



CONTROL PLAN

<input type="checkbox"/> Prototype	<input type="checkbox"/> Pre-launch	<input checked="" type="checkbox"/> Production	Key Contact / Phone :	Udham Singh / 9729202173 udham.singh@sssprings.com	Control plan Date	Rev.no	Change Details
Control Plan Number :	Control Plan Number : CP/ ETL/005				14.08.2019	00	Originated
Part Number / Latest Change Level :	FIGN011020/XC		Core Team :	Mr.Shashank,Mr.Chandrasekhar, Mr.Manikant,Mr.Yash,Mr.Paresh, Mr. Maheshwar, Mr.Parmanand	16.03.2020	01	At shotpeening process Batch qty fixed as 300-400 Nos & 100% Bend checking added at OP 60.
Part Name / Description :	Main Spring (K86A)				10.07.2020	02	Length group sorting and process parameter added in grinding Shotpeening time reduced from 20 Min to 5 Minute and outer dia changed as per customer requirements.
Supplier / Plant : SS&S - HALOL	Customer :	Endurance Technologies Ltd.	Supplier / Plant Approval / Date		07-04-2021	03	Bend checking gauge implemented at 100% inspection process at OP60 against customer complain
					18.06.2021	04	Testing Frequency & Reaction Plan updated for the error proofing established at tempering process
					12-02-2022	05	Bend checking gauge implemented at 100% inspection process at OP60 against customer complain
					04-04-2022	06	Verification of length gauge by master sample once in a shift.
			Other Approval / Date (if Req'd)		(if -----)	Customer Quality Approval / Date (if Req'd)	

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Part / Process No.	Process Name / Operation Description	Machine, Device, Jig Tools for Mfg.	Characteristics				Methods		Evaluation / Measurement Technique	Sample		Control Method & Error Proofing	Responsibility & Record	Reaction Plan & Corrective action
			No.	Product	Process	Special Char. Class	Product/Process Specification/Tolerance as per drg	Stage specification of Product / Process parameters		Size	Freq.			
5	Receipt & Inspection of raw material	-----	1	Diameter of the wire	-----	-----	3.2±0.030mm	3.2±0.030mm	Verification of Sup.TC /Insp. report , DC and Identn tag	Once	Every Lot	Verification during Receipt	Stores Incharge, Goods Receipt Note / SAP	
			2	Grade	-----	-----	IS 4454 GR-III	IS 4454 DH						
			3	Mechanical properties	-----	-----	IS 4454 DH	Tensile strength / Chemistry	As per Sampling Plan QS - WI - 100	Incoming Inspection & Cross verification	Quality Inspector, Inward inspection record Supplier TC			
			4	Diameter of the wire	-----	-----	3.2±0.030mm	3.2±0.030mm				Micrometer		
	Visual	-----	5	Appearance	-----	-----	Should be free from Oiled,Rust and Damage	Should be free from Oiled,Rust and Damage	Visual					
	Storage of materials	-----	1	Appearance	-----	-----	-----	Should be free from Rust and Damage and to be Stacked in the allocated & identified racks with proper packing & Identification tag	Visual Verification	Once	Every week	Cross verification	Stores Incharge	
10	Winding RH	Winding machine TK-550	1	Wire diameter	-----	-----	3.2±0.030mm	3.2±0.030mm	Micrometer	Once	Every setup	First Sample approval	operator MF-FR-001A/02	Follow 4M change cum abnormality handling matrix
			2	Outer Diameter Bigger side	-----	-----	23.3 ± 0.2 mm	23.30 - 23.50	Vernier caliper	2 nos	Every setup & 30 Minutes	First Sample approval & PMC	Operator MF-FR-001A/02 MF-FR-005 - REV-02	
			4	Outer Diameter taper Side	-----	-----	20.5+ 0.3 mm	21.8-22.2	Vernier Caliper					
			5	Free Length	-----	-----	215.4 + 4.0 / 0.0 mm	221 - 225.5	Vernier caliper / Length Gauge					
			6	Total coils	-----	-----	33.9 ref	33.30-33.60	Manual Count	2 Nos	Every setup	First Sample approval	Operator MF-FR-001A/02	
			7	Appearance	-----	-----	Free from Tool mark,Burr,breakage	Free from Tool mark,Burr,breakage	Visual					
			8	Coil Direction	-----	-----	RH	RH	Visual	2 Nos	Every setup	First Sample approval	Operator MF-FR-001A/02	
			9	Deflection @ 20.0 mm	-----	-----	82.4± 7% N	8.39± 7% Kgf	Elasticometer					
				Deflection @ 40.0 mm	-----	-----	164.8 ± 7% N	16.79± 7% Kgf	Elasticometer					
				Deflection @ 60.0 mm	-----	-----	247.2 ± 7% N	25.19± 7% Kgf	Elasticometer					
				Deflection @ 72.5 mm	-----	-----	298.7N	30.44Kgf	Elasticometer					
				Deflection @ 85.0 mm	-----	-----	396.8 ± 7% N	40.44± 7% Kgf	Elasticometer					
Deflection @ 95.0 mm	-----	-----		475.3 ± 7% N	48.45± 7% Kgf	Elasticometer								
10	Spring rate K1	-----	-----	4.12±7% N/mm	0.41±7% Kg/mm	Elasticometer	once	Every Setup	First sample approval					
11	Spring rate K2	-----	-----	7.85±7% N/mm	0.80±7% Kg/mm	Elasticometer								
12	-----	-----	Program No.	-----	-----	13	13	Visual	once	Every Setup	First sample approval			



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Part / Process No.	Process Name / Operation Description	Machine, Device, Jig Tools for Mfg.	Characteristics			Special Char. Class	Methods		Evaluation / Measurement Technique	Sample		Control Method & Error Proofing	Responsibility & Record	Reaction Plan & Corrective action	
			No.	Product	Process		Product/Process Specification/Tolerance as per drg	Stage specification of Product / Process parameters		Size	Freq.				
			13	Feed roller pressure		0.4 to 0.6 Mpa	0.4 to 0.6 Mpa	Visual	once	Every Shift	DPM Check sheet	Operator MF-FR-018		



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20	Stress Relieving	Stress relieving Furnace	1	-----	Temperature	-----	-----	280°-320°C	Temperature Indicator	Once	Once in shift	Verify Temperature daily during shift start.	operator MF-FR-018	
			2	-----	Duration	-----	-----	10 ' Min	Timer			Verification at setup	operator MF-FR-001A/02 MF-FR-10D	
			3	Outer Diameter Bigger side	-----	-----	23.3 ± 0.2 mm	23.1-23.3	Vernier/Bush gauge	2Nos	Every setup & 30 Minutes	First Sample approval & PMC	Operator (MF-FR-052A) & PMC (MF-FR-005A - Rev - 02)	
			4	Outer Diameter taper Side	-----	-----	22.2 ± 0.2 mm	21.6-22.0	Vernier/Bush gauge					
30	Grinding	Grinding M/C SGM 12-2,3,4	1	Free Length	-----	-----	215.4 + 4.0 / 0.0 mm	217 - 222	Vernier/Height gauge	2 nos	Every setup & 30 Minutes	First Sample approval & PMC	Operator (MF-FR-052A) & PMC (MF-FR-005A - Rev - 02)	Follow 4M change cum abnormality handling matrix
			2	Ends types	-----	-----	Squared & Ground	Squared & Ground	Visual					
			3	Squareness (e1)	-----	-----	6.5mm Max	6.5mm Max	Angle block/Filler gauge					
			4	Appearance	-----	-----	Free from Burr,dent,breakage,damage & End coil damage	Free from Burr,dent,breakage,damage & End coil damage	Visual	5 Nos	Every Shift	First Sample approval	Operator (MF-FR-052A)	
			5	Parallelism (e2)	-----	-----	0.50mm Max	0.50mm Max	Dial Gauge/Surface plate					
			6	Tipthickness	-----	-----	0.80 mm Min	0.80 mm Min	Digital caliper					
			7	Solid height	-----	-----	108.6 mm	108.6 mm	Elasticometer		Every 4 hour.	-----	Operator, PMC (MF-FR-005 A-Re-02)	
			8	-----	Dressing of wheels	-----	-----	Wheel Dresser	----					
			9	-----	Dresser Unit	-----	-----	Check for free movement	By hand Visual	Once	Every Shift	DPM Check sheet	Operator (MF-FR-018)	
			10	-----	Dust Collector	-----	-----	Check dust Extraction systems.	Visual					
			11	-----	Gap b/w grinding wheel & Guide plate < 5.0 mm	-----	-----	< 5.0 mm	Feeler Gauge					
			12	-----	Before grinding Position	-----	-----	225-305mm	Visual	Once	Every Shift	First Sample approval	Operator First sample report (MF-FR-052A)	
			13	-----	Before grinding Spring Length	-----	-----	223-303mm	Visual					
			14	-----	Grinding Feed Speed	-----	-----	1.2-1.6m/min	Visual					
			15	-----	Finish Grinding time	-----	-----	60-120 Sec.	Visual					
			16	-----	Total time of cycle	-----	-----	125-210 Sec	Visual					



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			No.	Product	Process	Product/Process Specification/Tolerance as per drg		Stage specification of Product / Process parameters	Size		Freq.				
			17	-----	Magazine Plate Speed	-----	-----	25-30 RPM	Visual						
			18	Length group Sorting before grinding-1	-----	-----	-----	221-222.5mm	Length Gauge	100%	Every Shift	----	Operator		
			19	Length group Sorting before grinding-2	-----	-----	-----	222.51-224mm	Length Gauge						



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			20	Length group Sorting before grinding-3				224.1-225.5mm	Length Gauge						
40	Shot peening	Shot Peening Machine (SP-02,03,04)	1	-----	Shot Size	-----	-----	0.60 mm	Profile projector/Micrometer	Once	Every Batch	-----	Quality inspector	Operator Shotpeening record MF-FR-10F	
			2	-----	Arc height	-----	-----	0.3 - 0.38	Almen Dial Gauge		Every week	Checked with Almen strip			
			3	-----	Duration	-----	-----	5 Minutes min.	Timer		Every Batch	First sample @ stage between process			
			4	Coverage	-----	-----	90% Min	95 % (minimum)	Comparison with Sid Photograph						
			5	-----	Amperage	-----	-----	12-15 amp	12-15 amp		Visual	Once In Quarter	R & D and XRD logbook.		
			6	Residual Stress Check	-----	-----	-100 to -1000 Mpa	-----	XRD						
			7	Sieveing	-----	-----	-----	-----	Sieve Analyser		Once in 48 hours	Operator (PMC board)			
			8	-----	Batch Qty.	-----	-----	-----	300-400 Nos		Count	100%	Every Batch		Process inspection
50	Scragging	Hydraulic press	1	-----	Setting Height	-----	130 mm	130 mm	-----	Once	Every Batch	First Sample Approval	Operator		
			2	-----	Bend	-----	No Bend	No Bend	Visual						
60	100% Lo,OD,e1 & bend sorting and correction	Manual	1	Free Length	-----	-----	215.4 + 4.0 / 0.0 mm	215.4 + 4.0 / 0.0 mm	Length Gauge	100%	Evey batch	First Sample Approval	Quality inspector	Follow 4M change cum abnormality handling matrix	
			2	Length Gauge Size	-----	-----	Must answer the length 215.4 + 4.0 / 0.0 mm	Must answer the length 215.4 + 4.0 / 0.0 mm	Length Gauge	Once	Every Shift	First Sample Approval & MF-WI-007	Quality inspector		
			3	Outer Diameter Bigger side	-----	-----	23.30 ± 0.20 mm	23.1-23.3	Bush gauge	100%	Every Batch	First Sample Approval	Operator		
			4	Squareness (e1)	-----	-----	6.5mm Max	6.5mm Max	Angle block/Filler gauge						
			5	Wavyness & Bend	-----	-----	Not allowed	Not Allowed	Surface plate & Bend checking gauge						
70	Stress Relieving (LTA)	Stress relieving Furnace	1	-----	Temperature	-----	-----	200°- 220° C	Temperature Indicator	Once	Once in shift	Verification @ setup	Operator MF-FR-10D		
			2	-----	Duration	-----	-----	8' Minimum	Timer						
80	Oiling	Oiling Tank	1	Oil Coverage	Oil Level / Time	-----	100% Coverage	100 % coverage	Visual	Random	Every Lot	-----	Operator Register		
			2	Oil Grade	RUSTOP 173 & 274	-----	-----	RUSTOP 173 & 274	Visual	Once	Every Lot	-----			
			3	Oil Change Frequency	-----	-----	-----	-----	Visual	Once	Every 15 days	-----			
90	Final Inspection	Measuring & Tessting Equipment	1	Product parameter	-----	-----	As per drg	As per Inspection std. QS-IP-FFFS70127	QS-WI-001	QS-WI-003	Every batch	QS-FR-006	QA Inspector (QS-FR-006)		



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100	Packing	Weighing m/c & Packing materials	1	Parts damage	-----	-----	Free from damage	Free from damage	Visual	100%	Evey batch	Final stage	Dispatch peoples		
			2	Less Qty	-----	-----	As per the invoice	As per the invoice	Visual	100%	Every batch	Final stage	Operator		
			3	Parts mix up	-----	-----	Free from other parts	Free from other parts	Visual	100%	Every batch	Final stage	Operator		
			4	Quantity	-----	-----	-----	200no's / plastisc bin	Visual	100%	Every batch	Final stage	Operator		
			5	Parts mix up	-----	-----	Free from other parts	Free from other parts	Visual	100%	Every batch	Final stage	Operator		
m/c - Machine		Inspection plan-QS-IP-FFFS70127			QS-FR-006 - Inspection flow sheet			QS-WI-001-Work instnction for Checking method			QS-WI-003- Work instnction for Sampling plan				