Martin-Gatton
College of Agriculture, Food and Environment
Center for Tobacco Reference Products
Telephone: (859) 257-2660
Fax: (859) 257-6012
Email: ctrp@uky.edu

University of Kentucky
Center for Tobacco Reference Products
1401 University Drive
Lexington, KY 40546-0236
https://ctrp.uky.edu/home

Certificate of Analysis

1RSC Certified Reference Cigarillo

Data Sheet Number: 2024-1RSC-CTRP
Reference values generated on: November 21, 2024
Reference values are valid until: November 21, 2029
Superseded data sheet code: NA

Description of material	Small cigar (cigarillo) with homogenized tobacco leaf wrapper
Lot/Batch number	**1RSC**
Matrix filler	Cut-rag tobacco filler blend (dark air-cured)
Major starting materials filler	Dark air-cured cut-rag and rolled stems with propylene glycol, water, and no flavors in the body filler and no head filler

1RSC Reference Cigarillo Values and Uncertainties

Mainstream Smoke Using CRM 64 Smoking Regime					
Parameter	**Certified Value**	**Certified Uncertainty (U_{CRM})**	**Coverage Factor of U_{CRM}**	**Unit**	**Number of accepted data points**
Total Particulate Matter (TPM)	64.59	7.46	2.13	mg/cigar	336
Tar (Nicotine-free Dry Particulate Matter (NFDPM))	57.14	6.47	2.21	mg/cigar	336
CO (Carbon Monoxide)	91.4	12.3	2.00	mg/cigar	336
Nicotine	2.424	0.394	1.98	mg/cigar	336
Puff Count	36.1	4.2	2.31	Puffs/cigar	336
Water	5.03	2.14	2.04	mg/cigar	336
Acetaldehyde	1838	476	1.99	µg/cigar	336
Acrolein	55	23	2.06	µg/cigar	336
Crotonaldehyde	37	26	2.36	µg/cigar	336
Formaldehyde	16	6	1.99	µg/cigar	336
NNK (4(methylnitrosamino)-1-(3-pyridyl)-1-butanone)	1722	408	2.00	ng/cigar	336
NNN (N-nitrosonornicotine)	3691	742	2.01	ng/cigar	336
Benzo[α]pyrene	68.9	12.6	2.35	ng/cigar	336
1-Aminonaphthalene	109	17	2.00	ng/cigar	336
2-Aminonaphthalene	68.8	24.8	2.71	ng/cigar	336
4-Aminobiphenyl	13.3	3.8	2.44	ng/cigar	336
1,3-Butadiene	239	38	2.01	µg/cigar	336
Acrylonitrile	67	32	2.68	µg/cigar	336
Benzene	235	123	2.90	µg/cigar	336
Isoprene	1675	409	2.38	µg/cigar	335
Toluene	414	364	3.07	µg/cigar	336

Homogenized Cigarillo (composite sample including the wrapper, binder, and filler)					
Parameter	**Certified Value**	**Certified Uncertainty (U_{CRM})**	**Coverage Factor of U_{CRM}**	**Unit**	**Number of accepted data points**
Arsenic	874	259	2.06	ng/g	228
Cadmium	838	304	2.77	ng/g	228
Nicotine	11505	1741	2.14	µg/g	228
NNK (4(methylnitrosamino)-1-(3-pyridyl)-1-butanone)	3045	960	1.99	ng/g	228
NNN (N-nitrosonornicotine)	18848	4375	2.01	ng/g	228
Moisture Content	14.83	1.31	1.99	%	228
pH	6.35	0.12	2.07	pH unit	228
Water Activity	0.65	0.05	2.03	a_w	228
Physical Properties					
Parameter	**Certified Value**	**Certified Uncertainty U_{CRM}**	**Coverage Factor of U_{CRM}**	**Unit**	**Number of accepted data points**
Pressure Drop	110.01	14.36	1.98	mmWg	5040
Circumference	32.1	0.6	1.98	mm	5040
Length	111.9	1.1	1.99	mm	5040
Nominal Diameter‡	10.23	0.19	1.98	mm	5040
Total weight	2705.78	113.89	1.98	mg/cigar	5040
Filler weight	2238.8	133.8	1.99	mg/cigar	456

‡Diameter was measured at 33 mm from the head of the cigarillo.

CPM HJ OC SS LT BJS.

CERTIFIED VALUES AND UNCERTAINTIES:
The "Certified Values" listed above are unweighted means of results submitted as 4 datasets from 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", U_{CRM}, 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 Linear Smoking machines.

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 participating contract 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 (CRM) 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/ TMS-00115	CRM-65
Tar (Nicotine-free Dry Particulate Matter (NFDPM))	AM-001/ TMS-00115	CRM-65
Nicotine Mainstream Smoke	AM-007/ TMS-00115	CRM-66
Carbon Monoxide in Mainstream Smoke	AM-001/ TMS-00115	CRM-68
Water in TPM	AM-001/ TMS-00115	CRM-67
Carbonyls in Mainstream Smoke	AM-076/ TMS-00104	
Tobacco Specific Nitrosamines (TSNAs) in Mainstream Smoke	AM-020/ TMS-00135	CRM-75
Benzo[α]pyrene in Mainstream Smoke	AM-044/ TMS-00120	
Aromatic Amines in Mainstream Smoke	AM-199/ TMS-00128 Appendix G	
Volatile Organic Compounds in Mainstream Smoke	AM-015/ TMS-00124	
Pressure Drop	AM-009/ TMG-00606	
Physical Parameters	AM-009/CRM65	
Moisture Content	AM-071/ TWT-00300	CRM-76

Physical Parameters	AM-009/CRM65	
Moisture Content	AM-071/ TWT-00300	CRM-76
pH	AM-071/TWT-00310	CRM-69
Water Activity	AM-233/ TWT-00378	CRM-88
Aerobic Microbial Counts	AM TOX-011/ TBA-00526B	
Nicotine in Tobacco	AM-072/ TWT-00324	CRM-62 or CRM-87
Tobacco Specific Nitrosamines (TSNAs) in Tobacco	AM-031/ TWT-00333	CRM-72
Metals in Tobacco	AM-052/ 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: Based on the guidance of CRM 46, 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 it is 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 a 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	Constant Coverage Factor	Unit	Number of accepted data
Total Aerobic Microbial Counts (TAMC)	6.53	1.07	1.99	Log (CFUs)	228
Total Yeast and Mold Counts (TYMC)	3.37	1.84	2.57	Log (CFUs)	171

TAMC and TYMC were measured by ISO 17025 accredited 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 1RSC and was not measured by ISO 17025 accredited laboratories. The filler is composed of blended tobacco that was cut on a cutting machine with a target cut width of 0.056 inches (0.142 cm) and random length.

NAMES AND SIGNATURES OF CERTIFYING OFFICERS:

Certificate Approved by:

Ling Yuan, Ph.D.
Director, CTRP

Certificate Approved by:

Orlando D. Chambers, Ph.D.
Principal Investigator

Certificate Approved by:

Brent J. Shelton, Ph.D.
Statistical design and data processing

Certificate Approved by:

Huihua Ji, MS
Analytical Lab Director/ Deputy Quality Control

Certificate Approved by:

C. Ruth McNees, Ph.D.
Quality Control/Quality Assurance

Certificate Approved by:

Stacey Slone, MS
Statistical design and data processing