

# b.n. kirk (natal) cc

Reg.No. CK 1994/015428/23

Water, Sewage & Industrial Effluent Testing Laboratory

45 Eaton Road, Congella, Durban P.O. Box 30140, Mayville, 4058 RSA  
 Tel : (031) 205 1245 Fax : (031) 205 6904 E-mail: [admin@bnkirk.co.za](mailto:admin@bnkirk.co.za)  
 Web Page: [www.bnkirk.co.za](http://www.bnkirk.co.za)



## CERTIFICATE OF ANALYSIS - BN Kirk (Natal) cc

CLIENT:	ILEMBE DISTRICT MUNICIPALITY	JOB NO:	T10-1
WORKS:	TUGELA RAIL WATER TREATMENT WORKS		
ADDRESS:	P.O. Box 1788 Kwadukuza 4450		
ATTENTION:	Mr. H.N. Maphumulo	REPORT DATE:	09-05-2014
eMail:	<a href="#">Group 3 Details</a>	DATE ANALYSED:	06-05-2014
In accordance with the visit schedule and procedure QP21.		DATE RECEIVED:	30-04-2014

### ANALYTICAL RESULTS

1	Test Method No	2	3	4	5	6	2013															
							Date Sampled															
Determinand	Risk	Unit	Standard limits *	% Compliance	Average quality	10-01	13-01	23-01	27-01	03-02	10-02	17-02	24-02	06-03	10-03	17-03	24-03	01-04	07-04	16-04	23-04	29-04

#### SETTLED WATER

##### Physical and aesthetic determinands

pH at 25°C <sup>c</sup>	P09/042	Operational	pH units		8.1				8.0	7.9		not sampled	not sampled	8.0	not sampled	8.0	7.9	8.2	8.1	8.2	8.2	8.2
Turbidity <sup>b</sup> {A}	P09/045	Operational	NTU		4.9				5.7	6.8				4.0		4.9	5.3	3.8	7.2	3.3	4.4	3.2
		Aesthetic	NTU		4.9				5.7	6.8				4.0		4.9	5.3	3.8	7.2	3.3	4.4	3.2
Conductivity at 25°C	P09/044	Aesthetic	mS/m		14				12	12				12		13	12	15	13	17	18	19

#### FINAL WATER

##### Physical and aesthetic determinands



pH at 25°C <sup>c</sup>	P09/042	Operational	pH units	≥ 5 to ≤ 9.7	100%	7.6	7.6	7.4	7.5	7.3	7.7	7.4			7.5	7.6	7.9	7.5	7.9	7.9	7.6	8.0	7.8
Colour	P09/011	Aesthetic	mg/L Pt-Co	≤ 15	64%	18				10	52				12	29	8.3	24	8.0	25	10	8.2	11
Turbidity <sup>b</sup> {A}	P09/045	Operational	NTU	≤ 1	9%	3.6				3.0	7.6				2.0	3.4	1.5	4.4	1.2	12	1.1	0.8	2.5
		Aesthetic	NTU	≤ 5	91%	3.6				3.0	7.6				2.0	3.4	1.5	4.4	1.2	12	1.1	0.8	2.5
Conductivity at 25°C	P09/044	Aesthetic	mS/m	≤ 170	100%	14				12	12				12	14	13	13	15	13	17	18	19
Total Chlorine	P09/025	ns	ns	ns		1.9	1.78	2.08	2.30	2.87	1.07	2.34			1.90	2.05	1.37	1.24	1.97	1.18	2.23	1.44	2.37
Free chlorine	P09/025	Chronic health	mg/L	≤ 5	100%	1.7	1.70	1.93	2.25	2.84	0.89	2.25			1.80	1.85	1.24	1.15	1.84	1.07	2.02	1.30	1.78
Monochloramine	P09/025	Chronic health	mg/L	≤ 3	100%	0.1	0.08	0.05	0.05	0.03	0.18	0.09			0.10	0.20	0.13	0.09	0.13	0.11	0.21	0.14	0.59

##### Chemical determinands - macro-determinands

Nitrate as NO <sup>3</sup>	P09/018	Acute health - 1	mg/L	ns			not tested	not tested	not tested	not tested	not tested	not tested			9.4	6.3	5.6	3.8	0.90	2.2	1.2	0.60	1.4
Nitrate as N <sup>d</sup>	P09/018	Acute health - 1	mg/L	≤ 11	100%	0.8									2.12	1.4	1.3	0.86	0.20	0.50	0.27	0.14	0.32
Nitrite as N <sup>d</sup>	P09/019	Acute health - 1	mg/L	≤ 0.9	100%	0.03									<0.01	<0.01	0.01	<0.01	0.01	0.02	0.03	0.06	<0.01

##### Chemical determinands - micro-determinands

Iron as Fe	P09/014	Chronic health	mg/L	≤ 2	100%	0.19				0.12	0.33				0.08	0.29	0.15	0.19	0.20	0.42	0.05	0.03	0.21
		Aesthetic	mg/L	≤ 0.3	82%	0.19				0.12	0.33					0.08	0.29	0.15	0.19	0.20	0.42	0.05	0.03
Aluminium as Al	P09/053	Operational	mg/L	≤ 0.3	92%	0.16	0.13	0.03	0.23			0.24			0.06	0.24	0.08	0.20	0.08	0.37	0.14	0.05	0.20

Determinand	Test Method No	SANS 241-1:2011 Physical, aesthetic, operational, chemical and Microbiological determinands					2013																
		Risk	Unit	Standard limits <sup>a</sup>	% Compliance	Average quality	Date Sampled																
							10-01	13-01	23-01	27-01	03-02	10-02	17-02	24-02	06-03	10-03	17-03	24-03	01-04	07-04	16-04	23-04	29-04
<p><b>a</b> = The health-related standards are based on the consumption of 2 L of water per day per person of a mass of 60kg over a period of 70 years.</p> <p><b>b</b> = Values in excess of those given in column 4 may negatively impact disinfection.</p> <p><b>c</b> = Low pH values can result in structural problems in the distribution system.</p> <p><b>d</b> = This is equivalent to nitrate at 50mg NO<sub>3</sub><sup>-</sup> /L and nitrite as 3mg NO<sub>2</sub><sup>-</sup> /L</p> <p><b>e</b> = Microcystin only needs to be measured where an algal bloom (&gt;20 000 cyanobacteria cells per millilitre) is present in a raw water source. In the absence of algal monitoring, an algal bloom is deemed to occur where the surface water is visibly green in the vicinity of the abstraction, or samples taken have a strong musty odour.</p>																							
<b>MICROBIOLOGICAL RESULTS</b>																							
Heterotrophic plate count <sup>f</sup>	P09/103	Operational	Count per ml	< 1000	93%	118	0	2	2	0	10	0			0	0	1	1552	29	168	0	5	5
Total coliforms <sup>e</sup>	P09/102	Operational	Count per 100ml	< 10	100%	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0
Faecal coliforms <sup>b</sup> {A}	P09/046	Acute health - 1	Count per 100ml	Not detected	100%	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0
E.coli <sup>a</sup> {A}	P09/046	Acute health - 1	Count per 100ml	Not detected	100%	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0
<p><b>a</b> = Definitive, preferred indicator of faecal pollution.</p> <p><b>b</b> = Indicator of unacceptable microbial water quality, could be tested instead of E.coli, but is not the preferred indicator of faecal pollution. Also provides information on treatment efficiency and aftergrowth in distribution networks.</p> <p><b>c</b> = Confirms a risk of human infection and faecal pollution and also provides information on treatment efficiency. The detection of selected viruses confirms faecal pollution of human origin.</p> <p><b>d</b> = Confirms a risk of infection and faecal pollution and also provides information on treatment efficiency. The detection of selected protozoan parasites confirms a human health risk.</p> <p><b>e</b> = Indicates potential faecal pollution and provides information on treatment efficiency and aftergrowth.</p> <p><b>f</b> = Process indicator that provides information on treatment efficiency, aftergrowth in distribution networks and adequacy of disinfectant residuals.</p> <p><b>g</b> = Process indicator that provides information on treatment efficiency.</p>																							
<p><b>KEY</b> ** = TOO NUMEROUS TO COUNT    ns = NOT SPECIFIED</p>																							
for and on behalf of B N KIRK (Natal) cc																							
 Dawn Bester - Laboratory Manager Technical Signatory										 S. Subban - Chemistry Lab Supervisor Technical Signatory										00 January 1900 Date			
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<p><b>Accreditation Disclaimer:</b></p> <ol style="list-style-type: none"> <li>Results marked {A} are included in the SANAS Schedule of accreditation for this laboratory.</li> <li>Results marked "Subcontracted Test" in this report, are not included in the SANAS Schedule of accreditation for this laboratory.</li> <li>The estimated uncertainty of measurements for the accredited test results is obtainable from the laboratory - QP24 Appendix A.</li> <li>The results relate to the sample tested and the most recent methods available with a 95% confidence level.</li> </ol>																							

End of Report