Chettinad Cement Corporation Limited
Sangem (K) & Kallur V illages
Gulbarga District, Karnataka

Ambient Air Quality data - April 2013 September 2013

Sl. No	Location	PM_{10}			$PM_{2.5}$			SO_2			NOx		
		Max	Min	**Avg**	Max	Min	**Avg**	Max	Min	**Avg**	Max	Min	**Avg**
1	ML Area	**50.0**	**28.0**	**38.3**	23.0	18.1	14.0	15.0	7.0	10.7	18.0	10.0	13.8
2	Miryan	48.0	20.0	35.1	22.0	16.5	12.0	14.0	7.0	10.6	17.0	11.0	13.7
3	Polkampalli	**43.0**	**20.0**	**31.3**	20.0	15.6	11.0	13.0	7.0	10.0	17.0	10.0	13.1
4	Bhaktampalli	46.0	20.0	34.5	22.0	16.5	11.0	15.0	7.0	10.3	18.0	10.0	13.8
5	Somalingdahalli	43.0	20.0	31.2	20.0	15.8	12.0	13.0	7.0	10.0	17.0	10.0	13.1
6	Kalllur	46.0	22.0	34.5	22.0	17.1	13.0	14.0	7.0	10.2	17.0	10.0	13.2
7	Factory area	53.0	20.0	36.8	27.0	18.8	13.0	16.0	7.0	11.3	18.0	9.0	14.3
	Limits	**100**			**60**			**80**			**80**		

Ground Water Quality Monitoring (Summer 2013)										
Sl. No.	Parameters	Sample code							Desirable Limts	Permissible Limts
		GW1	GW2	GW3	GW4	GW5	GW6	GW7		
i	Colour (Hazen Units), Max	<5	<5	<5	<5	<5	<5	<5	5	25
ii	Odour	Unobjec-	Unobjec-	Unobjec-	Unobjec-	Unobjec-	Unobjec-	Unobjec-	Unobjec-	Unobjec-
		tionable	tionable	tionable	tionable	tionable	tionable	tionable	tionable	tionable
iii	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
iv	Turbidity,NTU, Max	0.4	0.4	0.4	0.4	0.6	0.4	0.6	5.0	10
v	Total Dissolved Solids,mg/l, Max	473	418	560	470	592	490	724	500	2000
vi	pH	7.26	7.75	7.50	7.32	7.94	7.56	7.34	6.5 to 8.5	6.5 - 8.5
vii	Total Hardness (as $CaCO_3$),mg/l, Max	300	315	390	395	330	315	960	300	600
viii	Copper (as Cu),mg/l, Max	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	1.5
ix	Iron (as Fe),mg/l, Max	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.30	1.0
x	Manganese (as Mn),mg/l, Max	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.1	0.3
xi	Nitrates (as NO_3),mg/l, Max	22.6	45..7	43.3	49.0	57.4	46.7	72.0	45	45
xii	Fluoride (as F),mg/l, Max	0.49	0.77	0.30	0.11	0.43	0.13	0.91	1	1.5
xiii	Zinc (as Zn),mg/l, Max	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	5	15
xiv	Aluminium (as Al), Max	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.2
xv	Chloride as Cl (mg/l),mg/l, Max	85.0	40.0	80.0	25.0	65.0	55.0	97.8	250	1000
xvi	Selenium (as Se),mg/l, Max	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	0.01
xviii	Sulphates (as SO_4),mg/l, Max	26.4	21.1	27.2	10.4	26.3	13.1	38.6	200	400
xix	Alkalinity (as $CaCO_3$) mg/l, Max	315	320	330	375	375	325	430	200	600
xxi	Calcium (as Ca),mg/l, Max	72.0	82.0	102.2	108	68	80	184	75	200
xxii	Magnesium (as Mg)mg/l, Max	29.0	26.7	32.8	30.3	38.8	28	121.5	30	100
xxiii	Residual, Free Chlorine,mg/l, Max	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	1
xxiv	Phenolics (as C_6H_5OH),mg/l, Max	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002
xxv	Mineral Oil,mg/l, Max	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.01	0.03
xxvi	Anionic Detergents (as MBAS),mg/l , Max	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	1.0
xxvii	Boron (as B), mg/l, Max	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	1.5
xxviii	Barium (as Ba), mg/l, Max	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.7
xxix	Molybdenum (as Mo), mg/l, Max	NA	NA	NA	NA	NA	NA	NA	0.07	0.07
xxx	Sulphide (as H_2S) , mg/l, Max	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.05
xxxi	Mercury (as Hg),mg/l, Max	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.001
xxxii	Cadmium (as Cd),mg/l, Max	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	0.003
xxxiii	Arsenic (as As),mg/l, Max	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	0.05
xxxiv	Cyanide (as CN),mg/l, Max	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.05
xxxv	Lead (as Pb),mg/l, Max	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	0.01
xxxvi	Chromium (as Cr^{+6}),mg/l, Max	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	0.05
xxxvii	Polynuclear Aromatic Hydrocarbons (as PAH),mg/l, Max	NA	NA	NA	NA	NA	NA	NA	0.0001	0.0001
xxxvii	Pestiides,mg/l, Max	NA	NA	NA	NA	NA	NA	NA	Absent	0.001
xxxviii	Nickel (as Ni),mg/l, Max	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.02
xxxix	Polychlorinated biphenyls mg/l, Max	NA	NA	NA	NA	NA	NA	NA	0.0005	0.0005
XL	Total Coliform (/100ml)	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	10
XLi	E-Coli (cfu/100ml)	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

GW1 - Plant Bore Well	GW5- Polkamplli Village Bore Well
GW2 -Kallur village Village Bore Well	GW6 -Pardhi Motakpalli Village Bore Well
GW3 - Mirayan Village Bore Well	GW7 - Somalingadahalli Village Bore
GW4 - Bhaktampalli Village Bore Well	

Ground Water Quality Monitoring (Monsoon 2013)										
Sl. No.	Parameters	Sample code							Desirable Limts	Permissible Limts
		GW1	GW2	GW3	GW4	GW5	GW6	GW7		
i	Colour (Hazen Units), Max	<5	<5	<5	<5	<5	<5	<5	5	25
ii	Odour	Unobjec-	Unobjec-	Unobjec-	Unobjec-	Unobjec-	Unobjec-	Unobjec-	Unobjec-	Unobjec-
		tionable	tionable	tionable	tionable	tionable	tionable	tionable	tionable	tionable
iii	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
iv	Turbidity,NTU, Max	0.2	0.4	0.4	0.2	0.2	0.1	0.2	5.0	10
v	Total Dissolved Solids,mg/l, Max	420	446	650	450	710	480	640	500	2000
vi	pH	7.51	7.61	7.26	7.32	7.35	7.50	7.30	6.5 to 8.5	6.5 - 8.5
vii	Total Hardness (as $CaCO_3$),mg/l, Max	275	240	420	390	600	380	480	300	600
viii	Copper (as Cu),mg/l, Max	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	1.5
ix	Iron (as Fe),mg/l, Max	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.30	1.0
x	Manganese (as Mn),mg/l, Max	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.1	0.3
xi	Nitrates (as NO_3),mg/l, Max	20.0	24.8	33.8	33.8	45.0	35.6	45.0	45	45
xii	Fluoride (as F),mg/l, Max	0.46	1.50	0.32	0.63	0.50	1.03	0.40	1	1.5
xiii	Zinc (as Zn),mg/l, Max	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	5	15
xiv	Aluminium (as Al), Max	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.2
xv	Chloride as Cl (mg/l),mg/l, Max	70.0	43.7	190.0	34.0	131.1	43.7	87.4	250	1000
xvi	Selenium (as Se),mg/l, Max	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	0.01
xviii	Sulphates (as SO_4),mg/l, Max	20.0	23.7	26.7	14.0	47.8	18.6	35.3	200	400
xix	Alkalinity (as $CaCO_3$) mg/l, Max	20.0	320	350	380	350	390	410	200	600
xxi	Calcium (as Ca),mg/l, Max	20.0	92.2	152.3	120	188	120	104	75	200
xxii	Magnesium (as Mg)mg/l, Max	20.0	26.7	9.7	21.9	31.6	19.4	53.5	30	100
xxiii	Residual, Free Chlorine,mg/l, Max	20.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	1
xxiv	Phenolics (as C_6H_5OH),mg/l, Max	20.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002
xxv	Mineral Oil,mg/l, Max	20.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.01	0.03
xxvi	Anionic Detergents (as MBAS),mg/l , Max	20.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	1.0
xxvii	Boron (as B), mg/l, Max	20.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	1.5
xxviii	Barium (as Ba), mg/l, Max	20.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.7
xxix	Molybdenum (as Mo), mg/l, Max	20.0	NA	NA	NA	NA	NA	NA	0.07	0.07
xxx	Sulphide (as H_2S) , mg/l, Max	20.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.05
xxxi	Mercury (as Hg),mg/l, Max	20.0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.001
xxxii	Cadmium (as Cd),mg/l, Max	20.0	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	0.003
xxxiii	Arsenic (as As),mg/l, Max	20.0	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	0.05
xxxiv	Cyanide (as CN),mg/l, Max	20.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.05
xxxv	Lead (as Pb),mg/l, Max	20.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	0.01
xxxvi	Chromium (as Cr^{+6}),mg/l, Max	20.0	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	0.05
xxxvii	Polynuclear Aromatic Hydrocarbons (as PAH),mg/l, Max	20.0	NA	NA	NA	NA	NA	NA	0.0001	0.0001
xxxvii	Pestiides,mg/l, Max	20.0	NA	NA	NA	NA	NA	NA	Absent	0.001
xxxviii	Nickel (as Ni),mg/l, Max	20.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.02
xxxix	Polychlorinated biphenyls mg/l, Max	20.0	NA	NA	NA	NA	NA	NA	0.0005	0.0005
XL	Total Coliform (/100ml)	20.0	Absent	Absent	Absent	Absent	Absent	Absent	Absent	10
XLi	E-Coli (cfu/100ml)	20.0	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

GW1 - Plant Area Bore Well	GW5- Polkamplli Village Bore Well
GW2 -Kallur village Village Bore Well	GW6 -Pardhi Motakpalli Village Bore Well
GW3 - Mirayan Village Bore Well	GW7 - Somalingadahalli Village Bore
GW4 - Bhaktampalli Village Bore Well	

Noise Level Monitoring (Summer 2013)

Code No.	Monitoring stations	Day			Night		
		L_{min}	L_{eq}	L_{max}	L_{min}	L_{eq}	L_{max}
	Bufferzone						
N1	Miryan village	44.8	48.6	51.2	36.4	38.6	42.0
N2	Polkampalli village	44.7	47.7	51.2	34.0	37.5	41.3
N3	Bhaktampalli village	42.0	45.2	48.1	34.0	37.8	40.6
N4	Somalingadhalli village	41.9	45.0	49.1	34.6	36.2	38.6
N5	Kallur village	40.8	45.9	49.1	34.2	37.8	42.3
	Corezone	L_{min}	L_{eq}	L_{max}	**Remarks**		
N6	Core zone ML Area	43.2	47.5	52.0	34.5	38.5	43.1
N7	Factry Area	63.7	64.4	65.3	36.8	39	44.6

Permissible limits as per ILO Code of Practice

For Unprotected ear - 8 hrs working shift
Warning limit - 85 dB(A)
Danger limit - 90 dB(A)
Worker not to be exposed for more than 115 dB(A)
With ear protection -
130 dB(A) 'Impulse' or 120 dB(A) 'Fast'
No entry when noise level exceeds 140 dB(A)

Ambient Noise Levels

	Leq. Limit dB(A)	
	Day	**Night**
Industrial areas	75	70
Residential area	55	45

Noise Level Monitoring (Monsoon 2013)

Code No.	Monitoring stations	Day			Night		
		L_{min}	L_{eq}	L_{max}	L_{min}	L_{eq}	L_{max}
	Bufferzone						
N1	Miryan village	45.5	49.0	52.3	35.4	39.3	43.0
N2	Polkampalli village	41.2	47.3	51.3	34.0	37	41.0
N3	Bhaktampalli village	43.2	45.4	48.1	36.0	38.2	42.0
N4	Somalingadhalli village	39.5	44.8	50.1	35.0	36.9	40.0
N5	Kallur village	43.5	46.5	52.5	34.2	37.8	42.3
	Corezone	L_{min}	L_{eq}	L_{max}			
N6	Core zone ML Area	38.5	46.7	51.5	34.5	38.4	42.5
N7	Factry Area	58.5	62.6	64.5	35.8	38.8	43.0

Permissible limits as per ILO Code of Practice

For Unprotected ear - 8 hrs working shift
Warning limit - 85 dB(A)
Danger limit - 90 dB(A)
Worker not to be exposed for more than 115 dB(A)
With ear protection -
130 dB(A) 'Impulse' or 120 dB(A) 'Fast'
No entry when noise level exceeds 140 dB(A)

Ambient Noise Levels

	Leq. Limit dB(A)	
	Day	**Night**
Industrial areas	75	70
Residential area	55	45

Stack Monitoring

Sl.No	Stack Connected to	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
1	Kiln/Raw Mill	18	23	18	17	15	18
2	Cooler	15	18	20	19	17	20
3	Coal Mill	26	24	21	23	24	22
4	Cement Mill	16	18	16	18	26	19
5	Capitive Power Plant	18	22	16	25	22	23
	Particulate Matter Limits	**50**	**50**	**50**	**50**	**50**	**50**

Treated Sewage Effluent -Colony

S.No	Parameter	Jun-13	Jul-13	Aug-13	Sep-13	Max	Limits As per Consent for Operation
1	Suspended solids	21	23	19	15	23	30
2	BOD(3 days at 27^{o}C) mg/l max	2	2.5	2.2	3.6	3.6	20

Treated Sewage Effluent -Factory

S.No	Parameter	Jun-13	Jul-13	Aug-13	Sep-13	Max	Limits As per Consent for Operation
1	Suspended solids	19	18	16	16	19	30
2	BOD(3 days at 27^{o}C) mg/l max	2.3	2.5	2.7	2.9	2.9	20

Treated Industrial Effluent

S.No	Parameter	Jun-13	Jul-13	Aug-13	Sep-13	Max	Limits As per Consent for Operation
1	Suspended solids	11	9	11	20	20	100
2	Dissolved solids (in organic)	931	895	910	700	931	2100
3	pH	8.32	7.8	7.85	8.81	8.81	5.5 - 9.0
4	Chloride(as CL)	161	155	161	218	218	1000
5	Dissolved Phospates(as P)	<0.5	<0.5	<0.5	<0.5	<0.5	5
6	Sulphates (as SO_4)	43.1	38	42	64.2	64.2	1000