

Supplementary Materials File S2

1 Per Collection Limits Summary

1.1 Virginia Tobacco 18 mg/mL Non-Intense Per Collection Limit of Detection and Quantification Values

Parameter/ Constituent	Units	T0		T3		T6		T9		T12	
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary Constituents		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Nicotine	mg/collection	0.20	2.02	0.20	1.99	0.20	2.03	0.20	2.02	0.20	2.09
Glycerol	mg/collection	0.50	12.58	0.50	5.02	0.50	5.03	0.50	5.04	0.50	5.04
Propylene Glycol	mg/collection	0.21	2.06	0.21	2.06	0.21	2.08	0.21	2.01	0.21	2.14
Water	mg/collection	24.63	24.63	24.60	24.60	24.53	24.53	24.52	24.52	24.43	24.43
Menthol	mg/collection	0.16	1.58	0.16	1.61	0.16	1.60	0.16	1.59	0.16	1.64
Diethylene Glycol	mg/collection	0.17	1.76	0.16	1.65	0.16	1.67	0.16	1.67	0.17	1.66
Ethylene Glycol	mg/collection	0.18	1.77	0.18	1.76	0.18	1.78	0.18	1.79	0.18	1.77
Carbonyls & Glycidol		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Acetaldehyde	mcg/collection	0.17	1.13	0.17	1.13	0.20	1.13	0.20	1.13	0.20	1.13
Acrolein	mcg/collection	0.11	1.13	0.11	1.13	0.15	1.13	0.15	1.13	0.15	1.13
Diacetyl	mcg/collection	0.12	1.14	0.12	1.15	0.11	1.15	0.11	1.12	0.11	1.12
Formaldehyde	mcg/collection	0.25	1.13	0.25	1.13	0.38	1.13	0.38	1.13	0.38	1.13
Glycidol	mcg/collection	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03
Acetyl Propionyl	mcg/collection	0.11	1.12	0.11	1.13	0.11	1.13	0.11	1.14	0.11	1.14
Butyraldehyde	mcg/collection	0.12	1.13	0.12	1.13	0.11	1.13	0.11	1.13	0.11	1.13
Crotonaldehyde	mcg/collection	0.11	1.12	0.11	1.12	0.18	1.13	0.18	1.13	0.18	1.11
Furfural	mcg/collection	0.15	1.13	0.15	1.13	0.19	1.13	0.19	1.13	0.19	1.13
Nicotine Degradants & TSNAs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
β-Nicotyrine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Cotinine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90

Supplementary Material

Myosmine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Nicotine N Oxide	mcg/collection	0.31	0.90	0.31	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Nornicotine	mcg/collection	0.14	0.90	0.14	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Anabasine	mcg/collection	0.09	0.89	0.09	0.91	0.09	0.91	0.09	0.91	0.09	0.91
Anatabine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90
NNK	mcg/collection	0.003	0.03	NT	NT	NT	NT	NT	NT	NT	NT
NNN	mcg/collection	0.003	0.03	NT	NT	NT	NT	NT	NT	NT	NT
Metals		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Arsenic	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Beryllium	ng/collection	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00
Cadmium	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Chromium	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Cobalt	ng/collection	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00
Copper	ng/collection	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00
Gold	ng/collection	170.00	200.00	NT	NT	NT	NT	NT	NT	NT	NT
Iron	ng/collection	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00
Lead	ng/collection	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00
Nickel	ng/collection	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00
Selenium	ng/collection	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00
Silver	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Tin	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Zinc	ng/collection	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00
Organic Acids		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Benzoic Acid	mg/collection	0.09	0.88	0.09	0.88	0.06	0.35	0.15	0.88	0.09	0.88
Propionic Acid	mcg/collection	3.53	35.31	3.53	35.31	61.89	352.71	3.53	35.31	3.53	35.31
VOCs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1,3-Butadiene	mcg/collection	0.05	0.20	NT	NT	NT	NT	NT	NT	NT	NT
Acrylonitrile	mcg/collection	0.04	0.21	NT	NT	NT	NT	NT	NT	NT	NT
Benzene	mcg/collection	0.06	0.30	NT	NT	NT	NT	NT	NT	NT	NT

Isoprene	mcg/collection	0.08	0.25	NT	NT	NT	NT	NT	NT	NT	NT
Propylene Oxide	mcg/collection	0.15	0.85	NT	NT	NT	NT	NT	NT	NT	NT
Toluene	mcg/collection	0.09	0.35	NT	NT	NT	NT	NT	NT	NT	NT
Esters & Alcohols		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1-Butanol	mcg/collection	1.62	16.20	NT	NT	NT	NT	NT	NT	NT	NT
Benzyl Acetate	mcg/collection	2.51	25.12	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Acetate	mcg/collection	2.88	28.76	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Acetoacetate	mcg/collection	2.05	20.54	NT	NT	NT	NT	NT	NT	NT	NT
Isoamyl Acetate	mcg/collection	1.75	17.52	NT	NT	NT	NT	NT	NT	NT	NT
Isobutyl Acetate	mcg/collection	1.74	17.36	NT	NT	NT	NT	NT	NT	NT	NT
Methyl Acetate	mcg/collection	1.87	18.66	NT	NT	NT	NT	NT	NT	NT	NT

1.2 Virginia Tobacco 18 mg/mL Intense Per Collection Limit of Detection and Quantification Values

Parameter/ Constituent	Units	T0		T3		T6		T9		T12	
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary Constituents		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Nicotine	mg/collection	0.20	2.02	0.20	1.99	0.20	2.03	0.20	2.02	0.20	2.09
Glycerol	mg/collection	0.50	12.58	0.50	5.02	0.50	5.03	0.45	4.53	0.45	4.54
Propylene Glycol	mg/collection	0.21	2.06	0.21	2.06	0.21	2.08	0.21	2.01	0.21	2.14
Water	mg/collection	24.62	24.68	24.66	24.66	24.46	24.46	24.48	24.48	24.45	24.45
Menthol	mg/collection	0.16	1.58	0.16	1.61	0.16	1.60	0.16	1.59	0.16	1.64
Diethylene Glycol	mg/collection	0.17	1.76	0.16	1.65	0.16	1.67	0.16	1.67	0.17	1.66
Ethylene Glycol	mg/collection	0.18	1.77	0.18	1.76	0.18	1.78	0.18	1.79	0.18	1.77
Carbonyls & Glycidol		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Acetaldehyde	mcg/collection	0.20	1.32	0.20	1.32	0.24	1.31	0.24	1.31	0.24	1.32
Acrolein	mcg/collection	0.13	1.32	0.13	1.32	0.18	1.32	0.18	1.32	0.18	1.31
Diacetyl	mcg/collection	0.14	1.33	0.14	1.34	0.13	1.34	0.13	1.30	0.13	1.30

Supplementary Material

Formaldehyde	mcg/collection	0.29	1.31	0.29	1.31	0.44	1.31	0.44	1.31	0.44	1.32
Glycidol	mcg/collection	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03
Acetyl Propionyl	mcg/collection	0.13	1.31	0.13	1.32	0.13	1.32	0.13	1.33	0.13	1.33
Butyraldehyde	mcg/collection	0.14	1.32	0.14	1.32	0.13	1.32	0.13	1.30	0.13	1.30
Crotonaldehyde	mcg/collection	0.13	1.31	0.13	1.31	0.21	1.32	0.21	1.32	0.21	1.29
Furfural	mcg/collection	0.18	1.32	0.18	1.32	0.22	1.32	0.22	1.32	0.22	1.32
Nicotine Degradants & TSNA's		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
β-Nicotyrine	mcg/collection	0.10	1.05	0.10	1.05	0.11	1.06	0.11	1.06	0.11	1.06
Cotinine	mcg/collection	0.10	1.05	0.10	1.05	0.11	1.06	0.11	1.06	0.11	1.06
Myosmine	mcg/collection	0.10	1.05	0.10	1.05	0.11	1.05	0.11	1.05	0.11	1.05
Nicotine N Oxide	mcg/collection	0.37	1.06	0.37	1.05	0.11	1.05	0.11	1.05	0.11	1.05
Nornicotine	mcg/collection	0.17	1.05	0.17	1.05	0.11	1.05	0.11	1.05	0.11	1.05
Anabasine	mcg/collection	0.11	1.04	0.11	1.05	0.11	1.06	0.11	1.06	0.11	1.06
Anatabine	mcg/collection	0.11	1.06	0.11	1.06	0.11	1.06	0.11	1.06	0.11	1.06
NNK	mcg/collection	0.002	0.03	NT	NT	NT	NT	NT	NT	NT	NT
NNN	mcg/collection	0.003	0.03	NT	NT	NT	NT	NT	NT	NT	NT
Metals		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Arsenic	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Beryllium	ng/collection	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00
Cadmium	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Chromium	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Cobalt	ng/collection	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00
Copper	ng/collection	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00
Gold	ng/collection	170.00	200.00	NT	NT	NT	NT	NT	NT	NT	NT
Iron	ng/collection	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00
Lead	ng/collection	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00
Nickel	ng/collection	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00
Selenium	ng/collection	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00
Silver	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00

Tin	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Zinc	ng/collection	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00
Organic Acids		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Benzoic Acid	mg/collection	0.09	0.88	0.09	0.88	0.07	0.67	0.16	0.88	0.16	0.88
Propionic Acid	mcg/collection	3.53	35.31	3.53	35.31	87.72	670.15	3.53	35.31	3.53	35.31
VOCs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1,3-Butadiene	mcg/collection	0.05	0.20	NT	NT	NT	NT	NT	NT	NT	NT
Acrylonitrile	mcg/collection	0.04	0.21	NT	NT	NT	NT	NT	NT	NT	NT
Benzene	mcg/collection	0.06	0.30	NT	NT	NT	NT	NT	NT	NT	NT
Isoprene	mcg/collection	0.08	0.25	NT	NT	NT	NT	NT	NT	NT	NT
Propylene Oxide	mcg/collection	0.15	0.85	NT	NT	NT	NT	NT	NT	NT	NT
Toluene	mcg/collection	0.09	0.35	NT	NT	NT	NT	NT	NT	NT	NT
Esters & Alcohols		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1-Butanol	mcg/collection	1.62	16.20	NT	NT	NT	NT	NT	NT	NT	NT
Benzyl Acetate	mcg/collection	2.51	25.12	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Acetate	mcg/collection	2.88	28.76	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Acetoacetate	mcg/collection	2.05	20.54	NT	NT	NT	NT	NT	NT	NT	NT
Isoamyl Acetate	mcg/collection	1.75	17.52	NT	NT	NT	NT	NT	NT	NT	NT
Isobutyl Acetate	mcg/collection	1.74	17.36	NT	NT	NT	NT	NT	NT	NT	NT
Methyl Acetate	mcg/collection	1.87	18.66	NT	NT	NT	NT	NT	NT	NT	NT

1.3 Crisp Menthol 18 mg/mL Non-Intense Per Collection Limit of Detection and Quantification Values

Parameter/ Constituent	Units	T0		T3		T6		T9		T12	
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary Constituents		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Nicotine	mg/collection	0.20	2.02	0.20	1.99	0.20	2.03	0.20	2.02	0.20	2.09
Glycerol	mg/collection	0.25	6.29	0.25	2.51	0.25	2.52	0.25	2.52	0.25	2.52

Supplementary Material

Propylene Glycol	mg/collection	0.42	4.12	0.41	4.11	0.41	4.16	0.41	4.02	0.41	4.28
Water	mg/collection	24.79	24.85	24.60	24.60	24.52	24.52	24.64	24.64	24.57	24.57
Menthol	mg/collection	0.16	1.58	0.16	1.61	0.16	1.60	0.16	1.59	0.16	1.64
Diethylene Glycol	mg/collection	0.17	1.76	0.16	1.65	0.16	1.67	0.16	1.67	0.17	1.66
Ethylene Glycol	mg/collection	0.18	1.77	0.18	1.76	0.18	1.78	0.18	1.79	0.18	1.77
Carbonyls & Glycidol		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Acetaldehyde	mcg/collection	0.17	1.13	0.17	1.13	0.20	1.13	0.20	1.13	0.20	1.13
Acrolein	mcg/collection	0.11	1.13	0.11	1.13	0.15	1.13	0.15	1.13	0.15	1.13
Diacetyl	mcg/collection	0.12	1.14	0.12	1.15	0.11	1.15	0.11	1.12	0.11	1.12
Formaldehyde	mcg/collection	0.25	1.13	0.25	1.13	0.38	1.13	0.38	1.13	0.38	1.13
Glycidol	mcg/collection	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03
Acetyl Propionyl	mcg/collection	0.11	1.12	0.11	1.13	0.11	1.13	0.11	1.14	0.11	1.14
Butyraldehyde	mcg/collection	0.12	1.13	0.12	1.13	0.11	1.13	0.11	1.13	0.11	1.13
Crotonaldehyde	mcg/collection	0.11	1.12	0.11	1.12	0.18	1.13	0.18	1.13	0.18	1.11
Furfural	mcg/collection	0.15	1.13	0.15	1.13	0.19	1.13	0.19	1.13	0.19	1.13
Nicotine Degradants & TSNAs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
β-Nicotyrine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Cotinine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Myosmine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Nicotine N Oxide	mcg/collection	0.31	0.90	0.31	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Nornicotine	mcg/collection	0.14	0.90	0.14	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Anabasine	mcg/collection	0.09	0.89	0.09	0.91	0.09	0.91	0.09	0.91	0.09	0.91
Anatabine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90
NNK	mcg/collection	0.003	0.03	NT	NT	NT	NT	NT	NT	NT	NT
NNN	mcg/collection	0.003	0.03	NT	NT	NT	NT	NT	NT	NT	NT
Metals		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Arsenic	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Beryllium	ng/collection	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00
Cadmium	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00

Chromium	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Cobalt	ng/collection	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00
Copper	ng/collection	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00
Gold	ng/collection	170.00	200.00	NT	NT	NT	NT	NT	NT	NT	NT
Iron	ng/collection	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00
Lead	ng/collection	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00
Nickel	ng/collection	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00
Selenium	ng/collection	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00
Silver	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Tin	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Zinc	ng/collection	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00
Organic Acids		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Benzoic Acid	mg/collection	0.09	0.88	0.09	0.88	0.06	0.35	0.09	0.88	0.16	0.88
Propionic Acid	mcg/collection	6.19	35.48	6.19	35.27	35.27	352.71	3.53	35.31	3.53	35.31
VOCs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1,3-Butadiene	mcg/collection	0.05	0.20	NT	NT	NT	NT	NT	NT	NT	NT
Acrylonitrile	mcg/collection	0.04	0.21	NT	NT	NT	NT	NT	NT	NT	NT
Benzene	mcg/collection	0.06	0.30	NT	NT	NT	NT	NT	NT	NT	NT
Isoprene	mcg/collection	0.08	0.25	NT	NT	NT	NT	NT	NT	NT	NT
Propylene Oxide	mcg/collection	0.15	0.85	NT	NT	NT	NT	NT	NT	NT	NT
Toluene	mcg/collection	0.09	0.35	NT	NT	NT	NT	NT	NT	NT	NT
Esters & Alcohols		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1-Butanol	mcg/collection	1.62	16.20	NT	NT	NT	NT	NT	NT	NT	NT
Benzyl Acetate	mcg/collection	2.51	25.12	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Acetate	mcg/collection	2.88	28.76	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Acetoacetate	mcg/collection	2.05	20.54	NT	NT	NT	NT	NT	NT	NT	NT
Isoamyl Acetate	mcg/collection	1.75	17.52	NT	NT	NT	NT	NT	NT	NT	NT
Isobutyl Acetate	mcg/collection	1.74	17.36	NT	NT	NT	NT	NT	NT	NT	NT
Methyl Acetate	mcg/collection	1.87	18.66	NT	NT	NT	NT	NT	NT	NT	NT

1.4 Crisp Menthol 18 mg/mL Intense Per Collection Limit of Detection and Quantification Values

Parameter/ Constituent	Units	T0		T3		T6		T9		T12	
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary Constituents		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Nicotine	mg/collection	0.20	2.02	0.20	1.99	0.20	2.02	0.20	2.02	0.20	2.09
Glycerol	mg/collection	0.25	6.29	0.25	2.51	0.25	2.52	0.25	2.52	0.25	2.52
Propylene Glycol	mg/collection	0.42	4.12	0.41	4.11	0.41	4.02	0.41	4.02	0.41	4.28
Water	mg/collection	24.63	24.63	24.73	24.73	24.64	24.64	24.58	24.58	24.09	24.09
Menthol	mg/collection	0.16	1.58	0.16	1.61	0.16	1.59	0.16	1.59	0.16	1.64
Diethylene Glycol	mg/collection	0.17	1.76	0.16	1.65	0.16	1.67	0.16	1.67	0.17	1.66
Ethylene Glycol	mg/collection	0.18	1.77	0.18	1.76	0.18	1.79	0.18	1.79	0.18	1.77
Carbonyls & Glycidol		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Acetaldehyde	mcg/collection	0.20	1.32	0.20	1.32	0.20	1.13	0.24	1.31	0.25	1.32
Acrolein	mcg/collection	0.13	1.32	0.13	1.32	0.15	1.13	0.18	1.32	0.38	1.31
Diacetyl	mcg/collection	0.14	1.33	0.14	1.34	0.11	1.12	0.13	1.30	0.26	1.30
Formaldehyde	mcg/collection	0.29	1.31	0.29	1.31	0.38	1.13	0.44	1.31	0.76	1.32
Glycidol	mcg/collection	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03
Acetyl Propionyl	mcg/collection	0.13	1.31	0.13	1.32	0.11	1.14	0.13	1.33	0.18	1.33
Butyraldehyde	mcg/collection	0.14	1.32	0.14	1.32	0.11	1.13	0.13	1.30	0.31	1.32
Crotonaldehyde	mcg/collection	0.13	1.31	0.13	1.31	0.18	1.13	0.21	1.32	0.37	1.29
Furfural	mcg/collection	0.18	1.32	0.18	1.32	0.19	1.13	0.22	1.32	0.30	1.32
Nicotine Degradants & TSNAs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
β-Nicotyrine	mcg/collection	0.10	1.05	0.10	1.05	0.09	0.90	0.11	1.06	0.11	1.06
Cotinine	mcg/collection	0.10	1.05	0.10	1.05	0.09	0.90	0.11	1.06	0.11	1.06
Myosmine	mcg/collection	0.10	1.05	0.10	1.05	0.09	0.90	0.11	1.05	0.11	1.05
Nicotine N Oxide	mcg/collection	0.37	1.06	0.37	1.06	0.09	0.90	0.11	1.05	0.11	1.05

Nornicotine	mcg/collection	0.17	1.05	0.17	1.05	0.09	0.90	0.11	1.05	0.11	1.05
Anabasine	mcg/collection	0.11	1.04	0.11	1.04	0.09	0.91	0.11	1.06	0.11	1.06
Anatabine	mcg/collection	0.11	1.06	0.11	1.06	0.09	0.90	0.11	1.06	0.11	1.06
NNK	mcg/collection	0.00	0.03	NT	NT	NT	NT	NT	NT	NT	NT
NNN	mcg/collection	0.00	0.03	NT	NT	NT	NT	NT	NT	NT	NT
Metals		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Arsenic	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Beryllium	ng/collection	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00
Cadmium	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Chromium	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Cobalt	ng/collection	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00
Copper	ng/collection	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00
Gold	ng/collection	170.00	200.00	NT	NT	NT	NT	NT	NT	NT	NT
Iron	ng/collection	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00
Lead	ng/collection	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00
Nickel	ng/collection	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00
Selenium	ng/collection	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00
Silver	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Tin	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Zinc	ng/collection	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00
Organic Acids		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Benzoic Acid	mg/collection	0.09	0.88	0.09	0.88	0.09	0.88	0.09	0.88	0.09	0.88
Propionic Acid	mcg/collection	6.19	35.48	4.62	35.27	3.53	35.31	3.53	35.31	3.53	35.31
VOCs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1,3-Butadiene	mcg/collection	5.49E-02	2.00E-01	NT	NT	NT	NT	NT	NT	NT	NT
Acrylonitrile	mcg/collection	3.60E-02	2.11E-01	NT	NT	NT	NT	NT	NT	NT	NT
Benzene	mcg/collection	6.30E-02	3.00E-01	NT	NT	NT	NT	NT	NT	NT	NT
Isoprene	mcg/collection	8.46E-02	2.53E-01	NT	NT	NT	NT	NT	NT	NT	NT
Propylene Oxide	mcg/collection	1.46E-01	8.52E-01	NT	NT	NT	NT	NT	NT	NT	NT

Toluene	mcg/collection	9.25E-02	3.52E-01	NT	NT	NT	NT	NT	NT	NT	NT
Esters & Alcohols		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1-Butanol	mcg/collection	1.62	16.20	NT	NT	NT	NT	NT	NT	NT	NT
Benzyl Acetate	mcg/collection	2.51	25.12	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Acetate	mcg/collection	2.88	28.76	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Acetoacetate	mcg/collection	2.05	20.54	NT	NT	NT	NT	NT	NT	NT	NT
Isoamyl Acetate	mcg/collection	1.75	17.52	NT	NT	NT	NT	NT	NT	NT	NT
Isobutyl Acetate	mcg/collection	1.74	17.36	NT	NT	NT	NT	NT	NT	NT	NT
Methyl Acetate	mcg/collection	1.87	18.66	NT	NT	NT	NT	NT	NT	NT	NT

1.5 Polar Menthol 18 mg/mL Non-Intense Per Collection Limit of Detection and Quantification Values

Parameter/ Constituent	Units	T0		T3		T6		T9		T12	
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary Constituents		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Nicotine	mg/collection	0.20	2.02	0.20	1.99	0.20	2.03	0.20	2.02	0.20	2.09
Glycerol	mg/collection	0.25	6.29	0.25	2.51	0.25	2.52	0.25	2.52	0.25	2.52
Propylene Glycol	mg/collection	0.42	4.12	0.41	4.11	0.41	4.16	0.41	4.02	0.37	3.85
Water	mg/collection	24.64	24.64	24.60	24.60	24.50	24.50	24.62	24.62	24.53	24.53
Menthol	mg/collection	0.16	1.58	0.16	1.61	0.16	1.60	0.16	1.59	0.16	1.64
Diethylene Glycol	mg/collection	0.17	1.76	0.16	1.65	0.16	1.67	0.16	1.67	0.17	1.66
Ethylene Glycol	mg/collection	0.18	1.77	0.18	1.76	0.18	1.78	0.18	1.79	0.18	1.77
Carbonyls & Glycidol		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Acetaldehyde	mcg/collection	0.17	1.13	0.17	1.13	0.20	1.13	0.20	1.13	0.20	1.13
Acrolein	mcg/collection	0.11	1.13	0.11	1.13	0.15	1.13	0.15	1.13	0.15	1.13
Diacetyl	mcg/collection	0.12	1.14	0.12	1.15	0.11	1.15	0.11	1.12	0.11	1.12
Formaldehyde	mcg/collection	0.25	1.13	0.25	1.13	0.38	1.13	0.38	1.13	0.38	1.13
Glycidol	mcg/collection	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03

Acetyl Propionyl	mcg/collection	0.11	1.12	0.11	1.13	0.11	1.13	0.11	1.14	0.11	1.14
Butyraldehyde	mcg/collection	0.12	1.13	0.12	1.13	0.11	1.13	0.11	1.13	0.11	1.13
Crotonaldehyde	mcg/collection	0.11	1.12	0.11	1.12	0.18	1.13	0.18	1.13	0.18	1.11
Furfural	mcg/collection	0.15	1.13	0.15	1.13	0.19	1.13	0.19	1.13	0.19	1.13
Nicotine Degradants & TSNAs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
β-Nicotyrine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Cotinine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Myosmine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Nicotine N Oxide	mcg/collection	0.31	0.90	0.31	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Nornicotine	mcg/collection	0.14	0.90	0.14	0.90	0.09	0.90	0.09	0.90	0.09	0.90
Anabasine	mcg/collection	0.09	0.89	0.09	0.91	0.09	0.91	0.09	0.91	0.09	0.91
Anatabine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90
NNK	mcg/collection	0.003	0.03	NT	NT	NT	NT	NT	NT	NT	NT
NNN	mcg/collection	0.003	0.03	NT	NT	NT	NT	NT	NT	NT	NT
Metals		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Arsenic	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Beryllium	ng/collection	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00
Cadmium	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Chromium	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Cobalt	ng/collection	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00
Copper	ng/collection	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00
Gold	ng/collection	170.00	200.00	NT	NT	NT	NT	NT	NT	NT	NT
Iron	ng/collection	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00
Lead	ng/collection	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00
Nickel	ng/collection	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00
Selenium	ng/collection	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00
Silver	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Tin	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Zinc	ng/collection	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00

Organic Acids		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Benzoic Acid	mg/collection	0.09	0.88	0.09	0.88	0.04	0.35	0.09	0.88	0.15	0.88
Propionic Acid	mcg/collection	3.53	35.31	3.53	35.31	43.99	352.71	3.53	35.31	6.19	35.31
VOCs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1,3-Butadiene	mcg/collection	0.05	0.20	NT	NT	NT	NT	NT	NT	NT	NT
Acrylonitrile	mcg/collection	0.04	0.21	NT	NT	NT	NT	NT	NT	NT	NT
Benzene	mcg/collection	0.06	0.30	NT	NT	NT	NT	NT	NT	NT	NT
Isoprene	mcg/collection	0.08	0.25	NT	NT	NT	NT	NT	NT	NT	NT
Propylene Oxide	mcg/collection	0.15	0.85	NT	NT	NT	NT	NT	NT	NT	NT
Toluene	mcg/collection	0.09	0.35	NT	NT	NT	NT	NT	NT	NT	NT
Esters & Alcohols		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1-Butanol	mcg/collection	1.62	16.20	NT	NT	NT	NT	NT	NT	NT	NT
Benzyl Acetate	mcg/collection	2.51	25.12	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Acetate	mcg/collection	2.88	28.76	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Acetoacetate	mcg/collection	2.05	20.54	NT	NT	NT	NT	NT	NT	NT	NT
Isoamyl Acetate	mcg/collection	1.75	17.52	NT	NT	NT	NT	NT	NT	NT	NT
Isobutyl Acetate	mcg/collection	1.74	17.36	NT	NT	NT	NT	NT	NT	NT	NT
Methyl Acetate	mcg/collection	1.87	18.66	NT	NT	NT	NT	NT	NT	NT	NT

1.6 Polar Menthol 18 mg/mL Intense Per Collection Limit of Detection and Quantification Values

Parameter/ Constituent	Units	T0		T3		T6		T9		T12	
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary Constituents		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Nicotine	mg/collection	0.20	2.02	0.20	1.99	0.20	2.03	0.20	2.02	0.20	2.09
Glycerol	mg/collection	0.25	6.29	0.25	2.51	0.25	2.52	0.25	2.52	0.25	2.52
Propylene Glycol	mg/collection	0.42	4.12	0.41	4.11	0.41	4.16	0.41	4.02	0.41	4.28
Water	mg/collection	24.76	24.81	24.54	24.54	24.54	24.54	24.54	24.54	24.16	24.16

Menthol	mg/collection	0.16	1.58	0.16	1.61	0.16	1.60	0.16	1.59	0.16	1.64
Diethylene Glycol	mg/collection	0.17	1.76	0.16	1.65	0.16	1.67	0.16	1.67	0.17	1.66
Ethylene Glycol	mg/collection	0.18	1.77	0.18	1.76	0.18	1.78	0.18	1.79	0.18	1.77
Carbonyls & Glycidol		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Acetaldehyde	mcg/collection	0.20	1.32	0.20	1.32	0.24	1.31	0.24	1.31	0.25	1.32
Acrolein	mcg/collection	0.13	1.32	0.13	1.32	0.18	1.32	0.18	1.32	0.38	1.31
Diacetyl	mcg/collection	0.14	1.33	0.14	1.34	0.13	1.34	0.13	1.30	0.26	1.30
Formaldehyde	mcg/collection	0.29	1.31	0.29	1.31	0.44	1.31	0.44	1.31	0.76	1.32
Glycidol	mcg/collection	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03
Acetyl Propionyl	mcg/collection	0.13	1.31	0.13	1.32	0.13	1.32	0.13	1.33	0.18	1.33
Butyraldehyde	mcg/collection	0.14	1.32	0.14	1.32	0.13	1.32	0.13	1.30	0.31	1.32
Crotonaldehyde	mcg/collection	0.13	1.31	0.13	1.31	0.21	1.32	0.21	1.32	0.37	1.29
Furfural	mcg/collection	0.18	1.32	0.18	1.32	0.22	1.32	0.22	1.32	0.30	1.32
Nicotine Degradants & TSNAs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
β-Nicotyrine	mcg/collection	0.10	1.05	0.10	1.05	0.11	1.06	0.11	1.06	0.11	1.06
Cotinine	mcg/collection	0.10	1.05	0.10	1.05	0.11	1.06	0.11	1.06	0.11	1.06
Myosmine	mcg/collection	0.10	1.05	0.10	1.05	0.11	1.05	0.11	1.05	0.11	1.05
Nicotine N Oxide	mcg/collection	0.37	1.06	0.37	1.06	0.11	1.05	0.11	1.05	0.11	1.05
Nornicotine	mcg/collection	0.17	1.05	0.17	1.05	0.11	1.05	0.11	1.05	0.11	1.05
Anabasine	mcg/collection	0.11	1.04	0.11	1.04	0.11	1.06	0.11	1.06	0.11	1.06
Anatabine	mcg/collection	0.11	1.06	0.11	1.06	0.11	1.06	0.11	1.06	0.11	1.06
NNK	mcg/collection	0.002	0.03	NT	NT	NT	NT	NT	NT	NT	NT
NNN	mcg/collection	0.003	0.03	NT	NT	NT	NT	NT	NT	NT	NT
Metals		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Arsenic	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Beryllium	ng/collection	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00
Cadmium	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Chromium	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Cobalt	ng/collection	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00

Copper	ng/collection	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00
Gold	ng/collection	170.00	200.00	NT	NT	NT	NT	NT	NT	NT	NT
Iron	ng/collection	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00
Lead	ng/collection	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00
Nickel	ng/collection	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00
Selenium	ng/collection	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00
Silver	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Tin	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Zinc	ng/collection	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00
Organic Acids		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Benzoic Acid	mg/collection	0.09	0.88	0.09	0.88	0.06	0.35	0.09	0.88	0.15	0.88
Propionic Acid	mcg/collection	3.53	35.31	3.53	35.31	61.89	352.71	3.53	35.31	6.19	35.31
VOCs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1,3-Butadiene	mcg/collection	0.05	0.20	NT	NT	NT	NT	NT	NT	NT	NT
Acrylonitrile	mcg/collection	0.04	0.21	NT	NT	NT	NT	NT	NT	NT	NT
Benzene	mcg/collection	0.06	0.30	NT	NT	NT	NT	NT	NT	NT	NT
Isoprene	mcg/collection	0.08	0.25	NT	NT	NT	NT	NT	NT	NT	NT
Propylene Oxide	mcg/collection	0.15	0.85	NT	NT	NT	NT	NT	NT	NT	NT
Toluene	mcg/collection	0.09	0.35	NT	NT	NT	NT	NT	NT	NT	NT
Esters & Alcohols		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1-Butanol	mcg/collection	1.62	16.20	NT	NT	NT	NT	NT	NT	NT	NT
Benzyl Acetate	mcg/collection	2.51	25.12	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Acetate	mcg/collection	2.88	28.76	NT	NT	NT	NT	NT	NT	NT	NT
Ethyl Acetoacetate	mcg/collection	2.05	20.54	NT	NT	NT	NT	NT	NT	NT	NT
Isoamyl Acetate	mcg/collection	1.75	17.52	NT	NT	NT	NT	NT	NT	NT	NT
Isobutyl Acetate	mcg/collection	1.74	17.36	NT	NT	NT	NT	NT	NT	NT	NT
Methyl Acetate	mcg/collection	1.87	18.66	NT	NT	NT	NT	NT	NT	NT	NT

1.7 Autumn Tobacco 18 mg/mL Non-Intense Per Collection Limit of Detection and Quantification Values

Parameter/ Constituent	Units	T0		T3		T6		T9		T12	
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary Constituents		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Nicotine	mg/collection	0.15	1.50	0.15	1.50	0.05	0.45	0.05	0.45	0.23	2.25
Glycerol	mg/collection	1.25	12.54	1.25	12.63	0.38	3.78	0.59	5.90	1.88	18.96
Propylene Glycol	mg/collection	0.40	4.03	0.40	4.01	0.29	2.93	0.60	6.02	0.60	6.02
Water	mg/collection	4.63	9.97	4.63	9.96	1.39	3.08	1.39	3.01	6.95	15.10
Menthol	mg/collection	0.05	0.48	0.05	0.48	0.01	0.14	0.01	0.14	0.07	0.74
Diethylene Glycol	mg/collection	0.04	0.24	0.04	0.28	0.01	0.08	0.01	0.08	0.07	0.41
Ethylene Glycol	mg/collection	0.03	0.25	0.03	0.25	0.01	0.07	0.01	0.08	0.05	0.46
Carbonyls & Glycidol		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Acetaldehyde	mcg/collection	0.20	1.13	0.20	1.13	0.20	1.13	0.20	1.13	0.19	1.13
Acrolein	mcg/collection	0.15	1.13	0.15	1.13	0.15	1.13	0.15	1.13	0.14	1.13
Diacetyl	mcg/collection	0.11	1.15	0.11	1.12	0.11	1.12	0.11	1.13	0.16	1.13
Formaldehyde	mcg/collection	0.38	1.13	0.38	1.13	0.38	1.13	0.38	1.13	0.15	1.13
Glycidol	mcg/collection	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.005	0.05
Acetyl Propionyl	mcg/collection	0.11	1.13	0.11	1.14	0.11	1.14	0.11	1.14	0.15	1.14
Butyraldehyde	mcg/collection	0.11	1.13	0.11	1.11	0.11	1.13	0.11	1.13	0.12	1.13
Crotonaldehyde	mcg/collection	0.18	1.11	0.18	1.13	0.18	1.13	0.18	1.13	0.15	1.13
Furfural	mcg/collection	0.19	1.13	0.19	1.13	0.19	1.13	0.19	1.13	0.21	1.13
Nicotine Degradants & TSNAs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
β-Nicotyrine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.89	0.09	0.89
Cotinine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.19	0.90
Myosmine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.91	0.09	0.91
Nicotine N Oxide	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.89	0.22	0.89
Nornicotine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.23	0.90
Anabasine	mcg/collection	0.09	0.91	0.10	0.91	0.09	0.91	0.09	0.91	0.13	0.91
Anatabine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.91	0.11	0.91

Supplementary Material

NNK	mcg/collection	0.001	0.003	0.001	0.003	NT	NT	NT	NT	NT	NT
NNN	mcg/collection	0.001	0.003	0.001	0.003	NT	NT	NT	NT	NT	NT
Metals		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Arsenic	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Beryllium	ng/collection	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00
Cadmium	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Chromium	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Cobalt	ng/collection	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00
Copper	ng/collection	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00
Gold	ng/collection	170.00	200.00	170.00	200.20	170.00	200.00	170.00	200.00	170.00	200.00
Iron	ng/collection	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00
Lead	ng/collection	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00
Nickel	ng/collection	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00
Selenium	ng/collection	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00
Silver	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Tin	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Zinc	ng/collection	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00
Organic Acids		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Benzoic Acid	mg/collection	0.06	0.35	0.06	0.35	0.04	0.35	0.06	0.35	0.07	0.70
Propionic Acid	mcg/collection	35.27	352.71	61.89	354.83	35.27	354.83	35.27	354.83	70.61	706.10
VOCs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1,3-butadiene	mcg/collection	0.05	0.20	0.07	0.20	NT	NT	NT	NT	NT	NT
Acrylonitrile	mcg/collection	0.04	0.21	0.02	0.20	NT	NT	NT	NT	NT	NT
Benzene	mcg/collection	0.06	0.31	0.06	0.31	NT	NT	NT	NT	NT	NT
Isoprene	mcg/collection	0.08	0.27	0.06	0.27	NT	NT	NT	NT	NT	NT
Propylene Oxide	mcg/collection	0.15	0.87	0.23	0.87	NT	NT	NT	NT	NT	NT
Toluene	mcg/collection	0.09	0.35	0.04	0.35	NT	NT	NT	NT	NT	NT
Esters & Alcohols		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1-Butanol	mcg/collection	1.91	19.47	1.91	19.71	NT	NT	NT	NT	NT	NT

Benzyl Acetate	mcg/collection	2.52	25.22	2.52	25.17	NT	NT	NT	NT	NT	NT
Ethyl Acetate	mcg/collection	2.00	20.48	2.00	20.24	NT	NT	NT	NT	NT	NT
Ethyl Acetoacetate	mcg/collection	3.90	27.83	3.90	24.81	NT	NT	NT	NT	NT	NT
Isoamyl Acetate	mcg/collection	2.03	20.78	2.03	20.83	NT	NT	NT	NT	NT	NT
Isobutyl Acetate	mcg/collection	2.02	20.59	2.02	20.50	NT	NT	NT	NT	NT	NT
Methyl Acetate	mcg/collection	2.09	21.60	2.09	21.07	NT	NT	NT	NT	NT	NT

1.8 Autumn Tobacco 18 mg/mL Intense Per Collection Limit of Detection and Quantification Values

Parameter/ Constituent	Units	T0		T3		T6		T9		T12	
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary Constituents		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Nicotine	mg/collection	0.15	1.50	0.15	1.50	0.05	0.45	0.05	0.45	0.23	2.25
Glycerol	mg/collection	1.25	12.54	1.25	12.63	0.38	3.78	0.38	3.75	1.88	18.96
Propylene Glycol	mg/collection	0.40	4.03	0.40	4.01	0.36	3.62	0.53	5.33	0.60	6.02
Water	mg/collection	4.63	9.97	4.63	9.96	1.39	3.08	1.39	3.01	6.95	15.10
Menthol	mg/collection	0.05	0.48	0.05	0.48	0.01	0.14	0.01	0.14	0.07	0.74
Diethylene Glycol	mg/collection	0.04	0.24	0.04	0.26	0.01	0.08	0.01	0.08	0.07	0.41
Ethylene Glycol	mg/collection	0.03	0.25	0.03	0.27	0.01	0.07	0.01	0.08	0.05	0.46
Carbonyls & Glycidol		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Acetaldehyde	mcg/collection	0.24	1.32	0.24	1.31	0.20	1.13	0.24	1.32	0.22	1.32
Acrolein	mcg/collection	0.18	1.31	0.18	1.32	0.15	1.13	0.18	1.32	0.16	1.32
Diacetyl	mcg/collection	0.13	1.34	0.13	1.30	0.11	1.12	0.13	1.32	0.18	1.32
Formaldehyde	mcg/collection	0.44	1.32	0.44	1.31	0.38	1.13	0.44	1.32	0.17	1.31
Glycidol	mcg/collection	0.004	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.005	0.05
Acetyl Propionyl	mcg/collection	0.13	1.32	0.13	1.33	0.11	1.14	0.13	1.33	0.18	1.33
Butyraldehyde	mcg/collection	0.13	1.32	0.13	1.30	0.11	1.13	0.13	1.32	0.14	1.32
Crotonaldehyde	mcg/collection	0.21	1.29	0.21	1.32	0.18	1.13	0.21	1.32	0.18	1.31

Furfural	mcg/collection	0.22	1.32	0.22	1.32	0.19	1.13	0.22	1.32	0.25	1.32
Nicotine Degradants & TSNAs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
β-Nicotyrine	mcg/collection	0.11	1.06	0.10	1.06	0.11	1.06	0.11	1.04	0.10	1.04
Cotinine	mcg/collection	0.11	1.06	0.10	1.06	0.11	1.06	0.11	1.05	0.22	1.05
Myosmine	mcg/collection	0.11	1.05	0.10	1.05	0.11	1.05	0.11	1.06	0.11	1.06
Nicotine N Oxide	mcg/collection	0.11	1.05	0.10	1.05	0.11	1.05	0.11	1.04	0.26	1.04
Nornicotine	mcg/collection	0.11	1.05	0.10	1.05	0.11	1.05	0.11	1.04	0.27	1.04
Anabasine	mcg/collection	0.11	1.06	0.12	1.06	0.11	1.06	0.11	1.06	0.15	1.06
Anatabine	mcg/collection	0.11	1.06	0.11	1.06	0.11	1.06	0.11	1.06	0.12	1.06
NNK	mcg/collection	0.001	0.003	0.001	0.003	NT	NT	NT	NT	NT	NT
NNN	mcg/collection	0.001	0.003	0.001	0.003	NT	NT	NT	NT	NT	NT
Metals		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Arsenic	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Beryllium	ng/collection	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00
Cadmium	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Chromium	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Cobalt	ng/collection	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00
Copper	ng/collection	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00
Gold	ng/collection	170.00	200.00	170.00	200.20	170.00	200.00	170.00	200.00	170.00	200.00
Iron	ng/collection	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00
Lead	ng/collection	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00
Nickel	ng/collection	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00
Selenium	ng/collection	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00
Silver	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Tin	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Zinc	ng/collection	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00
Organic Acids		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Benzoic Acid	mg/collection	0.06	0.35	0.06	0.35	0.06	0.35	0.04	0.35	0.07	0.70
Propionic Acid	mcg/collection	35.27	352.71	61.89	354.83	61.89	354.83	35.31	354.83	70.61	706.10

VOCs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1,3-butadiene	mcg/collection	0.05	0.20	0.05	0.20	NT	NT	NT	NT	NT	NT
Acrylonitrile	mcg/collection	0.04	0.21	0.04	0.21	NT	NT	NT	NT	NT	NT
Benzene	mcg/collection	0.06	0.31	0.06	0.31	NT	NT	NT	NT	NT	NT
Isoprene	mcg/collection	0.08	0.27	0.08	0.27	NT	NT	NT	NT	NT	NT
Propylene Oxide	mcg/collection	0.15	0.88	0.15	0.87	NT	NT	NT	NT	NT	NT
Toluene	mcg/collection	0.09	0.35	0.09	0.35	NT	NT	NT	NT	NT	NT
Esters & Alcohols		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1-Butanol	mcg/collection	1.91	19.47	1.91	19.66	NT	NT	NT	NT	NT	NT
Benzyl Acetate	mcg/collection	2.52	25.22	2.52	25.65	NT	NT	NT	NT	NT	NT
Ethyl Acetate	mcg/collection	2.00	20.48	2.00	20.38	NT	NT	NT	NT	NT	NT
Ethyl Acetoacetate	mcg/collection	3.90	27.83	3.90	25.01	NT	NT	NT	NT	NT	NT
Isoamyl Acetate	mcg/collection	2.03	20.78	2.03	21.02	NT	NT	NT	NT	NT	NT
Isobutyl Acetate	mcg/collection	2.02	20.59	2.02	20.78	NT	NT	NT	NT	NT	NT
Methyl Acetate	mcg/collection	2.09	21.60	2.09	21.98	NT	NT	NT	NT	NT	NT

1.9 Ruby Menthol 18 mg/mL Non-Intense Per Collection Limit of Detection and Quantification Values

Parameter/ Constituent	Units	T0		T3		T6		T9		T12	
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary Constituents		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Nicotine	mg/collection	0.15	1.50	0.15	1.50	0.05	0.45	0.05	0.45	0.23	2.25
Glycerol	mg/collection	1.25	12.54	1.25	12.63	0.59	5.93	1.02	10.19	1.88	18.96
Propylene Glycol	mg/collection	0.40	4.03	0.40	4.01	0.24	2.41	0.60	6.02	0.60	6.02
Water	mg/collection	4.63	9.97	4.63	9.96	1.39	3.08	1.39	3.01	6.95	15.10
Menthol	mg/collection	0.05	0.48	0.05	0.48	0.01	0.14	0.01	0.14	0.07	0.74
Diethylene Glycol	mg/collection	0.04	0.24	0.04	0.28	0.01	0.08	0.01	0.08	0.07	0.41
Ethylene Glycol	mg/collection	0.03	0.25	0.03	0.25	0.01	0.07	0.01	0.08	0.05	0.46

Carbonyls & Glycidol		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Acetaldehyde	mcg/collection	0.20	1.13	0.20	1.13	0.20	1.13	0.20	1.13	0.19	1.13
Acrolein	mcg/collection	0.15	1.13	0.15	1.13	0.15	1.13	0.15	1.13	0.14	1.13
Diacetyl	mcg/collection	0.11	1.15	0.11	1.12	0.11	1.12	0.11	1.13	0.16	1.13
Formaldehyde	mcg/collection	0.38	1.13	0.38	1.13	0.38	1.13	0.38	1.13	0.15	1.13
Glycidol	mcg/collection	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.005	0.05
Acetyl Propionyl	mcg/collection	0.11	1.13	0.11	1.14	0.11	1.14	0.11	1.14	0.15	1.14
Butyraldehyde	mcg/collection	0.11	1.13	0.11	1.11	0.11	1.13	0.11	1.13	0.12	1.13
Crotonaldehyde	mcg/collection	0.18	1.11	0.18	1.13	0.18	1.13	0.18	1.13	0.15	1.13
Furfural	mcg/collection	0.19	1.13	0.19	1.13	0.19	1.13	0.19	1.13	0.21	1.13
Nicotine Degradants & TSNAs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
β-Nicotyrine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.89	0.09	0.89
Cotinine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.19	0.90
Myosmine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.91	0.09	0.91
Nicotine N Oxide	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.89	0.22	0.89
Nornicotine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.23	0.90
Anabasine	mcg/collection	0.09	0.91	0.10	0.91	0.09	0.91	0.09	0.91	0.13	0.91
Anatabine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.91	0.11	0.91
NNK	mcg/collection	0.001	0.003	0.001	0.003	NT	NT	NT	NT	NT	NT
NNN	mcg/collection	0.001	0.003	0.001	0.003	NT	NT	NT	NT	NT	NT
Metals		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Arsenic	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Beryllium	ng/collection	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00
Cadmium	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Chromium	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Cobalt	ng/collection	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00
Copper	ng/collection	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00
Gold	ng/collection	170.00	200.00	170.00	200.20	170.00	200.00	170.00	200.00	170.00	200.00
Iron	ng/collection	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00

Lead	ng/collection	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00
Nickel	ng/collection	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00
Selenium	ng/collection	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00
Silver	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Tin	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Zinc	ng/collection	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00
Organic Acids		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Benzoic Acid	mg/collection	0.04	0.35	0.06	0.35	0.04	0.35	0.06	0.35	0.07	0.70
Propionic Acid	mcg/collection	46.17	352.71	61.89	354.83	35.27	354.83	35.27	354.83	70.61	706.10
VOCs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1,3-butadiene	mcg/collection	0.05	0.20	0.07	0.20	NT	NT	NT	NT	NT	NT
Acrylonitrile	mcg/collection	0.04	0.21	0.02	0.20	NT	NT	NT	NT	NT	NT
Benzene	mcg/collection	0.06	0.31	0.06	0.31	NT	NT	NT	NT	NT	NT
Isoprene	mcg/collection	0.08	0.27	0.06	0.27	NT	NT	NT	NT	NT	NT
Propylene Oxide	mcg/collection	0.15	0.87	0.23	0.87	NT	NT	NT	NT	NT	NT
Toluene	mcg/collection	0.09	0.35	0.04	0.35	NT	NT	NT	NT	NT	NT
Esters & Alcohols		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1-Butanol	mcg/collection	1.91	19.47	1.91	19.71	NT	NT	NT	NT	NT	NT
Benzyl Acetate	mcg/collection	2.52	25.22	2.52	25.17	NT	NT	NT	NT	NT	NT
Ethyl Acetate	mcg/collection	2.00	20.48	2.00	20.24	NT	NT	NT	NT	NT	NT
Ethyl Acetoacetate	mcg/collection	3.90	27.83	3.90	24.81	NT	NT	NT	NT	NT	NT
Isoamyl Acetate	mcg/collection	2.03	20.78	2.03	20.83	NT	NT	NT	NT	NT	NT
Isobutyl Acetate	mcg/collection	2.02	20.59	2.02	20.50	NT	NT	NT	NT	NT	NT
Methyl Acetate	mcg/collection	2.09	21.60	2.09	21.07	NT	NT	NT	NT	NT	NT

1.10 Ruby Menthol 18 mg/mL Intense Per Collection Limit of Detection and Quantification Values

Parameter/ Constituent	Units	T0	T3	T6	T9	T12
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pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary Constituents		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Nicotine	mg/collection	0.15	1.50	0.15	1.50	0.05	0.45	0.05	0.45	0.23	2.25
Glycerol	mg/collection	1.25	12.54	1.25	12.63	0.48	4.85	1.66	16.62	1.88	18.96
Propylene Glycol	mg/collection	0.40	4.03	0.40	4.01	0.36	3.62	0.60	6.02	0.60	6.02
Water	mg/collection	4.63	9.97	4.63	9.96	1.39	3.08	1.39	3.01	6.95	15.10
Menthol	mg/collection	0.05	0.48	0.05	0.48	0.01	0.14	0.01	0.14	0.07	0.74
Diethylene Glycol	mg/collection	0.04	0.24	0.04	0.26	0.01	0.08	0.01	0.08	0.07	0.41
Ethylene Glycol	mg/collection	0.03	0.25	0.03	0.27	0.01	0.07	0.01	0.08	0.05	0.46
Carbonyls & Glycidol		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Acetaldehyde	mcg/collection	0.24	1.32	0.24	1.31	0.20	1.13	0.24	1.32	0.22	1.32
Acrolein	mcg/collection	0.18	1.31	0.18	1.32	0.15	1.13	0.18	1.32	0.16	1.32
Diacetyl	mcg/collection	0.13	1.34	0.13	1.30	0.11	1.12	0.13	1.32	0.18	1.32
Formaldehyde	mcg/collection	0.44	1.32	0.44	1.31	0.38	1.13	0.44	1.32	0.17	1.31
Glycidol	mcg/collection	0.004	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.005	0.05
Acetyl Propionyl	mcg/collection	0.13	1.32	0.13	1.33	0.11	1.14	0.13	1.33	0.18	1.33
Butyraldehyde	mcg/collection	0.13	1.32	0.13	1.30	0.11	1.13	0.13	1.32	0.14	1.32
Crotonaldehyde	mcg/collection	0.21	1.29	0.21	1.32	0.18	1.13	0.21	1.32	0.18	1.31
Furfural	mcg/collection	0.22	1.32	0.22	1.32	0.19	1.13	0.22	1.32	0.25	1.32
Nicotine Degradants & TSNAs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
β-Nicotyrine	mcg/collection	0.11	1.06	0.10	1.06	0.11	1.06	0.11	1.04	0.10	1.04
Cotinine	mcg/collection	0.11	1.06	0.10	1.06	0.11	1.06	0.11	1.05	0.22	1.05
Myosmine	mcg/collection	0.11	1.05	0.10	1.05	0.11	1.05	0.11	1.06	0.11	1.06
Nicotine N Oxide	mcg/collection	0.11	1.05	0.10	1.05	0.11	1.05	0.11	1.04	0.26	1.04
Nornicotine	mcg/collection	0.11	1.05	0.10	1.05	0.11	1.05	0.11	1.04	0.27	1.04
Anabasine	mcg/collection	0.11	1.06	0.12	1.06	0.11	1.06	0.11	1.06	0.15	1.06
Anatabine	mcg/collection	0.11	1.06	0.11	1.06	0.11	1.06	0.11	1.06	0.12	1.06
NNK	mcg/collection	0.001	0.003	0.001	0.003	NT	NT	NT	NT	NT	NT
NNN	mcg/collection	0.001	0.003	0.001	0.003	NT	NT	NT	NT	NT	NT

Metals		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Arsenic	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Beryllium	ng/collection	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00
Cadmium	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Chromium	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Cobalt	ng/collection	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00
Copper	ng/collection	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00
Gold	ng/collection	170.00	200.00	170.00	200.20	170.00	200.00	170.00	200.00	170.00	200.00
Iron	ng/collection	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00
Lead	ng/collection	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00
Nickel	ng/collection	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00
Selenium	ng/collection	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00
Silver	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Tin	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Zinc	ng/collection	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00
Organic Acids		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Benzoic Acid	mg/collection	0.06	0.71	0.06	0.35	0.06	0.35	0.05	0.50	0.07	0.70
Propionic Acid	mcg/collection	61.89	352.71	61.89	354.83	61.89	354.83	50.44	506.90	70.61	706.10
VOCs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1,3-butadiene	mcg/collection	0.05	0.20	0.05	0.20	NT	NT	NT	NT	NT	NT
Acrylonitrile	mcg/collection	0.04	0.21	0.04	0.21	NT	NT	NT	NT	NT	NT
Benzene	mcg/collection	0.06	0.31	0.06	0.31	NT	NT	NT	NT	NT	NT
Isoprene	mcg/collection	0.08	0.27	0.08	0.27	NT	NT	NT	NT	NT	NT
Propylene Oxide	mcg/collection	0.15	0.88	0.15	0.87	NT	NT	NT	NT	NT	NT
Toluene	mcg/collection	0.09	0.35	0.09	0.35	NT	NT	NT	NT	NT	NT
Esters & Alcohols		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1-Butanol	mcg/collection	1.91	19.47	1.91	19.66	NT	NT	NT	NT	NT	NT
Benzyl Acetate	mcg/collection	2.52	25.22	2.52	25.65	NT	NT	NT	NT	NT	NT
Ethyl Acetate	mcg/collection	2.00	20.48	2.00	20.38	NT	NT	NT	NT	NT	NT

Ethyl Acetoacetate	mcg/collection	3.90	27.83	3.90	25.01	NT	NT	NT	NT	NT	NT
Isoamyl Acetate	mcg/collection	2.03	20.78	2.03	21.02	NT	NT	NT	NT	NT	NT
Isobutyl Acetate	mcg/collection	2.02	20.59	2.02	20.78	NT	NT	NT	NT	NT	NT
Methyl Acetate	mcg/collection	2.09	21.60	2.09	21.98	NT	NT	NT	NT	NT	NT

1.11 Summer Menthol 18 mg/mL Non-Intense Per Collection Limit of Detection and Quantification Values

Parameter/ Constituent	Units	T0		T3		T6		T9		T12	
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary Constituents		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Nicotine	mg/collection	0.15	1.50	0.15	1.50	0.05	0.45	0.05	0.45	0.23	2.25
Glycerol	mg/collection	1.25	12.54	1.25	12.63	0.70	7.01	1.66	16.62	1.88	18.96
Propylene Glycol	mg/collection	0.40	4.03	0.40	4.01	0.24	2.41	0.60	6.02	0.60	6.02
Water	mg/collection	4.63	9.97	4.63	9.96	1.39	3.08	1.39	3.01	6.95	15.10
Menthol	mg/collection	0.05	0.48	0.05	0.48	0.01	0.14	0.01	0.14	0.07	0.74
Diethylene Glycol	mg/collection	0.04	0.24	0.04	0.28	0.01	0.08	0.01	0.08	0.07	0.41
Ethylene Glycol	mg/collection	0.03	0.25	0.03	0.25	0.01	0.07	0.01	0.08	0.05	0.46
Carbonyls & Glycidol		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Acetaldehyde	mcg/collection	0.20	1.13	0.20	1.13	0.20	1.13	0.20	1.13	0.19	1.13
Acrolein	mcg/collection	0.15	1.13	0.15	1.13	0.15	1.13	0.15	1.13	0.14	1.13
Diacetyl	mcg/collection	0.11	1.15	0.11	1.12	0.11	1.12	0.11	1.13	0.16	1.13
Formaldehyde	mcg/collection	0.38	1.13	0.38	1.13	0.38	1.13	0.38	1.13	0.15	1.13
Glycidol	mcg/collection	0.003	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.005	0.05
Acetyl Propionyl	mcg/collection	0.11	1.13	0.11	1.14	0.11	1.14	0.11	1.14	0.15	1.14
Butyraldehyde	mcg/collection	0.11	1.13	0.11	1.11	0.11	1.13	0.11	1.13	0.12	1.13
Crotonaldehyde	mcg/collection	0.18	1.11	0.18	1.13	0.18	1.13	0.18	1.13	0.15	1.13
Furfural	mcg/collection	0.19	1.13	0.19	1.13	0.19	1.13	0.19	1.13	0.21	1.13
Nicotine Degradants & TSNAs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ

β-Nicotyrine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.89	0.09	0.89
Cotinine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.19	0.90
Myosmine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.91	0.09	0.91
Nicotine N Oxide	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.89	0.22	0.89
Nornicotine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.90	0.23	0.90
Anabasine	mcg/collection	0.09	0.91	0.10	0.91	0.09	0.91	0.09	0.91	0.13	0.91
Anatabine	mcg/collection	0.09	0.90	0.09	0.90	0.09	0.90	0.09	0.91	0.11	0.91
NNK	mcg/collection	0.001	0.003	0.001	0.003	NT	NT	NT	NT	NT	NT
NNN	mcg/collection	0.001	0.003	0.001	0.003	NT	NT	NT	NT	NT	NT
Metals		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Arsenic	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Beryllium	ng/collection	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00
Cadmium	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Chromium	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Cobalt	ng/collection	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00
Copper	ng/collection	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00
Gold	ng/collection	170.00	200.00	170.00	200.20	170.00	200.00	170.00	200.00	170.00	200.00
Iron	ng/collection	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00
Lead	ng/collection	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00
Nickel	ng/collection	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00
Selenium	ng/collection	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00
Silver	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Tin	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Zinc	ng/collection	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00
Organic Acids		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Benzoic Acid	mg/collection	0.04	0.35	0.06	0.35	0.04	0.35	0.07	0.40	0.07	0.70
Propionic Acid	mcg/collection	46.17	352.71	61.89	354.83	35.27	354.83	40.31	405.52	70.61	706.10
VOCs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1,3-butadiene	mcg/collection	0.05	0.20	0.07	0.20	NT	NT	NT	NT	NT	NT

Acrylonitrile	mcg/collection	0.04	0.21	0.02	0.20	NT	NT	NT	NT	NT	NT
Benzene	mcg/collection	0.06	0.31	0.06	0.31	NT	NT	NT	NT	NT	NT
Isoprene	mcg/collection	0.08	0.27	0.06	0.27	NT	NT	NT	NT	NT	NT
Propylene Oxide	mcg/collection	0.15	0.87	0.23	0.87	NT	NT	NT	NT	NT	NT
Toluene	mcg/collection	0.09	0.35	0.04	0.35	NT	NT	NT	NT	NT	NT
Esters & Alcohols		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1-Butanol	mcg/collection	1.91	19.47	1.91	19.71	NT	NT	NT	NT	NT	NT
Benzyl Acetate	mcg/collection	2.52	25.22	2.52	25.17	NT	NT	NT	NT	NT	NT
Ethyl Acetate	mcg/collection	2.00	20.48	2.00	20.24	NT	NT	NT	NT	NT	NT
Ethyl Acetoacetate	mcg/collection	3.90	27.83	3.90	24.81	NT	NT	NT	NT	NT	NT
Isoamyl Acetate	mcg/collection	2.03	20.78	2.03	20.83	NT	NT	NT	NT	NT	NT
Isobutyl Acetate	mcg/collection	2.02	20.59	2.02	20.50	NT	NT	NT	NT	NT	NT
Methyl Acetate	mcg/collection	2.09	21.60	2.09	21.07	NT	NT	NT	NT	NT	NT

1.12 Summer Menthol 18 mg/mL Intense Per Collection Limit of Detection and Quantification Values

Parameter/ Constituent	Units	T0		T3		T6		T9		T12	
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary Constituents		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Nicotine	mg/collection	0.15	1.50	0.15	1.50	0.05	0.45	0.05	0.45	0.23	2.25
Glycerol	mg/collection	1.25	12.54	1.25	12.63	0.59	5.93	1.66	16.62	1.88	18.96
Propylene Glycol	mg/collection	0.40	4.03	0.40	4.01	0.36	3.62	0.60	6.02	0.60	6.02
Water	mg/collection	4.63	9.97	4.63	9.96	1.39	3.08	1.39	3.01	6.95	15.10
Menthol	mg/collection	0.05	0.48	0.05	0.48	0.01	0.14	0.01	0.14	0.07	0.74
Diethylene Glycol	mg/collection	0.04	0.24	0.04	0.26	0.01	0.08	0.01	0.08	0.07	0.41
Ethylene Glycol	mg/collection	0.03	0.25	0.03	0.27	0.01	0.07	0.01	0.08	0.05	0.46
Carbonyls & Glycidol		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Acetaldehyde	mcg/collection	0.24	1.32	0.24	1.31	0.20	1.13	0.24	1.32	0.22	1.32

Acrolein	mcg/collection	0.18	1.31	0.18	1.32	0.15	1.13	0.18	1.32	0.16	1.32
Diacetyl	mcg/collection	0.13	1.34	0.13	1.30	0.11	1.12	0.13	1.32	0.18	1.32
Formaldehyde	mcg/collection	0.44	1.32	0.44	1.31	0.38	1.13	0.44	1.32	0.17	1.31
Glycidol	mcg/collection	0.004	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.005	0.05
Acetyl Propionyl	mcg/collection	0.13	1.32	0.13	1.33	0.11	1.14	0.13	1.33	0.18	1.33
Butyraldehyde	mcg/collection	0.13	1.32	0.13	1.30	0.11	1.13	0.13	1.32	0.14	1.32
Crotonaldehyde	mcg/collection	0.21	1.29	0.21	1.32	0.18	1.13	0.21	1.32	0.18	1.31
Furfural	mcg/collection	0.22	1.32	0.22	1.32	0.19	1.13	0.22	1.32	0.25	1.32
Nicotine Degradants & TSNAs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
β-Nicotyrine	mcg/collection	0.11	1.06	0.10	1.06	0.11	1.06	0.11	1.04	0.10	1.04
Cotinine	mcg/collection	0.11	1.06	0.10	1.06	0.11	1.06	0.11	1.05	0.22	1.05
Myosmine	mcg/collection	0.11	1.05	0.10	1.05	0.11	1.05	0.11	1.06	0.11	1.06
Nicotine N Oxide	mcg/collection	0.11	1.05	0.10	1.05	0.11	1.05	0.11	1.04	0.26	1.04
Nornicotine	mcg/collection	0.11	1.05	0.10	1.05	0.11	1.05	0.11	1.04	0.27	1.04
Anabasine	mcg/collection	0.11	1.06	0.12	1.06	0.11	1.06	0.11	1.06	0.15	1.06
Anatabine	mcg/collection	0.11	1.06	0.11	1.06	0.11	1.06	0.11	1.06	0.12	1.06
NNK	mcg/collection	0.001	0.003	0.001	0.003	NT	NT	NT	NT	NT	NT
NNN	mcg/collection	0.001	0.003	0.001	0.003	NT	NT	NT	NT	NT	NT
Metals		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Arsenic	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Beryllium	ng/collection	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00	2.20	20.00
Cadmium	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Chromium	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Cobalt	ng/collection	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00	0.50	5.00
Copper	ng/collection	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00	25.00	75.00
Gold	ng/collection	170.00	200.00	170.00	200.20	170.00	200.00	170.00	200.00	170.00	200.00
Iron	ng/collection	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00	100.00	200.00
Lead	ng/collection	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00	2.50	10.00
Nickel	ng/collection	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00	5.00	10.00

Supplementary Material

Selenium	ng/collection	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00	3.90	20.00
Silver	ng/collection	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
Tin	ng/collection	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00	10.00	50.00
Zinc	ng/collection	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00	150.00	350.00
Organic Acids		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
Benzoic Acid	mg/collection	0.06	0.71	0.06	0.35	0.06	0.35	0.06	0.55	0.07	0.70
Propionic Acid	mcg/collection	61.89	352.71	61.89	354.83	61.89	354.83	55.48	557.58	70.61	706.10
VOCs		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1,3-butadiene	mcg/collection	0.05	0.20	0.05	0.20	NT	NT	NT	NT	NT	NT
Acrylonitrile	mcg/collection	0.04	0.21	0.04	0.21	NT	NT	NT	NT	NT	NT
Benzene	mcg/collection	0.06	0.31	0.06	0.31	NT	NT	NT	NT	NT	NT
Isoprene	mcg/collection	0.08	0.27	0.08	0.27	NT	NT	NT	NT	NT	NT
Propylene Oxide	mcg/collection	0.15	0.88	0.15	0.87	NT	NT	NT	NT	NT	NT
Toluene	mcg/collection	0.09	0.35	0.09	0.35	NT	NT	NT	NT	NT	NT
Esters & Alcohols		LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
1-Butanol	mcg/collection	1.91	19.47	1.91	19.66	NT	NT	NT	NT	NT	NT
Benzyl Acetate	mcg/collection	2.52	25.22	2.52	25.65	NT	NT	NT	NT	NT	NT
Ethyl Acetate	mcg/collection	2.00	20.48	2.00	20.38	NT	NT	NT	NT	NT	NT
Ethyl Acetoacetate	mcg/collection	3.90	27.83	3.90	25.01	NT	NT	NT	NT	NT	NT
Isoamyl Acetate	mcg/collection	2.03	20.78	2.03	21.02	NT	NT	NT	NT	NT	NT
Isobutyl Acetate	mcg/collection	2.02	20.59	2.02	20.78	NT	NT	NT	NT	NT	NT
Methyl Acetate	mcg/collection	2.09	21.60	2.09	21.98	NT	NT	NT	NT	NT	NT