DALMIA CEMENT (B) LIMITED – DALMIAPURAM PRODUCTION DEPARTMENT			
Issue No. 02	**Rev. No: 01**	**Effective Date: 22.05.2015**	**SOP/PROD/14**
Issued By: S & P		**Approved By: Head – Production**	

SOP FOR GRIND CLINKER WITH GYPSUM, WITH OR WITHOUT POZZOLANA IN CVRM

SCOPE : GRIND CLINKER WITH GYPSUM, WITH OR WITHOUT POZZOLANA IN CVRM

RESPONSIBILITY : CCR executive.

Accountability : Section Head –CVRM.

PPE:

1. Safety goggles,
2. Safety helmet,
3. Safety shoe,
4. Mask,
5. Cotton Gloves.

TOOLS:

1. Poking bar,
2. Hammer.
3. Showel

Hazard:

Risks associated:	**Mitigating Measures**
Fall of tools;	Carry the tools in tool bags
Hit of Hammer in hand;	Trained to be engaged
Hit injury while poking	Hand gloves and no one near by while poking

Procedure:

1.1 Get clearance from the W/F M/A for clinker extraction from the clinker silo and feeding the same into the clinker hopper.

1.2 Get clearance from the M/A for Gypsum / Pozzolana feeding into their respective hoppers.

1.3 Get clearance from the miller to start cement grinding and transport the same into cement silo as per W/I.

1.4 Depending upon silo level & type of cement to be ground, select silo, out of 1,2 …..13, 14A, 14B, 14C, 14D silo and ensure cement discharge to the selected silo.

- Select 561BE2 elevator if the cement discharge is to four compartment silo (14A-14D), select 58ABE1, if the cement discharge is to old silo (Silo 1,2….13)

1.5 Select the type of cement to be ground.

1.6 Depending upon the type of cement select the W/Fs to be run.

1.7 Get clearance from the electrical shift in-charge for starting CVRM B/F fan, mill and booster fan.

1.8 Start groups 511 for clinker extraction from silo and feed the clinker hopper.

1.9 Put 511 group in auto mode for automatic filling of clinker hopper.

1.10 Start group K21 for Gypsum / Pozzolana feeding into their respective hoppers.

1.11 Ensure compressor air pressure is OK i.e. comp. “Air pressure low”alarm is not appearing on the Screen permanently.

1.12 Ensure B/F Hopper bottom slide gates OP limits for all the ten hoppers are available.

- Ensure OP limits for all the ten puppet dampers are available.
- Ensure B/F fan inlet damper (561 LD1) CP limit is available.
- Start mill auxiliaries group.
- Ensure all the drives are running.
- Set the classifier shaft RPM at min 30 and ensure both master rollers 1 & 3 and slave rollers 2 & 4 are lifted and the positions of all the master and slave rollers are OK.
- Check whether OP limits for any one of the silo compartments is available i.e. OP limits for 58A RG1 & 58BD1 or 58ARG2 & 58ABD2 or 58ARG3 & 58ABD3 or 58ARG4 & 584BD4 should be available. If cement discharge is to four compartment silo (14A-14D).
- If cement discharge is to old silo (Silo 1,2…13) check and ensure that the selected silo blower is running.

- Start the cement silo infeed group.
- Ensure all the drives are running.
- Ensure dedusting B./ F fan damper 58ABD5 OP limit is available.
- Ensure all the drives are running.
- Keep stack damper 561 LD3 100% open.
- Announce in the 'PA' system that the CVRM B/F fan and booster fan are going to be started.
- Start CVRM B/F fan in SPRS or LRR mode or LRS mode.
- If the fan runs in LRS mode ensure LRS end portion is reached within 60 secs.
- If the fan runs in SPRS or LRR mode regulate the fan speed as per the requirement.
- Open the B/F fan inlet damper 561LD1 so as to create negative pressure at the mill inlet.
- Start booster fan 561FN4 or hot air generator or both to heat-up the mill.
- If hot air generator is running open hot air damper 561SH8 and close the chimney damper 561SH9 to heat up the mill.
- If booster fan is running and VRM-I is also running open 561SH2 & 561SH3 and 561LD6 & 561SH6 (1000 mm dia duct).
- Regulate the hot air volume around min 70 Km3/hr by adjusting the hot air dampers 561LD6, 561LD5 and the booster fan speed suitably.
- If booster fan is running and VRM-I is not running open 561SH4 & 561SH5 and 561LD7 & 561SH7 (1200 mm dia duct).
- Regulate the hot air volume around 150 Km3/hr by adjusting the hot air dampers 561LD7, 561LD5 and the booster fan speed.
- Ensure that the mill gets heated-up slowly or minimum 30 minutes to be taken for the mill outlet. Temp. to reach 70° C.

SOP FOR GRIND CLINKER WITH GYPSUM, WITH OR WITHOUT POZZOLANA IN CVRM

- Announce in the PA system that CVRM Mill is going to be started.
- Start the mill once the mill outlet temp. Reaches 70° C.
- Ensure that mill LRs end position is reached within 60 secs.
- Adjust B/F fan damper so as to keep the mill air flow min 380 Km3/hr for OPC & OPC 43S/53S and min. 250 Km3/Hr for pozzolana grinding.
- Start the mill feed system when the mill outlet temp. reaches 90° C.
- Ensure all the drives are running.
- If required select the key "Grinding aid pump in" and start the grinding aid pump.
- Ensure that the master rollers are lowered after 40 secs. From the 531BC3 belt material "Starvation healthy" signal.

5

- For OPC & OPC 43S/53S grinding, regulate and set the mill total feed around 100 -250 T/Hr so as to maintain mill differential pressure between 250 – 550 mmW g..
- For PPC grinding regulate and set the feed around 100 - 200 T/hr. to maintain mill DP between 350 - 550 .
- While grinding PPC, use dry fly ash depending upon the availability and inform the Miller about using dry fly ash.
- Start 531RV5 and set the required speed in the adviser
- Adjust wet fly ash feed rate to maintain the lime as per quality control plan
- Stop the dry fly ash Rotary Air Lock, when the bin is empty or PPC grinding is stopped
- Lower the slave rollers after master rollers have started lowering.
- Position the slave rollers between 65 – 200 mm so that the rpm of the rollers get maintained between 2-20 rpm.
- Air volume balancing through the mill is controlled by adjusting the recirculation damper, stack damper, fresh air damper, B/F fan inlet damper and B/F fan speed.

- Adjust the grinding pressure between 45 - 98 bar to control mill vibration, mill DP, Mill load and cement fineness.

- Adjust the classifier shaft rpm between 65 - 110 to control the cement fineness for OPC & OPC 43S/53S and 50 - 85 for PPC.

- If required to control the mill outlet temp. below 100° C water spray can be made by selecting the key "Water pump in" and keeping the delivery valve min.20% open.

- During OPC & OPC 43S/53S grinding stop booster fan once mill outlet temp. gets maintained between 76-98° C.

- Optimise the production by monitoring and controlling the operating parameters in the following range.

	For OPC & OPC 43S/53S	**For PPC**
- Mill feed rate	100-250 MT/HR	100 - 225 MT/HR.
- Mill DP	250 – 550 mm WG	350 – 550 mmWG
- Bag Filter inlet temp.	76 – 98 oC	76 – 98 o C
- Mill inlet Pr.	Min 50 mmWG	Min 50 mmWG
- B/F outlet Pr.	< 900 mmWG	< 800 mmWG
	For OPC & OPC 43S/53S	**For PPC**
- Classifier shaft RPm	65 - 110	70 - 110
- Mill total air vol.	Min 380 Km3 / Hr	Min 250 Km3/Hr
- Grinding Pressure	45 - 98 bar	45-98 bar
- Slave roller RPM	2 – 20	2 – 20

- When the operating parameters deviate beyond above said range, take corrective actions to bring it back to the operating range.

- When the mill is running in stable condition put total air vol. Loop, mill DP loop, mill inlet pressure loop, and mill outlet temp. loop in Auto,.

- Inform testing lab about mill running.
- Maintain the parameters as per Quality control plan.
- Ensure that the operating parameters are automatically logged in the system and write values manually when the automatic logging is not working.
- Record the stop and start hrs. of the mill with reasons in stoppage report.

To Divert the Cement from CVRM to Old Silo:

- Select the specific old silo in which cement to be discharged depending upon the variety of cement being ground as per the Tester instruction.
- Start the old silo infeed group after selecting the required silo and ensure that all the drives are running.
- If 561BE2 elevator is running, change over to 58ABE1 elevator by selecting 58ABE1 & 561BE2 key in CVRM group command.
- Give start command in Cement silo infeed group.
- Open 561SHA and then close 561SHB and ensure their positions accordingly.
- Select 58ABE1 elevator in group command key.
- Select the divertor (561MW1) to old silo.
- Ensure from the Miller that the cement is going to the selected silo.

Shutting down the plant (CVRM)

- Take all loop controls in manual mode open fresh air damper 100% (561LD2). If HAG is running open HAG chimney damper (561 SH9) and close hot air damper (561SH8) and then stop HAG.
- If Booster fan is running close booster fan inlet damper (561LD5) and stop the fan.
- If mill is to be stopped for 1 – 2 Hrs. stop mill feed group; in case of long stoppage of the mill stop clinker A/F and other W/Fs first and then stop the mill feed group after ensuring the conveyors are empty.

- Wait till the master & slave rollers get lifted and stop the mill.
- Close B/F fan inlet damper gradually and then stop the fan.
- Stop mill auxiliaries group.
- Stop cement transportation and silo infeed group after ensuring that they are empty.
- Inform electrical shift in-charge about mill stoppage.

Restarting the mill after tripping or after maintenance

- Get the clearance from the maintenance dept.
- Get the clearance from the W/F M/A.
- Get clearance from the Gypsum / Pozzolana belt M/A.
- Get clearance from the Miller.
- Get clearance from the electrical Shift-in-charge.
- Start the plant as per the procedure.

HAG Operation:

- Get clearance from the CVRM miller for HAG light up and hot air generator
- Get clearance from KHD Coal miller for coal extraction from coal Bin I,II or III and ensure that the blower air line and fine coal transport line from any one of the coal bins are ok.
- Ensure that HAG panel ok, oil pressure and air pressure ok signals are coming.
- Start combustion and dilution air fans and bloweStart oil pumps.
- Before lighting-up the HAG, ensure the following conditions are satisfied.

  a. 561 SH8 should be in closed condition.
  b. 561 SH9 should be in open position and
  c. Mill running or mill outlet temperature is less than 98º C.

- After ensuring all the above conditions first give stop command and then start command.

- Check and ensure that the following sequence of automatic light up of HAG is carried out after 30 seconds of start command.

    a. Pilot valve on
    b. Flame on
    c. Main valve on and
    d. Pilot valve switches off when or air valve on indication appears.

- As soon as main valve on indication comes, open the combustion air fan damper by 10% minimum.

- Once the combustion chamber temperature reaches 600º C start coal feeding to HAG from coal bin I,II or III by switching on respective screw pump and rotary air lock.

- Regulate the RPM of rotary air lock 50062 or 30072 (which ever is in circuit) if the fine coal extraction is from coal bin I.

- Regulate the RPM of rotary air lock 50066 or 561 RVM (which ever is in circuit) if the fine coal extraction is from coal bin II.

- Regulate the RPM of 60011 if the fine coal extraction is from coal bin III.

- Maintain the combustion chamber temperature below 975º C by regulating coal rotary air lock RPM, combustion air fan and dilution air fan dampers.

- Stop the oil pumps once HAG is stabilized.

- Supply hot air from HAG to CVRM by opening HAG outlet damper 561 SH8 and closing 561 SH9 (stack damper or coffee pot damper).

- Ensure that there is no black smoke – Carbon monoxide in the HAG stack.

- If black smoke is seen in the HAG stack increase the combustion air volume/reduce feed rate.

- For safety reasons the following conditions are to be satisfied for closing stack damper 561 SH9.

    a. Mill should be running.
    b. Mill fan should be running.
    c. Material feed on

    d. 561 SH8 (HAG O/L damper) in open condition
    e. B/F inlet temperature < 100º C

f. Flame on indication and
g. All HAG drives should be running.

- If flame on indication is not coming ensure that the fine coal feeding rotary air lock trips immediately and stack damper also opens simultaneously.
- If combustion chamber temperature goes above 975º C ensure that the fine coal feeding rotary air lock trips immediately.
- Ensure the half-reduction of fine coal rotary air lock RPM when the HAG chamber temperature reaches 925º C.
- Always ensure that the firefighting equipment is available in conditions at the HAG site.

Stopping the HAG:

- Stop the fine coal feeding rotary air lock.
- Stop the coal feeding screw pump after emptying.
- Open the stack damper 561 SH9.
- Close the HAG outlet damper 561 SH8.
- Run the combustion and dilution air fans with dampers opened condition till the HAG chamber temperature dips below 300º C.
- Stop the combustion and dilution fans.
- Empty the ash in HAG hopper manually.

To Transport Dry Fly Ash from DD Silo to CVRM Dry Fly Ash Storage Bin :

- Get clearance from DD Silo Machinery Attendant for extraction and pumping of Dry Fly Ash from DD Silo to CVRM Dry Fly Ash Storage Bin.
- Start Group K31 for extraction of Dry Fly Ash from DD Silo and ensure all the drives are running.
- Then start the pumping system to pump Dry Fly Ash to CVRM Dry Fly Ash Bin and monitor operation of the system.

SOP FOR GRIND CLINKER WITH GYPSUM, WITH OR WITHOUT POZZOLANA IN CVRM

Stopping Transport of Dry Fly Ash from DD Silo to CVRM Dry Fly Ash Bin :

- Stop Group K31 and ensure that all the drives stopped.
- Then stop the pumping system. Before stopping ensure that the pump is empty.

Job Safety Analysis	Job: Cement grinding	Date: 01 – 09 - 2013	Analysis by: Section Incharge	Reviewed by: Section Head
Title of employee doing job:	Supervisor: Sec.Incharge	Department: Production	Section: CVRM	Approved by: Department Head
Req'd/recommended PPE:				
Sequence of Basic Job Steps	**Potential Hazards**	**Recommended Safe Job Procedure**	**What Could Go Wrong**	**Corrective Action**
Cleaning of the Chute	pipe hit to the person	Hold the Pipe properly, if there any possible tie it one end.	Pipe may hit the person while cleaning the chute.	Hazards to be explain to the people who are working in that area by safety PP talk, tool box talk.
Inspecting the chute	Fall of the person	While inspecting the chute use safety belt and make proper approach to view the chute.	Person may fall on to the chute due to slip.	Use Proper safety belt to inspect the chute.
Cleaning spillage in aumond conveyor bottom	Showel may entrapped into conveyor	Ensure showel should not touch the conveyor while cleaning	Person may entrapped into conveyor if he hold strongly	Stop the conveyor and start the conveyor after clean the spillage materuial
Light up the HAG	Coal may flush	Ensure all doors are closed	Coal may leak because of pressurization	Maintain daft of -25 mmWC to avoid

Emergency Shut- off:

1. In case of belt is moving, Emergency pull chord switch should be activated by the person.
2. If body injury is there, First aid will be given and inform to the Safety department or Call Emergency number 233/555/9865125176/9865177444.

Records/Annexure:

1. Refer Line clearance certificates.
2. JSA as enclosed below.

HOD PRODUCTION HOD TECHNICAL