

Certificate of Analysis

1RFC Certified Reference Filtered Cigar

Data Sheet Number: 2025-1RFC-CTRP

Reference values generated on: January 28, 2025

Reference values are valid until: January 28, 2030

Superseded data sheet code: NA

Description of material	Filtered cigar with homogenized tobacco leaf wrapper
Lot/Batch number	1RFC
Matrix filler	Cut-rag tobacco filler (Dark air-cured and sun-cured)
Major starting materials filler	Dark air-cured and sun-cured cut-rag and rolled stem with propylene glycol, and water

1RFC Reference Filtered Cigar 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)	20.06	2.30	2.14	mg/cigar	192
Tar (Nicotine-free Dry Particulate Matter (NFDPM))	17.61	1.65	2.08	mg/cigar	192
CO (Carbon Monoxide)	28.9	5.2	2.35	mg/cigar	192
Nicotine	1.133	0.139	2.11	mg/cigar	192
Puff Count	17.1	3.4	2.71	Puffs/cigar	192
Water	1.42	1.05	2.81	mg/cigar	173
Acetaldehyde	740	254	2.52	μg/cigar	192
Acrolein	35	14	2.57	μg/cigar	192
Crotonaldehyde	11	9	2.98	μg/cigar	184
Formaldehyde	10	4	2.34	μg/cigar	192
NNK (4(methylnitrosamino)-1-(3-pyridyl)-1-butanone)	108	11	2.00	ng/cigar	192
NNN (N-nitrosornicotine)	181	23	2.16	ng/cigar	192
Benzo[α]pyrene	18	5	2.25	ng/cigar	192
1-Aminonaphthalene	36	9	2.32	ng/cigar	192
2-Aminonaphthalene	19	9	2.90	ng/cigar	192
4-Aminobiphenyl	3.6	1.4	2.63	ng/cigar	192
1,3-Butadiene	62	12	2.25	μg/cigar	192
Acrylonitrile	13	5	2.71	μg/cigar	192
Benzene	77	29	2.64	μg/cigar	192
Isoprene	490	113	2.37	μg/cigar	192
Toluene	99	68	3.08	μg/cigar	192

YPM
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Homogenized Filtered Cigar (composite sample including the wrapper and filler)					
Parameter	Certified Value	Certified Uncertainty (U_{CRM})	Coverage Factor of U_{CRM}	Unit	Number of accepted data points
Arsenic	159	30	2.15	ng/g	132
Cadmium	1316	176	2.58	ng/g	132
Nicotine	15355	1460	2.39	µg/g	132
NNK (4(methylnitrosamino)-1-(3-pyridyl)-1-butanone)	395	68	2.01	ng/g	132
NNN (N-nitrosornicotine)	1804	335	2.23	ng/g	132
Moisture Content	12.19	1.79	2.25	%	132
pH	5.94	0.11	2.03	pH unit	132
Water Activity	0.61	0.06	2.49	a_w	132
Physical Properties					
Parameter	Certified Value	Certified Uncertainty (U_{CRM})	Coverage Factor of U_{CRM}	Unit	Number of accepted data points
Pressure Drop	150.37	6.74	2.00	mmWg	2400
Circumference	24.7	0.5	2.05	mm	2160
Length†	98.6	0.5	2.01	mm	2400
Nominal Diameter	7.87	0.15	2.05	mm	2160
Total Weight	1122.35	32.29	2.00	mg/cigar	2400
Filler Weight	800.6	46.9	2.02	mg/cigar	570
Filter Weight‡	145.1	3.0	2.02	mg/cigar	460
Filter Density‡	0.11	0.00*	2.22	g/cm³	459
Filter Length†	27.0	0.19	2.02	mm	700
Filter Ventilation	14.35	0.88	2.01	%	2400
Tobacco Rod Density	0.26	0.05	2.82	g/cm³	700
Tobacco Rod Length†	71.6	0.5	2.06	mm	700
Total Ventilation	29.58	3.95	2.00	%	2400

* Certified Uncertainty reporting an additional significant digit = 0.005

† Length measurements were calculated after the data was rounded to #.5 or #.0 based on CRM 65.

‡ Filter weight measured without filter paper. One of the four datasets was excluded for this parameter and filter density due to including filtered paper in the reported results.

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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 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-00115a	CRM-65
Tar (Nicotine-free Dry Particulate Matter (NFDPM))	AM-001/ TMS-00115a	CRM-65
Nicotine Mainstream Smoke	AM-001/ TMS-00115a	CRM-66

Carbon Monoxide in Mainstream Smoke	AM-001/ TMS-00115a	CRM-68
Water in TPM	AM-001/TMS-00115a	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	
Volatile Organic Compounds in Mainstream Smoke	AM-015/ TMS-00124	
Pressure Drop	AM-009/TMG-00606	
Physical Parameters	AM-009/ CRM64	
Moisture Content	AM-071/ TWT-00300	CRM-76
pH	AM-071	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 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)	6.82	0.78	2.38	Log (CFUs)	132
Total Yeast and Mold Counts (TYMC)	2.72	1.29	2.47	Log (CFUs)	115

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 1RFC and was not measured by ISO 17025 accredited laboratories. The filler is composed of blended tobacco that was cut on a cutting machine and reported to have a cut-width of 0.9 mm and 28.3 cuts per inch.

NAMES AND SIGNATURES OF CERTIFYING OFFICERS:

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