1/4 inch (0.635 cm)	1/8 inch (0.318 cm)	1/16 inch (0.0625 cm)	Particles
Average	14.48 %	44.92 %	25.68 %	13.15 %	1.77 %

NAMES AND SIGNATURES OF CERTIFYING OFFICERS:

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