STANDARD OPERATING PROCEDURE

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SOP No:-	**CRM/TS/SOP/CGL-PRO/ 031**	**Effective Date**	**26-07-2020**		**REVISION No**	**00**
SOP DESC	**Bath Chemistry Control, Zinc Charging & Zinc Sampling**	**Section**	**CGL2**	**Rev Date**	**04-01-2023**	
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Step No.	Activity (WHAT)	Associated Requirements/Hazards/Impacts	Responsibility (WHO)	Process / tools / PPEs (HOW)	Remarks / Reference
1	Zinc Sampling	**SAFETY :** 1. Zinc Splashing due to Strip Breakage in Zinc Pot 2. Burn Injury due to Molten splash/ Zinc contact with Body 3. Falling into Molten Zinc Pot **ENVIRONMENT** **NA** **QUALITY** **NA**	Job Execution: Contractor Employee Supervision: Process Associate	**PPEs:** Safety Goggles, Safety Shoes, Safety Helmet, Fire Resistant jacket, Face shield, Leather Hand Gloves and Shin Guard. Use Ear Plugs **Tools:** Sample Collecting Tool and Mould for Creating Zinc Sample **Process:** 1. Keep the sample collector and mould in front right corner of the pot. 2. Thoroughly remove dross from the bath surface from where sample is to be collected. 3. Dip the sample collector, approx 1 feet into the molten zinc. 4. Take out the sample and pour the molten sample into the mould. 5. Allow the sample to solidify and cool properly. 6. When sample is solidified, pour some water to cool it further for handling. 7. Take out the sample from mould. 8. Get the sample ID created and then sent to lab.	1. Beware of the 6 directional hazards Galvalibs to be used for Zn chemistry, if not working, sampling is to be done or else for calibration requirement. Sampling to be till stabilization of GALVALIBS

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2	Bath Chemistry Control	**SAFETY :** NA **ENVIRONMENT** **NA** **QUALITY** Zinc Coating Quality as per requirement Different Zn requirements for GA/ZS	Job Execution: Process Associate	**PPEs:** NA Following types of Zinc Ingots can be used in CGL2 Zinc Pot: SHG Zinc (99.995% Zinc) CGG (0.5% Al pre - alloyed zinc ingot) ZN-Al 5% ingot containing 5% Al Bath Chemistry to be maintained are as follows: **ZS:** Effective Al: 0.185% LCL: 0.1709% UCL: 0.1933% Mean: 0.1821% **GA:** Effective Al: 0.1220% LCL: 0.1110% UCL: 0.1340% Mean: 0.1227% **Process:** 1. There are different pot chemistries which are maintained for different product mix, (as mentioned above). These chemistries have to be maintained by the addition of above-mentioned ingots with different combinations. 3. At the beginning of shift, operator prepares the ACPM model for shift, enters the Al value of last coil of previous shift, makes the charging schedule as per requirement and instructs the fork lift operator. 4. Level to be maintained between 201 to 206 t (Visual estimation). 5. The decision of correction is taken by the Pot Operator or Shift-Incharge based upon the lab results of the sample and campaign using the ACPM model.	

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6. Necessary communications in this regard are put in process logbook.
7. Our Zn charging mechanism can't take more than 1+3 combination, so accordingly decision is taken between SHG, CGG, and 5% Al ingots.
8. Whenever the bath result is doubtful or is out of range (above or below UCL and LCL value), take necessary correction and extra sample must be sent to lab for cross verification

Till the lab give result, continue charging as per the campaign.

10. Bulk Charging of Al to be done in ZS to bring the Bath Fe% Down to 150 ppm range as per instruction of Line manager in consultation with TG.
11. During GA operation, Ramp Up and Run Down, 2 samples to be send per shift. (One at beginning and one in middle of shift).

Al Run Down Pre GA:

Al in bath is to be reduced in ZS pot before the commencement of GA campaign as per the guidance of line managers. Below are the steps:

1. Time of starting the run down is to be decided by line managers. (Normally 4 shifts before shutdown).
2. Rundown plan is prepared based on the predicted coil schedule given by planning.
3. Stop charging any Al in the bath during rundown.
4. Frequent drossing of pot to be done during the

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period of rundown.

5. Two bath samples in shift is to be sent to lab during rundown.

Coils of less critical surface quality should be taken in schedule during rundown.

Al Ramp Up Post GA:

Al in bath is to be increased in ZS pot after the completion of GA campaign as per the guidance of line managers. A minimum of 120 pieces of Al is charged in bunch of 8 Al ingots in one shot.

Below are the steps:

1. Time of starting the ramp up is to be decided by line managers. (Normally immediately after the last coil of GA campaign).
2. Keep the pot level low towards the end of GA coils to facilitate quick charging of Al.
3. Get complete drossing behind the snout done before starting Al ramp up.
4. Start charging Al blocks of 8 ingots as soon as last GA coil ends.
5. Complete the charging of 120 pieces as quickly as possible maintaining the bath level.
6. Coils of less critical surface quality should be taken in schedule during ramp up.

Frequent drossing of pot to be done during ramp up as there will be more top dross.

8. After around 24 hours, charge the another 32 pieces.
9. Send two samples in each shift during ramp up process.

				10. If Eff Al / Fe does not come in normal operating range, line manager to decide on further addition plan on discussion with TG Team. 11. Less Critical Surface Quality TDC Coils of ZS to be taken in Schedule during Ramp Up.	
3	Loading & Charging of Zn/Al Alloy Ingots in Zinc Pot	SAFETY: 1. Injury due to falling of ingot from height (while forklift handling) 2. Injury due to collision with forklift 3. Liquid Metal explosion during ingot charging 4. Injury due to toppling of Forklift 5. Falling of ingot from the cradle, causing equipment damage **ENVIRONMENT** **NA** **QUALITY** Charging to be done skillfully to avoid excess dross formation		PPEs: Safety Helmet, Safety Goggles, Shin Guard and Safety Shoes to be used. Use Fire Retardent Jacket, Leather Hand Gloves and Ear Plugs Procedure: 1. Check the Forklift Condition as per the Inspection Checklist; Proceed for Zinc Charging only if found Ok. In case of abnormality inform Shift Incharge/ Process Associate 2. No person should stand beside ingots, when Forklift is in operation 3. If Ok then Get the "Ingot charging details" from the CGL#2 Process pulpit in the starting of the shift : i) Ingot type ii) Time of charging 4. Communicate to process pulpit before going to charge the Ingot 5. Go to the storage location of the required ingots to be charged	

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				6. Record the weight of the charging ingot/ ingots in the "pot charging schedule". 7. Lift the ingot/ ingots from the storage location with the help of Fork lift.Take the ingot/ ingots, with the help of Fork lift, to the Air cleaning location. Open the Air cleaning valve, holding the air pipe at one end. Clean the top surface of the ingot/ ingots with the help of Air cleaning pipe, until all the dust and water is removed from the surface. 9. Take the ingot/ ingots to the charging cradle location near Zinc pot, with the help of forklift. 10. Unload the ingot/ ingots on to the charging cradle, which is removed from the Zinc pot already. 11. After unloading the ingot/ ingots, take the forklift to its parking place - away from the zinc pot area. 12. From Forklift parking area, come to the operating panel near Zinc pot Open the barricading door such that it should cover the operating panel, while operator is using the panel. Charge the ingot/ ingots along with the cradle in to the pot, through following	

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				operations from the operating panel i) Lift the cradle up, using the UP pushbutton ii) Move the cradle forward, using Forward push button, till the cradle completely moves over the pot iii) Lower the cradle, using downward push button, till it is half submerged in the pot 14. Remove the other submerged cradle from the Zinc pot using following operations i) Lift the submerged cradle up, using upward push button untill the bottom part of cradle comes out of the pot ii) Wait for 5 Minutes, till the molten zinc solidifies on the cradle iii) Move the cradle backward, using backward push button.	

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