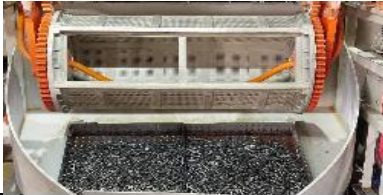

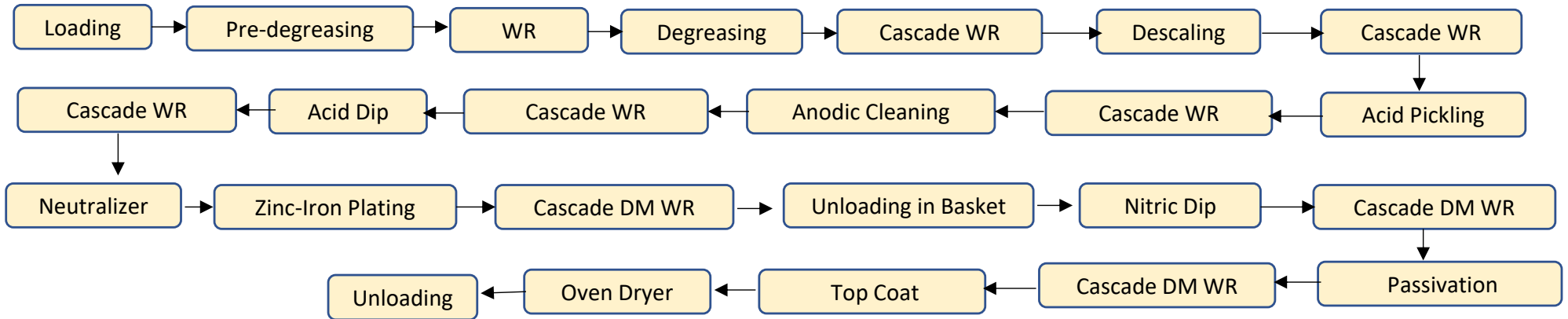


Process & Product Validation Report

Part Name:- 9 MM Ancor Pin		Part Code:- B2TD006260		Model:-	
Vendor Name :- M/s Metaforge Engg Pvt Ltd, Nasik			ST Vendor-M/s Metaforge Engg Pvt Ltd Nasik		
Plating Process:- Zinc-Iron Black passivation		Trial Date:-		29.04.2022	
		Testing Start Date:-		29.04.2022	
Empty Barrel		Loaded Barrel		Part After Plating	
				50 Kg	

Zinc Plating Ref- ABS00010;	
Process Flow - Fasteners & Small F&M Parts	

Loading on Barrels + Pre-treatment+ Zn-Iron Plating+ Unloading on Bucket + Dipping on DM Water Tank+Passivation+ Top Coat + Oven Dryer [Batch Oven]



Process Parameter of Zn Iron Plating as per Control Plan:

Process	Parameter	Specification	Measuring Method	Observation	Result
Pre-Degreasing Unisole NE	Bath Temp	55-70 deg C	Thermometer	67.4 °C	OK
	Conc	60 -70 g/L	Titration Method	70.3 g/l	OK
	Oil Content	<4 g/L	Titration Method	2 g/l	OK
	Time	8 min	Stop Watch	8 min	OK
Degreasing - Super Soak	Temp	60-80 deg C	Thermometer	71°C	OK
	Conc	60-70 g/L	Titration Method	66.12 g/l	OK
	Time	8 min	Stop Watch	8 min	OK
Descaling - Unisole NE	Conc	60-80 g/L	Titration Method	65.2 g/l	OK
	Temp	60-90 deg C	Thermometer	84.9 °C	OK
	Time	8 min	Stop Watch	8 min	OK
Acid Pickling - HCl	Conc	20-40%	Titration Method	35%	OK
	Time	30 sec	Stop Watch	30 sec	OK
Anodic Cleaning- Unisole NE	Temp	60-90 deg C	Thermometer	81.8 °C	OK
	Time	8 min	Stop Watch	5 min	OK
	Current Density	0.5 sqdm	Digital Display	0.5 sqdm	OK
	Conc	60-70 g/L	Titration Method	66.98 g/l	OK
Acid Dip- HCl	Conc	5-10 %	Titration Method	6%	OK
	Time	1 min	Stop Watch	1 min	OK
Neutralizer- NaOH	Conc	50-100 g/L	Titration Method	99 g/l	OK
	Time	1 min	Stop Watch	1 min	OK
Alkaline Zn-Iron Plating	Zn Metal	10-14 g/L	Titration Method	13.69 g/l	OK
	NaOH	120-140 g/L	Titration Method	130.2 g/l	OK
	Temp	20 -30 deg C	Thermometer	23.7 °C	OK
	Current Density	0.5-1 sq dm	Digital Display	450 amp	OK
	Voltage	8-12V	Digital Display	10 V	OK

Nitric Dip	Ph	1 to 2	Online pH meter	1	OK
	Conc	0.5 -1%	Titration Method	0.86%	OK
Black Passivation	Conc	230 -250 ml/L	Titration Method	247 ml/lit	OK
	Temp	Room Temp	Thermometer	Room Temp	OK
	Dosing Chemical	1.5-2.0 ml/Kg	Manually	2.0 ml/Kg	OK
	Ph	2.2 -2.6	Online pH meter	2	OK
	Time	20-40 sec	Timer	30 sec	OK
Top Coat Trivalent Black	Ph	8.5 - 9.5	Online pH meter	8.8	OK
	Zinthium 302	100-250ml/L	Manually		
	Finigard	200-350 ml/L	Manually		
	Time	10 sec	Stop Watch	10 sec	OK
	Solid Content	4 - 6 %	Lab Oven Method	5.30%	OK
	Temp	Room Temp	Thermometer	Room Temp	OK
Oven Drying	Temp	80-120 °C	Thermometer	100 °C	OK
	Time	10-20 min	Timer	10 min	OK

Product Validation as per ABS00010 [Rev03]

Parameter	Specification	Fe/Zn-Fe Black		
Visual Appearance- Fe/Zn	As per ABS00010	Uniform Smooth Black		
Plating Thickness	8 ~12 Micron	9.1, 8.6, 8.8, 9.5, 9.0		
Salt Spray Test	192 Hrs WR & 600 Hrs RR	In Process		

M/s Metaforge Engg Pvt Ltd

Mr. Adarsh Aher
Mr. Yogesh Kulkarni
Ms. Alpana Lonare