

PROCESS CONTROL PLAN												
Description EG LINE	Effective Date: DRAFT January 9, 2001		Control Plan No. CP50	Quality System Representative			V-P Manufacturing			Plant Superintendent		
Plant			Industrial Code	Quality Assurance Manager			Maintenance Manager			Manager, Chemical Process Engineering		
Oper. Ref. No.	Process Operation Description	Equipment, Tools, Fixtures for Operation	Characteristics		Critical Char. < >	Responsibility	Procedure					
			Product	Process			Product/Process Specification & Tolerance Range	Evaluation Measurement Technique	Sample		Control Method and Record	Reaction Plan
									Size	Frequency		
0	PRE-START-UP	Line (incl. upper level), console, service building, power bank		All items on checklist		Maintenance personnel	All checks and activities to be completed	EGL-009	Once	Each week, before starting the Line	Checklist (Form #XXX)	Do not start Line
0	START-UP	Line and console		All items on checklist		EGL Operators	All checks and activities to be completed	EGL-009	Once	Before each production run	Checklist (Form #XXX)	Do not start production run
1	Retrieve coil		Identification			Crane Operator and Hookman	Coil number	Verification	Each coil	Before processing	Cross-check with Entry Payoff	Notify Supervisor. Do not run coil. Tag coil as nonconforming; complete a NC Report. Segregate coil if applicable
2	Weigh coil	Overhead crane Weigh scale	Coil weight			Hookman and Entry Operator		Verification	Each coil	Before processing	Record weight on Entry Payoff; check against ?	Notify Supervisor. Do not run coil. Tag coil as nonconforming; complete a NC Report. Segregate coil if applicable
3	Measure coil width	Tape measure	Strip width			Entry Operator	EGL-002 and GEN-E10-011 Figures 4 & 5	Tape measure	Each coil	OD, (outer lap?) before processing	Record width on Entry Payoff Check against ?	Notify Supervisor. Do not run coil. Tag coil as nonconforming; complete a NC Report. Segregate coil if applicable

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4	Load coil on Line	Coil transfer buggy				Entry Operator						
5	Measure coil gauge	Uncoiler	Strip gauge			Entry Operator	GEN-E10-011	0 - 1" Micrometer (ensure gauge is verified at start of shift; refer to LAB-E11-045)	Each coil	ID & OD (inner & outer laps?) before processing		Notify Supervisor. Do not run coil. Tag coil as nonconforming; complete a NC Report. Segregate coil if applicable
6	Test metal hardness <i>(before or after processing??)</i>	Rockwell	Hardness				As specified on Line Spec	LAB-E10-035 (ensure gauge is verified at start of week; refer to LAB-E11-045)	Each coil	As requested	EG Line Quality Report	Notify Supervisor. Do not run coil. Tag coil as nonconforming; complete a NC Report. Segregate coil if applicable
7	Join coil to previous coil	Spot welders Stitchers?		Quality of weld		Entry Operator	50 welds	Counter		Every stitch		Change tips
8	Entry inspection	Uncoiler	Metal shape & Surface Condition			Entry Operator	As per Shop Order requirements and standard inspection criteria for substrate nonconformances	Visual	Each coil	Continuously as it is unwound	Compare to Shop Order requirements and QAP-E12-003	Notify Supervisor. Stop running coil. Tag coil as nonconforming; complete a NC Report. Segregate coil if applicable
9	Stage IA, Pre-wet			Temperature		Chemical Tester	>130 °F	EGL-E9-008	Once	Every 3 hours	Control chart C100	Refer to flowchart for EG Line control charts RP#50
	Stage IA, Pre-wet			Pressure		Chemical Tester	Spec????	Pressure gauge	Once	Every 3 hours		Reaction???
10	Stage IB, Brush Scrubber					Chemical Tester	On or Off, as specified (SPP?)					

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11	Stage II, Electrocleaner			Temperature		Chemical Tester	>160 °F	EGL-E9-008	Once	Every 3 hours	Control chart C101	Refer to flowchart for EG Line control charts RP#51
	Stage II, Electrocleaner			Concentration		Chemical Tester	20-22 points	EGL-E9-008	Once	Every 3 hours	Control chart C102	Refer to flowchart for EG Line control charts RP#52
	Stage II, Electrocleaner			Ratio TA/FA		Chemical Tester	<1.55	EGL-E9-008	Once	Every 3 hours	Control chart C103	Refer to flowchart for EG Line control charts Refer to RP#52
	Stage II, Electrocleaner			Current		Console Operator	5,000-10,000 Amps	Visual, meter at console display				
12	Stage III, Alkali Cleaner Rinses			Temperature		Chemical Tester	120°F°	EGL-E9-008				
	Stage III, Alkali Cleaner Rinses			Concentration		Chemical Tester		EGL-E9-008				
	Stage III, Alkali Cleaner Rinses			pH		Chemical Tester	9 - 11.2	pH meter as per EGL-E9-008		Once per shift	Log (Form: chemtesteg)	RP #56, only (do no follow flowchart)
13	Stage IV, Acid Electro-Pickle			Temperature		Chemical Tester	Ambient to 165°F					
	Stage IV, Acid Electro-Pickle			Concentration		Chemical Tester	3-5% w/ sulfuric acid	EGL-E9-008		Every 3 hours	control chart???	Refer to flowchart for EG Line control charts RP#53
							Max. 8% w/ iron			Iron, once per shift	Control chart C104	
	Stage IV OIL SKIMMING											
	Stage IV, Acid Electro-Pickle			Current		Console Operator	5,000-8,000 Amps	Visual, meter at console display				

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14	Stage V, Acid Electro-Pickle Rinse			Temperature		Chemical Tester	Ambient	EGL-E9-008				
	Stage V, Acid Electro-Pickle Rinse			Concentration		Chemical Tester	TBD			Not checked unless a problem observed		
	Stage V Water addition to Overflow					Chemical Tester	Fresh water make-up from #2 plating rinse			Not checked unless a problem observed		
	Stage V Misting Spray											
15	Stage VI, Plating Cells Bi-Polar & Plating Cells (7 Cells Total)			Temperature		Chemical Tester	Ambient (or 70 -165?)			Every 3 hours?	Log (Form: chemtesteg)	
	Stage VI, Plating Cells Bi-Polar & Plating Cells (7 Cells Total)			Concentration		Chemical Tester	10-12 oz./gallon zinc  6-8 oz./gallon sodium sulfate	EGL-E9-008		Zn every 3 hours. Sodium sulfate done once/mo. by outside analysis	Control chart C105	Refer to flowchart for EG Line control charts RP#54
	Stage VI, Plating Cells Bi-Polar & Plating Cells (7 Cells Total)			pH		Chemical Tester	1.1-1.6	pH meter as per EGL-E9-008		Every 3 hours	Control chart C106	Refer to flowchart for EG Line control charts RP#55
	Stage VI, Plating Cells Bi-Polar & Plating Cells (7 Cells Total)			Current		Console Operator	50,000-64,000 amps top, 50,000-64,000 amps bottom	Visual, meter at console display				

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16	Stage VII, #1 Plating Rinse			Temperature		Chemical Tester	Ambient					
	Stage VII OVERFLOW					Chemical Tester	Water feed at 2 US GPM from #2 plating solution					
	Stage VII DUMPING					Contracted out	Once per Week					
17	Stage VIII, #2 Plating Rinse			Temperature		Chemical Tester	Ambient					
	Stage VIII OVERFLOW DI water feed on level control					Chemical Tester	Water feed at 2 US GPM through flow control orifice on spray header line.					
	Stage VIII DUMPING						Once per Week					
18	Conductor roll rinse	Spray nozzles	Staining Dimples Cr build up					Visual				
	Conductor roll rinse	Spray nozzles		pH		Chemical Tester	1.8 - 2.3	pH meter		Once per shift	Control chart C107 Control of acidification by injection	Refer to flowchart for EG Line control charts RP# ?

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Zinc Phosphating (If required)												
19	Stage IX, Zinc Phosphate pretreatment hot water Rinse			Temperature		Chemical Tester	100-110 °F			Every 3 hours	Increase or decrease feed rate on chemical pump	
	Stage IX, Zinc Phosphate pretreatment hot water Rinse			Concentration		Chemical Tester	pH >8.5	EGL-015 pH meter		Every 3 hours	Overflow set manually	
	Stage IX, Zinc Phosphate pretreatment hot water Rinse					Chemical Tester				Every 3 hours and after each run?		
20	Stage X, Zinc Phosphate treatment			Temperature for high coating wt.		Chemical Tester	150-160 °F			Every 3 hours	Control chart C108	Refer to flowchart for EG Line control charts RP#57
	Stage X, Zinc Phosphate treatment			Temperature for low coating wt.		Chemical Tester	130-140 °F			Every 3 hours	Control chart C109	
	Stage X, Zinc Phosphate treatment			Concentration for high coating weight		Chemical Tester	Free Acid 2-4 points	EGL-015		Every 3 hours	Control chart C110	Refer to flowchart for EG Line control charts RP#58
	Stage X, Zinc Phosphate treatment			Concentration for low coating weight		Chemical Tester	Free Acid 1-2 points	EGL-015		Every 3 hours	Control chart C111	
	Stage X, Zinc Phosphate treatment			Ratio TA/FA for high coatwt.		Chemical Tester	6-9			Every 3 hours	Control chart C112	Refer to flowchart for EG Line control charts and to RP#58
	Stage X, Zinc Phosphate treatment			Ratio TA/FA for low coatwt.		Chemical Tester	8-15			Every 3 hours	Control chart C113	
21	Stage X, Zinc Phosphate treatment		Coating Weight High Range			Senior Operator	120-175 mg/ft.²			Every 3 hours	Control chart C114	Refer to flowchart for EG Line control charts RP# ?
	Stage X, Zinc Phosphate treatment		Coating Weight Low Range			Senior Operator	70-140 mg/ft.²			Every 3 hours	Control chart C115	
	Stage X DUMPING					Senior Operator				Once/yr or when bath badly nated with sludge		
22	Stage XI, Water Rinse			Temperature		Chemical Tester	Ambient					
	Stage XI, Water Rinse			Contamination		Chemical Tester					Open Manual valve	

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Passivation (If required)												
23	Stage XII, Dilute Passivation Treatment			Temperature		Chemical Tester	110-140 °F			Every 3 hours	LOG ?	
	Stage XII, Dilute PassivationTreatment			P62 Conc.		Chemical Tester	Total Acid 8-12 points	EGL-015		Every 3 hours	Control chart C116	Refer to flowchart for EG Line control charts RP#59
	Stage XII, Dilute PassivationTreatment			P62 pH		Chemical Tester	1.8 - 3.5			Every 3 hours	Control chart C117	Refer to flowchart for EG Line control charts RP# ?
	Stage XII, Dilute Passivation Treatment			Conductivity		Chemical Tester		EGL-015		Every 3 hours		
Passivation via Dry-in-Place Application (If required)												
24	Stage XII		Coating Weight			Senior Operator	1.5 - 2.5 mg/ft²			Every 3 hours	Control charts C119 & C120	Refer to flowchart for EG Line control charts RP#60
25	Stage XIII, Dry	Strip Dryer				Console Operator		Visual		As required to dry strip	Controlled manually either on or off	
26	Product Sampling  Cut samples for testing AND for retain samples	Cutters				Senior Operator		QAP-E10-002	12" x width	For G-designated coatings: Head of first coil & tail of every coil For other coatings tail of every coil	Identify each sample with coil no. & WO# on bottom W side. Store retain samples from first & last coil of each WO in rack behind console, for not less than ????	
27	Remove stitch					Console Operator				When present		
28	Recoil	Exit Recoiler				Console	EGL-016					

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						Operator						
29	Inspection		Appearance of processed strip			Console Operator	As per Shop Order requirements and standard inspection criteria ?? for EG nonconformances	Visual	Each coil	Stop recoiler periodically to inspect entire length	Compare to Shop Order requirements and QAP-E12-003	Notify Supervisor Tag coil as nonconforming; complete a NC Report. Segregate, as required



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Oil Strip (If required)												
30	Stage XIV, Oil application	Recoiler hold-down roll, Feed pump	Oil film			Senior Operator	EGL-001	Visually EGL-001	Each coil		potentiometer	
Handling and Testing of Finished Coils												
31	Remove coil from mandrel					Console Operator						
32	Determine Zn coating weight if applicable	Analytical balance	Coating weight			Senior Operator, if G designation Otherwise, Console Operator	EGL-003 or EGL-009	Weigh/Strip/Weigh LAB-003	Each side: average triple spot (E,C,E)	As per Product Sampling Plan	Record in DG/MIS (QC Report?)	Retest 2 samples from same lot. If either test fails, notify Supervisor and tag coil as nonconforming; complete a NC Report. Segregate, as required Re-sample next coil. Stop production if necessary
33	Test Zn adhesion ??		Adhesion			Senior Operator, if G designation Otherwise, Console Operator		Olsen Test / Tape-off LAB-034	Coil OD	First pass: 1st & 4th coil 2nd & 3rd pass: every coil (refer to QAP-E10-002)	Record in DG/MIS (QC Report?)	As above
34	Determine Zinc Phosphate coating weight if applicable	Analytical balance	Coating weight			Senior Operator		(ensure gauge is verified as per LAB-E11-045)		Each coil when applied		
35	Determine Cr coating weight if applicable	Portaspec	Coating weight			Senior Operator	EGL-029	EGL-029		A few times a shift	EGL-029	
36	Apply paper to top of coil		Packaging			Entry and Console  Operator	Send to Material Handling if packaging requirements specified					
						Entry and						

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37	Band Coil		Banding			Console Operator						
38	Weigh coil	Overhead crane electronic scale	Coil weight			Console Operator		Weigh scale			Record in DG/MIS Print coil tag.	If a nonconformance is noted, a Problem Report??? is generated and the discrepancy described.