

Annex - IV

Unit: JOJOBERA CEMENT PLANT, JAMSHEDPUR

1	Details of Process and Quality Control Measure taken by the your Plant	Please see ANNEXURE-A
2 Quality Parameters (for 15 days):-		
a	Fly ash (IS-3812)	
	Chemical parameter:-	Unit Value
	LOI	% 1.30
	SiO ₂ +Al ₂ O ₃ +Fe ₂ O ₃	% 94.70
	MgO	% 0.5
	Total sulphur as SO ₃	% 0.4
	Cl	% 0.012
	Physical parameter:-	
	Fineness	M ² /Kg 290
	Residue on 45 R	% Max. 25%
	LR(320blaine)	Mpa 6.0
	Comp. Strength - 28 day:	% 96 of OPC
	Glass content	% 39%
b	PPC (IS-1489)	
	Chemical parameter:-	Unit
	LOI	% 1.15
	MgO	% 3.1
	IR	% 28.5
	SO ₃	% 1.78
	Cl	% 0.01
	Physical parameter:-	
	Fineness	M ² /Kg 365
	Setting :	
	Initial	Min. 185
	Final	Min. 230
	Comp. Strength	Mpa
	3 days	26
	7 days	34
	28 days	51
c	Suggestions for checking the Important Parameters at site Laboratories	Fineness ,setting time, Comp. Strength (Site lab should be well equipped and well maintained)

Plant trials were conducted in Sept 2005. We made a protocol for observing quality and process parameters on hourly as well as on daily average basis. We also stopped the grinding aid in Oct for 8 Hrs then again for 6-7 days in Nov'2005 and found similar observation what we have mentioned in Annex – B during the trials in Sept'2005. We could further improve our confidence levels after we had conducted continued trial for a month and now Sika GA is a part of our regular operation in cement mill.

Annexure – C

Industrial Trial at Arasmeta with Sika Grinding Aid – Sept- Oct 2005

Cement Mill Trials	CaO	SO3	Fly ash	45m R	Blaine	IST	3 Days	7 Days	28 Days	Prod.	SPC
Description	%	%	%	%	M2/Kg	Minutes	MPa	MPa	MPa	M.T./Hr	M.Motor
Blank	43.4	1.5	29.0	14.0	343	215	24.5	32.0	46.0	118	24.9
Sika (0.05%) P-PPC	43.3	1.48	30.2	11.5	328	160	26.5	34.0	50.0	126	23.1
Sika(0.03%)	41.98	1.58	32.2	12.4	332	200	25.4	33.0	48.5	127	23.0
Sika(0.04%)	41.76	1.52	32.5	11.4	328	190	25.8	33.5	49.5	128	23.0

Remarks :-

1. Decrease in IST .
2. Increase in CS
3. Increase in prod by 7-8% and reduction in SPC by 6- 7%
4. Increase in CM addition with better IQP's parameters (IST and CS) compared to the blank trial.
5. Decrease in 45 micron residue

Summary:

- a) Particle Size Distribution is better by the use of GA. There is reduction of minimum 2% on 45 R.
- b) % fly ash increase by ~ 2.5%
- c) IST reduction is observed in all the cases (up to 40 minutes)
- d) Productivity has improved.
- e) Reduction in cement mill power consumption
- f) Less load on separator / separator rpm has decreased
- g) Increase in dust load /bag filters dp has increased.
- h) Day to day fluctuations of process and quality parameters have reduced.

	2001	2002	2003	2004	2005	2006(upto Aug)
Iron Ore	0.69	0.45	0.39	0.37	0.27	0.29
+45 μ	44.46	41.49	42.00	40.93	40.36	42.47
C3A	9.28	9.80	10.10	10.00	10.23	9.87
Fly ash	26.21	27.91	27.53	30.25	30.93	32.82
Cement : Clinker	1.41	1.465	1.471	1.484	1.502	1.546

Annex – V

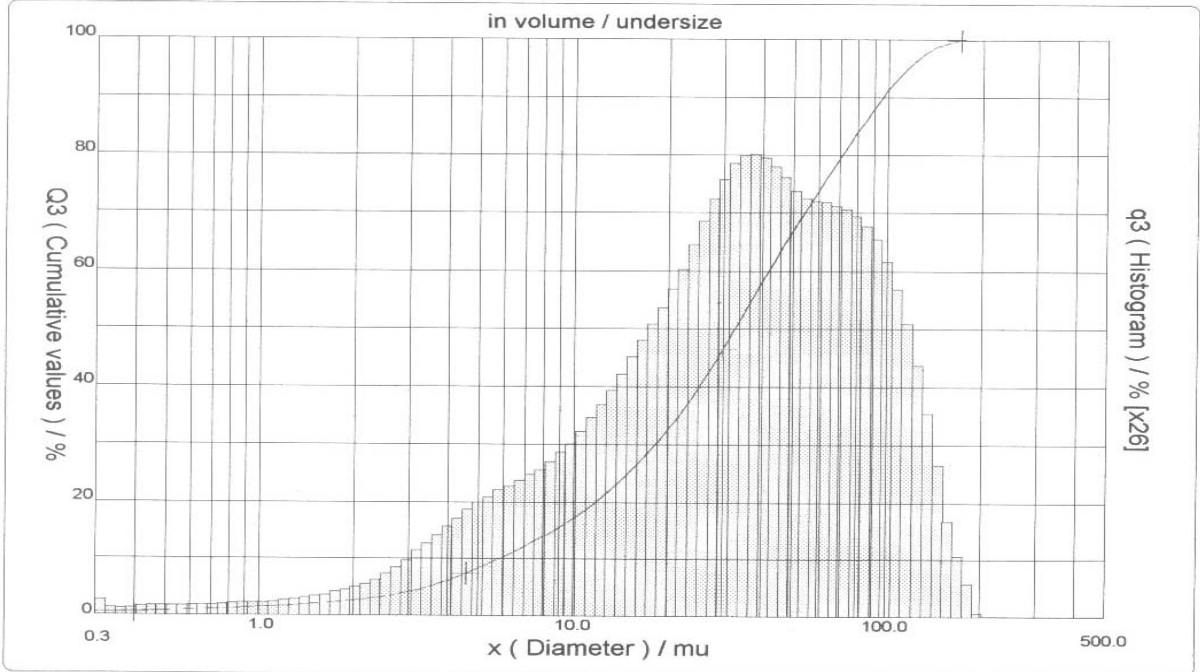
Sample Ref : S2
 Product : CEMENT
 Customer : LAFARGE
 Comments :

 Operator : MG
 Company :
 Location :
 Date : 21/04/2002 Time : 11:39:10
 Index meas. : 634

Pressure/Distributor : 612 mb / 4
 Concentration : 100
 Diameter at 10% : 5.83 mu
 Diameter at 50% : 32.60 mu
 Diameter at 90% : 95.66 mu
 Mean diameter : 42.59 mu
 Fraunhofer
 Density/Factor : -----
 Specific surface : -----
 Meas./Rins. : 10/10/0
 SOP : LAFARGE

FA

S_2 = Fly-Ash from TEE, combine of Unit II & III
 Fineness : - 265 m²/kg.



PARTICLE SIZE DISTRIBUTION CILAS 1064 DRY

Range : 0.30 mu - 500.00 mu / 100 Classes

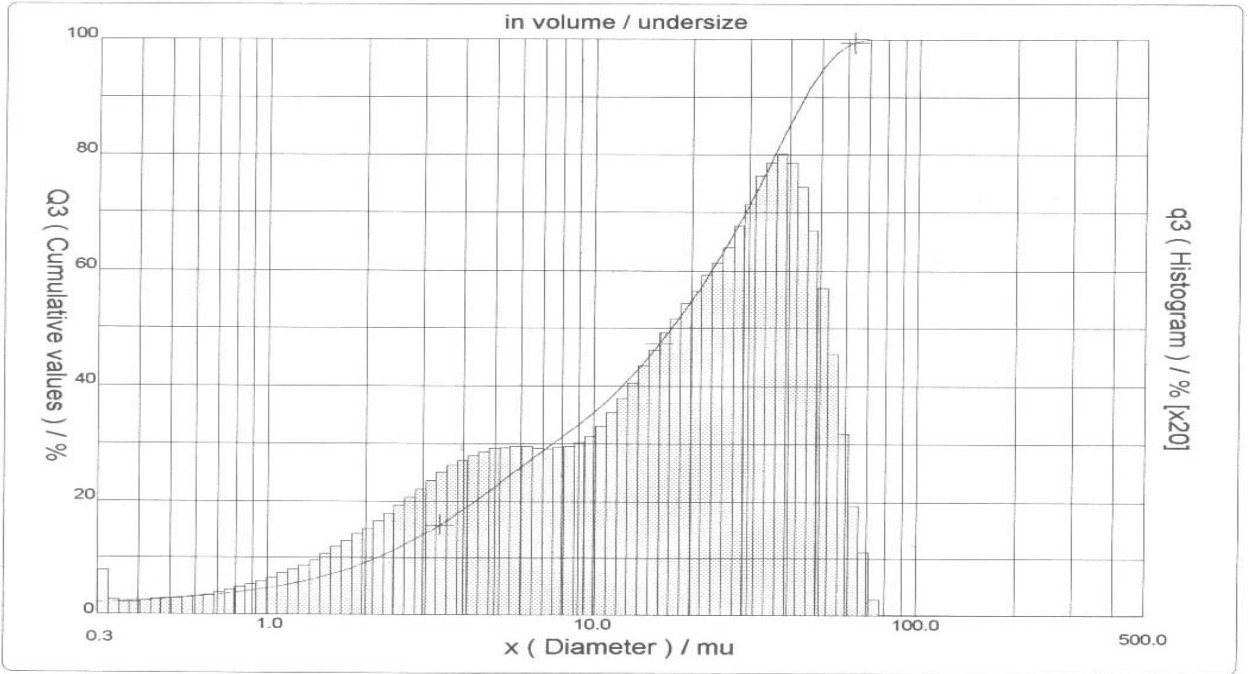
Sample Ref	: S6
Product	: CEMENT
Customer	: LAFARGE
Comments	:

Operator	: MG
Company	:
Location	:
Date : 21/04/2002	Time : 10:59:13
Index meas.	: 615

Pressure/Distributor	: 604 mb / 4
Concentration	: 252
Diameter at 10%	: 2.18 mu
Diameter at 50%	: 17.35 mu
Diameter at 90%	: 44.17 mu
Mean diameter	: 20.49 mu
Fraunhofer	:
Density/Factor	-----
Specific surface	-----

Meas./Rins.	: 10/10/0
SOP : LAFARGE	

PRC #2 (Cyclonafino + BF₂ discharge), fineness 338 m²/kg





PARTICLE SIZE DISTRIBUTION

CILAS

CILAS 1064 DRY

Range : 0.30 mu - 500.00 mu / 100 Classes

Sample Ref : P.P.C GRAB 12.11 0.08
 Type produit : P.P.C
 Client : LAFARGE
 Comments :

 Operator : U.P
 Company : LAFARGE
 Location : JOJOBERA
 Date : 11/15/2006 Time : 11:31:28AM
 Index meas. : 2896

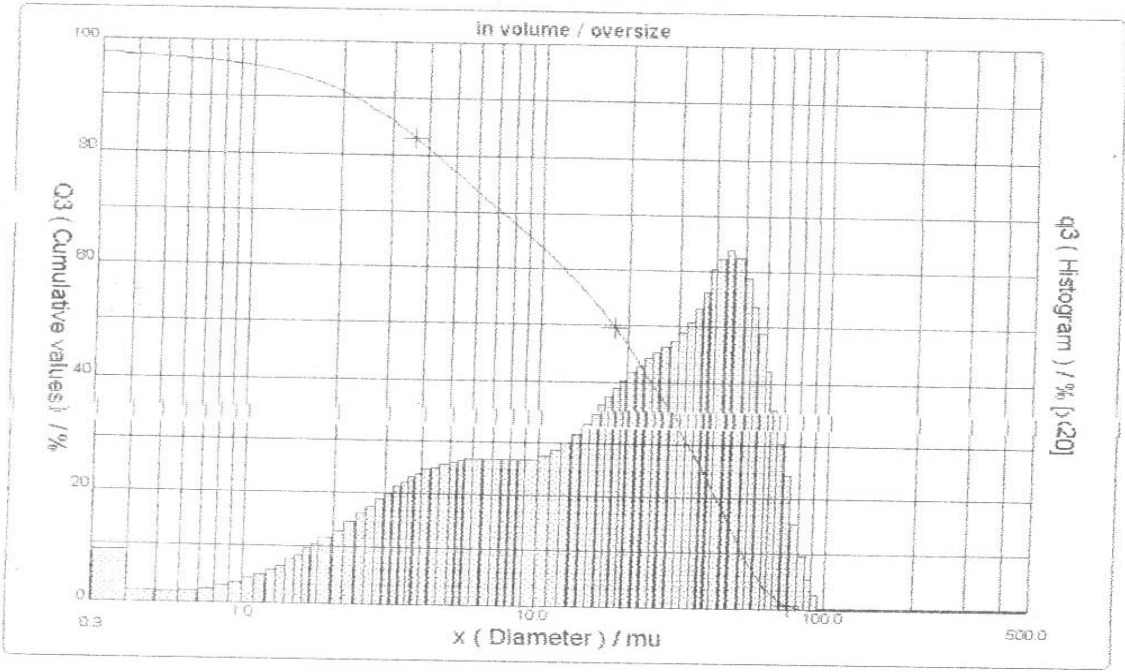
Pressure/Distributor : 888 mb / 3
 Concentration : 97
 Diameter at 10% : 51.58 mu
 Diameter at 50% : 17.73 mu
 Diameter at 90% : 2.17 mu
 Fraunhofer
 DensityFactor : -----
 Specific surface : -----
 Meas./Rins. : 60/15/0
 SOP : CEMENT

Customer defined classes

in volume / oversize

x	45.00	90.00
Q3	15.77	0.00

x : diameter / mu Q3 : cumulative value / % q3 : population density / %



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Lafarge India Pvt Limited, Jojobera Cement Plant

Quality Plan

Sl.No.	Sample	Approx. Qty	Sample collection			Test		Wef		
			Location	Frequency	Type	Who	Parameter		Who	
1	Dry/Wet Slag	1 Kg	Slag Dump hopper/Belt	Hrly	Grab		Weekly avg.	Officer	Continue	
							Hourly		% Galss content	Continue
							Weekly avg.		Surface Moisture	Continue
2	Gypsum	20 Kg	Wagon tippler circuit	Rake wise	Grab		3 Sample/ Rake		Continue	
							Weekly avg.		Full chemical	Continue
3	Fly ash	1 Kg	Fly ash feeding circuit	Daily	Grab		Once a day		Continue	
							Once a day		Chemical & R45	16.11.06
4	Clinker (Receipt)	20 Kg	Wagon tippler circuit	Placement wise	Grab		Weekly avg.		Continue	
									Full chemical & Physical	Continue
5	Clinker (Process)	1 Kg	WF discharge,- Silo wise	Shift wise	Grab		3 Sample/ Rake		Continue	
							Weekly avg.		Full chemical	Continue
6	Ground Slag	1 Kg	Screw Sampler	Hrly	Grab		Once a shift		18.10.06	
							Bihrlly		CaO & SO3 -XRF	18.10.06
7	Ground Clinker	1 Kg	Screw Sampler	Hrly	Grab		Bihrlly		13.10.06	
							Once a day		Full chemical	03.10.06
8	Mixing	1 Kg	Screw Sampler	Hrly	Grab		Bihrlly		13.10.06	
							Bihrlly		Blaine	14.10.06
							R45 μ		18.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06
							Bihrlly		Continue	
							Bihrlly		Blaine	13.10.06
							R45 μ		14.10.06	
							Once a day		Full chemical	18.10.06

Quality Plan

Sl.No.	Sample	Approx. Qty	Sample collection			Modified frequency	Test		Wef
			Location	Frequency	Type		Who	Parameter	
9	Ground - PPC1 & 2	1 Kg	Screw Sampler	Hrly	Grab	Bihrlly	Blaine	13.10.06	
						Bihrlly	R45 μ	14.10.06	
						Bihrlly	CaO & SO ₃ -XRF	18.10.06	
						Shift avg	Setting Time	Continue	
						Daily avg	Full chem & Physical	Continue	
						Weekly avg.	Full chemical	Continue	
						---	Blaine	01.01.07	
10	Loading - CTO & PSC	1 Kg	Screw Sampler	Hrly	Grab	Shift avg	Setting Time	Continue	
						Daily avg	Full chem & Physical	Continue	
						Weekly avg.	Full chemical	Continue	
						---	Blaine	01.01.07	
11	Loading - PPC	1 Kg	Packer Spout	Hrly	Grab	Shift avg	Setting Time	Continue	
						Daily avg	Full chem.& Physical	Continue	
						Weekly avg.	Full chemical	Continue	
						---	Blaine	01.01.07	
12	IQP - Loading CTO /PSC/ PPC	6 Kg	Packer Spout	Once	Grab	Shift avg	Setting Time	Continue	
						Daily avg	Full chem.& Physical	Continue	
						Weekly avg.	Full chemical	Continue	
						Once a day	IST, 3 Days	Continue	
						Once a day	Full physical & 1Day	01.09.06	
						Once a day	Full chemical	16.11.06	
						Once a week	Slump Test	11.10.06	
						Once a week	PSA	04.09.06	
Once a week	Refractance	Continue							
13	Weigh feeder accuracy	1 Kg	WF discharge / Screw Sample	Weekly	Grab	Fortnightly	CaO & SO ₃ -XRF	17.11.06	
						Mll wise & Product wise	Full chem.& Physical	Oct'06	
14	Gypsum Optimization	6 Kg	WF discharge / Screw Sample	Change in process or Historical data	Grab	Quarterly by historical data	Blaine	Oct'06	
						R45 μ	C _s O & SO ₃ -XRF		
15	Capability of Process	1 Kg	Screw Sample	Change in process or Historical data	Grab	Quarterly by historical data	Blaine	Oct'06	
						R45 μ	C _s O & SO ₃ -XRF		