Gems & Gemology **Data Depository: Chemical composition of Zambian emeralds by electron microprobe.** [a]
From J.C. Zwaan et al., "Emeralds from the Kafubu Area, Zambia," Summer 2005 *Gems & Gemology,* pp. 116–148

Mine	Chantete			Chantete			Chantete			Chantete			Chantete	
Weight	0.21 ct			0.31 ct			0.66 ct			0.75 ct			0.91 ct	
Color[b]	Med.-lt. bG			Med. bG			Med. bG			Med. bG			Med. bG	
Laboratory	UNO[c]			UNO			UNO			UNO			UNO	
Sample no.	0.21-1	0.21-2	0.21-3	0.31-1	0.31-2	0.31-3	0.66-1	0.66-2	0.66-3	0.75-1	0.75-2	0.75-3	0.91-1	0.91-2
Oxides (wt.%)														
SiO_2	65.41	65.32	65.34	65.23	65.31	65.37	65.28	65.24	65.21	65.43	65.33	65.43	65.22	65.30
TiO_2	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
Al_2O_3	15.31	15.40	15.39	15.17	15.12	15.11	15.39	15.33	15.34	15.43	15.32	15.30	15.40	15.39
Cr_2O_3	0.23	0.21	0.19	0.13	0.15	0.11	0.24	0.20	0.21	0.03	bdl	bdl	0.23	0.21
V_2O_3	0.01	0.01	0.02	0.02	0.01	0.02	0.03	0.04	0.04	0.01	0.01	0.02	bdl	bdl
Sc_2O_3	na	na	na	na	na	na	na	na	na	na	na	na	na	na
BeO (calc.)	13.54	13.55	13.57	13.57	13.56	13.57	13.57	13.57	13.54	13.56	13.51	13.55	13.57	13.58
FeO[e]	0.28	0.28	0.26	0.88	0.89	0.80	0.33	0.34	0.32	0.31	0.30	0.33	0.45	0.43
MnO	bdl	bdl	bdl	0.01	bdl	bdl	bdl	bdl	bdl	bdl	0.01	bdl	bdl	bdl
MgO	1.90	1.90	1.98	2.25	2.20	2.24	2.00	2.22	2.01	2.13	1.95	2.02	2.11	2.33
CaO	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
Na_2O	1.43	1.54	1.75	1.47	1.38	1.47	1.66	1.71	1.58	1.34	1.40	1.55	1.57	1.22
K_2O	bdl	bdl	bdl	0.04	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
Rb_2O	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Cs_2O	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Total[f]	98.12	98.21	98.49	98.76	98.62	98.67	98.48	98.65	98.24	98.24	97.84	98.20	98.57	98.46
Ions based on 18 oxygens														
Si	6.033	6.022	6.013	6.003	6.014	6.015	6.009	6.000	6.015	6.024	6.038	6.032	6.002	6.006
Ti	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
Al	1.665	1.674	1.669	1.645	1.641	1.639	1.670	1.662	1.667	1.674	1.669	1.662	1.670	1.668
Cr	0.017	0.015	0.014	0.009	0.011	0.008	0.018	0.014	0.015	0.002	0.000	0.000	0.017	0.015
V	0.001	0.001	0.002	0.002	0.001	0.001	0.002	0.003	0.003	0.001	0.001	0.002	0.000	0.000
Sc	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Be	3.000	3.000	3.000	3.000	3.000	3.000	3.000	2.999	3.000	3.000	3.000	3.000	3.001	3.000
Fe	0.022	0.022	0.020	0.067	0.068	0.061	0.025	0.026	0.025	0.024	0.023	0.025	0.034	0.033
Mn	bdl	bdl	bdl	0.001	bdl	bdl	bdl	bdl	bdl	bdl	0.001	bdl	bdl	bdl
Mg	0.262	0.261	0.272	0.308	0.302	0.307	0.274	0.304	0.276	0.292	0.268	0.277	0.290	0.320
Ca	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
Na	0.256	0.276	0.311	0.263	0.246	0.262	0.296	0.305	0.282	0.238	0.251	0.278	0.281	0.217
K	bdl	bdl	bdl	0.004	0.001	0.000	0.000	0.000	bdl	bdl	bdl	bdl	bdl	bdl
Rb	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Cs	na	na	na	na	na	na	na	na	na	na	na	na	na	na

[a] Abbreviations: bdl = below detection limit; bG = bluish green; FUA = Free University of Amsterdam, the Netherlands; Int. = intense; Lt. = light; med. = medium; na = not analyzed; sl = slightly; and UNO = University of New Orleans, Louisiana. BeO was calculated based on an assumed stoichiometry of 3 Be atoms per formula unit.

[b] Refers to overall color appearance, except for sample r29, in which specific color zones that correspond to each analysis are listed for this gem-quality crystal (which had an overall color appearance of medium slightly bluish green).

[c] Analyses performed at the University of New Orleans, Louisiana. Background counts were determined by a mean atomic number method (MAN). Analytical standards included both natural and synthetic materials: albite (Na), adularia (K), quartz, clinopyroxene (Mg, Ca, Fe, and Ti), chromite (Cr), rhodonite (Mn), V_2O_5 (V), PbO (Pb), ZnO (Zn), Bi-germanate (Bi), and sillimanite (Si and Al). MAN standards in addition to the above as appropriate: MgO, hematite, rutile, strontium sulfate, ZrO_2. Detection limits (in wt.%): TiO_2 = 0.009, CaO = 0.008, MnO = 0.005, and K_2O = 0.012. Cl was analyzed but not detected.

[d] Analyses performed at the Free University of Amsterdam, the Netherlands. Analytical standards included both natural and synthetic materials: diopside (Si), corundum (Al), fayalite (Fe), Sc_2O_3 (Sc), jadeite (Na), orthoclase (K), diopside (Mg, Ca), V_2O_5 (V), Cr_2O_3 (Cr), RbBr (Rb), Cs_2ReCl_6 (Cs), fluorite (F), and marialite (Cl). Detection limits: Cr_2O_3 = 0.018, Sc_2O_3 = 0.012, and Rb_2O = 0.029. Cl was analyzed but not detected. Low overall totals appear mainly due to low analytical SiO_2 data.

[e] Total Fe as FeO.

[f] Analyses do not include H_2O. Data on Kafubu emeralds from Hickman (1972) and Banerjee (1995) showed 2.5 wt.% H_2O, and 2.61 and 2.69 wt.% H_2O, respectively.

		Chantete 0.95 ct Med. bG UNO			Chantete 1.34 ct Med. bG UNO			Chantete 1.35 ct Med. bG UNO			Chantete 1.39 ct Med. bG UNO			Chantete 1.47 ct Med. bG UNO
0.91-3	0.95-1	0.95-2	0.95-3	1.34-1	1.34-2	1.34-3	1.35-1	1.35-2	1.35-3	1.39-1	1.39-2	1.39-3	1.47-1	1.47-2
65.20	65.31	65.39	65.20	64.79	65.10	64.88	65.01	64.84	64.75	64.99	64.88	64.78	65.29	65.20
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
15.34	15.32	15.42	15.32	15.22	15.21	15.29	15.49	15.30	15.29	15.06	15.18	15.41	15.32	15.22
0.23	0.07	0.08	bdl	0.16	0.45	0.21	0.30	0.34	0.27	0.49	0.31	0.65	0.10	bdl
bdl	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	bdl	0.01	0.01	0.01
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
13.55	13.58	13.61	13.56	13.54	13.55	13.54	13.56	13.55	13.53	13.52	13.54	13.54	13.56	13.54
0.42	0.38	0.37	0.35	0.66	0.63	0.61	0.54	0.63	0.58	0.66	0.62	0.64	0.47	0.47
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.01	0.01	bdl	bdl	bdl	bdl	bdl
2.22	2.33	2.39	2.22	2.54	2.24	2.53	2.18	2.54	2.33	2.14	2.39	2.07	2.10	2.12
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.01	bdl	bdl	bdl
1.28	1.54	1.46	1.78	1.64	1.32	1.37	1.44	1.32	1.71	1.49	1.59	1.48	1.57	1.77
0.12	0.02	bdl	bdl	bdl	bdl	0.02	bdl	bdl	bdl	bdl	bdl	bdl	0.01	bdl
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
98.35	98.57	98.72	98.44	98.55	98.49	98.46	98.53	98.53	98.47	98.38	98.52	98.59	98.43	98.33
6.008	6.006	6.001	6.006	5.976	6.000	5.983	5.987	5.976	5.977	6.003	5.985	5.974	6.014	6.015
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
1.667	1.661	1.668	1.663	1.655	1.653	1.662	1.681	1.662	1.664	1.639	1.650	1.675	1.664	1.655
0.017	0.005	0.006	bdl	0.012	0.033	0.015	0.022	0.025	0.020	0.036	0.023	0.047	0.007	bdl
0.000	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	bdl	0.000	0.001	0.001
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
3.000	3.000	3.001	3.000	3.000	2.999	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
0.032	0.029	0.028	0.027	0.051	0.048	0.047	0.042	0.048	0.045	0.051	0.048	0.050	0.036	0.036
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.001	0.001	bdl	bdl	bdl	bdl	bdl
0.305	0.320	0.327	0.305	0.349	0.307	0.348	0.299	0.349	0.320	0.295	0.329	0.285	0.288	0.291
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.001	bdl	bdl	bdl
0.228	0.275	0.260	0.317	0.292	0.235	0.245	0.258	0.236	0.306	0.266	0.284	0.265	0.279	0.316
0.014	bdl	bdl	bdl	bdl	bdl	0.002	bdl	bdl	bdl	bdl	bdl	bdl	0.001	bdl
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

1.47-3	3.47-1	Chantete 3.47 ct Med. bG UNO 3.47-2	3.47-3	4.27-1	Chantete 4.27 ct Med. bG UNO 4.27-2	4.27-3	**Chantete UNO Min**	**Max**	**Ave**	r24-1	r24-2	r24-3	r24-4
65.33	64.86	64.86	64.79	65.21	65.38	65.31	**64.75**	**65.43**	**65.16**	63.07	63.38	63.11	63.32
bdl	bdl	bdl	bdl	bdl	bdl	bdl	**bdl**	**bdl**	**bdl**	na	na	na	na
15.29	14.79	14.81	14.90	15.32	15.40	15.22	**14.79**	**15.49**	**15.26**	15.44	15.31	15.38	15.18
0.03	0.36	0.63	0.35	0.16	0.18	0.16	**bdl**	**0.65**	**0.21**	0.27	0.33	0.39	0.38
0.02	0.02	0.02	0.01	0.02	0.02	0.03	**bdl**	**0.04**	**0.01**	0.03	0.02	0.03	0.02
na	na	na	na	na	na	na	**na**	**na**	**na**	bdl	0.01	bdl	bdl
13.57	13.50	13.52	13.48	13.54	13.57	13.54	**13.48**	**13.61**	**13.55**	13.09	13.14	13.13	13.12
0.45	0.87	0.90	0.82	0.38	0.37	0.32	**0.26**	**0.90**	**0.51**	0.74	0.81	0.79	0.74
bdl	bdl	0.01	0.01	bdl	bdl	bdl	**bdl**	**0.01**	**bdl**	na	na	na	na
2.23	2.37	2.47	2.29	2.06	1.98	2.04	**1.90**	**2.54**	**2.19**	1.39	1.43	1.57	1.57
bdl	bdl	bdl	bdl	bdl	bdl	bdl	**bdl**	**0.01**	**0.00**	bdl	0.03	0.01	0.02
1.60	1.68	1.36	1.55	1.50	1.55	1.65	**1.22**	**1.78**	**1.52**	0.67	0.69	0.71	0.68
0.02	bdl	bdl	bdl	0.10	0.03	0.04	**bdl**	**0.12**	**0.01**	0.04	0.03	0.03	0.03
na	na	na	na	na	na	na	**na**	**na**	**na**	bdl	bdl	bdl	bdl
na	na	na	na	na	na	na	**na**	**na**	**na**	0.11	0.14	0.17	0.09
98.53	98.44	98.59	98.20	98.27	98.49	98.32				94.86	95.32	95.32	95.15
6.012	5.998	5.990	6.001	6.016	6.016	6.021	**5.974**	**6.038**	**6.005**	6.018	6.025	6.004	6.026
bdl	bdl	bdl	bdl	bdl	bdl	bdl	**bdl**	**bdl**	**bdl**	na	na	na	na
1.658	1.612	1.612	1.627	1.666	1.670	1.654	**1.612**	**1.681**	**1.658**	1.737	1.715	1.725	1.703
0.002	0.027	0.046	0.026	0.011	0.013	0.012	**bdl**	**0.047**	**0.016**	0.020	0.025	0.029	0.028
0.002	0.001	0.001	0.001	0.001	0.002	0.003	**bdl**	**0.003**	**0.001**	0.002	0.001	0.003	0.002
na	na	na	na	na	na	na	**na**	**na**	**na**	bdl	0.001	bdl	bdl
3.000	2.999	3.000	3.000	3.000	3.000	3.000	**2.999**	**3.001**	**3.000**	3.000	3.000	3.000	3.000
0.035	0.067	0.070	0.064	0.029	0.029	0.025	**0.020**	**0.070**	**0.039**	0.059	0.064	0.063	0.059
bdl	bdl	0.001	0.001	bdl	bdl	bdl	**bdl**	**0.001**	**bdl**	na	na	na	na
0.305	0.327	0.340	0.316	0.283	0.271	0.280	**0.261**	**0.349**	**0.301**	0.197	0.203	0.223	0.222
bdl	bdl	bdl	bdl	bdl	bdl	bdl	**bdl**	**0.001**	**bdl**	bdl	0.003	0.001	0.002
0.285	0.300	0.244	0.278	0.268	0.276	0.294	**0.217**	**0.317**	**0.271**	0.125	0.127	0.130	0.126
0.003	bdl	bdl	bdl	0.011	0.004	0.004	**bdl**	**0.014**	**0.001**	0.005	0.003	0.003	0.003
na	na	na	na	na	na	na	**na**	**na**	**na**	bdl	bdl	bdl	bdl
na	na	na	na	na	na	na	**na**	**na**	**na**	0.004	0.006	0.007	0.004

	Chantete 5.27 ct Int. med. sl. bG FUA[d]							Lt. bG	Lt. bG	Med. bG	Lt. bG	Int. med. bG	Int. med. bG	Colorless
r24-5	r24-6	r24-7	r24-8	r24-9	r24-10	r24-11	r24-12	r29-1	r29-2	r29-3	r29-4	r29-5	r29-6	r29-7
63.26	62.97	63.36	63.65	63.11	63.25	63.25	63.63	63.09	63.32	62.97	63.19	62.29	62.67	63.52
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
15.49	15.48	15.55	15.86	15.55	15.55	15.64	15.64	15.13	15.75	14.48	14.97	13.58	14.05	15.81
0.33	0.28	0.24	0.21	0.24	0.26	0.27	0.26	0.15	0.07	0.24	0.11	0.46	0.39	bdl
0.02	0.03	0.04	bdl	0.03	0.03	0.03	0.02	bdl	0.03	0.04	0.03	0.04	0.03	0.04
bdl	bdl	bdl	0.01	bdl	bdl	bdl	bdl	bdl	bdl	0.02	bdl	0.03	0.01	bdl
13.14	13.08	13.14	13.21	13.10	13.14	13.15	13.20	13.07	13.15	13.03	13.09	12.89	12.98	13.20
0.75	0.77	0.74	0.75	0.78	0.75	0.76	0.72	0.72	0.59	0.94	0.91	1.31	1.10	0.58
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
1.48	1.42	1.33	1.19	1.34	1.42	1.37	1.34	1.62	1.43	1.92	1.75	2.36	2.27	1.48
0.04	0.02	bdl	bdl	0.03	0.01	0.01	0.01	0.02	bdl	0.02	bdl	0.02	0.04	0.02
0.65	0.67	0.65	0.64	0.66	0.66	0.70	0.69	0.80	0.73	0.91	0.85	0.98	0.91	0.76
0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.02	0.03	0.03	0.04	0.04	0.02
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
0.08	0.10	0.12	0.11	0.14	0.16	0.13	0.08	0.19	0.15	0.19	0.23	0.20	0.13	0.23
95.27	94.84	95.20	95.68	95.02	95.26	95.33	95.61	94.83	95.24	94.78	95.16	94.20	94.61	95.65
6.011	6.011	6.022	6.017	6.015	6.013	6.008	6.020	6.028	6.012	6.036	6.027	6.035	6.028	6.010
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
1.735	1.742	1.742	1.767	1.747	1.742	1.751	1.744	1.704	1.763	1.636	1.683	1.551	1.593	1.763
0.025	0.021	0.018	0.016	0.018	0.020	0.020	0.019	0.011	0.005	0.018	0.008	0.035	0.029	0.000
0.002	0.002	0.003	bdl	0.002	0.002	0.002	0.002	0.001	0.002	0.003	0.002	0.003	0.003	0.003
bdl	bdl	bdl	0.001	bdl	bdl	bdl	bdl	bdl	bdl	0.002	bdl	0.003	0.001	bdl
3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
0.060	0.061	0.059	0.060	0.062	0.059	0.061	0.057	0.057	0.047	0.075	0.073	0.106	0.088	0.046
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
0.209	0.202	0.189	0.167	0.190	0.201	0.193	0.188	0.231	0.202	0.274	0.248	0.340	0.325	0.208
0.004	0.002	bdl	bdl	0.003	0.001	0.001	0.001	0.002	bdl	0.002	bdl	0.002	0.004	0.002
0.119	0.124	0.119	0.117	0.122	0.121	0.129	0.126	0.148	0.134	0.170	0.158	0.185	0.169	0.139
0.003	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.002	0.004	0.003	0.005	0.005	0.002
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
0.003	0.004	0.005	0.005	0.006	0.007	0.005	0.003	0.008	0.006	0.008	0.009	0.008	0.005	0.009

Chantete

4.93 ct

Int. med. bG	Med. bG	Med. bG	Lt. bG	Med. bG	Lt. bG	Med. bG	Lt. bG	Med. bG

FUA

r29-8	r29-9	r29-10	r29-11	r29-12	r29-13	r29-14	r29-15	r29-16	r38-1	r38-2	r38-3	r38-4	r38-5	r38-6
63.05	63.20	63.23	63.47	63.21	63.10	63.06	63.19	62.67	63.47	63.48	63.22	63.69	63.21	62.95
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
13.63	14.68	14.98	15.63	14.97	15.44	15.20	15.72	14.79	15.53	15.36	15.41	15.93	15.32	15.52
0.44	0.27	0.22	0.11	0.25	0.13	0.20	0.09	0.39	0.28	0.32	0.33	0.17	0.32	0.30
0.03	bdl	bdl	0.04	0.02	0.03	bdl	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.03
0.01	bdl	0.02	0.01	0.01	bdl	0.01	bdl	0.01	0.00	0.02	bdl	0.02	bdl	0.01
13.02	13.08	13.11	13.17	13.10	13.10	13.09	13.14	13.02	13.18	13.17	13.13	13.24	13.11	13.08
1.19	0.77	0.78	0.67	0.72	0.63	0.82	0.55	0.82	0.76	0.78	0.74	0.68	0.77	0.74
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
2.43	2.01	1.86	1.50	1.84	1.63	1.72	1.58	1.97	1.44	1.52	1.54	1.37	1.48	1.40
0.03	0.03	0.03	0.01	0.02	0.02	0.03	0.04	0.02	0.02	0.01	0.02	0.02	0.02	0.01
0.94	0.76	0.77	0.69	0.74	0.73	0.72	0.71	0.74	0.69	0.75	0.69	0.67	0.67	0.66
0.04	0.02	0.03	0.02	0.03	0.01	0.02	0.02	0.04	0.03	0.02	0.02	0.04	0.03	0.03
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
0.13	0.05	0.05	0.07	0.06	0.07	0.05	0.08	0.05	0.12	0.15	0.11	0.07	0.13	0.14
94.94	94.90	95.07	95.40	94.98	94.92	94.93	95.15	94.55	95.55	95.61	95.24	95.92	95.07	94.87
6.048	6.033	6.024	6.016	6.026	6.013	6.016	6.003	6.011	6.015	6.018	6.011	6.005	6.021	6.009
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
1.541	1.652	1.682	1.746	1.682	1.734	1.709	1.760	1.672	1.735	1.716	1.727	1.770	1.720	1.746
0.033	0.020	0.017	0.008	0.019	0.010	0.015	0.007	0.029	0.021	0.024	0.025	0.012	0.024	0.023
0.002	bdl	bdl	0.003	0.002	0.002	bdl	0.001	0.002	0.002	0.002	0.001	0.002	0.001	0.002
0.001	bdl	0.001	0.001	0.001	bdl	0.001	bdl	0.001	0.000	0.001	bdl	0.002	bdl	0.001
3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
0.095	0.061	0.062	0.053	0.057	0.050	0.065	0.044	0.066	0.060	0.062	0.059	0.053	0.061	0.059
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
0.348	0.286	0.264	0.212	0.262	0.231	0.245	0.224	0.282	0.203	0.215	0.219	0.193	0.210	0.200
0.003	0.003	0.003	0.001	0.002	0.002	0.003	0.004	0.002	0.002	0.001	0.002	0.002	0.002	0.001
0.176	0.140	0.143	0.126	0.137	0.135	0.133	0.132	0.138	0.127	0.138	0.127	0.123	0.124	0.123
0.005	0.003	0.004	0.002	0.004	0.002	0.002	0.003	0.005	0.004	0.003	0.003	0.005	0.004	0.003
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
0.005	0.002	0.002	0.003	0.002	0.003	0.002	0.003	0.002	0.005	0.006	0.004	0.003	0.005	0.006

Chantete 2.76 ct Int. med. bG FUA								**Chantete FUA**			Kagem 0.55 ct Lt. bG FUA		
r38-7	r38-8	r38-9	r38-10	r38-11	r38-12	r38-13	r38-14	**Min**	**Max**	**Ave**	z01c	z01r-1	z01r-2
63.45	63.27	63.38	63.08	63.40	63.46	63.68	63.46	**62.29**	**63.69**	**63.23**	63.78	63.40	64.67
na	na	na	na	na	na	na	na	**na**	**na**	**na**	na	na	na
15.62	15.61	15.48	15.55	15.47	15.68	15.66	15.68	**13.58**	**15.93**	**15.30**	16.07	15.96	15.87
0.24	0.25	0.28	0.28	0.26	0.24	0.24	0.23	**bdl**	**0.46**	**0.25**	0.23	0.25	0.24
bdl	0.02	0.02	0.03	0.03	0.03	bdl	0.02	**bdl**	**0.04**	**0.02**	0.04	0.06	0.05
bdl	bdl	bdl	bdl	bdl	0.02	bdl	bdl	**bdl**	**0.03**	**0.01**	0.02	0.03	0.02
13.17	13.14	13.15	13.11	13.14	13.18	13.21	13.18	**12.89**	**13.24**	**13.12**	13.29	13.21	13.34
0.76	0.81	0.77	0.81	0.77	0.80	0.78	0.80	**0.55**	**1.31**	**0.78**	0.36	0.36	0.36
na	na	na	na	na	na	na	na	**na**	**na**	**na**	na	na	na
1.36	1.33	1.40	1.37	1.36	1.34	1.32	1.34	**1.19**	**2.43**	**1.57**	1.24	1.26	1.32
0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	**bdl**	**0.04**	**0.02**	0.02	0.03	0.02
0.65	0.68	0.68	0.64	0.65	0.65	0.67	0.68	**0.64**	**0.98**	**0.72**	1.18	1.04	0.22
0.03	0.02	0.03	0.03	0.02	0.02	0.02	0.04	**0.01**	**0.04**	**0.03**	0.02	0.02	0.01
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	**bdl**	**bdl**	**bdl**	bdl	bdl	bdl
0.13	0.14	0.12	0.17	0.09	0.10	0.11	0.15	**0.05**	**0.23**	**0.12**	0.02	0.04	0.04
95.44	95.28	95.32	95.10	95.22	95.53	95.72	95.59				96.28	95.64	96.16
6.017	6.013	6.020	6.010	6.025	6.013	6.020	6.012	**6.003**	**6.048**	**6.018**	5.993	5.996	6.053
na	na	na	na	na	na	na	na	**na**	**na**	**na**	na	na	na
1.746	1.749	1.733	1.746	1.733	1.751	1.745	1.750	**1.541**	**1.770**	**1.716**	1.780	1.779	1.751
0.018	0.019	0.021	0.021	0.019	0.018	0.018	0.017	**bdl**	**0.035**	**0.019**	0.017	0.019	0.018
bdl	0.001	0.001	0.002	0.002	0.002	bdl	0.002	**bdl**	**0.003**	**0.002**	0.003	0.004	0.004
bdl	bdl	bdl	bdl	bdl	0.001	bdl	bdl	**bdl**	**0.003**	**0.001**	0.002	0.002	0.001
3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	**3.000**	**3.000**	**3.000**	3.000	3.000	3.000
0.060	0.064	0.061	0.064	0.061	0.063	0.062	0.063	**0.044**	**0.106**	**0.062**	0.028	0.028	0.028
na	na	na	na	na	na	na	na	**na**	**na**	**na**	na	na	na
0.192	0.188	0.198	0.195	0.192	0.189	0.186	0.189	**0.167**	**0.348**	**0.222**	0.174	0.178	0.183
0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	**bdl**	**0.004**	**0.002**	0.002	0.003	0.002
0.119	0.125	0.125	0.117	0.120	0.120	0.123	0.125	**0.117**	**0.185**	**0.133**	0.216	0.190	0.041
0.003	0.002	0.003	0.004	0.003	0.002	0.003	0.004	**0.002**	**0.005**	**0.003**	0.002	0.002	0.002
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	**bdl**	**bdl**	**bdl**	bdl	bdl	bdl
0.005	0.006	0.005	0.007	0.004	0.004	0.004	0.006	**0.002**	**0.009**	**0.005**	0.001	0.002	0.002

Kagem 0.71 ct Lt. bG FUA		Kagem 1.04 ct Med. bG FUA		Kagem 0.66 ct Med. bG FUA			Kagem 1.73 ct Med. bG FUA			Kagem 2.02 ct Med. Sl. bG FUA			Kagem 3.06 ct Dark sl. bG FUA	
z02c	z02r	z03c	z03r	z04c	z04r	z05c	z05ra	z05rb	z05rc	z06c	z06ra	z06rb	z07c	z07r
64.32	64.15	63.08	62.77	63.17	63.24	63.63	63.25	63.15	63.38	63.17	62.82	62.55	62.02	62.15
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
17.82	17.89	14.39	14.57	14.09	14.10	14.69	14.39	14.30	15.00	14.35	14.45	15.23	12.51	12.68
0.12	0.09	0.31	0.31	0.15	0.13	0.17	0.15	0.18	0.10	0.18	0.17	0.08	0.53	0.50
bdl	bdl	0.02	0.04	0.02	0.03	0.03	0.03	0.03	bdl	0.02	0.03	0.02	0.06	0.09
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.01	0.01	bdl	0.02	bdl
13.43	13.41	13.08	13.05	13.12	13.12	13.26	13.17	13.14	13.21	13.08	13.03	13.02	12.88	12.90
0.08	0.06	0.96	0.92	1.10	1.09	0.86	0.95	0.89	0.62	1.10	1.11	0.71	1.74	1.63
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
0.29	0.27	2.11	2.05	2.45	2.43	2.16	2.26	2.26	2.00	2.15	2.13	1.83	2.80	2.77
bdl	0.01	0.05	0.05	0.06	0.05	0.04	0.04	0.03	0.05	0.03	0.04	0.04	0.12	0.09
0.56	0.56	1.15	1.15	1.49	1.43	1.82	1.86	1.88	1.75	0.98	0.97	0.85	1.99	1.90
0.01	0.01	0.04	0.03	0.05	0.04	0.06	0.08	0.05	0.05	0.04	0.03	0.03	0.13	0.13
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
0.03	0.05	0.11	0.10	0.08	0.09	bdl	bdl	0.04	0.01	0.13	0.10	0.07	0.21	0.18
96.67	96.51	95.30	95.02	95.78	95.75	96.74	96.20	95.95	96.18	95.24	94.90	94.44	95.01	95.03
5.980	5.974	6.021	6.007	6.013	6.018	5.993	5.997	6.001	5.991	6.031	6.019	6.000	6.015	6.015
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
1.953	1.964	1.619	1.644	1.581	1.582	1.631	1.608	1.602	1.671	1.615	1.632	1.722	1.430	1.447
0.009	0.007	0.023	0.023	0.011	0.010	0.013	0.011	0.014	0.007	0.013	0.013	0.006	0.040	0.038
bdl	bdl	0.002	0.003	0.002	0.003	0.002	0.002	0.003	bdl	0.002	0.002	0.002	0.005	0.007
bdl	bdl	0.000	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.001	0.001	bdl	0.002	bdl
3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
0.006	0.004	0.076	0.073	0.087	0.087	0.068	0.075	0.070	0.049	0.088	0.089	0.057	0.141	0.132
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
0.040	0.037	0.300	0.292	0.347	0.344	0.303	0.319	0.321	0.281	0.306	0.304	0.262	0.405	0.400
bdl	0.001	0.005	0.005	0.006	0.005	0.004	0.004	0.003	0.005	0.003	0.005	0.004	0.012	0.010
0.101	0.101	0.212	0.213	0.276	0.264	0.332	0.342	0.345	0.320	0.181	0.180	0.158	0.374	0.357
0.001	0.001	0.005	0.004	0.006	0.005	0.008	0.009	0.006	0.006	0.005	0.004	0.003	0.016	0.016
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
0.001	0.002	0.005	0.004	0.003	0.004	bdl	bdl	0.001	0.001	0.005	0.004	0.003	0.009	0.007

		Kagem 0.91 ct Med sl. bG FUA			Kagem 0.89 ct Int. med. sl. bG FUA		Kagem 5.69 ct Med. bG FUA				Kagem 0.96 ct Dark sl. bG FUA			
z08a	z08b	z08c	z08d	z08e	z09c	z09r	z10	z10a	z42a	z42b	z42c	z42d	z42e	z43a
62.24	62.44	62.60	62.14	62.00	62.71	62.72	61.95	63.17	63.40	65.14	63.52	63.12	63.21	63.35
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
13.74	13.65	13.41	13.62	13.53	13.63	13.66	14.77	15.09	14.09	17.19	14.01	13.78	13.82	14.62
0.24	0.04	0.37	0.29	0.04	0.33	0.34	0.10	0.07	0.52	0.84	0.50	0.51	0.51	0.70
0.02	0.02	0.03	0.02	0.02	0.03	0.02	bdl	0.02	0.04	0.04	0.03	0.06	0.04	0.03
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.06	0.05	0.07	0.07	0.07	bdl
12.91	12.93	12.95	12.88	12.87	12.99	12.99	12.93	13.13	13.12	13.54	13.13	13.04	13.05	13.19
1.05	1.11	1.15	1.05	1.26	0.93	0.95	0.96	0.83	1.66	0.10	1.70	1.75	1.65	1.01
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
2.72	2.77	2.72	2.68	2.83	2.90	2.81	1.87	1.69	1.98	0.49	2.01	2.06	2.03	1.81
0.04	0.03	0.07	0.06	0.06	0.07	0.06	0.05	0.03	0.06	0.01	0.05	0.05	0.03	0.04
0.95	0.99	0.93	0.94	1.06	0.86	0.82	1.46	1.38	0.76	0.16	0.76	0.72	0.78	1.45
0.24	0.26	0.27	0.25	0.27	0.21	0.20	0.07	0.06	0.12	bdl	0.14	0.18	0.15	0.03
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
0.06	bdl	0.01	0.05	bdl	0.04	bdl	0.10	0.10	bdl	bdl	bdl	bdl	bdl	0.15
94.20	94.24	94.51	93.97	93.94	94.71	94.57	94.26	95.58	95.85	97.57	95.94	95.36	95.36	96.39
6.018	6.031	6.037	6.024	6.018	6.027	6.031	5.985	6.005	6.034	6.006	6.040	6.043	6.047	5.997
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
1.566	1.554	1.524	1.556	1.548	1.544	1.548	1.682	1.691	1.581	1.868	1.570	1.555	1.558	1.631
0.018	0.003	0.028	0.023	0.003	0.025	0.026	0.008	0.005	0.039	0.061	0.037	0.039	0.039	0.053
0.001	0.001	0.002	0.001	0.002	0.002	0.002	bdl	0.001	0.003	0.003	0.002	0.004	0.003	0.003
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.005	0.004	0.006	0.006	0.005	bdl
3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.002	3.000	3.000	3.000	3.000	3.000	3.000
0.085	0.090	0.093	0.085	0.102	0.075	0.076	0.077	0.066	0.132	0.008	0.135	0.140	0.132	0.080
na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
0.392	0.398	0.390	0.387	0.410	0.415	0.402	0.269	0.240	0.280	0.067	0.285	0.293	0.289	0.256
0.004	0.003	0.007	0.006	0.007	0.007	0.006	0.005	0.003	0.006	0.001	0.005	0.005	0.003	0.004
0.177	0.186	0.175	0.176	0.199	0.160	0.153	0.274	0.254	0.140	0.028	0.140	0.133	0.144	0.265
0.030	0.032	0.033	0.031	0.033	0.026	0.024	0.008	0.008	0.015	bdl	0.017	0.022	0.018	0.003
bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl
0.003	bdl	0.001	0.002	bdl	0.001	bdl	0.004	0.004	bdl	bdl	bdl	bdl	bdl	0.006

Kagem 0.98 ct Dark bG FUA			Kagem FUA			All data	All data	All data
z43b	z43c	z43d	**Min**	**Max**	**Ave**	**Min**	**Max**	**Ave**
63.34	63.37	63.07	**61.95**	**65.14**	**63.12**	**61.95**	**65.43**	**63.80**
na	na	na	**na**	**na**	**na**	**bdl**	**bdl**	**bdl**
14.65	14.94	14.75	**12.51**	**17.89**	**14.59**	**12.51**	**17.89**	**15.07**
0.67	0.42	0.66	**0.04**	**0.84**	**0.31**	**bdl**	**0.84**	**0.26**
0.04	0.02	0.02	**bdl**	**0.09**	**0.03**	**bdl**	**0.09**	**0.02**
0.02	0.02	bdl	**bdl**	**0.07**	**0.01**	**bdl**	**0.07**	**0.01**
13.17	13.19	13.14	**12.87**	**13.54**	**13.11**	**12.87**	**13.61**	**13.25**
0.94	0.93	0.96	**0.06**	**1.75**	**0.97**	**0.06**	**1.75**	**0.76**
na	na	na	**na**	**na**	**na**	**bdl**	**0.01**	**bdl**
1.71	1.73	1.74	**0.27**	**2.90**	**2.01**	**0.27**	**2.90**	**1.90**
0.04	0.03	0.03	**bdl**	**0.12**	**0.04**	**bdl**	**0.12**	**0.02**
1.45	1.36	1.34	**0.16**	**1.99**	**1.14**	**0.16**	**1.99**	**1.10**
0.03	0.03	0.03	**bdl**	**0.27**	**0.09**	**bdl**	**0.27**	**0.04**
bdl	bdl	bdl	**bdl**	**bdl**	**bdl**	**bdl**	**bdl**	**bdl**
0.12	0.13	0.15	**bdl**	**0.23**	**0.06**	**bdl**	**0.23**	**0.09**
96.17	96.15	95.89						
6.004	6.000	5.995	**5.974**	**6.053**	**6.013**	**5.974**	**6.053**	**6.012**
na	na	na	**na**	**na**	**na**	**bdl**	**bdl**	**bdl**
1.637	1.667	1.653	**1.430**	**1.964**	**1.637**	**1.430**	**1.964**	**1.673**
0.050	0.031	0.049	**0.003**	**0.061**	**0.023**	**bdl**	**0.061**	**0.019**
0.003	0.001	0.002	**bdl**	**0.007**	**0.002**	**bdl**	**0.007**	**0.002**
0.001	0.001	bdl	**bdl**	**0.006**	**0.001**	**bdl**	**0.006**	**0.001**
3.000	3.000	3.000	**3.000**	**3.002**	**3.000**	**2.999**	**3.002**	**3.000**
0.075	0.074	0.076	**0.004**	**0.141**	**0.077**	**0.004**	**0.141**	**0.060**
na	na	na	na	**na**	**na**	**bdl**	**0.001**	**bdl**
0.242	0.244	0.247	**0.037**	**0.415**	**0.286**	**0.037**	**0.415**	**0.267**
0.004	0.003	0.003	**bdl**	**0.012**	**0.005**	**bdl**	**0.012**	**0.002**
0.266	0.250	0.247	**0.028**	**0.374**	**0.210**	**0.028**	**0.374**	**0.201**
0.003	0.003	0.004	**bdl**	**0.033**	**0.011**	**bdl**	**0.033**	**0.005**
bdl	bdl	bdl	**bdl**	**bdl**	**bdl**	**bdl**	**bdl**	**bdl**
0.005	0.005	0.006	**bdl**	**0.009**	**0.003**	**bdl**	**0.009**	**0.004**